FUNCTIONAL TEST FORMAT AT

SYSTEM LEVEL

FOR

KAVACH (The Indian Railway ATP System)

(FRS)

SPECIFICATION No. RDSO/SPN/196/2020

Version 4.0

Issued by

SIGNAL AND TELECOM DIRECTORATE
RESEARCH, DESIGNS & STANDARDS ORGANISATION
MINISTRY OF RAILWAYS
MANAK NAGAR
LUCKNOW – 226 011

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Revision History

Amdt.	Brief description of changes made
Version-4.2, Amdt.-1 Dated 07.03.2024	• The clauses 3.28, 4.81, 4.82, 5.82, 5.83, 5.84, 6.32, 11.24, 14.22 are modified to incorporate the handling of train deregistration after reading exit tag. • New clauses are added from 14.23 to 14.30 to handle jumbling of tags, reading other route tags in communication mandatory area and non-communication mandatory area.
Version-4.3 Dated 27.03.2024	Clause No. 5.65: New Clause added. Clause No. 7.6: deleted (Repeat in cl 7.14). Clause No. 7.9: Modified as "Train Tripped, Select P_Trip" shall be displayed on DMI after standstill. Clause No. 7.13: The word ~~immediately~~ is removed. Clause No. 8.6: Modified with addition of Brake shall not be applied when Onboard is at standstill. Clause No. 10.12: Modified with addition of After recovery system should enter into previous mode. Clause No. 10.13: Case modified to only standstill. Clause No. 10.14: New clause added to not standstill condition. Clause No. 10.25 & 10.26: position report elaborated. Clause No. 10.27 & 10.28: The word absolute location should be incremented is added. Clause No. 10.29: modified with MA shall be undefined. Clause No. 10.30: The word absolute location should be decremented is added. Clause No. 10.31: The word absolute location should be incremented is added. Clause No. 11.2: ~~OV mode~~ removed. Clause No. 19.3: The word exit signal aspect as RED is added. Clause No. 19.4, 19.5, 19.6 and 19.7: New clauses added for Exit Signal aspect as Blank, Yellow, Double Yellow & Green respectively. Clause No. 22.34: Rear End Collision message shall be displayed on L-2 Onboard is added. Clause No. 22.37: New test case added to cover "signal going to RED" on detection of point failure.
Version-4.4 Dated 11.04.2024	Clause No 24- Radio communication security security by Stationary KAVACH/Onboard KAVACH
Version-4.5 Dated	Clause No. 2.14: Clause modified with addition of 'Both the Onboard are having position report'. Clause No. 2.33: The word 'without position report' is added.

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01.05.2024	Clause No. 2.39: Clause modified with addition of 'TID & Dir-U shall be displayed in DMI and absolute location, T Dist shall be blank'. Clause No. 3.35: Clause deleted. Clause No. 4.128: Clause modified. Clause No. 5.4 & 5.5: The word 'OV' is added. Clause No. 5.12, 5.13, 5.14, 5.15, 5.17 & 5.20: The word 'Keep approaching STOP signal in ON position' is added. Clause No. 6.88: The word 'current signal aspect & next signal Aspect "Undefined"' is added. Clause No. 6.95: The word 'self-tests replaced with brake test. Clause No. 12.13: The word 'SMOCIP replaced with LP-OCIP & inactive is added. Clause No. 12.14: The word 'SMOCIP replaced with LP-OCIP & active is added. Clause No. 15.6: The word 'Absolute location is on decreasing to be shown in DMI' is added. Clause No. 15.8: The word 'Reverse' replaced with 'nominal'. Clause No. 17.3: The word 'not' is added. Clause No. 17.7: The word 'not & Adjustment' is added. Clause No. 19.8: Clause modified. Clause No. 21.1, 21.2, 21.3 & 21.5: The word 'OS/FS/SH' is added. Clause No. 21.7 to 21.12: Exit tag is changed in diagram. Clause No. 21.13, 21.15, 21.16, 21.19 & 21.20: The word 'FS/OS/PTRIP/SH' is added. Clause No. 23.7 & 23.8: The word 'non is deleted & OFF condition is added. Clause No. 23.9 & 23.10: The word 'Simulate such that L2 is in communication mandatory area, override selected and OS MA is extended' is added in Input Specification and 'target distance' & 'collision margin when in the same TIN' is added in Expected Output/Values. Clause No. 23.11 & 23.12: The word 'non is deleted & OFF condition is added. Clause No. 23.13 & 23.14: The word 'Simulate such that L2 is in communication mandatory area, override selected and OS MA is extended' and 'ON Aspect' is added. Clause No. 23.15: The word 'Head ON Collision' and 'OFF Condition' is added. Clause No. 23.16: The word 'Head ON Collision' and 'OFF Condition' is added. Clause No. 23.19: The word 'rear end replaced with Head ON. Clause No. 23.21 & 23.22: Deleted.
Version-4.6 Dated 06.05.2024	Clause 5.59, 5.60, 5.61 – Test case modified for OV selected time out from 240 second to 120 second. Clause 14.1, 14.3, 14.11, 14.22- Test case modified with testing of Reader-1 and Reader-2. Clause 14.26, 14.27, 14.33 & 14.34- New test case added for missing tag.

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	Clause 14.28, 14.29, 14.30, 14.31, 14.32 modified with in line with the condition -44 of Annexure-A1. Clause 21.1, 21.2, 21.3, 21.4, 21.5, 21.6, 21.7, 21.8, 21.9, 21.10, 21.11, 21.12, 21.13, 21.14, 21.15, 21.16, 21.17, 21.18, 21.19, 21.20: Test cases modified for clarification. Clause 23.1 to 23.9: Test Cases modified with addition of 'Prompt for "Rear End Collision from station (XXXXX)" and message shall be displayed on LP-OCIP of L-2'. Clause 23.10, 23.11, 23.12, 23.13, 23.14, Test case modified with addition of "collision margin when override route known" & Prompt for "Rear End Collision from station (XXXXX)" and message shall be displayed on LP-OCIP. Clause 23.15, 23.16, 23.17, 23.18, 23.19, 23.20, test case modified with Prompt for "Head On Collision from station (XXXXX)" and message shall be displayed on LP-OCIP.
Version 4.7 Dated 27.05.2024	• Clause 2.24, 3.27, 3.37, 3.39, 3.51.4.65 modified for conformity. • Clause No. 4.58- Deleted as repeated test case. • Clause 5.4, 5.5, 5.6, 5.7, 5.8, 5.9, 5.10, 5.11, 5.20, 5.21, 5.22, 5.23, 5.24, 5.25, 5.34, 5.37, 5.42, 5.43, 5.46, 5.47, 5.48, 5.49, 5.51, 5.52, 5.53, 5.54, 5.55, 5.56, 5.57, 5.58, 5.62, 5.63, 5.67, 5.68, 5.69, 5.70, 5.85, 5.86 modified for conformity.
Version-4.8 Dated 07.06.2024	• Clause No. 2.34, 2.37, 2.38, 2.39, 3.4, 3.27, 3.29, 3.39, 3.42, 4.4, 4.5, 4.10, 4.18, 4.20, 4.72, 4.125, 6.37, 6.38, 6.39, & 13.4 are modified for conformity. • Clause No. 2.35, 3.2, 3.38, 15.9 to 15.14 and 24.4 are added as new clauses. • Clause No. 4.126, 5.88, 5.89, 5.90, 6.8, 6.33, 6.52, 6.67, 6.68, 9.93 are deleted.
Version 4.9 Dated 18.06.2024	• Clause No. 1.2, 1.4, 1.5, 1.7, 2.8, 2.14, 3.9, 3.28, 3.30, 4.18, 4.19, 4.29, 4.30, 4.31, 4.48, 4.49, 4.64, 4.73, 4.122, 4.123, 4.126, 4.134, 4.138, 6.21, 6.35, 6.37, 4.37, 4.134, 4.138, 6.21, 6.35, 7.9, 10.5, 10.27 to 10.32, 11.23, 12.10, 14.28, 14.29, 14.33, 14.34, 14.35, 21.1, 21.3, 21.5, 21.7, 21.9, 21.13, 21.15, 21.16, 21.19, 22.3, 22.4, 22.15, 22.20, 22.30 and 22.33 are modified for conformity. • Clause No. 1.33, 4.32, 4.145 to 4.152, 6.98, 10.35, 10.36, 14.30, 15.9, 15.10, 15.11, 154.12, 15.13 and 15.14.
Version-4.10 Dated 25.06.2024	• New Clause No 4.93, 4.153 to 4.157, 5.113 to 5.116, 6.98 to 6.102, 20.15, and 25.1 to 25.50 (Test cases for flickering of signals, points, Berthing Tracks, and Cab Inputs) are added. • Clause modified for conformity- 1.14, 1.23. 1.28, 1.33, 2.42, 3.20, 3.21, 3.42, 3.43, 4.48, 4.62, 4.74, 4.122, 4.144, 5.68 & 6.77. • Clause deleted 6.62.
Version-4.11 Dated 13.07.2024	• **Clause modified**: 1.23 (Train configuration disabled in shunt mode), (Handling braking during mode change-3.2), (MBT test – 4.48), (FSB symbol display – 4.59), (Signal linking in calling ON -4.71) ,), 4.94 (FS to SR modified to FS to SF), (Odometry correction -4.112), (6 seconds display – 4.149), (OSMA extension – 5.71), (No track profile in

	OS mode after PT mode and SR Authorization handling during shortest MA– 6.83), (System restart -6.90), (DMI speed display - 8.29), (Shunt mode to SR mode – 11.23), 12.4 , (Unlinked Tag handling- 14.28, 14.29, 14.31, 14.32, 14.33, 14.34), (Rear End Collision SoS-22.1, 22.3, 22.4, 22.25, 22.32, 22.34), (Head On Collision-22.17, 22.20, 22.21, 22.22, 22.23, 22.24, 22.26, 22.28, 22.30, 22.33). • **New clause added**: 2.43, 2.44, 2.45, 2.46, (Handling acknowledgement during multiple mode changes), (Handling acknowledgement during multiple mode changes -2.47, 3.55), (Handling braking during mode change- 2.48, 2.49 (Calling ON handling- 6.103), (Reduction of FSMA by collision margin – 4.158, 4.159), (Authorized Speed handling during OS to SR transitions within deregistration time out -6.104, 6.105, 6.106), (Reduction of OSMA by collision margin – 6.107, 6.108), (Tag handling in PT Mode – 8.31). • **Clause deleted**: (FS to SF mode transition – 4.104, 4.105 and 4.106), (unlinked Tag handling – 14.35) (KMS key – 24.13, 24.14, 24.15, 24.16, 24.38, 24.45, 24.53, 24.56, 24.58, 24.61, 24.63, 24.65).
Version-4.12 Dated 25.07.2024	• **Clause modified**: 4.122 (LS mode message deleted), 4.123 & 4.124 (communication time out deleted), 5.68, 6.29 & 6.30 (Authorized speed=0 added), 6.98, 6.99, 6.101 & 6.102 (modified in BP pressure values), 12.3 (RFID Reader added), 14.4 & 14.14 (SH Mode deleted), 24.37 (First key request time modified as 14 minutes and updated key time as 15 minutes). • **New clause added**: 5.117 to 5.119 (Rear end and head on collision test added for Emu/Trainset), 5.120 (Route is not ascertained in OS mode), 10.37 (Communication time out in RV mode), 11.24 (Communication time out in SH mode). • **Clause deleted**: 4.145, 4.155, 6.97, 6.100 & 15.15 in (Adjustment Tag)
Version-4.13 Dated 29.07.2024	• **Clause modified**: 2.48,2.49, 5.104, 5.119, 20.15, 22.1, 23.9, 23.10, 23.20 (SOS Handling in block sections with adjustment tags), 25.8, 25.17, 25.26 • **New clause added**: 26 (Remote Interface Unit related test cases**)** • **Deleted -** 6.97.
Version-4.14 Dated 10.08.2024	• **Clause modified**: 4.13, 4.64, 5.119 modified as ~~rear end~~ Head ON, 26.2, 26.3, 26.4, 26.5, 26.6, 26.20, 26.37, 26.38 & 26.39. • **Deleted:** 26.23, 26.24, 26.25 & 26.26.
Version-4.15 Dated 09.10.2024	• **Clause modified**: 4.62 modified for linking distance as 200 meter in place of 100 meters, clause 5.119, 8.28, 10.25,10.26, 11.23, 22.30, 26.1, 26.2, 26.20,26.33,26.34,26.35, • **Deleted- 25.8** • **New clause added in trial phase use cases:** Clause 2.50 to 2.55, 3.56, 4.64, 4.160.
Version-4.16	• **Clause modified for conformity**: 2.13, 2.16, 2.17, 2.28, 2.47, 3.23, 3.55, 4.18, 4.19, 4.25, 4.26, 4.33, 4.81, 4.92, 4.97,

Dated 11.11.2024	4.144, 10.5, 24.62, 24.64, 25.17, 25.26 • **New clause added in trial phase use cases. Clause 2.56, 2.57, 5.121, 5.122, 22.31, 24.66 & 24.67.**
Version-4.17 Dated 18.11.2024	• **Clause modified for conformity**: 1.26, 2.24 & 2.25 (Both cabs deleted), 24.10 to 24.12 (Stationary word replaced with Onboard), 24.48 to 24.49 (LS/FS replaced with OS). • **New clause added in trial phase use cases.** Clause 4.161 (tag read during Roll back), 4.162 (REC during LC gate operation), 4.163 (HOC during LC gate operation), 4.164 (Verify Speed limit when Onboard received OSMA), 4.165 (OSMA correction when calling on signal is taken off), 5.123 (SR authorization after read border tag), 15.16 (Adjustment tag related), 22.32 (ACK during REC SoS), 22.33 (ACK during HOC SoS), 22.34 (Received REC SoS when braking distance is less than target distance). • **Clause Deleted:** 1.25
Version-4.18 Dated 28.11.2024	• **Clause modified for conformity:** 1.4, 1.25, 2.8, 2.42, 2.43, 4.15, 4,20, 4.21,4.22, 4.23, 4.28, 4.32, 4.101, 4.102, 4.122, 4.123, 4.124, 4.130, 4.153, 4,154, 4.156, 4.162, 5.22, 5.23, ,5,24, 5.25, 5.65, 5.84, 5.85, 5.104, 5.106, 5.110, 6.51, 6.35, 6.52, 6.70, 6.88, 6.92, 6.93, 6.98, 6.99, 6.101, 6.102, 8.16, 8.17, 8.18, 8.19, 8.27, 8.28, 12.11, 12.12, 12.13, 12.14, 12.15, 12.16, 14.17, 14.19, 15.12, 15.14, 19.1, 19.23, 20.14, 21.1, 21.3, 22.2, 22.4, 22.12, 22.13, 22.14, 22.15, 22.16, 22.17, 22.18, 22.19, 22.20, 22.21, 22.22, 22.23, 22.24, 22.26, 23.4, 23.5, 23.7, 23.10, 23.14, 23.15, 23.16, 23.17, 23.18, 23.19, 23.20, 23.21, 23.22, 24.27, 24.43, 24.44, 24.45, 25.6, 25.14, 25.15, 25.16, 25.23, 25.24, 25.25, 25.30, 25.31, 25.32, 25.37, 25.38 and 25.39. • **New clause added**- 23.24 and 23.24 as use cases.
Version-4.19 Dated 23.12.2024	• **Clause modified for conformity** 4.122, 4.123, 4.124, 4.162, 4.163, 10.35, 12.16, 21.3, 21.4, 21.5, 21.10, 21.12, 21.14, 21.16, 21.17, 21.19, 24.50 & 24.59.
Version-4.20 Dated 10.02.2025	• **Clause modified for conformity** 1.4, 1.7, 1.9, 1.18, 2.6, 2.9, 2.11, 2.53, 2.54, 3.3, 3.16, 3.27, 3.28, 3.29, 3.36, 3.51, 4.9, 4.12, 4.14, 4.15, 4.19, 4.36, 4.38, 4.43, 4.44, 4.45, 4.46, 4.57, 4.67, 4.68, 4.69, 4.70, 4.76, 4.82 to 4.87, 4.90, 4.92 to 4.107, 4.113, 4.118, 4.121, 4.128, 4.133, 4.134, 4.156, 4.158, 5.23, 5.26 to 5.37, 5.41, 22.2, 22.31. • **Clause Deleted as duplicated**: 25.12 & 25.21. • **New Clause Added as use cases**: 2.8, 3.40, 4.112, 4.155, 4.157, 4.164 to 4.174, 17.13, 20.16.
Version-4.21 Dated: 04.04.2025	• **Clause modified for conformity:** 1.14, 3.21, 4.83, 4.84, 4.85, 4.86, 5.42, 5.43, 5.54, 5.55, 5.56, 5.58, 5.59, 5.82, 5.83, 5.84, 5.86, 5.87, 5.88, 5.94, 5.95, 6.9, 6.24, 6.25, 6.26, 6.27, 6.29, 6.35, 6.36, 6.39, 6.40, 6.46, 6.60, 6.61, 6.62, 6.63, 6.64, 6.65. 6.70, 6.71, 6.72, 6.73, 6.74, 6.75, 6.76, 6.77, 6.82, 6.86, 6.88, 6.92, 6.94, 6.102, 6.105. 6.106, 7.11, 7.14, 7.15, 7.16, 7.17, 8.1, 8.3, 8.12, 8.20, 8.21, 8.22, 8.23, 8.29, 9.9, 9.10, 9.12, 10.6, 10.7, 10.8, 10.9, 10.22, 10.27 to 10.32, 11.8, 12.10 to 12.14, 13.5, 14.22 & 14.32.

	• **Clause Deleted**: 6.24 & 8.24. • **New Clause Added as use cases**: 5.46, 5.125, 6.5, 6.7, 6.11, 6.13, 6.16, 6.18, 6.81, 6.83, 7.2, 7.3, 7.5, 7.6, 7.7, 7.20, 7.28, 7.29, 7.30, 7.31, 9.15, 14.33.

Test Definitions

#	Sys Testing Test Case ID	Test Case	Description
1.	KAVACH_FRS_01	Standby Mode	This Test cases check for all functionalities that are possible in SB mode and Mode Transitions from SB mode to other modes.
2.	KAVACH_FRS_02	Staff Responsible Mode	This Test cases check for all functionalities that are possible in SR and Mode Transitions from concerned mode to other modes.
3.	KAVACH_FRS_03	Limited Supervision Mode	This Test cases check for all functionalities that are possible in Limited supervision mode and Mode Transitions from concerned mode to other modes.
4.	KAVACH_FRS_04	Full Supervision Mode	This Test cases check for all functionalities that are possible in Full Supervision Mode and mode Transitions from concerned mode to other modes.
5.	KAVACH_FRS_05	Override	This Test cases check for all functionalities that are possible in Override and Mode Transitions from concerned mode to other modes.
6.	KAVACH_FRS_06	On Sight Mode	This Test cases check for all functionalities that are possible in Onsight mode and Mode Transitions from concerned mode to other modes.
7.	KAVACH_FRS_07	Trip Mode	This Test cases check for all functionalities that are possible in Trip mode and Mode Transitions from concerned mode to other modes.
8.	KAVACH_FRS_08	Post Trip Mode	This Test cases check for all functionalities that are possible in Post trip mode and Mode Transitions from concerned mode to other modes.
9.	KAVACH_FRS_09	Non Leading Mode	This Test cases check for all functionalities that are possible in non-leading mode and Mode Transitions from concerned mode to other modes.
10.	KAVACH_FRS_10	Reverse Mode	This Test cases check for all functionalities that are possible in Reverse mode and Mode Transitions from concerned mode to other modes.
11.	KAVACH_FRS_11	Shunt Mode	This Test cases check for all functionalities that are possible in shunt mode and Mode Transitions from concerned mode to other modes.
12.	KAVACH_FRS_12	System Failure Mode	This Test cases check for all functionalities that are possible in System failure mode and Mode Transitions from concerned mode to other modes.
13.	KAVACH_FRS_13	Isolation Mode	This Test cases check for all functionalities that are possible in Isolation Mode and Mode Transitions from concerned mode to other modes.
14.	KAVACH _FRS_14	RFID Tag Missing	This test case checks to verify that Onboard KAVACH send TAG LINK INFO

Test Definitions			
#	**Sys Testing Test Case ID**	**Test Case**	**Description**
			based on the RFID tag missed.
15.	KAVACH _FRS_15	ABS_LOC_RESET Adjustment Tag Read	Testing for ABS_LOC_RESET by Onboard KAVACH when radio communication is available. Adjustment details incorporated tag is read.
16.	KAVACH _FRS_16	ABS_LOC_RESET Adjustment Tag missing	Testing for ABS_LOC_RESET by Onboard KAVACH when radio communication is available and adjustment details incorporated tag is missing.
17.	KAVACH _FRS_17	ABS_LOC_RESET Adjustment Tag missing No Communication	Testing for ABS_LOC_RESET by Onboard KAVACH when radio communication is not available. (No Transmission of packets from Stationary KAVACH). Adjustment details incorporated tag is available.
18.	KAVACH _FRS_18	Direction Determination test based on Tag read	This test case checks for direction determination by Tag read by RFID reader-1 and RFID reader-2 for various combination.
19.	KAVACH_FRS_19	Handing of Onboard KAVACH during Start of mission	This test case to check that stationary KAVACH and Onboard KAVACH handling of MA, Track profile during start of mission.
20.	KAVACH _FRS_20	Border Tag handling	This test case to check that stationary KAVACH and Onboard KAVACH handling of Border tag.
21.	KAVACH_FRS_21	Exit Tag Handling	This test case to check that stationary KAVACH and Onboard KAVACH handling of Exit tag.
22.	KAVACH_FRS_22	SOS Handling	This test case checks for SOS and MA handling by Stationary KAVACH
23.	KAVACH_FRS_23	SOS Handling in block sections with adjustment tags	This test case checks for SOS and MA handling by Stationary KAVACH/Onboard KAVACH in block section.
24.	KAVACH_SYS_24	Radio Communication Security	This test case checks for Radio communication security by Stationary KAVACH/Onboard KAVACH.
25.	KAVACH_SYS_25	Flickering of signals, points, Berthing Tracks, and Cab Inputs	Test cases for flickering of signals, points, Berthing Tracks, and Cab Inputs
26.	KAVACH_FRS_26	Remote Interface Unit related test cases	Test case related to Remote Interface Unit.

S. No	Date	Stationary KAVACH Executive software CRC	Onboard KAVACH Executive software CRC	Remarks

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S. No	Date	Stationary KAVACH Executive software CRC	Onboard KAVACH Executive software CRC	Remarks

Note: Any change in the Executive software CRC shall be recorded in above table with remarks.

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Test ID	Test Scenario	Input Specification	Expected Output/Values	Observed Output (Pass/Fail)
1.	**KAVACH_FRS_01: Standby Mode (SB Mode)-This Test cases check for all functionalities that are possible in SB mode and Mode Transitions from SB mode to other modes.**			
1.1.	Check for SB Mode Entry of Onboard when Onboard KAVACH is Powered On and is healthy without any fault and No CAB is active. (**FRS-4.1, 4.2**)	1. Power on the Onboard KAVACH. 2. KAVACH should be healthy. 3. No CAB should be Active.	1. The Onboard KAVACH should enter SB Mode. 2. Check for SB mode Indication on DMI.	
1.2.	Check for Standstill protection. **(FRS 4.5)**	1. Power on the Onboard KAVACH. 2. KAVACH should be healthy. 3. Any one CAB should be Active. 4. Try to Move Onboard.	1. Brakes should get applied and Onboard KAVACH should not allow train Movement. 2. Message shall be displayed in DMI as "**Standstill Protection, Brake Applied".**	
1.3.	Check for brake test performed in SB mode when no CAB is active.	1. Power on the Onboard KAVACH. 2. KAVACH should be healthy. 3. No CAB should be Active.	1. No Brake Test should get performed. 2. Check for Test status message on DMI.	
1.4.	Check for brake test performed in SB mode when CAB is active. **(FRS 19.2,4.3(a)**	1. Power on the Onboard KAVACH. 2. KAVACH should be healthy. 3. Any one CAB should be Active. 4. Onboard is in standstill (No brake application required).	1. After power on the Onboard KAVACH, message "System Self-Test in progress" shall be display in DMI. 2. After completion of self-test, message "System Self-Test Success" shall be display in DMI. 3. Brake Test should get performed and message "Brakes Testing Success".	

Test ID	Test Scenario	Input Specification	Expected Output/Values	Observed Output (Pass/Fail)
			4. After that, message "Select Train Config, Press CONFIG Button" shall be display in DMI. 5. Check for Test status on DMI. 6. After that, message "Select Staff Responsible or Shunt Mode" shall be display in DMI. 7. Not require any action on the part of Loco pilot. 8. All vital equipment shall be working normal.	
			9. Should display context message "Brakes Test – Waiting for MR xxxx (8kg/cm^2) ".	
			10. Should display context message "Brakes Test – Waiting for BP xxxx (5kg/cm^2)".	
			11. Should display context message "Brakes Test – NSB Applied, BP – approx. 4.2 kg/cm2" (Where applicable). Check for buzzer working during application of brakes.	
			12. Should display context message "Brakes Test – FSB Applied, BP – 3.6kg/cm2". Check for buzzer working during application of brakes.	

Test ID	Test Scenario	Input Specification	Expected Output/Values	Observed Output (Pass/Fail)
			13. Should display context message "Brakes Test – EB Applied, BP – 0kg/cm2". Check for buzzer working during application of brakes.	
			14. Should display context message Brake Test-LEB, BC-1.5 kg.cm2. Check for buzzer working during application of brakes.	
			15. Should display context message "Waiting for Traction Command".	
			16. Should display context message "Brakes Testing Success".	
1.5.	Check for brake test performed in SB mode when Brake Test gets Failed due to EB valve fail.	1. Power on the Onboard KAVACH. 2. KAVACH should be healthy. 3. CAB should be Active. 4. Brake system health test should Fail by opening the EB valve. 5. Check for mode Transition of Onboard KAVACH.	1. Onboard KAVACH should retain in SB Mode. 2. Message "Brake Test Fail (NSB, FSB, EB)" shall be display in DMI. 3. Message should display on DMI as "Brake Testing Fail, Press ACK for Retesting".	
			4. After acknowledgement brakes shall be re-tested.	
1.6.	Check for display of train speed and permitted speed on	1. Power on the Onboard KAVACH.	1. The train speed shall be displayed as Zero.	

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Test ID	Test Scenario	Input Specification	Expected Output/Values	Observed Output (Pass/Fail)
	DMI. **(FRS 4.7)**	2. KAVACH should be healthy. 3. CAB should be Active. 4. Brake system health Test should be success.	2. The permitted speed shall be displayed as Zero.	
1.7.	Check for Mode transition suggested by Onboard KAVACH when Brake Test is success and cab is Active after configuration. **(FRS 4.8 (a))**	1. Power on the Onboard KAVACH. 2. KAVACH should be healthy. 3. CAB should be Active. 4. Brake system health Test should be success. 5. Select train configuration. 6. Check for mode of Onboard KAVACH.	1. ONBOARD KAVACH Mode should be SB only. 2. Message "Brake Testing Success" shall be displayed on DMI. 3. Subsequently 'Select Staff Responsible or Shunt Mode' message shall be displayed on DMI.	
1.8.	Check for Mode transition of Onboard KAVACH when Brake Test gets Failed due to EB valve fail.	1. Power on the Onboard KAVACH. 2. KAVACH should be healthy. 3. CAB should be Active. 4. Brake system health test should Fail by opening the EB valve. 5. Check for mode Transition of Onboard KAVACH.	1. Onboard KAVACH should retain in SB Mode.	
			2. Check for Mode on DMI Display.	
			3. By pressing SR & CNFM button, check that it shall not be selected.	
			4. By pressing shunt & CNFM button, check that it shall not be selected.	
1.9.	Check for brake test behavior, when KAVACH is isolated in SB mode and CAB is active. **(FRS 4.3 (c) and FRS 4.8 (d))**	1. Power on the Onboard KAVACH. 2. KAVACH should be healthy. 3. KAVACH shall be isolated manually. 4. Any one CAB should be Active.	1. Brake Test should not get performed. 2. KAVACH shall transit to IS mode. 3. Check for Test status on DMI. 4. Isolation counter shall be	

Test ID	Test Scenario	Input Specification	Expected Output/Values	Observed Output (Pass/Fail)
		5. Onboard is in standstill.	incremented.	
1.10.	Check for brake test performed in SB mode when KAVACH is brought back from Isolation mode and CAB is active. **(FRS 4.3 (c) and 4.8 (d))**	1. Isolation Switch to be made normal. 2. Onboard is in standstill. 3. Non-Leading input is not Active. 4. Any one CAB should be Active. 5. KAVACH should perform all the brake tests. 6. Train configuration to be selected.	1. KAVACH shall transit to SB mode. 2. Brake Test should get performed. 3. Train configuration shall be enabled only if brake tests are successful. (FRS 20.1 (b)) 4. Check for Test status on DMI.	
1.11.	Check for Mode transition from SB to SR when SR is selected on DMI (Power on) when no CAB is active.	1. Power on the Onboard KAVACH. 2. KAVACH should be healthy. 3. CAB should be Active. 4. Brake system health test should be success. 5. Current mode is SB. 6. Select train configuration and CAB shall be made inactive. 7. No Mode selected and Onboard KAVACH is still in SB mode. 8. Select SR mode.	1. Onboard KAVACH should not get changed to SR mode. 2. Check for Onboard KAVACH on DMI.	
1.12.	Check for Mode transition from SB to SH when SH is selected on DMI (Power on).	1. Power on the Onboard KAVACH. 2. KAVACH should be healthy. 3. CAB should be Active. 4. Brake system health test should be success. 5. Current mode is SB and	1. Onboard KAVACH should get changed to SH mode. 2. Check for Onboard KAVACH on DMI.	

Test ID	Test Scenario	Input Specification	Expected Output/Values	Observed Output (Pass/Fail)	
		Onboard is at standstill. 6. No Mode selected and Onboard is still in SB mode. 7. Select train configuration. 8. Select SH mode.			
1.13.	Check for train configuration entry when Onboard KAVACH enters SB mode from Shunt mode. **(FRS 20.1 (b))**	1. Onboard KAVACH shall be healthy and in shunt mode. 2. Non-Leading input is made in active. 3. Train is at stand still. 4. Any cab input active. 5. Press **Shunt** and **CNFM** buttons to enter into SB mode. 6. Onboard KAVACH enters into SB mode. 7. KAVACH should perform all the brake tests. 8. Train configuration to be selected after successful brake test.	Train configuration entry shall be prompted.		
1.14.	Check for Mode transition automatically, from SR/ LS/ FS/ FS+OV/ OS+OV/ OS / Post Trip/ PT+OV/ Reverse/ Shunt to SB mode when no cab is occupied. **(FRS 4.3 (b) & FRS 4.6).**	1. When Onboard is in one of the specified modes in test scenario (SR/ LS/ FS/ FS+OV/ OS/ OS+OV/ Post Trip/ PT+OV/ Reverse/ Shunt mode. 2. Make the CAB inactive. 3. Train is at stand still.	1. Onboard KAVACH should transit to SB mode. Radio transmission shall be active (FRS 4.6). 2. When Cab is made active, the Onboard shall transit to previous selected mode. 3. Check for Onboard KAVACH on DMI.	SR LS FS FS+OV OS OS+OV PTRIP PT+OV REV	

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Test ID	Test Scenario	Input Specification	Expected Output/Values	Observed Output (Pass/Fail)	
				SH	
1.15.	Check for Mode transition automatically from SB to SR/ LS/ FS/ FS+OV/ OS+OV/ Onsight/ post trip/ PT+OV /Reverse/ Shunt when Onboard enters SB from SR/ LS/ FS/ FS+OV/ OS+OV/ OS / Post Trip/ PT+OV/ Reverse/ Shunt, Train formation is not changed and CAB is made active again & train is at standstill. **(FRS 4.3 (b))**	1. When Onboard is in one of the specified modes in test scenario (SR/ LS/ FS/ /FS+OV/ OS / OS+OV/ Post Trip/ PT+OV/ Reverse/ Shunt mode) change it to SB mode by making CAB Inactive. 2. Don't change the train formation. 3. Train is at standstill. 4. Make the same CAB active.	1. It should automatically change from SB to previous mode when the same cab is made Active. 2. Previous mode which is before CAB inactive, the same mode should be continue. 3. Check for Onboard KAVACH on DMI.	SR	
				LS	
				FS	
				FS+OV	
				OS	
				OS+OV	
				PTRIP	
				PT+OV	
				REV	
				SH	
1.16.	Check for Mode transition automatically from SR/LS/FS/ FS+OV/ OS+OV/ PT+OV/OS/ Post Trip/Reverse/ Shunt to SB when EM cock is closed & train is at standstill. **(FRS 4.3(b))**	1. Ensure that Onboard is in one of the specified modes in test scenario (SR/LS/FS/ FS+OV/ OS/ OS+OV/ Post Trip/ PT+OV/ Reverse/ shunt mode. 2. Close the EM cock. 3. Make the CAB1 active and other cab inactive. 4. Onboard is at stand still.	1. Onboard KAVACH should transit to SB mode when EM cock is closed. 2. Check for Onboard KAVACH on DMI.	SR	
				LS	
				FS	
				FS+OV	
				OS	
				OS+OV	
				PTRIP	
				PT+OV	
				REV	
				SH	
1.17.	Check for Mode transition automatically from SR/LS/FS/ FS+OV/ OS+OV/ PT+OV/OS/ Post Trip/Reverse/ Shunt to SB when EM cock is closed & train is at standstill.	1. Ensure that Onboard is in one of the specified modes in test scenario (SR/LS/FS/ FS+OV/ OS/ OS+OV/ Post Trip/ PT+OV/ Reverse/ shunt mode. 2. Close the EM cock.	1. Onboard KAVACH should transit to SB mode when EM cock is closed. 2. Check for Onboard KAVACH on DMI.	SR	

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Test ID	Test Scenario	Input Specification	Expected Output/Values	Observed Output (Pass/Fail)	
	(FRS 4.3(b))	3. Make both the CAB (CAB1 & CAB2) active. 4. Onboard is at stand still.			
1.18.	Check for Mode transition automatically from SR/ LS/ FS/ FS+OV/ OS/ OS+OV/ Reverse/ shunt mode to SB when EM cock is closed & Onboard is in movement. **(FRS 4.3(b))**	1. Ensure that Onboard is in one of the specified modes in test scenario (SR/ LS/ FS/ FS+OV/ OS/ OS+OV/ Reverse/ Shunt mode. 2. Close the EM cock. 3. Make the CAB active. 4. Onboard is in movement.	1. Onboard KAVACH should transit to SB mode after braking and speed is zero (when EM cock is closed). 2. Check for Onboard KAVACH on DMI.		
1.19.	Check for Mode transition automatically from SB to previous mode when EM cock is closed and opened & train is at standstill. **(FRS 4.3 (b))**	1. Ensure that Onboard is in one of the specified modes in test scenario (SR/ LS/ FS/ FS+OV/ OS/ OS+OV/ Post Trip/PT+OV/Reverse/ Shunt mode. 2. Close the EM cock. 3. Make the CAB active. 4. Onboard is at stand still. 5. Onboard enters SB mode. 6. Open the EM cock.	1. Onboard KAVACH should transit to previous mode when EM cock is open. 2. Check for Onboard KAVACH on DMI.	FS FS+OV OS OS+OV PTRIP PT+OV REV SH REV SH	
1.20.	Check for no Mode transition from SB when train configuration is changed during standstill. **(FRS 22.1)**	1. Ensure that Onboard is in SB. 2. Onboard is at stand still. 3. Make the CAB active. 4. Change the train configuration.	1. Onboard KAVACH should remain in SB mode. 2. Prompt for selection of SR/Shunt mode.		
1.21.	Check for Mode transition automatically from SB to	1. When Onboard is in shunting mode	1. Onboard KAVACH should get changed to shunting mode		

Test ID	Test Scenario	Input Specification	Expected Output/Values	Observed Output (Pass/Fail)
	shunting mode, when Onboard enters SB from shunting mode. Train formation does not gets changed and configuration is available. Train is stand still. (Same Cab)	2. Change it to SB mode making CAB Inactive. 3. Make same CAB active. 4. No Change in the train formation. 5. Onboard is standstill.	automatically. 2. Check for Onboard KAVACH on DMI. 3. Brake test should not be carried out.	
1.22.	Check for Mode transition automatically from SB to shunting mode, when Onboard enters SB from shunting mode and train formation does not gets changed and configuration is available. Train is stand still. (Other Cab)	1. When Onboard is in shunting mode and change it to SB mode making CAB Inactive. 2. Make other CAB active. 3. No Change the train formation.	1. Onboard KAVACH should get changed to shunting mode automatically. 2. Check for Onboard KAVACH on DMI. 3. Brake test should not be carried out.	
1.23.	Check for Mode transition automatically from SB to shunting mode, when Onboard enters SB from shunting mode and train formation gets changed and configuration is available. Train is stand still. (Same Cab)	1. When Onboard is in shunting mode. 2. Change it to SB mode making CAB Inactive. 3. Make same CAB active. 4. Change the train formation and press configuration for selecting new configuration.	1. Onboard KAVACH should get changed to shunt mode automatically. 2. Check for Onboard KAVACH DMI. 3. Brake test should be carried out.	
1.24.	Check for Mode transition automatically from SB to shunting mode, when Onboard enters SB from shunting mode and train formation gets changed and configuration is available. Train is stand still.	1. When Onboard is in shunting mode and change it to SB mode making CAB Inactive. 2. Make other CAB active. 3. Change the train formation and press configuration for selecting new configuration.	It shall not possible to perform the train configuration while in shunt mode.	

Test ID	Test Scenario	Input Specification	Expected Output/Values	Observed Output (Pass/Fail)
	(Other Cab)			
1.25.	Check for mode transition automatically from Shunt mode to SB mode when SHUNT & CNFM button are pressed.	1. Onboard KAVACH shall be in shunt mode. 2. Press the SHUNT and CNFM buttons.	Onboard KAVACH shall transit to SB mode.	
1.26.	Check for mode transition from SB mode to Non Leading mode when Non Leading input is present in active cab 2 and train is at standstill (**FRS 4.8 (c)**).	1. Onboard is in SB mode and Train is at standstill. 2. Make Non Leading input is Active in active cab-2.	Onboard KAVACH shall transit to Non Leading mode.	
1.27.	Check for train configuration entry when Onboard KAVACH enters SB mode from Non Leading mode. **(FRS 4.3 (c), 20.1 (b))**	1. Non Leading input is made inactive in both CABs. 2. Train is at stand still. 3. Any cab input active. 4. Onboard enters into SB mode. 5. Train configuration to be selected. 6. KAVACH should perform all the brake tests.	Train configuration entry shall be prompted.	
1.28.	Check for mode transition from Reverse mode to SB mode when train is at standstill. **(FRS 4.3 (c))**	1. Onboard is in Reverse mode and Train is at standstill. 2. Move the reverser in forward direction.	Onboard KAVACH shall transit to SB mode.	
1.29.	Check for mode transition from SB to System failure when critical fault occurs in system. **(FRS 4.3 (c), 4.8 (e), 20.1 (b))**	1. When Onboard is in SB mode. 2. Simulate a critical fault by removing the vital card such as communication of both RFID reader or Cab input card, both radios fail etc.	1. Onboard KAVACH should get changed to System failure mode. 2. Check for Onboard KAVACH on DMI.	

Test ID	Test Scenario	Input Specification	Expected Output/Values	Observed Output (Pass/Fail)
1.30.	Check for train configuration entry when Onboard KAVACH enters SB mode from System Failure mode. **(FRS 4.3 (c), 4.8 (e), 20.1 (b))**	1. Onboard KAVACH shall be healthy. 2. Non Leading input is made inactive. 3. Train is at stand still. 4. Any cab input active. 5. Onboard enters into SB mode. 6. KAVACH should perform all the brake tests. 7. Train configuration to be selected.	Train configuration entry shall be prompted.	
1.31.	Check for DMI access from the CAB which is inactive and in Standby Mode. (**FRS Cl.4.4)**	1. When Onboard is in SB Mode Make CAB in active. 2. Try to select a Mode on DMI (inactive) after Boot-up sequence is completed. 3. Try to enter configuration details.	No interaction should be possible from the corresponding CAB DMI.	
1.32.	While in SB mode, after changing the train configuration check the available mode selection options.	1. Ensure Onboard KAVACH is in SB mode. 2. Change the train formation and provide configuration from the active Cab.	1. Onboard should be in SB Mode. 2. After successful brake test, prompt shall be displayed to select SR or shunt mode.	
1.33.	Check for display of message in SB mode when no cab is active	1. Power on the Onboard KAVACH. 2. KAVACH should be healthy. 3. Ensure Onboard KAVACH is in SB mode. 4. Make the both the cab inactive.	Check in DMI that message “Stand By mode- CAB input is not Active”.	

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System Level Test Cases (RDSO)				
Test ID	**Test Scenario**	**Input Specification**	**Expected Output/Values**	**Observed Output (Pass/Fail)**
2.	**KAVACH_FRS_02: Staff Responsible Mode- To check the system performance in SR mode when KAVACH is not isolated**			
2.1.	To check the SR mode entry through manual selection when all conditions for SR mode entry are satisfied. **(FRS 5.1) & Cl.21**	1. Power on the system. 2. Make sure that no faults are present and cab is active. 3. Train configuration is available. 4. Select the train configuration & train is in standstill. 5. Press SR and CNFM buttons on DMI.	1. System should enter into SR mode and it should be verified on DMI screen. 2. Default Train length & DC shall be displayed on DMI.	
2.2.	To check the SR mode entry through manual selection when train configuration is not available. **(FRS 5.1) & Cl.21**	1. Power on the system. 2. Make sure that no faults are present. 3. Train configuration is not available 4. Make sure that train is in standstill condition. 5. Press SR and CNFM buttons on DMI.	System should not enter into SR mode and should be in SB mode. To be verified on DMI screen.	
2.3.	To check the SR mode entry through manual selection when train is not in standstill. **(FRS 5.1)**	1. Power on the system. 2. Make sure that no faults are present. 3. Select the train configuration. 4. Simulate loco in OS/FS mode. 5. Train is not in standstill. 6. Press SR and CNFM buttons on DMI.	System should not enter into SR mode and it should be verified on DMI screen.	
2.4.	Check for mode transition from SR to SB mode when CAB is changed in case of dual CAB or driving position is changed in case of single cab. **(FRS 21.1 (d) and (e))**	1. Keep the Onboard in SR mode. 2. Change the CAB.	1. Onboard KAVACH shall transit to SB mode. 2. Check for mode on DMI.	

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System Level Test Cases (RDSO)					
Test ID	**Test Scenario**	**Input Specification**	**Expected Output/Values**	**Observed Output (Pass/Fail)**	
2.5.	Check for Ceiling Speed: Maximum permissible speed for Onboard KAVACH or train in SR mode. (**FRS 5.4 (a)) & FRS 5.8**	1. Power on the system. 2. Make sure that no faults are present and select the train configuration. 3. Make sure that Onboard KAVACH is in SR mode. 4. Now keep the train in running with the speed up to the configured value.	1. Train has to run with the speed without any brake application. 2. The permitted speed limit on DMI should be the lower of Light Engine/ train maximum speed i.e., ceiling speed. 3. The permitted speed and train speed shall be displayed.		
2.6.	To check the Maximum Restricted Speed Profile in SR mode when the train speed is more than the ceiling speed. **(FRS 5.4 (a))**	1. Power on the system. 2. Make sure that no faults are present. 3. Make sure that train is in SR mode. 4. Now keep the train in running with the speed more than the configured value. 5. Configure the Onboard/ Train speed limit as 100KMPH and train speed as 100 KMPH.	1. The warning should display at 102KMPH to 105KMPH along with buzzer.	102<S<105 KMPH **Warning**	
			2. NB should apply after 105-108KMPH along with warning display and buzzer.	105<S<108 KMPH **NB**	
			3. FSB should apply after 108-112 KMPH along with warning display and buzzer.	108<S<110 KMPH **FSB**	
			4. EB should apply after >110 KMPH along with warning display and buzzer.	>110 KMPH EB	

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System Level Test Cases (RDSO)					
Test ID	**Test Scenario**	**Input Specification**	**Expected Output/Values**	**Observed Output (Pass/Fail)**	
2.7.	To check the Maximum Restricted Speed Profile in SR mode when IRAB BIU communication is failed. **(FRS 5.4 (a))**	1. Power on the system. 2. Make sure that no faults are present, Select the train Configuration. 3. Make sure that train is in SR mode 4. Note down the configured speed limit of SR mode. 5. Now keep the train in running with the speed more than the configured value. 6. Simulate BIU communication is failed.	KAVACH should enter into SF Mode.		
2.8.	To check the LC gate operation in SR mode.	1. Make sure that no faults are present. 2. Make sure that train is in SR mode. 3. Simulate the condition such that the LC gate tag is received.	1. A message should be display on DMI as "**Unmanned LC gate XXXX in YYYY m**, auto whistling should be ON, in data log /DMI LC gate tag data (gate class, gate ID) need to be verified. 2. Auto whistling should be ON until the Loco Pilot gives ACK or LC gate crossed since MA is not available in SR mode.	Auto Whistling	
				Message on DMI for unmanned gate	
				Gate Id in log/DMI	
2.9.	To check the LC gate operation in SR mode.	1. Make sure that no faults are present. 2. Make sure that train is in SR mode. 3. Simulate the condition such that the LC gate tag is received.	1. A message should be display on DMI as "**Manned LC gate XXXX in YYYY m**, auto	Auto Whistling	
				Message on DMI for manned gate	

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System Level Test Cases (RDSO)					
Test ID	**Test Scenario**	**Input Specification**	**Expected Output/Values**	**Observed Output (Pass/Fail)**	
			whistling should be ON, in data log /DMI LC gate tag data (gate class, gate ID) need to be verified. 2. Auto whistling should be ON until the Loco Pilot gives ACK or LC gate crossed since MA is not available in SR mode.	Gate Id in log/DMI	
2.10.	To check the manual SOS operation in Onboard KAVACH when it is in SR mode in block section. **FRS 5.4 (c)**	1. Make sure that no faults are present. 2. Make sure that train is in SR mode through manual selection after booting. 3. Make sure that TIN, direction and absolute location are known to Onboard KAVACH. 4. Now give the manual SOS (by activating the COMMON and SOS simultaneously) in block section. 5. Also check the SOS status in other Onboard which is in 3000m from the SOS generated Onboard KAVACH. 6. Keep the Onboard with speed more than 30kmph.	1. The SOS should generate and it can be checked on DMI. 2. Source Loco should apply brakes to bring the train to standstill. 3. If there is any other Onboard within 3km and approaching towards the location of SoS (originating source) then the Onboard has to receive the SOS and brakes should apply to bring the train to stand still.	Same Direction (No SOS shall be received ahead Onboard), self-loco should stop.	
				Same Direction (SOS shall be received in rear Onboard), self-loco should stop.	
				Opposite Direction (SoS shall be received	

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System Level Test Cases (RDSO)					
Test ID	**Test Scenario**	**Input Specification**	**Expected Output/Values**	**Observed Output (Pass/Fail)**	
				in the approaching Onboard)	
2.11.	To check the manual SOS operation in Onboard KAVACH when it is in SR mode in station Section. **FRS 5.4 (c)**	1. Power on the system. 2. Make sure that no faults are present. 3. Make sure that train is in SR mode. 4. Now simulate the condition such that two Onboard are within station region within 3km region and Manual SOS is generated from one Onboard KAVACH.	1. The SOS should generate and it can be checked on DMI. Brakes should apply. 2. The other Onboard within 3km has to receive the SOS and brakes should apply, if it is approaching the Concerned SOS generating Onboard.	Same Direction (No SOS shall be received ahead Onboard), self-loco should stop.	
				Same Direction (SOS shall be received in rear Onboard), self-loco should stop.	
				Opposite Direction (Both Onboard shall apply the brake)	
2.12.	To check the manual SOS operation in Stationary KAVACH when it is in SR mode in station Section and radio communication is active.	1. Power on the system. 2. Make sure that no faults are present. 3. Make sure that train is in SR mode. 4. Now simulate the condition such that two Onboard KAVACH unit are	The SOS should generate and it can be checked on DMI. Brakes should apply within 3 km.	Brakes shall be applied in all Onboard.	

System Level Test Cases (RDSO)				
Test ID	**Test Scenario**	**Input Specification**	**Expected Output/Values**	**Observed Output (Pass/Fail)**
	FRS 5.4 (c)	within station region within 3km region and Manual SOS is generated from the station.		
2.13.	To check the reverse movement operation in SR mode.	1. Power on the system. 2. Make sure that no faults are present, Select the train configuration. 3. Make sure that train is in SR mode. 4. Note down the configured speed limit of SR mode. 5. Move Onboard in Reverse Direction.	Brakes should be applied and Onboard should not move in reverse direction.	
2.14.	To check the rollback condition in SR mode. **(FRS 31.3)**	1. Power on the system. 2. Make sure that no faults are present. 3. Select the train Configuration. 4. Make sure that train is in SR mode. 5. Note down the configured speed limit of SR mode. 6. Now simulate the condition such that the Onboard is in rollback, by making the input rollback too high in simulator.	1. Brakes should be applied after detecting the rollback. 2. Brake shall not be released till acknowledged by loco pilot.	
2.15.	To check the unusual block stoppage SOS is received in SR mode. **(FRS 31.2)**	1. Power on the system. 2. Both the Onboard are having position report. 3. Make sure that no faults are present and note down the configured speed limit of SR mode. 4. Make sure that Onboard1 is in SR mode.	1. Message **"Ack Block Stop, SoS Generates in XX s**" should be generated in the originating Onboard.	Onboard 2
			2. If LP acknowledges train stop, the above message shall get stopped.	Onboard 2
			3. If MA in Onboard 2 is	Onboard 2

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System Level Test Cases (RDSO)					
Test ID	**Test Scenario**	**Input Specification**	**Expected Output/Values**	**Observed Output (Pass/Fail)**	
		5. Now simulate the condition such that the SOS is received from Onboard2 which is stopped in block section (other Onboard is in OS or FS mode with MA>300mts), both Onboard1 and Onboard2 are in same/ opposite direction on different track.	shortened to less than 300m, the SoS should get cancelled.		
			4. After 7 seconds (configurable), Onboard 1 shall receive the message "SoS – From Onboard xxxxxx stopped in Block Section".	Onboard1	
			5. If LP acknowledges train stop, the above message shall get stopped.	Onboard 2	
			6. The speed of Onboard1 if in rear should reach 0 kmph just before the point of Onboard2.	Same direction	
			7. The speed of Onboard1 if in ahead should not be affected.	Same direction	
			8. The speed of Onboard1 if in rear should not be affected.	Opposite direction	
			9. The brake shall be applied in Onboard1 and come to zero kmph speed just before the point of Onboard2.	Opposite direction	
			10. After crossing the location of Onboard2, the Onboard1 should maintain the speed to	Same direction	

System Level Test Cases (RDSO)				
Test ID	**Test Scenario**	**Input Specification**	**Expected Output/Values**	**Observed Output (Pass/Fail)**
			30kmph till the train passes the originating location of SoS.	
			11. After crossing the location of Onboard2, the Onboard1 should maintain the speed to 30kmph till the train passes the originating location of SoS.	Opposite direction
2.16.	If active DMI communication is failed while the system is in SR mode.	1. Power on the system. 2. Make sure that no faults are present and radio communication is healthy. 3. Make sure that train is in SR mode. 4. Now simulate the condition such that the active DMI communication is faulty on active cab.	System should be in SF mode and it should be verified on the other DMI screen.	
2.17.	If no CAB is selected and EM cock (EB bypassed) is closed. **(FRS 5.6 (a), (FRS 4.8(b))**	1. Power on the system. 2. Make sure that no faults are present and note down the configured speed limit of SR mode. 3. Make sure that train is in SR mode and EM cock is closed. 4. Now remove the CAB occupied input i.e., no CAB is occupied. 5. Train is at Standstill.	1. System will enter into SB mode; it can be verified on DMI. 2. Message "EB Bypassed (EB Cock Closed), No Traction" shall be displayed in DMI.	
2.18.	If EM cock is closed and any one Cab is active. **(FRS 5.6 (a))**	1. Power on the system. 2. Make sure that no faults are present and note down the configured speed	1. System should enter into SB mode; it can be verified on DMI.	

System Level Test Cases (RDSO)				
Test ID	**Test Scenario**	**Input Specification**	**Expected Output/Values**	**Observed Output (Pass/Fail)**
		limit of SR mode and any one cab is occupied. 3. Make sure that train is in SR mode. 4. Train is at Standstill. 5. Now make EM cock is closed.	2. Message "EB Bypassed (EB Cock Closed), No Traction" shall be displayed in DMI."	
2.19.	If EM cock health of EM channel failed and any one CAB is active. **(FRS 5.6 (a))**	1. Power on the system. 2. Make sure that no faults are present and note down the configured speed limit of SR mode and any one cab is occupied. 3. Make sure that train is in SR mode. 4. Train is at Standstill. 5. Now make health of EB channel failed by removing of wires of EM cock.	System will enter into SF mode; it can be verified on DMI.	
2.20.	Check for transition from SR mode to OS mode. **(FRS, 5.5, 5.6 (b), Cond. No. 87)**	1. Power on the system. 2. Make sure that no faults are present. 3. Select the train configuration. 4. Make sure that train is in SR mode. 5. Direction is available. 6. Make sure that radio communication is good. 7. OS MA and track profile received.	System will enter into OS mode; it can be verified on DMI.	
2.21.	Check for transition from SR mode to RV mode. **(FRS 5.6 (c), Cond. No. 58)**	1. Power on the system. 2. Make sure that no faults are present. 3. Select the train configuration. 4. Make sure that Onboard KAVACH is in SR mode. 5. Make sure that radio communication is good.	System shall enter into RV mode; it can be verified on DMI.	

System Level Test Cases (RDSO)				
Test ID	**Test Scenario**	**Input Specification**	**Expected Output/Values**	**Observed Output (Pass/Fail)**
		6. Onboard is in standstill. 7. Loco pilot requests for Reverse mode.		
2.22.	Check for transition from SR mode to RV mode, when Onboard is not standstill. **(Cond. No. 58)**	1. Power on the system. 2. Make sure that no faults are present. 3. Select the train configuration. 4. Make sure that train is in SR mode. 5. Make sure that radio communication is good. 6. Onboard is not in standstill. 7. Loco pilot requests for Reverse mode.	There shall not be change in mode, it can be verified on DMI.	
2.23.	Check for transition from SR mode to shunt mode when all conditions to SH mode entry are satisfied. **(FRS 5.6 (d), Cond. No. 56)**	1. Power on the system. 2. Make sure that no faults are present. 3. Make sure that train is in SR mode. 4. Now keep the Onboard is in standstill. 5. Press the “shunt” and CNFM button.	System shall enter into SHUNT mode; it can be verified on DMI.	
2.24.	Check for transition from SR mode to SHUNT mode when Onboard is not in standstill. **(Cond. No. 56)**	1. Power on the system. 2. Make sure that no faults are present. 3. Make sure that train is in SR mode. 4. Now keep the Onboard is in running. 5. Press the “shunt” and CNFM button.	System will be in SR mode only, on DMI SR mode should be displayed.	
2.25.	Check for transition from SR mode to Non Leading mode when non leading input is active and leading input is inactive (standstill). **(Cond. No. 53)**	1. Power on the system. 2. Make sure that no faults are present and train is in standstill. 3. Make sure that train is in SR mode. 4. Now make Non Leading input is active in active cab.	System shall enter into Non Leading mode. On DMI Non Leading mode shall be displayed.	
2.26.	Check for transition from SR mode to Non Leading mode	1. Power on the system. 2. Make sure that no faults are present	System shall not enter into Non Leading mode.	

System Level Test Cases (RDSO)				
Test ID	**Test Scenario**	**Input Specification**	**Expected Output/Values**	**Observed Output (Pass/Fail)**
	when non leading input is active (not in standstill). **(Cond. No. 53)**	and train is not in standstill. 3. Make sure that train is in SR mode. 4. Now make Non Leading input is active in active cab.	On DMI SR mode shall be displayed.	
2.27.	Check for transition from SR mode to System Failure mode in running when any critical fault occurred. **(Cond. No. 5)**	1. Power on the system. 2. Make sure that no faults are present. 3. Make sure that train is in SR mode. 4. Now simulate any critical fault.	System will enter into SF mode after the fault declared, on DMI SF mode should be displayed, the fault should be logged in data logger.	
2.28.	Check for transition from SR mode to System Failure mode in standstill when any critical fault occurred. **(Cond. No. 5)**	1. Power on the system. 2. Make sure that no faults are present. 3. Make sure that train is in SR mode. 4. Now simulate any critical fault.	System shall enter into SF mode after the fault declared, on DMI SF mode should be displayed, the fault should be logged in data logger.	
2.29.	Check for transition from SR mode to isolation mode in running. **(Cond. No. 2)**	1. Power on the system. 2. Make sure that train is in SR mode. 3. Now do Manual Isolation of the KAVACH by making the input isolate/input active in running.	System shall enter into isolation mode, after speed become zero "0" & isolation counter shall be incremented. Isolation mode should be displayed on DMI.	
2.30.	From SR mode to isolation mode in standstill. **(Cond. No. 2)**	1. Power on the system. 2. Make sure that train is in SR mode. 3. Now do Manual Isolation of the KAVACH by making the input isolate/input active while train is at standstill.	System shall enter into isolation mode, on DMI Isolation mode should be displayed. Isolation counter shall be incremented.	
2.31.	To check the SR mode entry from inactive cab.	1. Power on the system. 2. Make sure that no faults are present.	System should enter into SF mode because of DMI	

System Level Test Cases (RDSO)				
Test ID	**Test Scenario**	**Input Specification**	**Expected Output/Values**	**Observed Output (Pass/Fail)**
	(Cond. No. 5)	3. Train configuration is available; train is in standstill. 4. Make sure that train is in SR mode. 5. Now simulate DMI communication fail of active cab. 6. Give the SR mode entry condition from inactive cab.	communication is failed. check in the inactive cab DMI.	
2.32.	To check the SR mode entry through manual selection when all conditions for SR mode entry are satisfied when from active cab.	1. Power on the system. 2. Make sure that no faults are present. 3. Train configuration is available; train is in standstill. 4. Now simulate DMI communication fail in non-active cab. 5. Give the SR mode entry condition from active cab.	System should enter into SR mode.	
2.33.	Check for SOS generation Onboard is in SR mode with **unknown direction, absolute location and TIN** (transmit SOS).	1. Keep the Onboard in SR mode. 2. Make sure that no details are available TIN, absolute location, direction. 3. Now simulate manual SOS from this Onboard. 4. Check the SOS status in other Onboard which in FS mode and within 3km.	SOS should not receive in second Onboard.	
2.34.	Check for SOS generation Onboard is in SR mode **with unknown direction, absolute location and TIN** (Receive SOS).	1. Keep the Onboard in SR mode. 2. Make sure that no details are available TIN, absolute location, direction. 3. Now bring other Onboard which is in FS mode and generate SOS from this Onboard.	SOS should not receive in first Onboard.	

System Level Test Cases (RDSO)				
Test ID	**Test Scenario**	**Input Specification**	**Expected Output/Values**	**Observed Output (Pass/Fail)**
		4. Check the SOS status in Onboard1 which in SR mode and within 3km.		
2.35.	The train direction shall not get changed when passed over junction tag in SR Mode (Without position report).	1. Make sure that train is in SR mode. 2. Now simulate the condition such that the train passes over Adjustment/ Junction tag.	1. The train direction shall not get changed (undefined) and Onboard to be continued in the existing mode. 2. No special message shall be displayed on DMI. 3. If no direction is available, then Train should not derive the direction until it passes two consecutive tags after Junction Tag.	
2.36.	The train direction shall get changed when passed over junction tag in SR Mode (position report).	1. Make sure that train is in SR mode. 2. Position report is available with Onboard. 3. Now simulate the condition such that the train passes over adjustment/ Junction tag.	1. The train direction shall get changed as per details in adjustment/junction tag. 2. Onboard to be continued in the existing mode.	
2.37.	Check for SPAD prevention in SR mode when approaching signal is at ON.	1. Make sure that train is in SR mode. 2. Onboard in communication mandatory area and having valid communication. 3. OSMA is not received from station.	No special message shall be displayed on DMI.	
2.38.	Check for rejection of SoS messages, if adjacent line info tag is provided.	1. Make sure that train is in SR mode. 2. Onboard KAVACH in communication mandatory area and having valid communication. 3. Stop the 1st Onboard in block section	SoS shall be accepted by second Onboard.	

System Level Test Cases (RDSO)				
Test ID	**Test Scenario**	**Input Specification**	**Expected Output/Values**	**Observed Output (Pass/Fail)**
		and second Onboard is moving in adjacent line. 4. Check for SoS accepted if line is adjacent (means infringes the 1st line) means that one Onboard stopped in adjacent line).		
2.39.	Check for rejection of SoS messages, if adjacent line info tag is provided and not infringe the adjacent line.	1. Make sure that train is in SR mode. 2. Onboard in communication mandatory area and having valid communication. 3. Stop first Onboard in block section and second Onboard is moving in adjacent line which does not infringes the 1st line. 4. Adjacent tag shall not be programmed with the adjacent line which is not infringing. 5. Check for SoS rejected if line is adjacent and not infringes the other line.	SoS shall not be accepted by second Onboard.	
2.40.	Check for acceptance of SoS messages, if adjacent line info tag is not provided.	1. Make sure that train is in SR mode. 2. Onboard in communication mandatory area and having valid communication. 3. Simulate that adjacent Line info RFID Tag not provided. 4. Stop first Onboard in block section and second Onboard is moving in adjacent line which does not infringes the 1st line. 5. Check for SoS is accepted.	SoS shall be accepted by second Onboard.	

System Level Test Cases (RDSO)				
Test ID	**Test Scenario**	**Input Specification**	**Expected Output/Values**	**Observed Output (Pass/Fail)**
2.41.	To check the SR mode entry through manual selection when train configuration is not available. (EMU & Trainset). **(FRS 5.1 & 21)**	1. Power on the system. 2. Make sure that no faults are present. 3. Train configuration is pre fed & not selected during boot up in EMU or Trainset. 4. Make sure that train is in standstill condition. 5. Now press the button SR mode on DMI.	System should enter into SR mode and should be verified on DMI screen.	
2.42.	Check for tag data after first tag is swiped.	1. Power on the system. 2. After brake test, select SR mode. 3. Swipe any one tag (signal/ signal approach/ Normal/ TIN discrimination tag).	1. Check the radio packet data in data logger, in this packet the absolute location and TIN should be zero. 2. Direction should be undefined. 3. TID & Dir-U shall be displayed in DMI and absolute location, 4. T Dist shall be blank.	
2.43.	Check for no Mode transition from SR mode when train configuration is changed during standstill. **(FRS 22.1)**	1. Ensure that Onboard is in SR mode. 2. Onboard is at stand still. 3. Make the CAB active. 4. Change the train configuration.	1. Onboard KAVACH shall conduct Brake test. 2. On successful Brake test Onboard KAVACH should remain in SR mode.	
2.44.	To check the LC gate operation in SR mode when LC gate is programmed as no auto	1. Make sure that train is in SR mode. 2. Make sure that no faults are present. **3.** LC Gate shall be programmed as **No**	1. A message should be display on DMI as "**Manned/ Unmanned LC gate XXXX**	No Auto Whistling Message on DMI

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System Level Test Cases (RDSO)				
Test ID	**Test Scenario**	**Input Specification**	**Expected Output/Values**	**Observed Output (Pass/Fail)**
	whistling.	**auto whistling.** 4. Simulate the condition such that the LC gate tag is read by Onboard.	**in YYYY m**, auto whistling should not be ON. 2. Data log /DMI LC gate tag data (gate class, gate ID) need to be verified. 3. No Auto whistling should be available.	Gate Id in log/DMI
2.45.	To check that in SR with position report when Onboard **exits from KAVACH territory area after reading exit tag.**	1. Make sure that Onboard is in SR mode with position report. 2. Now simulate the Onboard is exit from KAVACH territory area after reading exit tag.	1. After reading the exit tag, the message shall be displayed on DMI as **"KAVACH Territory Exit**".	
			2. The exit tag shall be reported through Access request packet till the entire train length is passed. This shall be checked in NMS log.	
			3. System should remain in SR mode after reading the exit tag. It can be verified on DMI.	
2.46.	To verify the head on collision avoidance in block section two Onboard in SR mode with position report. (Onboard read the exit tag) **(FRS 31.1.2, SRS 12.2)**	1. Make sure that both Onboard is in SR mode with position report. 2. Simulate the condition such that there are two Onboard present in block section with opposite direction and distance between them is more than	1. Head on collision message should generate in the two Onboard when the distance between the two Onboard are decreased to 5000m Configurable.	

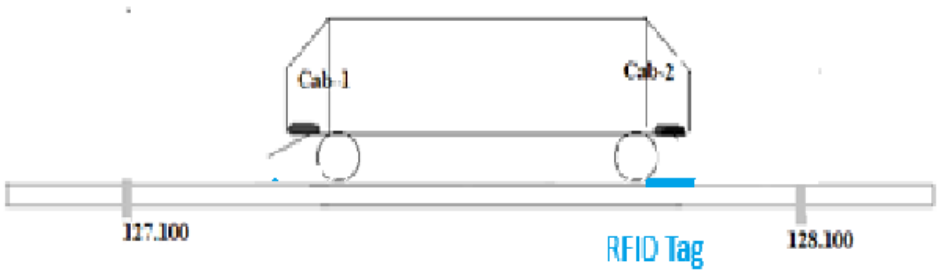
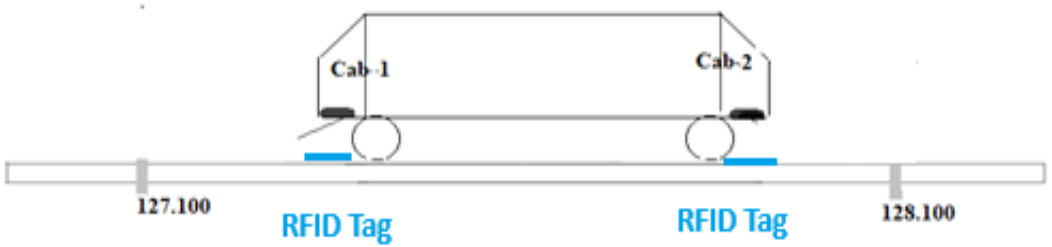
System Level Test Cases (RDSO)				
Test ID	**Test Scenario**	**Input Specification**	**Expected Output/Values**	**Observed Output (Pass/Fail)**
		5km say with same TIN. 3. Note the configured value for head on collision margin distance and move the two Onboard close to each other. 4. Simulate that scenario that head on collision initiated & brake application started, the Onboard read the exit tag.	2. "**Head on Collision with loco XXXXXX in YYYY m"** Context message shall be displayed in both the Onboard.	
			3. Brakes should apply in both Onboard immediately with warning and both the Onboard shall be brought to "0" speed **even though exit tag is read by Onboard and brake shall not be released.**	
2.47.	To verify the rear end collision avoidance in block section in block section two Onboard in SR mode with position report. **(FRS 31.1.2, SRS 12.3)**	1. Make sure that both Onboard is in SR mode with position report. 2. Simulate the condition such that there are two Onboard presents in block section with same direction and distance between them is more than 5km say with same TIN. 3. Note the configured value for rear end collision margin distance. 4. Now stop the front Onboard and make movement for rear end Onboard. 5. Simulate that scenario that Rear end on collision initiated & brake application started, the Onboard read the exit tag.	1. Rear end collision message should be generated in the rear Onboard only when the distance between the two Onboard is decreased to 5000m (Configurable).	
			2. "**Rear End on Collision with Onboard XXXXXX in YYYYY m**". Context message should be displayed only in rear Onboard.	
			3. Brakes should apply in rear Onboard only with warning **even though exit tag is read by Onboard and brake**	

System Level Test Cases (RDSO)				
Test ID	**Test Scenario**	**Input Specification**	**Expected Output/Values**	**Observed Output (Pass/Fail)**
			shall not be released. 4. The rear Onboard should stop before the rear end margin value of **300m** (configurable). There shall be no brake application in the train ahead.	
2.48.	Check for LP acknowledgement when Onboard Kavach transits from FS to SR and then to OS before LP acknowledgment.	1. Ensure Onboard Kavach is in FS mode with track profile less than 3000m. 2. Simulate radio communication fail at Stationary Kavach side and ensure that Onboard Kavach enters into SR mode. 3. No acknowledgement to be done by Loco Pilot.	1. The following context message shall be displayed on DMI "Ack SR Mode-Station Radio Comm Fail".	
		4. Restore the communication within the deregistration time out and Onboard Kavach shall transit to OS mode.	2. The following context message shall be displayed on DMI "Ack OS Mode". 3. Brakes shall be applied if no acknowledgement is received within LP acknowledgement timeout (7 second- configurable).	
2.49.	To check the SR mode entry from FS mode when radio Link failed in communication mandatory area and approaching signal is RED (ON Aspect). **(FRS 5.3 (b), 7.5(h-i), Cond.**	1. System is in FS mode. 2. Make sure that no faults are present in the system. 3. Cab is active. 4. Onboard is in Communication mandatory area. 5. Traffic direction is available.	1. Onboard KAVACH shall enter into SR mode and it can be verified on DMI. 2. The following context message shall be displayed on DMI "**Ack SR Mode-Station Radio Comm Fail**".	

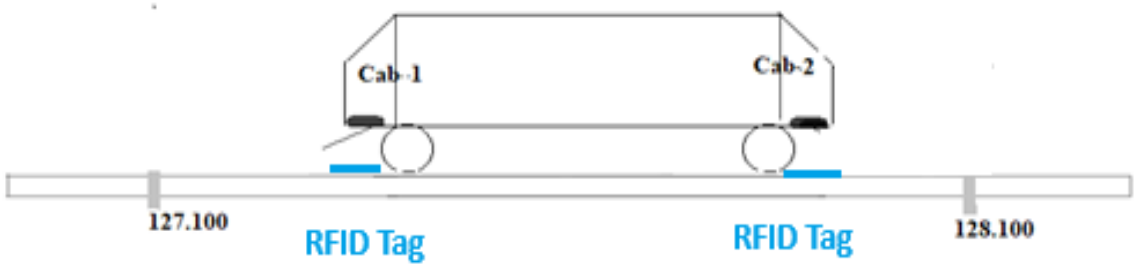
System Level Test Cases (RDSO)				
Test ID	**Test Scenario**	**Input Specification**	**Expected Output/Values**	**Observed Output (Pass/Fail)**
	No. 23)	6. Track profile is not available within 3000m (configurable). 7. Now simulate the radio Link failed by removing connector. 8. MA is available up to Approaching signal.	3. Brake shall be applied if MA is within the braking distance and shall not be released till acknowledgement.	
			4. After acknowledgement, the context message shall disappear.	
			5. After the acknowledgement brakes shall be released.	
2.50.	To check the SR mode entry from OS mode when radio Link failed in communication mandatory area and approaching signal is RED (ON Aspect). **(FRS 5.3 (b), 9.11(f-i), Cond. No. 23)**	1. System is in OS mode. 2. Make sure that no faults are present in the system. 3. Cab is active. 4. Onboard is in Communication mandatory area. 5. Traffic direction is available. 6. Track profile is not available within 3000m (configurable). 7. Now simulate the radio Link failed by removing connector. 8. MA is available up to Approaching signal.	1. Onboard KAVACH shall enter into SR mode and it can be verified on DMI. 2. The following context message shall be displayed on DMI "**Ack SR Mode-Station Radio Comm Fail**". 3. Brake shall be applied if MA is within the braking distance and shall not be released till acknowledgement.	
			4. After acknowledgement, the context message shall disappear.	
			.	
2.51.	When Onboard KAVACH is at standstill such that reader is over the RFID TAG, and start of mission (loco started).	1. Keep the KAVACH system in OFF condition. 2. Now simulate that cab -1 RFID tag is kept below the reader-1.	1. After self-test & brake test, Onboard transit to SB mode. 2. After selection SR mode,	

System Level Test Cases (RDSO)				
Test ID	**Test Scenario**	**Input Specification**	**Expected Output/Values**	**Observed Output (Pass/Fail)**
	Use cases	3. Now, switch ON the system and check that self-test is carried out the system and transit to SB mode. 4. Now select the SR mode. 5. RFID tag ID read shall be displayed in DMI and absolute location as "---".	Onboard shall read the tag and display the Tag ID in DMI.	
				
2.52.	When Onboard KAVACH is at standstill such that reader is over the RFID TAG, and start of mission (loco started). **Use cases**	1. Keep the KAVACH system in OFF condition. 2. Now simulate that cab -2 RFID tag is kept below the reader-2. 3. Now, switch ON the system and check that self-test is carried out the system and transit to SB mode. 4. Now select the SR mode. 5. RFID tag ID read shall be displayed in DMI and absolute location as "---".	1. After self-test & brake test, Onboard transit to SB mode. 2. After selection SR mode, Onboard shall read the tag and display the Tag ID in DMI.	

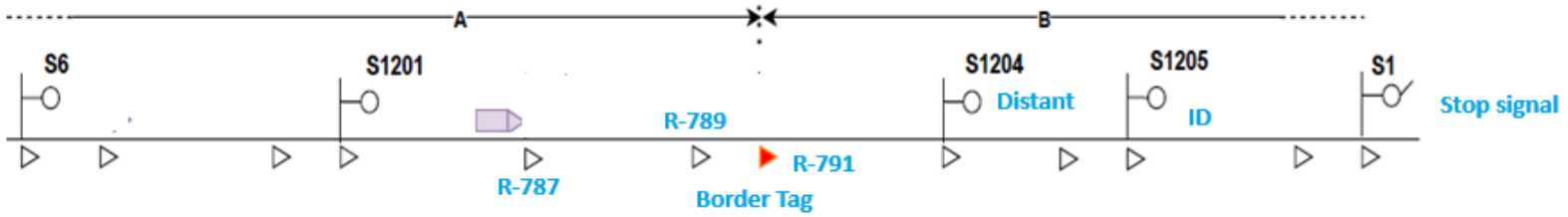
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System Level Test Cases (RDSO)				
Test ID	**Test Scenario**	**Input Specification**	**Expected Output/Values**	**Observed Output (Pass/Fail)**
				
2.53.	When Onboard KAVACH is at standstill such that both readers are over the RFID TAG, and start of mission (loco started) (Same location in both tags). **Use cases**	1. Keep the KAVACH system in OFF condition. 2. Now simulate that cab -1 RFID tag is kept below the reader-1 and cab-2 RFID tag is kept below the reader-2. 3. Programmed both RFID tags with same Location. 4. Now, switch ON the system and check that self-test is carried out the system and transit to SB mode. 5. Now select the SR mode.	1. After selection SR mode, Onboard shall read the tags. 2. The both tags shall be ignored because loco is in stand still condition	
				

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System Level Test Cases (RDSO)				
Test ID	**Test Scenario**	**Input Specification**	**Expected Output/Values**	**Observed Output (Pass/Fail)**
2.54.	When Onboard over the RFID TAG, and start of mission (loco started) (Different locations in both tags).	1. Keep the KAVACH system in OFF condition. 2. Now simulate that cab -1 RFID tag is kept below the reader-1 and cab-2 RFID tag is kept below the reader-2. 3. Programmed both RFID tag with different Location. 4. Now, switch ON the system and check that self-test is carried out the system and transit to SB mode. 5. Now select the SR mode.	1. After selection SR mode, Onboard shall read the tags. 2. The both tags shall be ignored because loco is in stand still condition.	
				
2.55.	In approach of border tag, Onboard KAVACH is in SR MODE, direction is available and next tag is border tag. **When S2S communication is available.** **Use Cases**	1. Keep the KAVACH system in SR mode without any RFID Tag read by the reader. 2. KAVACH is in communication mandatory area. 3. Simulate the movement of Onboard toward S-1204 and 1st read by Onboard is R-787.	1. Check in log that Onboard send Access request packet after position report. 2. Stationary KAVACH issue the Access Authority packet and Onboard shall send Loco to stationary KAVACH regular packet.	

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System Level Test Cases (RDSO)				
Test ID	**Test Scenario**	**Input Specification**	**Expected Output/Values**	**Observed Output (Pass/Fail)**
		4. Simultaneous next RFID tag read is R-789. 5. Check that direction is established after reading tag R-789. 6. S-KAVACH to SKAVACH communication is available and RRI packet is not received by dispatching station A from taking over station. 7. Check that the OSMA extended up to next stop signal up to S1.	3. Stationary KAVACH shall give SR authority till RRI packet is not received from taking over station. 4. Check in DMI & log for SR authority received by Onboard if RRI packet not received from taking over station.	
		S-KAVACH to SKAVACH communication is available and RRI packet is received by dispatching station A from taking over station.	5. Check in DMI & log for OSMA received by Onboard up to approaching stop signal if RRI packet received from taking over station.	
				
2.56.	In approach of border tag, Onboard KAVACH is in SR MODE, direction is available and next tag is border tag. **When S2S communication not available.**	1. Keep the KAVACH system in SR mode without any RFID Tag read by the reader. 2. Simulate the movement of Onboard toward S-1204 and 1st read by Onboard is R-787. 3. Simultaneous next RFID tag read is R-	1. Check in log that Onboard send Access request packet after position report. 2. Stationary KAVACH issue the Access Authority packet and Onboard shall send Loco to stationary KAVACH	

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System Level Test Cases (RDSO)				
Test ID	**Test Scenario**	**Input Specification**	**Expected Output/Values**	**Observed Output (Pass/Fail)**
	(Use Cases)	789. 4. Check that direction is established after reading tag R-789. 5. KAVACH is in communication mandatory area. 6. S-KAVACH to SKAVACH communication is not available. 7. Check that the SR authority is given by A station.	regular packet. 3. Stationary KAVACH shall give SR authority. 4. Check in DMI that SR authority received.	
				
2.57.	Check for trnasmission of SR authority in RRI packet when communication link failed in taking over station (Accepting station) with EI. **(Use cases)**	1. Keep the KAVACH system in FS/OS mode. 2. Onboard KAVACH is in communication mandatory area. 3. S-KAVACH to S-KAVACH communication is available. 4. Simulate the condition that communication link with Electronic Interlocking failed in accepting station of stationary KAVACH. 5. Accepting shall send SR authority in	Loco shall transit to SR mode on approach of border Tag.	

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System Level Test Cases (RDSO)				
Test ID	**Test Scenario**	**Input Specification**	**Expected Output/Values**	**Observed Output (Pass/Fail)**
		RRI packet to handing over station.		
2.58.	Check for transition of SR to OS in auto section when approaching track section is occupied by another non KAVACH train and TPR is down. **(Use cases)**	1. Keep the KAVACH system in SR mode. 2. Onboard KAVACH is in communication mandatory area. 3. All the track relay are wired to KAVACH system. 4. Simulate the condition that approaching track section is occupied by another train (Non KAVACH equipped train). 5. Simulate the movement of Onboard that the loco gets the position report. 6. Check for transition of SR to OS with OSMA up to occupied section.	Check that OSMA is extended upto occupied section only.	
2.59.	To check SR mode OS mode during start of mission	1. Onboard is in SR mode with position report. 2. Simulate the movement that onboard do not read signal foot tag. 3. SR authority shall be issued by stationary KAVACH after +30 meter.	Check that onboard in SR mode.	
2.60.	To check SR mode OS mode during start of mission	1. Onboard is in OS mode. 2. Communication failed for 30 second and loco transited to SR mode with position report. 3. Simulate the movement that onboard do not read signal foot tag. 4. Communication is restored after missing of tag.	Check that onboard in SR mode.	

System Level Test Cases (RDSO)				
Test ID	**Test Scenario**	**Input Specification**	**Expected Output/Values**	**Observed Output (Pass/Fail)**
		5. SR authority shall be issued by stationary KAVACH after +30 meter.		

Test ID	System Level TEST CASES (RDSO)			
	Test Scenario	**Input Specification**	**Expected Output/Values**	**Observed Output (Pass/Fail)**
3.	**KAVACH_FRS_03: Limited Supervision Mode - To check the system performance in LS mode when KAVACH is not isolated**			
3.1.	To check the LS mode entry from FS mode when radio Link failed in communication mandatory area but track profile is available up to 3000m (configurable) including traffic direction. **(FRS 6.2, 7.5(g), Cond. No. 76)**	1. System is in FS mode. 2. Make sure that no faults are present in the system. 3. Cab is active. 4. Onboard is in Communication mandatory area. 5. Traffic direction is available. 6. Now simulate the radio Link failed by removing connector.	1. Onboard KAVACH shall enter into LS mode and it can be verified on DMI, if track profile is available beyond 3000m (configurable). 2. The following context message shall be displayed on DMI "**Ack LS Mode- Station Radio Comm Fail**".	
			3. After acknowledgement, the context message shall change to "**LS Mode Waiting for station Radio Comm**".	
3.2.	To check the LS mode entry from FS mode when radio Link failed in communication mandatory area and approaching signal is RED (ON Aspect). **(FRS 6.2, 7.5(g), Cond. No. 76)**	1. System is in FS mode. 2. Make sure that no faults are present in the system. 3. Cab is active. 4. Onboard is in Communication mandatory area. 5. Traffic direction is available. 6. Track profile is available beyond 3000m (configurable) 7. MA is available up to Approaching signal. 8. Now simulate the radio Link failed by removing connector after initiation of braking.	1. Onboard KAVACH shall enter into LS mode and it can be verified on DMI. 2. The following context message shall be displayed on DMI "**Ack LS Mode- Station Radio Comm Fail**". 3. Brake shall be applied if MA is within the braking distance and shall not be released till acknowledgement.	
			4. After acknowledgement, the context message shall change to "**LS Mode Waiting for station Radio Comm**".	
			5. After the acknowledgement brakes	

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Test ID	System Level TEST CASES (RDSO)			
	Test Scenario	**Input Specification**	**Expected Output/Values**	**Observed Output (Pass/Fail)**
			shall be released.	
3.3.	To check the SR mode entry from FS mode when radio Link failed in communication mandatory area but track profile is not available up to 3000m (configurable) including traffic direction. **(FRS 6.2, Cond. No. 76)**	1. Power on the system. 2. Make sure that no faults are present in the system. 3. Cab is active. 4. Onboard is in Communication mandatory area. 5. Traffic direction is available. 6. And the system is in FS mode. 7. Now simulate the radio Link failed.	1. Onboard KAVACH shall enter into SR mode and it can be verified on DMI, if track profile is not available beyond 3000m (configurable).	
			2. The following context message shall be displayed on DMI "**Ack SR Mode, Station Radio Comm Fail**".	
3.4.	To check the LS mode entry from FS mode when radio Link failed in communication mandatory area but track profile is available up to 2000m (**by changing configurable value from 3000m to 2000m**) including traffic direction. **(FRS 6.2, Cond. No. 76, Table A5-item14)**	1. Power on the system. 2. Change the value of minimum track profile required distance from 3000m to 2000m. 3. Make sure that no faults are present in the system. 4. Cab is active. 5. Onboard is in Communication mandatory area. 6. Traffic direction is available. 7. And the system is in FS mode. 8. Now simulate the radio Link fail.	1. Onboard KAVACH shall enter into LS mode and it can be verified on DMI, if track profile is available beyond 2000m (configurable).	
			2. The following context message shall be displayed on DMI "**Ack LS Mode- Station Radio Comm Fail**".	
			3. If it is less than 2000m, then Onboard shall transit to SR mode.	
			4. After acknowledgement, the context message shall change to "Ack SR mode, Station Radio Comm Fail.	
			5. After the test changes the value of minimum track profile required distance to 3000m.	

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Test ID	System Level TEST CASES (RDSO)			
	Test Scenario	**Input Specification**	**Expected Output/Values**	**Observed Output (Pass/Fail)**
3.5.	To check the LS mode entry from FS mode when radio Link failed in **non-communication mandatory** area but track profile is available up to 3000m (configurable) including traffic direction. **(FRS 6.2, Cond. No. 76)**	1. Power on the system. 2. Make sure that no faults are present in the system. 3. Cab is active. 4. Onboard is in KAVACH territory. 5. Onboard is in non-Communication mandatory area. 6. Traffic direction is available. 7. And the system is in FS mode. 8. Now simulate the radio Link fail.	Onboard KAVACH shall not change its mode.	
3.6.	Check that SR mode manual selection is not feasible from LS mode in standstill. **(FRS 5.1)**	1. Keep the Onboard in LS mode. 2. Onboard is standstill. 3. Now press the SR and CNFM buttons on DMI.	Onboard KAVACH shall not transit from the existing mode.	
3.7.	Check that SR mode manual selection is not feasible from LS mode in on run. **(FRS 5.1)**	1. Keep the Onboard in LS mode. 2. Now press the SR and CNFM buttons on DMI.	Onboard KAVACH shall not transit from the existing mode.	
3.8.	Check for Mode transition to SB when CAB is changed in case of dual CAB or driving position is changed in case of single cab. **(FRS 21.1 (d) and (e))**	1. Keep the Onboard in LS mode. 2. Change the CAB.	1. Onboard KAVACH shall transit to SB mode. 2. Check for Onboard KAVACH mode on DMI.	
3.9.	Check for supervision of train movement against dynamic	1. Keep the Onboard in LS mode. 2. Let the max train speed be 160	1. When the max permissible speed of the track is 130 Kmph, the Onboard	

Test ID	System Level TEST CASES (RDSO)			
	Test Scenario	**Input Specification**	**Expected Output/Values**	**Observed Output (Pass/Fail)**
	speed profile. **(FRS 6.3 & 6.4)**	Kmph. 3. Let the max permissible speed of the track 130 Kmph. 4. Let the PSR of 80 Kmph be programmed for a distance of 1000m and a TSR of 60 Kmph be programmed within the PSR for a distance of 200m.	KAVACH shall show the permitted speed as 130 Kmph.	
			2. On the approach of 80 Kmph PSR, Onboard KAVACH shall supervise against this, till the complete train is passed.	
			3. On the approach of 60 Kmph TSR, Onboard KAVACH shall supervise against this, till the complete train is passed. 4. Message shall be displayed in DMI as" **PSR in XXXXm with Speed limit of YYY kmph**".	
			5. When the max permissible speed of the track is 160 Kmph, the Onboard KAVACH shall show the permitted speed as 160 Kmph.	
3.10.	To verify the Onboard over speed in LS when section speed is greater than Onboard speed. **(FRS 6.3 & FRS 6.4)**	1. Cab is active and Onboard is in KAVACH territory and KAVACH is healthy. 2. Make sure that Onboard is in LS mode by making Radio communication fail. 3. Now simulate the condition such that the Onboard speed is more than the configured maximum restricted speed profile.	1. Brakes should be applied. 2. Onboard Speed should be monitored for Max Onboard restricted speed profile.	

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Test ID	System Level TEST CASES (RDSO)			
	Test Scenario	**Input Specification**	**Expected Output/Values**	**Observed Output (Pass/Fail)**
3.11.	To verify the Onboard over speed in LS when section speed is less than Onboard speed. **(FRS 6.3) & (FRS 6.4)**	1. Cab is active and Onboard is in KAVACH territory and KAVACH is healthy. 2. Make sure that Onboard is in LS mode by making Radio communication fail. 3. Now configure the Onboard maximum speed value such that it is less than the track speed. 4. Now simulate the condition such that the Onboard speed is more than the configured maximum value. 5. Now check the speed and the speed should be less than the Onboard maximum speed limit.	1. Brakes should be applied and the speed is limited to the less than the Onboard maximum speed limit. 2. Onboard Speed should be monitored for Max Onboard Speed.	
3.12.	To check the LC gate operation in LS mode.	1. Make sure that train is in LS mode. 2. Simulate the condition such that the LC gate tag is received.	1. Message should be displayed on DMI. 2. Auto whistling should be ON if MA is beyond LC gate location. 3. Verify the LC gate related parameters displayed on DMI.	Auto whistling Message on DMI Gate class in log or DMI Gate ID in Log
3.13.	When roll back detected in LS mode, when the configured	1. Make sure that no faults are present.	Brakes should be applied after the configured distance is traveled for	

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Test ID	System Level TEST CASES (RDSO)			
	Test Scenario	**Input Specification**	**Expected Output/Values**	**Observed Output (Pass/Fail)**
	distance is 10m. **(Annexure A2 Cl. No. A2.4.4, Sr. No. 21.6)**	2. Make sure that train is in LS mode. 3. Simulate the condition of rollback by making the rollback input high and give some speed.	rollback movement.	
3.14.	When roll back detected in LS mode, when the configured distance is changed 10m to 5m. **(Annexure A2 Cl. No. A2.4.4, Sr. No. 21.6)**	1. Make sure that no faults are present. 2. Change in configured distance from 10m to 5m. 3. Make sure that train is in LS mode. 4. Simulate the condition of rollback by making the rollback input high and give some speed.	Brakes should be applied after the configured distance is traveled for rollback movement.	
3.15.	To verify the head on collision avoidance in block section. **(FRS 31.1.2, SRS 12.2)**	1. Make sure that one Onboard is in LS mode and the other Onboard is in SR mode. 2. Simulate the condition such that there are two Onboard present in block section with opposite direction and distance between them is more than 5km say with same TIN. 3. Note the configured value for head on collision margin distance and move the two Onboard.	1. Head on collision message should generate in the two Onboard when collision detected say, "Head on Collision with loco XXXXXX in YYYY m". 2. Context message shall be displayed in both the Onboard. 3. Brakes should apply in both Onboard immediately with warning and both the Onboard shall be brought to stop.	
3.16.	To verify the rear end collision avoidance in block	1. Make sure that two Onboard are in LS mode by making radio	1. Rear end collision message should generate in the rear Onboard only	

Test ID	System Level TEST CASES (RDSO)			
	Test Scenario	**Input Specification**	**Expected Output/Values**	**Observed Output (Pass/Fail)**
	section. **(FRS 31.1.2, SRS 12.3)**	communication fail. 2. Simulate the condition such that there are two Onboard present in block section with same direction and distance between them is more than 3km say with same TIN. 3. Note the configured value for rear end collision margin distance. 4. Now stop the front Onboard and make movement for rear end Onboard.	when the distance between the two Onboard is decreased to 3000m say. 2. "**Rear End on Collision with Onboard XXXXXX in YYYYY m**" Context message should be displayed only in rear Onboard. 3. Brakes should apply in rear Onboard only with warning if the train speed is required to be reduced, otherwise, no brakes to be applied. The rear Onboard should stop before the rear end margin value of 300m (configurable). There shall be no brake application in the train ahead.	
3.17.	Manual SOS is received when Onboard KAVACH is **within 3000m (configurable)** from the location SoS originating source (another Onboard KAVACH). **(FRS 31.4.5, 31.4.7) & Annexure 11.2, 13.4 &13.5.**	1. Make sure that Onboard is in LS mode. 2. Simulate the condition such that the SOS is received from another Onboard KAVACH which is within 3000m from the test Onboard KAVACH.	1. After speed come to zero (0), the speed **should be limited to 30kmph.** 2. The **30 Kmph restriction shall be released** after passing 1500m beyond the originating location of SoS message. 3. The **30 Kmph restriction/brakes shall be released** when SoS is cancelled by Source. 4. The **30 Kmph restriction/brakes shall be released** when SoS message is not received for more	

Test ID	System Level TEST CASES (RDSO)				
	Test Scenario	**Input Specification**	**Expected Output/Values**	**Observed Output (Pass/Fail)**	
			than 3 minutes (configurable).		
3.18.	Manual SOS is received when Onboard KAVACH is **beyond 3000m (configurable)** from the location SoS originating source. **(FRS 31.4.5, 31.4.7)**	1. Make sure that Onboard is in LS mode. 2. Simulate the condition such that the SOS is received from another Onboard KAVACH which is beyond 3000m from the test Onboard KAVACH.	No brakes should apply.		
3.19.	To check the MBT test success. (**Annexure-B 5.5.2) (Optional)**	1. Make sure that Onboard is in LS mode and Onboard is in standstill. 2. Make sure that no EB related faults are present. 3. Now give the command MBT from DMI.	1. MBT test should be successful. 2. Brake application and brake release time may suitably be updated as perceived during test by Onboard KAVACH. **(Optional**)		
3.20.	To check the MBT test failure. (**Annexure-B 5.5.2)**	1. Make sure that Onboard is in LS mode and Onboard is in standstill. 2. Make sure that no EB related faults are present. 3. Now give the command MBT from DMI, while brake test is going on, Close the EM Cock, by making the corresponding input low in Onboard simulator.	MBT test should fail and Onboard should transit to SB mode.		
3.21.	To check that MBT test is activated when Onboard is on	1. Make sure that Onboard is in	1. MBT test should be successful. 2. Brake application and brake release	SR	

Test ID	System Level TEST CASES (RDSO)			
	Test Scenario	**Input Specification**	**Expected Output/Values**	**Observed Output (Pass/Fail)**
	standstill. **(Annexure-B 5.5.2)** **(Optional)**	SR/LS/FS/OS mode. 2. Make sure that no EB related faults are present. 3. Now give the command MBT from DMI. 4. Onboard in standstill.	time may suitably be updated by Onboard KAVACH.	LS FS OS
3.22.	To check LS mode to NL mode transition when Onboard is in standstill when NL input is active. **(Cond. No. 53)**	1. Make sure that train is in LS mode. 2. Simulate the condition such that the Onboard is in standstill and leading input is inactive and Non Leading input is active.	System changed to NL mode and it can be verified on DMI.	
3.23.	To check LS mode to NL mode transition when Onboard is not in standstill when NL input is active.	1. Make sure that train is in LS mode. 2. Simulate the condition such that the Onboard is not in standstill and leading input is inactive & NL input active.	System should continue in LS mode.	
3.24.	To check LS mode to SF mode transition when any critical fault. **(Cond. No. 5)**	1. Make sure that train is in LS mode. 2. Simulate the condition such that any critical fault occurred.	System should change to SF mode and it can be verified on DMI	
3.25.	To check LS mode to IS mode transition in standstill. **(Cond. No. 2)**	1. Make sure that system is in LS mode. 2. Now do manual isolation of the KAVACH by making the KAVACH ISOLATE input active.	1. System should be in IS mode and it can be verified on DMI. 2. The 6-digit counter for isolation mode should be increased by one.	

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Test ID	System Level TEST CASES (RDSO)			
	Test Scenario	**Input Specification**	**Expected Output/Values**	**Observed Output (Pass/Fail)**
3.26.	To check LS mode to IS mode transition when Onboard on movement. **(Cond. No. 2)**	1. Make sure that system is in LS mode. 2. Now do manual isolation of the KAVACH by making the KAVACH ISOLATE input active. 3. Onboard on movement.	System should not transit to IS mode and it can be verified on DMI.	
3.27.	LS mode to SR mode when track profile is not available up to 3000m (configurable). **(FRS 6.5 (d) (i) Cond. No. 23)**	1. Power on the system. 2. Make sure that no faults are present and system is in LS mode. 3. Now simulate the condition such that track profile is not available up to 3000m (configurable). 4. when MA > 3000m is received from stationary KAVACH after establishing communication.	1. System should transit to SR mode and it can be verified on DMI and ACK request should be there. 2. If the Loco pilot does not give the ACK within the configurable time, brakes should apply. 3. After ACK, brakes should be released.	
3.28.	To check LS mode to SR mode transition when **three consecutive linked RFID tags** are missed. **(FRS, 5.3(C) 6.5 (d) (ii) Cond. No. 85)**	1. Make sure that train is in LS mode. 2. Now simulate the condition such that three consecutive linked RFID tags are missed.	1. System should transit to SR mode and it can be verified on DMI and ACK request should be there. 2. Direction and absolute location to be erased. 3. Check that message in DMI shall be displayed as "**Ack SR mode, Tags Missing".** 4. If the Loco pilot does not give the ACK within the configurable time, brakes should apply.	

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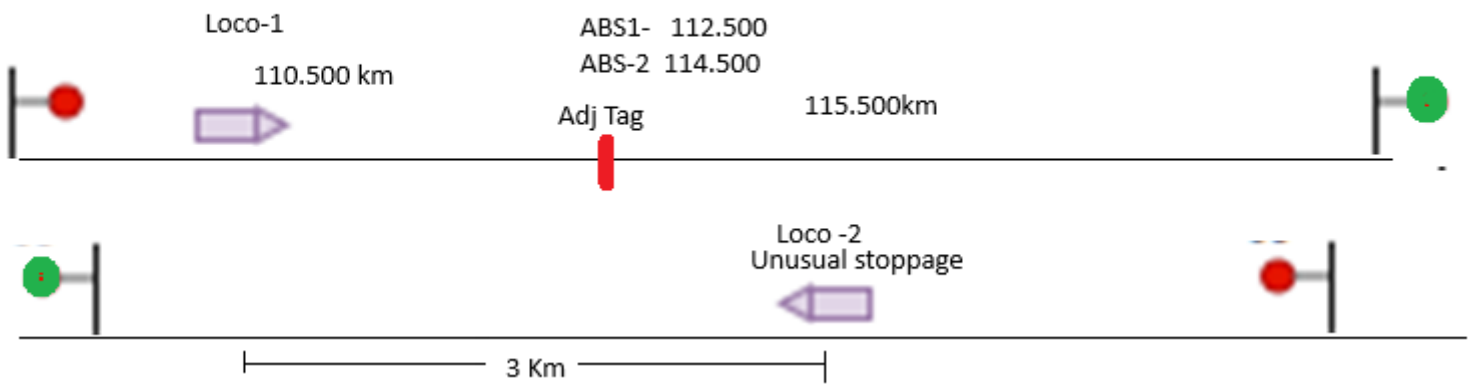
Test ID	System Level TEST CASES (RDSO)			
	Test Scenario	**Input Specification**	**Expected Output/Values**	**Observed Output (Pass/Fail)**
			5. After ACK, brakes should be released.	
3.29.	To check LS mode to SR mode transition when Onboard **exits from KAVACH territory area.** **(FRS 6.5 (d) (iii) Cond. No. 17)**	1. Make sure that train is in LS mode. 2. Now simulate the Onboard exits from KAVACH territory area.	1. System shall remain in LS mode till exit tag. There shall not any spurious braking of this.	
			2. The exit tag shall be reported to stationary KAVACH through Access request packet. This shall be checked in NMS log.	
			3. System should transit to SR mode after reading the exit tag. 4. Position report shall not be erased till the complete train has passed the last TIN (Tag). It can be verified on DMI and ACK request should be there.	
			5. If the Loco Pilot gives the ACK within the configurable time, brakes should not apply.	
3.30.	To check LS mode to SR mode transition **when train traffic direction is unknown.** **(FRS 6.5 (d) (iv) Cond. No. 30)**	1. Make sure that train is in LS mode. 2. Now simulate the condition such that the train traffic direction is unknown.	1. System should transit to SR mode and it can be verified on DMI. 2. Check that message displayed in DMI as **"Ack SR mode, Direction Unknown".**	
			3. If the Loco pilot gives the ACK within the configurable time, brakes should not apply.	
3.31.	To check LS mode to OS	1. Make sure that train is in LS	Onboard KAVACH shall transit to OS	

Test ID	System Level TEST CASES (RDSO)			
	Test Scenario	**Input Specification**	**Expected Output/Values**	**Observed Output (Pass/Fail)**
	mode transition. **(FRS 6.5 (a) Cond. No 90)**	mode. 2. Onboard is in communication mandatory area. 3. Simulate such that valid radio packets are received. 4. OS MA is sent by Stationary KAVACH.	mode.	
3.32.	To check LS mode to RV mode transition when Onboard is in standstill. **(FRS 6.5 (b), Condi. 58)**	1. Make sure that train is in LS mode. 2. Simulate the condition such that the Onboard is in standstill, reverser handle is changed to reverse position and Loco Pilot requests the RV mode.	System should be in RV mode and it can be verified on DMI.	
3.33.	To check LS mode to RV mode transition when Onboard is not in standstill. **(FRS 6.5 (b), Condi. 58)**	1. Make sure that train is in LS mode. 2. Simulate the condition such that the Onboard is not in standstill. 3. Loco Pilot requests the RV mode.	System should be in LS mode and it can be verified on DMI.	
3.34.	To check LS mode to SH mode transition when Onboard is in standstill. **(FRS 6.5 (c), Condi. 56)**	1. Make sure that train is in LS mode. 2. Simulate the condition such that the Onboard is in standstill and Loco Pilot requests the SH mode.	System should be in SH mode and it can be verified on DMI.	
3.35.	To check LS mode to SH mode transition when	1. Make sure that train is in LS mode.	System should be in LS mode and it can be verified on DMI.	

Test ID	System Level TEST CASES (RDSO)			
	Test Scenario	**Input Specification**	**Expected Output/Values**	**Observed Output (Pass/Fail)**
	Onboard is not in standstill. **(FRS 6.5 (c), Condi. 56)**	2. Simulate the condition such that the Onboard is not in standstill and Loco Pilot requests the SH mode.		
3.36.	To check LS mode to SB mode transition when no cab is occupied. **(FRS 4.8(B), Condi. 7)**	1. Make sure that train is in LS mode. 2. Train is running; 3. Make sure that no cab is active. 4. Train shall stop after some time.	System should transit to SB mode after the train comes to standstill and it can be verified on DMI.	
3.37.	To check LS mode to SB mode transition, if EM cock is Closed. **(Condi. 7)**	1. Make sure that no faults are present. 2. Make sure that train is in LS mode. 3. Now make EM cock is closed.	System should enter into SB mode; it can be verified on DMI.	
3.38.	To check LS mode to SB mode transition, EM cock health of EB channel failed. **(Safety Requirement)**	1. Keep the Onboard is in LS mode. 2. Now make health of EB channel failed by removing of wires of EM cock.	System should enter into SF mode; it can be verified on DMI.	
3.39.	To verify unusual stoppage of trains by transmitting the SOS in block section. **(FRS 31.2.4)**	1. Make sure that train is in LS mode. 2. Simulate a condition such that there is another train equipped with functional KAVACH within the region 3km, in block section on different TINs. 3. Simulate the condition that other train is stopped in block section	1. SOS should get generated from the Onboard KAVACH unit of stopped train. The location of the train is target. 2. Onboard KAVACH units which receive the SOS and are moving towards the target within 3km from the concerned should apply brakes and bring the loco to standstill	25 Kmph 60 Kmph >100 Kmph

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Test ID	System Level TEST CASES (RDSO)			
	Test Scenario	**Input Specification**	**Expected Output/Values**	**Observed Output (Pass/Fail)**
		and Loco Pilot has not responded within 7 Sec. 4. Check for 25 Kmph, 60 Kmph and more than 100 Kmph.	before reaching target. 3. After the loco speed is reduced to zero, the speed should be limited to 30kmph up to after train length and including Source train length. 4. Brake should not be applied to the train moving away from the target.	
3.40.	To verify unusual stoppage of trains by transmitting the SOS in block section. (in condition of adjustment tag as per below figure) **(FRS 31.2.4)**	1. Make sure that train is in LS mode. 2. Adjustment tag placed after the loco 1 for adjustment of 2 kilometers. 3. Simulate a condition such that there is another train equipped with functional KAVACH within the region 3km, in block section on different TINs. 4. Simulate the condition that other train is stopped in block section and Loco Pilot has not responded within 7 Sec. 5. Check for 25 Kmph, 60 Kmph and more than 100 Kmph.	1. SOS should get generated from the Onboard KAVACH unit of stopped train. The location of the train is target. 2. Onboard KAVACH units which receive the SOS and are moving towards the target within 3km from the concerned should apply brakes and bring the loco to standstill before reaching target. 3. After the loco speed is reduced to zero, the speed should be limited to 30kmph up to after train length and including Source train length. 4. Brake should not be applied to the train moving away from the target.	

Test ID	System Level TEST CASES (RDSO)			
	Test Scenario	**Input Specification**	**Expected Output/Values**	**Observed Output (Pass/Fail)**
				
3.41.	To verify not generation of SOS in the case of unusual stoppage of train in block section and Loco Pilot given ACK within the configurable time before generating the SOS. **(FRS 31.2.3)**	1. Make sure that train is in LS mode. 2. Simulate the condition that train is stopped in block section and Loco Pilot has responded within the 7 Sec (Configurable).	SOS should not generate.	
3.42.	Transmitting the manual SOS by the Onboard. **(FRS 31.4.5)**	1. Make sure that train is in LS mode. 2. Keep one Onboard in main line (Onboard1) and another Onboard in loop line (Onboard2). 3. Simulate Onboard-1 to be in rear of Onboard2.	1. SOS message should receive in Onboard1, the message "SOS - From Loco XXXXXX" should show. 2. Brake should apply in Onboard-1 till it comes to zero kmph. 3. From zero speed, the Onboard1 should be allowed to move at 30	

Test ID	System Level TEST CASES (RDSO)			
	Test Scenario	**Input Specification**	**Expected Output/Values**	**Observed Output (Pass/Fail)**
		4. Now give manual SOS from Onboard2.	kmph, until it moves 1500m beyond the SOS originating location.	
3.43.	Check that brakes are released when SOS is received and radio packets are not available from next for more than 180 seconds (configurable) after receiving the manual SOS from Registered station.	1. Make sure that train is in FS/OS mode. 2. Simulate the condition that a SOS is generated from station. 3. After receiving SOS at Onboard, remove RX connection of both radios in Onboard. 4. Onboard transits to SR/LS mode.	Brakes should be released after stand still and SoS is cancelled in loco after configurable time (180 seconds).	
3.44.	Check that brakes are released when SOS is received and radio packets are not available from next cycle for more than 180 seconds (configurable) after receiving the manual SOS. It is from stationary KAVACH in which, not registered.	1. Make sure that train is in FS/OS mode. 2. Simulate the condition that a SOS is generated from station. 3. After receiving SOS at Onboard, remove RX connection of both radios in Onboard.	Brakes should be released after stand still and SoS is cancelled in loco after configurable time (180 seconds).	
3.45.	To check the inhibition of reverse movement operation in LS mode and driving from CAB1. **(FRS 13.8)**	1. Power on the system. 2. Make sure that no faults are present and driving CAB is CAB1. 3. Make sure that train is in LS mode. 4. Now keep the reverser handle in reverse position and keep the Onboard running.	Brakes should apply and traction should be cut off.	

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Test ID	System Level TEST CASES (RDSO)			
	Test Scenario	**Input Specification**	**Expected Output/Values**	**Observed Output (Pass/Fail)**
3.46.	To check the inhibition of reverse movement operation in LS mode and driving from CAB2. **(FRS 13.8)**	1. Power on the system. 2. Make sure that no faults are present and driving CAB is CAB2. 3. Make sure that train is in LS mode. 4. Now keep the reverser handle in forward position and keep the Onboard in running.	Brakes should apply and traction should be cut off.	
3.47.	To check the LC gate operation in LS mode when LC gate tag is read in main line **and the train is not standstill.** **(FRS- 32)**	1. Power on the system. 2. Make sure that no faults are present. 3. Make sure that train is in LS mode. 4. Simulate the condition such that the LC gate tag is swiped.	A message should display on DMI, auto whistling should be ON, verify the LC gate related parameters. Auto whistling should be on until Loco Pilot gives ACK or LC gate is crossed.	
3.48.	To check the LC gate operation in LS mode when LC gate tag is not read, but Track profile information is there throughout the main line **and the train is not standstill.** **(FRS- 32)**	1. Power on the system. 2. Make sure that no faults are present. 3. Make sure that train is in LS mode. 4. Simulate the condition such that the LC gate tag is missed.	1. A message should have displayed on DMI, auto whistling should be ON, verify the LC gate related parameters. 2. Auto whistling should be on until Loco Pilot gives ACK or LC gate is crossed.	
3.49.	To check the LC gate operation in LS mode when LC gate tag is read in loop line **and the train is not**	1. Power on the system. 2. Make sure that no faults are present. 3. Make sure that train is in LS	1. A message should be displayed on DMI, auto whistling should be ON, verify the LC gate related parameters.	

Test ID	System Level TEST CASES (RDSO)			
	Test Scenario	**Input Specification**	**Expected Output/Values**	**Observed Output (Pass/Fail)**
	standstill. **(FRS- 32)**	mode. 4. Simulate the condition such that the LC gate tag is received.	2. Auto whistling should be on until Loco Pilot gives ACK or LC gate is crossed. 3. If the Onboard is come to standstill, then the LC gate message should not show and Auto whistling should be OFF until the Onboard is in standstill.	
3.50.	To check the LC gate operation in LS mode when LC gate tag is not read, but track profile information is there throughout the loop line **and the train is not standstill.** **(FRS- 32)**	1. Power on the system. 2. Make sure that no faults are present. 3. Make sure that train is in LS mode. 4. Simulate the condition such that the LC gate tag is missed and the MA is more than the LC gate distance.	1. A message should be displayed on DMI, auto whistling should be ON, verify the LC gate related parameters. 2. Auto whistling should be on until Loco Pilot gives ACK or LC gate is crossed.	
3.51.	To check the LC gate operation in LS mode**.** LC gate tag is read. **when train is standstill.** **(FRS- 32)**	1. Make sure that train is in LS mode. 2. Simulate the condition such that the LC gate tag is received. 3. Confirm that LC gate information is processed by system by verifying the LC gate distance on DMI and buzzer operation is working.	1. A message should be display on DMI, auto whistling should be ON, verify the LC gate related parameters. 2. Auto whistling should be on until Loco Pilot gives ACK or LC gate is crossed or Onboard comes to standstill. 3. When the Onboard moves, Auto whistling shall start again till the front end of train touches the LC	

Test ID	System Level TEST CASES (RDSO)			
	Test Scenario	**Input Specification**	**Expected Output/Values**	**Observed Output (Pass/Fail)**
			gate location.	
3.52.	To check the LC gate operation in LS mode **&** LC gate tag is not read (LC Gate info available in track profile packet). **when train is standstill. (FRS- 32)**	1. Make sure that train is in LS mode. 2. Simulate the condition such that the LC gate tag is not read.	LC gate information should not show on DMI when train standstill. There shall not be any auto whistling when train is standstill.	
3.53.	De registration of Onboard when there is no communication for more than de- registration time out. (120 second for Absolute Section).	When Onboard is in LS mode make a movement and there is no communication for more than de-registration time out.	Onboard should get De-registered when there is no communication for more than 120 second in absolute block section or station section.	
3.54.	De registration of Onboard when there is no communication for more than de- registration time out. (30 second for Automatic Section).	When Onboard is in LS mode make a movement and there is no communication for more than de-registration time out.	Onboard should get De-registered when there is no communication for more than 30 second in Automatic block section.	
3.55.	Check for no Mode transition from LS mode when train configuration is changed during standstill. **(FRS 22.1)**	1. Ensure that Onboard is in LS mode. 2. Onboard is at stand still. 3. Make the CAB active. 4. Change the train configuration.	1. Onboard KAVACH shall conduct brake tests. 2. On successful brake tests Onboard KAVACH should remain in LS mode.	
3.56.	Check for LP acknowledgement when Onboard Kavach transits from FS to LS and then to OS before LP acknowledgment.	1. Ensure Onboard Kavach is in FS mode with track profile greater than 3000m. 2. Simulate radio communication fail at Stationary Kavach side	1. The following context message shall be displayed on DMI “Ack LS mode, Station Radio Comm Fail”.	

Test ID	System Level TEST CASES (RDSO)			
	Test Scenario	**Input Specification**	**Expected Output/Values**	**Observed Output (Pass/Fail)**
		and ensure that Onboard Kavach enters into LS mode. 3. No acknowledgement to be done by Loco Pilot.		
		4. Restore the communication within the deregistration time out and Onboard Kavach shall transit to OS mode.	2. The following context message shall be displayed on DMI "Ack OS Mode". 3. Brakes shall be applied if no acknowledgement is received within LP acknowledgement timeout (7 second).	

	System Level TEST CASES (RDSO)			
Test ID	**Test Scenario**	**Input Specification**	**Expected Output/Values**	**Observed Output (Pass/Fail)**
4.	**KAVACH_FRS_04: Full Supervision Mode- To check the system performance in FS mode when KAVACH is not isolated**			
4.1.	To check the FS mode transition in Nominal Direction. **(FRS 7.1 (a to d))**	1. Make sure that KAVACH is in SR mode. 2. Now simulate the condition such that the Onboard is passed two consecutive RFID Tags such that the absolute distance is incrementing. 3. Make sure that no faults are present in the system. (i) Track profile Available (Including Traffic Direction) up to 3000m or Movement Authority, whichever is less. (ii) Valid Radio Packets are receiving in communication mandatory area. (iii) Movement Authority is valid. 4. Check that Onboard transits to OS mode.	1. Onboard KAVACH should enter into FS mode (after getting Valid MA & track profile up to 3000m (configurable) or movement authority which ever less, Valid radio packets are available, one stop signal should be passed in off condition.	
			2. On DMI, FS mode should be shown, absolute location value should be in incremented and it can be verified on DMI.	
			3. If the absolute location value is incremented then it should be nominal-N.	
			4. Onboard KAVACH should transmit the data (including location) to the station for every 2sec.	
			5. Check the parameters train speed, permitted speed, target distance, target speed to the Loco Pilot if any on DMI.	
			6. The Onboard KAVACH should receive the data from station for every 2sec. Check the radio	

	System Level TEST CASES (RDSO)			
Test ID	**Test Scenario**	**Input Specification**	**Expected Output/Values**	**Observed Output (Pass/Fail)**
			packet data and normal tag data in data logger.	
4.2.	To check the FS mode transition in Reverse Direction. **(FRS 7.1 (a to d))**	1. KAVACH is in OS mode. 2. Now simulate the condition such that the Onboard is passed two consecutive RFID Tags such that the absolute distance is decrementing. 3. Make sure that no faults are present in the system. (i) Track profile Available (Including Traffic Direction) up to 3000m or Movement Authority, whichever is less. (ii) Valid Radio Packets are receiving in communication mandatory area. (iii) Movement Authority is valid. 4. Check the traffic direction.	1. Onboard KAVACH should be enter into FS mode (after getting Valid MA & track profile up to 3000m (configurable) or movement authority which ever less, valid radio packets are available, one stop signal should be passed in off condition.	
			2. On DMI, FS mode should be shown, absolute location value should be in decremented and it can be verified on DMI.	
			3. If the absolute location value is decremented then it should be Reverse-R.	
			4. Onboard KAVACH should transmit the data (including location) to the station for every 2sec.	
			5. Check the parameters train speed, permitted speed, target distance, target speed to the Loco Pilot if any on DMI.	
			6. The Onboard KAVACH should receive the data from station for every 2sec Check the radio	

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	System Level TEST CASES (RDSO)			
Test ID	**Test Scenario**	**Input Specification**	**Expected Output/Values**	**Observed Output (Pass/Fail)**
			packet data and normal tag data in data logger.	
4.3.	Check that SR mode manual selection is not feasible from FS mode.	1. Keep the Onboard in FS mode. 2. Now press the SR and CNFM buttons on DMI.	Onboard KAVACH shall not transit from the existing mode.	
4.4.	To check the FS mode transition when track profile is not available from the REAR end of the train. **(FRS 7.2)**	1. Keep the Onboard OS mode. 2. Extend FS MA. 3. Extend track profile from the FRONT end of the train.	Onboard shall not transit FS mode.	
4.5.	To check the FS mode transition when track profile is available from the REAR end of the train. **(FRS 7.2)**	1. Keep the Onboard OS mode. 2. Extend FS MA. 3. Extend track profile from the REAR end of the train.	Onboard shall continue in FS mode after passing the approaching stop signal.	
4.6.	Check for supervision of train movement against dynamic speed profile in FS mode and Nominal direction. **(FRS 7.3)**	1. Keep the Onboard in FS mode. 2. Let the max train speed be 160 Kmph. 3. Let the max permissible speed of the track be 130 Kmph. 4. Let the PSR of 80 Kmph be programmed for a distance of 1000m and a TSR of 60 Kmph be programmed within the PSR for a distance of 200m. 5. Let the max permissible speed of the track be 160 Kmph. 6. Let of absolute location be X and direction is Nominal.	1. When the max permissible speed of the track is 130 Kmph, the Onboard KAVACH shall show the permitted speed as 130 Kmph.	
			2. On the approach of 80 Kmph PSR, Onboard KAVACH shall supervise against this, till the complete train is passed.	
			3. On the approach of 60 Kmph TSR, Onboard KAVACH shall supervise against this, till the complete train is passed.	
			4. When the max permissible	

<table>
<tr><th></th><th colspan="4">System Level TEST CASES (RDSO)</th></tr>
<tr><th>Test ID</th><th>Test Scenario</th><th>Input Specification</th><th>Expected Output/Values</th><th>Observed Output (Pass/Fail)</th></tr>
<tr><td></td><td></td><td>
<table>
<tr><th>TSR start</th><th>TSR end</th><th>TSR speed</th></tr>
<tr><td>X-200</td><td>X</td><td>30</td></tr>
<tr><td>X-100</td><td>X+100</td><td>40</td></tr>
<tr><td>X+100</td><td>X+200</td><td>75</td></tr>
<tr><td>X+800</td><td>X+1000</td><td>40</td></tr>
<tr><td>X+900</td><td>X+1100</td><td>30</td></tr>
<tr><td>X+1000</td><td>X+1200</td><td>60</td></tr>
</table>
</td><td>speed of the track is 160 Kmph, the Onboard KAVACH shall show the permitted speed as 160 Kmph.
5. Absolute location be X and direction is nominal.
<table>
<tr><th>TSR start</th><th>TSR end</th><th>TSR speed</th><th>Result OK/ Not OK</th></tr>
<tr><td>X-200</td><td>X</td><td>30</td><td></td></tr>
<tr><td>X-100</td><td>X+100</td><td>40</td><td></td></tr>
<tr><td>X+100</td><td>X+200</td><td>75</td><td></td></tr>
<tr><td>X+800</td><td>X+1000</td><td>40</td><td></td></tr>
<tr><td>X+900</td><td>X+1100</td><td>30</td><td></td></tr>
<tr><td>X+1000</td><td>X+1200</td><td>60</td><td></td></tr>
</table>
</td><td></td></tr>
<tr><td>4.7.</td><td>Check for supervision of train movement against dynamic speed profile in FS mode and Reverse direction. (FRS 7.3)</td><td>1. Keep the Onboard in FS mode.
2. Let the max train speed be 160 Kmph.
3. Let the max permissible speed of the track 130 Kmph.
4. Let the PSR of 80 Kmph be programmed for a distance of 1000m and a TSR of 60 Kmph be programmed within the PSR for a distance of 200m.</td><td>1. When the max permissible speed of the track is 130 Kmph, the Onboard KAVACH shall show the permitted speed as 130 Kmph.
2. On the approach of 80 Kmph PSR, Onboard KAVACH shall supervise against this, till the complete train is passed.</td><td></td></tr>
</table>

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<tr><td></td><td></td><td>5. Let the max permissible speed of the track 160 Kmph.
6. Let of absolute location be X and direction is Reverse
<table><tr><th>TSR start</th><th>TSR end</th><th>TSR speed</th></tr><tr><td>X+200</td><td>X</td><td>30</td></tr><tr><td>X+100</td><td>X-100</td><td>40</td></tr><tr><td>X-200</td><td>X-300</td><td>75</td></tr><tr><td>X-800</td><td>X-1000</td><td>40</td></tr><tr><td>X-900</td><td>X-1100</td><td>30</td></tr><tr><td>X-1000</td><td>X-1200</td><td>60</td></tr></table></td><td>3. On the approach of 60 Kmph TSR, Onboard KAVACH shall supervise against this, till the complete train is passed.</td><td></td></tr>
<tr><td></td><td></td><td></td><td>4. When the max permissible speed of the track is 160 Kmph, the Onboard KAVACH shall show the permitted speed as 160 Kmph.</td><td></td></tr>
<tr><td></td><td></td><td></td><td>5. Absolute location be X and direction is reverse<table><tr><th>TSR start</th><th>TSR end</th><th>TSR speed</th><th>Result OK/Not OK</th></tr><tr><td>X+200</td><td>X</td><td>30</td><td></td></tr><tr><td>X+100</td><td>X-100</td><td>40</td><td></td></tr><tr><td>X-200</td><td>X-300</td><td>75</td><td></td></tr><tr><td>X-800</td><td>X-1000</td><td>40</td><td></td></tr><tr><td>X-900</td><td>X-1100</td><td>30</td><td></td></tr><tr><td>X-1000</td><td>X-1200</td><td>60</td><td></td></tr></table></td><td></td></tr>
<tr><td>4.8.</td><td>Check for display for train speed, permitted speed, signal aspect, target type and target distance.
(FRS 7.4)</td><td>1. Make sure that Onboard KAVACH is in FS mode.
2. Note down the configured speed limit of the train.
3. Now keep the train in running with the speed up to the configured value.</td><td>1. Train has to run with the speed without any brake application.</td><td></td></tr>
<tr><td></td><td></td><td></td><td>2. The permitted speed limit on DMI should be the lower of LE/ train maximum speed.</td><td></td></tr>
<tr><td></td><td></td><td></td><td>3. The train speed shall be displayed.</td><td></td></tr>
</table>

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	System Level TEST CASES (RDSO)			
Test ID	**Test Scenario**	**Input Specification**	**Expected Output/Values**	**Observed Output (Pass/Fail)**
			4. The Signal aspect shall be displayed.	
			5. Create a target scenario like TSR/PSR. The target distance and speed shall be displayed.	
4.9.	Check for Mode transition to SB when CAB is changed in case of dual CAB or driving position is changed in case of single cab. **(FRS 21.1 (d) and (e))**	1. Keep the Onboard in FS mode. 2. Change the CAB.	Onboard KAVACH shall transit to SB mode. Check for mode on DMI, only after the train is come to standstill.	
4.10.	To verify over speed protection in FS Mode, when configured Onboard speed is less than section speed obtained.	1. Configure the Onboard maximum speed value such that it is less than the PSR. 2. Make sure that no faults are present in the system. 3. Cab is active and Onboard is in KAVACH territory and KAVACH, BIU is healthy. 4. Make sure that Onboard is in FS mode and any PSR received and these speeds are greater than the configured Onboard maximum speed.	1. Brakes should be applied based on Onboard speed, if it is within the range of FSB then FSB is applied or if it is within the range of EB then EB is applied. 2. Check the parameters train speed, permitted speed, target name, target distance, target speed to the Loco Pilot if any on DMI.	

	System Level TEST CASES (RDSO)			
Test ID	**Test Scenario**	**Input Specification**	**Expected Output/Values**	**Observed Output (Pass/Fail)**
4.11.	To verify over speed protection in FS Mode, when configured Onboard speed is less than section speed obtained.	1. Configure the Onboard maximum speed value such that it is less than the TSR. 2. Make sure that no faults are present in the system. 3. Cab is active and Onboard is in KAVACH territory and KAVACH BIU is healthy. 4. Make sure that Onboard is in FS mode and any TSR received but these speeds are more than the configured Onboard maximum speed. 5. Now simulate the condition such that the Onboard speed is more than the configured maximum value.	1. Brakes should be applied (NB, FSB, EB) based on Onboard speed along with warning.	
			2. Check the parameters train speed, permitted speed, target name, target distance, target speed to the Loco Pilot if any on DMI.	
4.12.	To check the LC gate operation in FS mode, when MA is more than the LC gate distance when LC gate tag is read in main line.	1. Make sure that train is in FS mode. 2. Simulate the condition such that the LC gate tag is received and the MA is more than the LC gate distance.	1. A message should be displayed on DMI, auto whistling should be ON within second after the tag is red, verify the LC gate related parameters.	
			2. Auto whistling should be ON until Loco Pilot gives ACK or LC gate is crossed by front end of the train.	
4.13.	To check the LC gate operation in FS mode when MA is not available up to the LC gate Tag location	1. Make sure that train is in FS mode. 2. MA is not available up to the LC gate location. 3. Move the Onboard and simulate the	1. A message should not be display on DMI. 2. Auto whistling should not be ON.	

	System Level TEST CASES (RDSO)			
Test ID	**Test Scenario**	**Input Specification**	**Expected Output/Values**	**Observed Output (Pass/Fail)**
	and LC gate tag is read.	condition such that the LC gate tag is read.	3. Verify the LC gate related parameters.	
4.14.	To check the LC gate operation in FS mode when MA is more than the LC gate distance when LC gate tag is not read, but TRACK PROFILE information is there throughout the main line.	1. Make sure that train is in FS mode. 2. Simulate the condition such that the LC gate tag is missed and the MA is more than the LC gate distance (No LC gate tag is swiped).	1. A message should be displayed on DMI 600m before the LC Gate, auto whistling should be ON, verify the LC gate related parameters.	
			2. Auto whistling should be ON until Loco Pilot gives ACK or LC gate is crossed by front end of the train.	
4.15.	To check the LC gate operation in FS mode when MA is more than the LC gate distance when LC gate tag is read in loop line.	1. Make sure that train is in FS mode. 2. Simulate the condition such that the LC gate tag is received and the MA is more than the LC gate distance and Onboard crossed the LC gate tag location.	1. A message should be display on DMI, auto whistling should be ON, verify the LC gate related parameters.	
			2. Auto whistling should be ON until Loco Pilot gives ACK or LC gate is crossed.	
			3. If the Onboard came to standstill, then the LC gate message should not show and buzzer should be OFF until the Onboard is in standstill.	
			4. Move the Onboard, LC gate	

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	System Level TEST CASES (RDSO)			
Test ID	**Test Scenario**	**Input Specification**	**Expected Output/Values**	**Observed Output (Pass/Fail)**
			Auto whistling should be ON & message shall be displayed in DMI. To stop Auto whistling, the loco pilot shall acknowledge. The acknowledgment shall be sent to stationary KAVACH for log.	
4.16.	To check the LC gate operation in FS mode when MA is more than the LC gate distance when LC gate tag is not read, but TRACK PROFILE information is there throughout the loop line.	1. Make sure that train is in FS mode. 2. Simulate the condition such that the LC gate tag is missed and the MA is more than the LC gate distance.	1. A message should be display on DMI, auto whistling should be ON 600m before the LC Gate, verify the LC gate related parameters.	
			2. Auto whistling should be ON until Loco Pilot gives ACK or LC gate is crossed.	
4.17.	To check the LC gate operation in FS mode when MA is not available up to the LC gate location and LC gate tag is read. But MA got extended subsequently.	1. Make sure that train is in FS mode but MA is not available up to the LC gate location. 2. Simulate the condition such that the LC gate tag is read. 3. MA got extended subsequently.	1. Till MA extension, no auto whistle shall be ON and no LC gate information to be displayed.	
			2. After MA extension, a message should be displayed on DMI, auto whistling should be ON, verify the LC gate related parameters.	
			3. Auto whistling should be ON until Loco Pilot gives ACK or LC gate is crossed by the front	

	System Level TEST CASES (RDSO)			
Test ID	**Test Scenario**	**Input Specification**	**Expected Output/Values**	**Observed Output (Pass/Fail)**
			end of the train.	
4.18.	To verify Roll back protection when Onboard movement is in Forward direction.	1. Make sure that train is in FS mode with forward direction selection. 2. Let configured roll back distance be 10m. 3. Simulate the condition such that roll back is detected in reverse direction.	1. Brake should not be applied till configured value of roll out. 2. MA should increase and absolute location should be decremented.	
			3. Brakes should be applied after configurable distance traveled.	
			4. The message **"Rollback Protection, Brake Applied"** should be displayed on DMI and audio alarm should be operated.	
			5. Brakes should be released when Onboard comes to standstill and loco pilot acknowledge.	
			6. The approaching signal distance shall be incremented.	
4.19.	To verify Roll back protection when Onboard movement is in reverse direction.	1. Make sure that train is in FS mode with reverse direction selection. 2. Let configured roll back distance be 10m. 3. Simulate the condition such that roll back is detected in forward direction.	1. Brake should not be applied till configured value of roll out. 2. MA should increase and absolute location should be incremented.	
			3. Brakes should be applied after configurable distance traveled.	
			4. The message "**Roll back Protection, Brake Applied**" should be displayed on DMI and audio alarm should be operated.	

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	System Level TEST CASES (RDSO)			
Test ID	**Test Scenario**	**Input Specification**	**Expected Output/Values**	**Observed Output (Pass/Fail)**
			5. Brakes should be released when Onboard comes to standstill and loco pilot acknowledge.	
			6. The approaching signal distance shall be incremented.	
4.20.	To verify Roll away (Forward direction) protection when Onboard is in standstill.	1. Power on the system. 2. Make sure that no faults are present. 3. FS mode with Onboard standstill. 4. Simulate the condition such that roll away in forward direction is detected. 5. Reverser shall be in neutral position.	1. Brakes should be applied after configurable distance travelled forward and MA should decrease.	
			2. The message "**Roll back Protection, Brake applied**" should be displayed on DMI and audio alarm should be operated.	
			3. Brake should not be released on run, if acknowledged by loco pilot.	
			4. Brakes should be released at standstill after acknowledgement by loco pilot.	
4.21.	To verify Roll away (reverse direction) protection when Onboard is in standstill.	1. Power on the system. 2. Make sure that no faults are present. 3. FS mode with Onboard standstill. 4. Simulate the condition such that roll away in reverse direction is detected.	1. Brakes should be applied after configurable distance travelled reverse and MA should increase.	
			2. The message **"Roll back Protection, Brake applied"** should be displayed on DMI and	

	System Level TEST CASES (RDSO)			
Test ID	**Test Scenario**	**Input Specification**	**Expected Output/Values**	**Observed Output (Pass/Fail)**
		5. Reverser shall be in neutral position.	audio alarm should be operated.	
			3. Brakes should be released at standstill after acknowledgement by loco pilot.	
4.22.	To verify Roll back (reverse direction) protection when Onboard is in standstill.	1. Power on the system. 2. Make sure that no faults are present. 3. FS mode with Onboard standstill. 4. Simulate the condition such that roll away in reverse direction is detected. 5. Reverser shall be in forward position.	1. Brakes should be applied after configurable distance travelled reverse and MA should increase.	
			2. The message "**Roll back Protection, Brake applied**" should be displayed on DMI and audio alarm should be operated.	
			3. Brakes should be released at standstill after acknowledgement by loco pilot.	
4.23.	To verify Roll away mean loco move forward (forward direction) protection when Onboard is in standstill.	1. Power on the system. 2. Make sure that no faults are present. 3. Simulate the condition such that roll away in forward direction is detected. 4. Reverser shall be in reverse position.	1. Brakes should be applied after configurable distance travelled forward and MA should decrease.	
			2. The message "**Rollback Protection, Brake applied**" should be displayed on DMI and audio alarm should be operated.	
			3. Brakes should be released at standstill after acknowledgement by loco pilot.	

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	System Level TEST CASES (RDSO)			
Test ID	**Test Scenario**	**Input Specification**	**Expected Output/Values**	**Observed Output (Pass/Fail)**
4.24.	Train length measurement in FS mode for formation.	1. Make sure that train is in FS mode with default train length, and train formation is selected. 2. Simulate the condition such that Onboard is passed in block section over the track circuits so that train length calculation is happened successfully by Onboard KAVACH. 3. The updated train length can be verified as follows, keep the Onboard in constant speed of 60kmph. Keep the track circuit time as 1min, the train length should be 1000m (d=s*t).	The default train length will be replaced with the calculated train length if it differs by more than 25m.	
4.25.	Train length verification in FS mode after system restart.	1. Power cycle the Onboard KAVACH. 2. Configure the train type as passenger train type with suitable coach selection. 3. Note down the train length as its length is 400mts say. 4. Now keep the Onboard in FS mode and train length measurement test may be carried out by keeping the train in constant speed of 60 kmph and track circuit up time as 1 minute. The train length should be 1000m.	The default train length shall be displayed as per selected train configuration. The train length shall be updated after Train Length measurement.	

	System Level TEST CASES (RDSO)			
Test ID	**Test Scenario**	**Input Specification**	**Expected Output/Values**	**Observed Output (Pass/Fail)**
		5. The updated value should show on DMI.		
4.26.	Train length verification in FS mode after cab change.	1. Power cycle the Onboard KAVACH. 2. Configure the train type as passenger train type with suitable coach selection. 3. Note down the default train length as its length is 400mts say. 4. Now keep the Onboard in FS mode and train length measurement test may be carried out by keeping the train in constant speed of 60 kmph and track circuit up time as 1 minute. The train length should be 1000m. 5. The updated value should show on DMI. 6. Change the CAB, select the train configuration as above and check the train length.	The default train length shall be displayed as per selected train configuration. The train length shall be updated after Train Length measurement.	

	System Level TEST CASES (RDSO)			
Test ID	**Test Scenario**	**Input Specification**	**Expected Output/Values**	**Observed Output (Pass/Fail)**
4.27.	Train length measurement in FS mode and it is within range of entered value while train configuration is provided. **(Start of mission)**	1. Power on the system, and note down the train length value which is configured (Default). 2. Make sure that no faults are present. 3. Make sure that train is in FS mode. 4. Now simulate the condition such that Onboard KAVACH received the track circuits data from station KAVACH and Onboard KAVACH will compute the train length, the difference between the computed value and the configured value is less than 25mts.	The train length should be updated.	
		5. Repeat the train length calculation step -4 but the train length should be less than the 25mts from the previous value. It is simulated as the track circuit occupation time is more than the previous scenario.	The train length should be updated.	

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	System Level TEST CASES (RDSO)			
Test ID	**Test Scenario**	**Input Specification**	**Expected Output/Values**	**Observed Output (Pass/Fail)**
4.28.	Train length measurement in FS mode and it is within range of entered value while train configuration is provided.	1. Power on the system, and note down the train length value which is configured. 2. Make sure that no faults are present. 3. Make sure that train is in FS mode. 4. Now simulate the condition such that Onboard KAVACH received the track circuits data from station KAVACH and Onboard KAVACH will compute the train length, the difference between the computed value and the configured value is more than 25mts. 5. Now change the CAB inactive and make Active. 6. Repeat the train length calculation step4 but the train length should be less than the 25mts from the previous value. It is simulated as the track circuit occupation time is less than the previous scenario.	The train length should be updated. The train length should not be updated.	
4.29.	Train length verification in FS mode after system restart and TLM start packet received from one station and TLM end packet received from next station.	1. Make sure that train is in FS mode with default train length, and train formation is selected. (Default) 2. Configure the train type as passenger train type with suitable coach selection. 3. Note down the train length as its	1. Message shall be displayed on DMI that **"Train length Computation Success"** 2. Check that updated TLM length is displayed on DMI.	

	System Level TEST CASES (RDSO)			
Test ID	**Test Scenario**	**Input Specification**	**Expected Output/Values**	**Observed Output (Pass/Fail)**
		length is 400mts say. 4. Now keep the Onboard in FS mode and train length measurement test may be carried out by keeping the train in constant speed of 60 kmph and track circuit up time as 1 minute. The train length should be 1000m. 5. TLM start packet received from 1st station. 6. TLM end packet received from the next adjacent station.		
4.30.	Train length verification in FS mode after system restart and TLM start packet received from adjacent station and TLM end packet received from same adjacent station.	1. Make sure that train is in FS mode with default train length, and train formation is selected. (Default) 2. Configure the train type as passenger train type with suitable coach selection. 3. Note down the train length as its length is 400mts say. 4. Now keep the Onboard in FS mode and train length measurement test may be carried out by keeping the train in constant speed of 60 kmph and track circuit up time as 1 minute. The train length should be 1000m. 5. TLM start packet received adjacent station.	1. Message shall be displayed on DMI that **"Train length Computation Success"** 2. Check that updated TLM length is displayed on DMI.	

	System Level TEST CASES (RDSO)			
Test ID	**Test Scenario**	**Input Specification**	**Expected Output/Values**	**Observed Output (Pass/Fail)**
		6. TLM end packet received from the same adjacent station.		
4.31.	Train length verification in FS mode after system restart and TLM start and TLM end packet received from same station.	1. Make sure that train is in FS mode with default train length, and train formation is selected. (Default) 2. Configure the train type as passenger train type with suitable coach selection. 3. Note down the train length as its length is 400mts say. 4. Now keep the Onboard in FS mode and train length measurement test may be carried out by keeping the train in constant speed of 60 kmph and track circuit up time as 1 minute. The train length should be 1000m. 5. TLM start and end packet received from same station.	1. Message shall be displayed on DMI that **"Train length Computation Success**" 2. Check that updated TLM length is displayed on DMI.	
4.32.	Train length verification in FS mode after system restart and TLM start and TLM end packet received from same station. (In case of failure of AT & BT track circuits i.e. remaining occupied for more than 3 minutes	1. Make sure that train is in FS mode with default train length, and train formation is selected. (Default) 2. Configure the train type as passenger train type with suitable coach selection. 3. Note down the train length as its length is 400mts say. 4. Now keep the Onboard in FS mode. (Example-train length measurement	1. TLM end packet shall not be send by SKAVACH. 2. Verify in the log.	

	System Level TEST CASES (RDSO)			
Test ID	**Test Scenario**	**Input Specification**	**Expected Output/Values**	**Observed Output (Pass/Fail)**
	(programmable from 0 to 10 minutes in step of 30 seconds), Stationary KAVACH unit shall not transmit packet & shall log it) **(Clause-8.1.6 of SRS).**	test may be carried out by keeping the train in constant speed of 60 kmph and track circuit up time as 1 minute. The train length should be 1000m.) 5. TLM start packet received from same station. 6. AT & BT track circuits shall remain occupied more than 180 second.		
4.33.	To check the unusual block stoppage SOS is received in FS mode and no L-tag details available. **(FRS 31.2)**	1. Power on the system. 2. Make sure that no faults are present and note down the configured speed limit of FS mode. 3. Make sure that Onboard1 is in FS mode. 4. Now simulate the condition such that the SOS is received from Onboard2 which is stopped in block section (other Onboard is in OS or FS mode with MA>300mts), both Onboard1 and Onboard2 are in same/ opposite direction on different track.	1. Message "**Ack Block stop SoS Generates in XX s**" should be generated in the originating Onboard.	Onboard 2
			2. If LP acknowledges train stop, the above message shall get stopped.	Onboard 2
			3. If MA in Onboard2 is shortened to less than 300m, the SoS should get cancelled.	Onboard 2
			4. After 7 seconds (configurable), Onboard 1 shall receive the message "SoS – From Onboard xxxxxx stopped in Block Section".	Onboard1
			5. If LP acknowledges train stop, the above message shall get stopped.	Onboard 2

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	System Level TEST CASES (RDSO)			
Test ID	**Test Scenario**	**Input Specification**	**Expected Output/Values**	**Observed Output (Pass/Fail)**
			6. The speed of Onboard1 if in rear should reach 0 kmph just before the point of Onboard2 and train length.	Same direction on other line
			7. The speed of Onboard1 if in ahead should not be affected.	Same direction on other line
			8. The speed of Onboard1 if in rear should not be affected.	Opposite direction
			9. The brake shall be applied in Onboard1 and come to zero kmph speed just before the point of Onboard2. including train length.	Opposite direction
			10. After crossing the location of Onboard2, the Onboard1 should maintain the speed to 30kmph till the train passes the originating location of SoS.	Same direction on other line
			11. After crossing the location of Onboard2, the Onboard1 should maintain the speed to 30kmph till the train passes the originating location of SoS.	Opposite direction on other line
4.34.	To check the unusual block stoppage SOS is received in FS mode. Onboard movement in Reverse	1. Power on the system. 2. Make sure that no faults are present and note down the configured speed limit of FS mode.	1. Message “Ack Block stop, SoS Generates in XXs” should be generated in the originating Onboard.	Onboard 2

	System Level TEST CASES (RDSO)			
Test ID	**Test Scenario**	**Input Specification**	**Expected Output/Values**	**Observed Output (Pass/Fail)**
	direction and L-Tag details available. **(FRS 31.2)**	3. Make sure that Onboard1 is in FS mode. 4. Now simulate the condition such that the SOS is received from Onboard2 which is stopped in block section (other Onboard is in OS or FS mode with MA>300mts), both Onboard1 and Onboard2 are in same/ opposite direction on different track.	2. If LP acknowledges train stop, the above message shall get stopped.	Onboard 2
			3. If MA in Onboard2 is shortened to less than 300m, the SoS should get cancelled.	Onboard 2
			4. After 7 seconds (configurable), Onboard 1 shall receive the message "SoS – From Onboard xxxxxx stopped in Block Section".	Onboard1
			5. If LP acknowledges train stop, the above message shall get stopped.	Onboard 2
			6. The speed of Onboard1 if in rear should reach 0 kmph just before the point of Onboard2.	Same direction on other line
			7. The speed of Onboard1 if in ahead should not be affected.	Same direction on other line
			8. The speed of Onboard1 if in rear should not be affected	Opposite direction on other line
			9. The speed of Onboard1 if ahead should reach 0 kmph just before the point of Onboard2 and train length.	Opposite direction on other line

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	System Level TEST CASES (RDSO)			
Test ID	**Test Scenario**	**Input Specification**	**Expected Output/Values**	**Observed Output (Pass/Fail)**
			10. After crossing the location of Onboard2, the Onboard1 should maintain the speed to 30kmph till the train passes the originating location of SoS.	Same direction on other line
			11. After crossing the location of Onboard2, the Onboard1 should maintain the speed to 30kmph till the train passes the originating location of SoS.	Opposite direction on other line
4.35.	Unusable stoppage message received from other lines mentioned in L-Tag.	1. Power on the system. 2. Make sure that no faults are present and note down the configured speed limit of FS mode. 3. Make sure that Onboard1 is in FS mode. 4. Now simulate the condition such that the SOS is received from Onboard2 which is stopped in block section (other Onboard is in OS or FS mode with MA>300mts), both Onboard1 and Onboard2 are in same/ opposite direction on different track. 5. Adjacent tag info is available for infringement line.	1. Message “Ack Block stop SoS Generates in XX s” should be generated in the originating Onboard.	Onboard 2
			2. If LP acknowledges train stop, the above message shall get stopped.	Onboard 2
			3. If MA in Onboard2 is shortened to less than 300m, the SoS should get cancelled.	Onboard 2
			4. After 7 seconds (configurable), Onboard 1 shall receive the message “SoS – From Onboard xxxxxx stopped in Block Section”.	Onboard1
			5. If LP acknowledges train stop, the above message shall get stopped.	Onboard 2

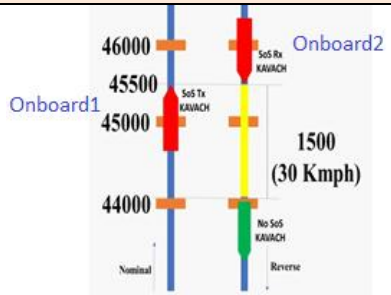
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	System Level TEST CASES (RDSO)			
Test ID	**Test Scenario**	**Input Specification**	**Expected Output/Values**	**Observed Output (Pass/Fail)**
			6. The speed of Onboard1 if in rear should reach 0 kmph just before the point of Onboard2 and train length if it is infringement line.	Same direction on other line
			7. The speed of Onboard1 if in ahead should not be affected.	Same direction on other line
			8. The speed of Onboard1 if in rear should not be affected.	Opposite direction
			9. The speed of Onboard1 if ahead should reach 0 kmph just before the point of Onboard2 including train length.	Opposite direction
			10. After crossing the location of Onboard2, the Onboard1 should maintain the speed to 30kmph till the train passes the originating location of SoS.	Same direction on other line
			11. After crossing the location of Onboard2, the Onboard1 should maintain the speed to 30kmph till the train passes the originating location of SoS.	Opposite direction on other line
4.36.	Unusable stoppage message received from other lines mentioned in L-Tag and L-Tag not read or message not	1. Power on the system. 2. Make sure that no faults are present and note down the configured speed limit of FS mode.	1. Message “Ack Block stop, SoS Generates in XX s” should be generated in the originating Onboard-2.	Onboard 2

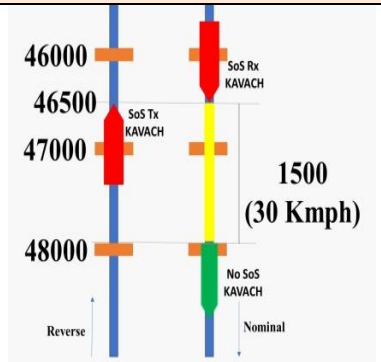
	System Level TEST CASES (RDSO)			
Test ID	**Test Scenario**	**Input Specification**	**Expected Output/Values**	**Observed Output (Pass/Fail)**
	received in Radio packet.	3. Make sure that Onboard 1 is in FS mode. 4. Now simulate the condition such that the SOS is received from Onboard 2 which is stopped in block section (other Onboard is in OS or FS mode with MA>300mts), both Onboard1 and Onboard2 are in same/ opposite direction on different track. 5. Adjacent tag info is available and not infringe another line.	2. If LP acknowledges train stop, the above message shall get stopped.	Onboard 2
			3. If MA in Onboard2 is shortened to less than 300m, the SoS should get cancelled.	Onboard 2
			4. After 7 seconds (configurable), Onboard 1 shall receive the message "SoS – From Onboard xxxxxx stopped in Block Section".	Onboard1
			5. If LP acknowledges train stop, the above message shall get stopped.	Onboard 2
			6. The speed of Onboard-1 if in rear should reach 0 kmph just before the point of Onboard2 and train length.	Same direction on other line
			7. The speed of Onboard1 if in ahead should not be affected.	Same direction on other line
			8. The speed of Onboard1 if in rear should not be affected.	Opposite direction
			9. The speed of Onboard1 if ahead should reach 0 kmph just before the point of Onboard2 including train length.	Opposite direction

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	System Level TEST CASES (RDSO)			
Test ID	**Test Scenario**	**Input Specification**	**Expected Output/Values**	**Observed Output (Pass/Fail)**
			10. After crossing the location of Onboard2, the Onboard1 should maintain the speed to 30kmph till the train passes the originating location of SoS.	Same direction on other line
			11. After crossing the location of Onboard2, the Onboard1 should maintain the speed to 30kmph till the train passes the originating location of SoS.	Opposite direction on other line
4.37.	To verify the SOS generation due to unusual stoppage in block section when MA<300mts.	1. Make sure that train is in FS mode with MA < 300mts. 2. Simulate the condition that Onboard stops in block section and wait for 7 sec.	The message for ACK should not display. SOS should not be generated even after 7 sec.	
4.38.	To verify the manual SOS transmission Onboard movement in nominal direction.	1. Make sure that two trains are in FS mode. 2. Make sure that two Onboards are on in same block section on different lines with different TIN, within 3km region, with opposite direction. Onboard1 is ahead of Onboard2. 3. Now stop the Onboard1 in the region MA>300mts and generate	1. In Onboard2, SOS from the Onboard1 should display. Speed should control to 0kmph in Onboard2 before reaching the Onboard1 location. 2. Brakes should apply in Onboard2. The SOS LED should be in red color. 3. After stopping of Onboard-2 in block section, the unusual stoppage SoS shall not be generated in Onboard -2.	

	System Level TEST CASES (RDSO)			
Test ID	**Test Scenario**	**Input Specification**	**Expected Output/Values**	**Observed Output (Pass/Fail)**
		manual SOS. 4. Check the SOS status in Onboard2 and observe the speed control up to 1500mts in Onboard2 without canceling the Onboard1 SOS.	4. After stopping near the Onboard1 location, brakes should release and speed restriction for 30kmph should maintain in Onboard-2 up to 1500mts from the point of source.	
			5. After traveling 1500mts from the Onboard1 position, speed limit should not be shown. Increase the speed beyond 30kmph and no brakes should apply. The SOS LED should be in green color.	
		5. Repeat the same scenario and check the SOS speed limit in Onboard2, by canceling the SOS in Onboard1 before Onboard2 traveling 1500mts.	6. SOS generated shall be cancelled in Onboard2. Brake should release. The SOS should be in green color.	
4.39.	To verify the manual SOS transmission Onboard movement in reverse direction.	1. Make sure that two trains are in FS mode. 2. Make sure that two Onboard are on in same block section on different lines with different TIN, within 3km region, with opposite direction. Onboard1 is ahead of	1. In Onboard2, SOS from the Onboard1 should display. Speed should control to 0kmph in Onboard2 before reaching the Onboard1 location. Brakes should apply in Onboard2. The SOS LED should be in red color.	

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	System Level TEST CASES (RDSO)			
Test ID	**Test Scenario**	**Input Specification**	**Expected Output/Values**	**Observed Output (Pass/Fail)**
		Onboard2. 3. Now stop the Onboard1 in the region MA>300mts and generate manual SOS. 4. Check the SOS status in Onboard2 and observe the speed control up to 1500mts in Onboard2 without canceling the Onboard1 SOS.	2. After stopping near the Onboard1 location, brakes should release and speed restriction for 30kmph should maintain in Onboard-2 up to 1500mts from the point of source. 3. After traveling 1500mts from the Onboard1 position, speed limit should not be shown. Increase the speed beyond 30kmph and no brakes should apply. The SOS LED should be in green color.	
		5. Repeat the same scenario and check the SOS speed limit in Onboard2, by canceling the SOS in Onboard1 before Onboard2 traveling 1500mts.	4. SOS generated shall be cancelled in Onboard2. Brake should release. The SOS should be in green color.	
4.40.	Brakes releasing when SOS is not received for more than 180 seconds say continuously after receiving the SOS in block section. **(FRS 31.4.7 (c))**	1. Simulate two Onboard (Onboard1, Onboard2) are in the block section within 3kms. 2. Now give the manual SOS from Onboard1, by activation the buttons COM and SOS. 3. After confirmation of SOS, fail the radio communication in Onboard-1 and wait for 180 seconds (configurable).	30kmph speed limit should be released after 3minutes in the SOS received Onboard2.	

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	System Level TEST CASES (RDSO)			
Test ID	**Test Scenario**	**Input Specification**	**Expected Output/Values**	**Observed Output (Pass/Fail)**
4.41.	Manual SOS in the stationary KAVACH region.	1. Simulate two Onboard (Onboard1, Onboard2) are in the stationary KAVACH region with speed more than 30kmph. 2. Now give the manual SOS from station, by activation the buttons COM and SOS in stationary KAVACH. 3. After conformation of SOS, cancel the SOS by activation the buttons COM and ACK.	1. A SOS should transmit to the Onboard which are within station region. Brakes are applied in both Onboard, the SOS event should be log in Data logger and it can be checked on DMI. 2. After SOS condition recovered, set the speed more than 30kmph the Onboard should attain the speed.	
4.42.	To check the configuration change in FS. **(FRS 19.2.1)**	1. Power on the system. 2. Make sure that no faults are present in the system. 3. Cab is active and Onboard is in KAVACH territory and KAVACH is healthy. 4. Make sure that Onboard is in FS mode. 5. Change the train configuration. 6. Now simulate the condition such that brake test is completed.	1. Check that brake testing after configuration. 2. Configuration should be success with change. 3. There shall not be any change in mode. Onboard should continue in FS mode. 4. New DC value shall be reflected on DMI.	
4.43.	To verify the brake application when SOS is received when driving from short hood (Cab-1).	1. Power on the system. 2. Make sure that no faults are present in the system. 3. Cab is active and Onboard is in KAVACH territory and KAVACH is healthy. 4. Make sure that Onboard is in FS	Brakes shall be applied in Onboard. Traction should be cut off.	

	System Level TEST CASES (RDSO)			
Test ID	**Test Scenario**	**Input Specification**	**Expected Output/Values**	**Observed Output (Pass/Fail)**
		mode. 5. Simulate the condition such that SOS is received from stationary KAVACH.		
4.44.	To verify the brake application when SOS is received when driving from long hood (Cab-2).	1. Power on the system. 2. Make sure that no faults are present in the system. 3. Cab is active and Onboard is in KAVACH territory and KAVACH is healthy. 4. Make sure that Onboard is in FS mode. 5. Simulate the condition such that SOS is received from stationary KAVACH.	Brakes shall be applied in Onboard. Traction should be cut off.	
4.45.	To verify the brake application when TIN conflict occurred.	1. Power on the system. 2. Make sure that no faults are present in the system. 3. Cab is active and Onboard is in KAVACH territory and KAVACH is healthy. 4. Make sure that Onboard is in FS mode and other Onboard is in SR/LS Mode. 5. Simulate the condition such that the two Onboard are in same station region with same TIN.	Brakes shall be applied in rear end Onboard only. Traction should be cut off.	
4.46.	Onboard specific SOS is received.	1. Simulate two Onboard are in the station region with speed more than	1. A SOS should transmit to the Onboard ONBOARD1 only.	

	System Level TEST CASES (RDSO)			
Test ID	**Test Scenario**	**Input Specification**	**Expected Output/Values**	**Observed Output (Pass/Fail)**
		30kmph. 2. Now simulate the Onboard specific SOS from station to the ONBOARD1 only.	Brakes are applied in that Onboard only, the SOS event should be log in Data logger and it can be check on DMI.	
			2. The other Onboard shall not be effected by SoS.	
			3. Stopping of this train shall not have impact on the other train.	
4.47.	To check the MBT test success.	1. Power on the system. 2. Make sure that no faults are present in the system. 3. Cab is active and Onboard is in KAVACH territory and KAVACH is healthy. 4. Make sure that Onboard is in FS mode and is in standstill. 5. Now do the MBT test.	MBT test should be success.	
4.48.	To check the MBT test failure.	1. Power on the system. 2. Make sure that no faults are present in the system. 3. Cab is active and Onboard is in KAVACH territory and KAVACH is healthy. 4. Make sure that Onboard is in FS mode and is in standstill. 5. Now do the MBT test and EM cock closed.	1. Check in DMI that "EB Bypassed (EB cock closed, No Traction)". 2. Onboard should transit to SB mode.	
4.49.	MA is available, one turnout	1. Power on the system.	1. Check that profile speed in LP-	

	System Level TEST CASES (RDSO)			
Test ID	**Test Scenario**	**Input Specification**	**Expected Output/Values**	**Observed Output (Pass/Fail)**
	data is received with speed of 15 Kmph.	2. Make sure that no faults are present in the system and system is in FS mode. 3. Cab is active and Onboard is in KAVACH territory and KAVACH is healthy. 4. Now simulate the condition such that turnout data is received. 5. Make that the Onboard speed is higher than the turnout speed.	OCIP shall be 15 Kmph and speed should be reduced to turnout speed limit. 2. Message shall be displayed in DMI as**" Turnout speed in XXXXm with Speed limit of YYY kmph**".	
4.50.	MA is available, one turnout data is received with speed of 30 Kmph.	1. Power on the system. 2. Make sure that no faults are present in the system and system is in FS mode. 3. Cab is active and Onboard is in KAVACH territory and KAVACH is healthy. 4. Now simulate the condition such that turnout data is received for Turnout-1. 5. Make that the Onboard speed is higher than the turnout speed.	Check that profile speed in LP-OCIP shall be 30 Kmph and speed should be reduced to turnout speed limit.	
4.51.	MA is available, more than one turnout data is received. Turnout1: 30 kmph Turnout2: 15 kmph	1. Power on the system. 2. Make sure that no faults are present in the system and system is in FS mode. 3. Cab is active and Onboard is in KAVACH territory and KAVACH is healthy.	1. Check that profile speed in LP-OCIP shall be 15 Kmph and speed should be reduced to turnout speed limit. 2. Speed shall be regulated to 30 kmph from the mouth of the 1st turn out.	

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	System Level TEST CASES (RDSO)			
Test ID	**Test Scenario**	**Input Specification**	**Expected Output/Values**	**Observed Output (Pass/Fail)**
		4. Now simulate the condition such that turnout data is received for Turn out as 30 kmph and turnout as 15 kmph. 5. Make that the Onboard speed is higher than the turnout speed.	3. Speed shall be regulated to 15 kmph from the mouth of 2nd turnout.	
4.52.	To check the signal foot tag data at stop signal.	1. Power on the system. 2. Make sure that no faults are present in the system. 3. Cab is active and Onboard is in KAVACH territory and KAVACH is healthy. 4. Make sure that Onboard is in FS mode. 5. Now simulate the condition such that signal foot tag is received at stop signal with the distance -10m to 10m. 6. MA should be more than approaching signal.	The extracts data should match with the mentioned data in Annexure-D and check the data in Data logger.	
4.53.	To check the signal approach tag data from the distance of 150m to 250m before the stop signal.	1. Power on the system. 2. Make sure that no faults are present in the system. 3. Cab is active and Onboard is in KAVACH territory and KAVACH is healthy. 4. Make sure that Onboard is in FS mode. 5. Now simulate the condition such	The data should match with the mentioned data in Annexure-D and check the data in Data logger.	

	System Level TEST CASES (RDSO)			
Test ID	**Test Scenario**	**Input Specification**	**Expected Output/Values**	**Observed Output (Pass/Fail)**
		that signal approach tag is received.		
4.54.	To check the TIN discrimination (turn out) tag data.	1. Power on the system. 2. Make sure that no faults are present in the system. 3. Cab is active and Onboard is in KAVACH territory and KAVACH is healthy. 4. Make sure that one Onboard is in FS mode. 5. Now simulate the condition such that TIN discrimination tag is received.	The data should match with the mentioned data in Annexure-D and check the data in Data logger.	
4.55.	To check the LC gate tag data.	1. Power on the system. 2. Make sure that no faults are present in the system. 3. Cab is active and Onboard is in KAVACH territory and KAVACH is healthy. 4. Make sure that Onboard is in FS mode. 5. Now simulate the condition such that LC gate tag is received.	The data should match with the mentioned data in Annexure-D and check the data in Data Logger.	
4.56.	Odometer correction, calculated distance is less than the received tag data.	1. Power on the system. 2. Make sure that no faults are present in the system. 3. Cab is active, user selected forward or reverse direction, train movement direction is computed based on speed sensors and	The Abs. Location (odometer error) should be corrected, if tag read within the limit of L_DOUBT OVER / L_DOUBT UNDER.	

	System Level TEST CASES (RDSO)			
Test ID	**Test Scenario**	**Input Specification**	**Expected Output/Values**	**Observed Output (Pass/Fail)**
		Onboard is in KAVACH territory and KAVACH is healthy. 4. Now simulate the condition such that the calculated distance is less than the received tag data.		
4.57.	Odometer correction, calculated distance is more than the received tag data.	1. Power on the system. 2. Make sure that no faults are present in the system. 3. Cab is active, user selected forward or reverse direction, train movement direction is computed based on speed sensors and Onboard is in KAVACH territory and KAVACH is healthy. 4. Now simulate the condition such that the calculated distance is more than the received tag data.	The Abs. Location (odometer error) should be corrected if it is within the ±5% +5 meter of train travelled distance from last tag and it shall not be more than 55 meters. If tag is read out of this window, then no correction shall be there and Tag reported as miss tag.	
4.58.	To verify normal brake functionality for light engine and formation.	1. Power on the system, make sure that brake test is success. 2. After brake test select the configuration as light engine. 3. Make sure that train is in FS mode. 4. Now simulate the condition such that normal brakes are applied through KAVACH. To simulate this condition, keep the speed such that, it is more than the MRSP+NSB and less than the MRSP+FSB limit.	Normal brakes should be applied. This can be verifying by checking the BP value. On DMI, the NB brake symbol can be checked.	Light Engine Formation Buzzer

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	System Level TEST CASES (RDSO)			
Test ID	**Test Scenario**	**Input Specification**	**Expected Output/Values**	**Observed Output (Pass/Fail)**
		5. Same steps repeat for formation configuration.		
4.59.	To verify normal brake functionality For Vande Bharat trains or EMUs or other self-propelled vehicles.	1. Power on the system, make sure that brake test is success. 2. Make sure that train is in FS mode. 3. Now simulate the condition such that normal brakes are applied through KAVACH. To simulate this condition, keep the speed such that, it is more than the MRSP+NSB and less than the MRSP+FSB limit. 4. Same steps repeat for formation configuration.	1. Normal brakes should not be applied. 2. NB symbol shall not be shown on DMI. 3. If FSB applied, the FSB symbol shall be shown.	
4.60.	To verify Full Service brake functionality for light engine and formation.	1. Power on the system, make sure that brake test is success. 2. Make sure that no faults are present and no formation is there. 3. Make sure that train is in FS mode and BIU is healthy. 4. Now simulate the condition such that Full Service brakes are applied through KAVACH. To simulate this condition, keep the speed such that, it is more than the MRSP+FSB and less than the MRSP+EB limit. 5. Same steps repeat for formation Configuration.	Full Service brakes should be applied, on DMI the FSB brake symbol can be checked.	Light Engine Formation Buzzer

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	System Level TEST CASES (RDSO)			
Test ID	**Test Scenario**	**Input Specification**	**Expected Output/Values**	**Observed Output (Pass/Fail)**
4.61.	To verify Emergency brake functionality for light engine and formation.	1. Power on the system, make sure that brake test is success. 2. Make sure that no faults are present and no formation is there. 3. Make sure that train is in FS mode and BIU is healthy. 4. Now simulate the condition such that emergency brakes are applied through KAVACH. To simulate this condition, keep the speed such that, it is more than the MRSP+EB limit. 5. Same steps repeat for formation configuration.	Emergency brakes should be applied; on DMI the EB brake symbol can be checked.	Light Engine Formation Buzzer
4.62.	To check FS mode to OS mode transition when all conditions are satisfied for home/ starter signal. **(FRS 7.5 (a))**	1. Power on the system. 2. Make sure that no faults are present. 3. Make sure that train is in FS mode. 4. Now keep the Onboard in standstill 5. FS MA<200mts and Loco Pilot request override option by pressing “OVRD” and “CNFM” buttons.	1. Override selected is to be shown on DMI. 2. The 6-digit counter should be incremented by one. 3. Check that OSMA is received from stationary KAVACH up to foot of approaching signal irrespective of signal aspect. 4. Signal aspect shall be linked only within 200 meters if there is no KAVACH equipped train.	
4.63.	To check FS mode to OS mode transition when all conditions are satisfied for	1. Power on the system. 2. Make sure that no faults are present.	Override shall not be selected.	

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	System Level TEST CASES (RDSO)			
Test ID	**Test Scenario**	**Input Specification**	**Expected Output/Values**	**Observed Output (Pass/Fail)**
	home/ starter signal. **(FRS 7.5 (a))**	3. Make sure that train is in FS mode. 4. Onboard is on run. 5. FS MA<200mts and Loco Pilot request override option by pressing "OVRD" and "CNFM" buttons.		
4.64.	To check FS mode to OS mode transition when all conditions are satisfied for Advanced starter/ IB signal. **(FRS 7.5 (a))**	1. Power on the system. 2. Make sure that no faults are present. 3. Make sure that train is in FS mode. 4. Keep the Advanced starter stop Signal in ON aspect (RED). 5. Now keep the Onboard in on run. 6. Loco Pilot request override option by pressing "OVRD" and "CNFM" buttons.	1. Override selected is to be shown on DMI.	
			2. The 6-digit counter should be incremented by one.	
			3. Check that OSMA is received from stationary KAVACH up to foot of next approaching signal irrespective of signal aspect.	
			4. Next Signal aspect shall be linked only if there is no KAVACH equipped train within 200 meters when S-KAVACH to S-KAVACH is not available.	
4.65.	To check FS mode to OS mode transition when all conditions are satisfied for Advanced starter/ IB signal and linking of approaching signal. **(FRS 7.5 (a))**	1. Power on the system. 2. Make sure that no faults are present. 3. Make sure that train is in FS mode. 4. Now keep the Onboard in on run. 5. Loco Pilot request override option by pressing "OVRD" and "CNFM"	1. Override selected is to be shown on DMI and	
			2. The 6-digit counter should be incremented by one.	
			3. Check that OSMA is received from stationary KAVACH up to rear of collision margin.	

	System Level TEST CASES (RDSO)			
Test ID	**Test Scenario**	**Input Specification**	**Expected Output/Values**	**Observed Output (Pass/Fail)**
		buttons. 6. Another train is available before the approaching stop signal.	4. Signal aspect shall not be linked and Onboard shall stop in rear of collision margin.	
4.66.	To check FS mode to OV Selected transition when FS MA > 200mts for home/ starter signal. **(FRS 7.5 (a))**	1. Power on the system. 2. Make sure that no faults are present. 3. Make sure that train is in FS mode. 4. Now keep the Onboard in standstill. 5. MA>200mts and Loco Pilot request override option.	1. System will continue in FS mode only, same is to be shown on DMI. 2. There shall be no increment in OV counter.	
4.67.	To check FS mode to OS mode transition when Onboard is in standstill when approaching LSS at danger irrespective of MA. **(FRS 7.5 (b))**	1. Make sure that train is in FS mode. 2. Now keep the Onboard in standstill position. 3. LP request override option. 4. OS MA received from the station.	1. System shall transit to OS mode with no mode specific speed limit, OV counter should increment by one and the same is to be shown on DMI. 2. The speed limit shall be governed by 'Authorized Speed' column of KAVACH TOC.	
4.68.	To check FS mode to OS mode transition when Onboard is not in standstill when approaching LSS at danger irrespective of MA. **(FRS 7.5 (b))**	1. Make sure that train is in FS mode. 2. Now keep the Onboard in running position. 3. LP request override option. 4. OS MA received from the station.	1. System shall transit to OS mode with no mode specific speed limit, OV counter should increment by one and the same is to be shown on DMI. 2. The speed limit shall be governed by 'Authorized Speed' column of KAVACH TOC.	
4.69.	To check FS mode to OS	1. Make sure that train is in FS mode.	1. System shall transit to OS mode	

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Test ID	**Test Scenario**	**Input Specification**	**Expected Output/Values**	**Observed Output (Pass/Fail)**
	mode transition when Onboard is in standstill when approaching IBS at danger irrespective of MA. **(FRS 7.5 (b))**	2. Now keep the Onboard in standstill position. 3. LP request override option. 4. OS MA received from the station.	with no mode specific speed limit, OV counter should increment by one and the same is to be shown on DMI. 2. The number of MA section shall be governed by KAVACH TOC.	
4.70.	To check FS mode to OS mode transition when Onboard is not in standstill when approaching IBS at danger irrespective of MA. **(FRS 7.5 (b))**	1. Make sure that train is in FS mode. 2. Now keep the Onboard in running position. 3. LP request override option. 4. OS MA received from the station.	1. System shall transit to OS mode with no mode specific speed limit, OV counter should increment by one and the same is to be shown on DMI. 2. The speed limit and number of MA section shall be governed by 'Authorized Speed' column of KAVACH TOC.	
4.71.	To check FS mode to OS mode transition when calling on signal is taken off. **(FRS 7.5 (c))**	1. Make sure that train is in FS mode. 2. Onboard is standstill. 3. Calling on signal is taken off. 4. OS MA received from the station.	1. System shall transit to OS mode with speed restriction of 15 kmph and the same is to be shown on DMI.	
			2. Next approaching signal shall not be linked.	
			3. Next approaching signal shall be linked within 200m only when there is no KAVACH Equipped loco.	
4.72.	To check FS mode to OS mode transition when	1. Make sure that train is in FS mode. 2. Onboard is on run.	System shall not transit to OS mode.	

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	System Level TEST CASES (RDSO)			
Test ID	**Test Scenario**	**Input Specification**	**Expected Output/Values**	**Observed Output (Pass/Fail)**
	calling on signal is taken off and OSMA not received. **(FRS 7.5 (c))**	3. Calling on signal is taken off. 4. OS MA shall not receive from the station.		
4.73.	To check FS mode to TR mode transition when all conditions are satisfied when signal foot tag is read. **(FRS 7.5 (d))**	1. Make sure that train is in FS mode. 2. Onboard is standstill. 3. Approaching stop signal is in ON aspect and EOA up to signal foot Tag. 4. Simulate the condition such that Onboard crossed after reading Signal Foot (S) tag.	1. The message **"End of Authority in XXXXm** shall be display in DMI. 2. Emergency brakes should be applied, TR mode is to be shown on DMI.	
			3. Trip Counter should increment by one.	
			4. After selection of PTRIP mode on DMI by the Loco Pilot in standstill condition, system should enter into post trip mode and brake should be release. 5. After override procedure, approaching stop signal shall be linked within 200 meters.	
4.74.	To check FS mode to TR mode transition when all conditions are satisfied when signal foot tag is missed. **(FRS 7.5 (d))**	1. Make sure that train is in FS mode. 2. Keep the approaching Signal at ON. 3. Simulate the condition such that Onboard crossed EOA (MA + 30mts) when Signal Foot (S) tag is missed. 4. SKAVACH sending MA = 0 after	1. Emergency brakes should be applied, TR mode is to be shown on DMI.	
			2. Trip Counter should increment by one.	
			3. After selection of PTRIP mode on DMI is given by the Loco Pilot in standstill condition,	

	System Level TEST CASES (RDSO)			
Test ID	**Test Scenario**	**Input Specification**	**Expected Output/Values**	**Observed Output (Pass/Fail)**
		passing signal location which will trip immediately when RF communication healthy.	system should enter into post trip mode and brake should be release.	
4.75.	To check FS mode to RV mode transition when all conditions are satisfied. **(FRS 7.5 (e))**	1. Power on the system. 2. Make sure that no faults are present. 3. Make sure that train is in FS mode. 4. Now make sure that the Onboard is in standstill and Loco Pilot requests the reverse mode. 5. Place the handle in reverse direction, w.r.t cab before selecting the RV mode.	RV mode is to be shown on DMI only if loco is in reversing area track condition.	Reversing area Non-reversing area
4.76.	To check FS mode to RV mode transition when Onboard is not in standstill. **(FRS 7.5 (e))**	1. Power on the system. 2. Make sure that no faults are present. 3. Make sure that train is in FS mode. 4. Handle is in forward direction. 5. Now make sure that the Onboard is not in standstill and Loco Pilot requests the reverse mode in Reversing area.	FS mode is to be shown on DMI.	
4.77.	To check FS mode to SH mode transition when all conditions are satisfied. **(FRS 7.5 (f))**	1. Power on the system. 2. Make sure that no faults are present. 3. Make sure that train is in FS mode. 4. Now make sure that the Onboard is in standstill and Loco Pilot requests the shunt mode.	SH mode is to be shown on DMI.	

	System Level TEST CASES (RDSO)			
Test ID	**Test Scenario**	**Input Specification**	**Expected Output/Values**	**Observed Output (Pass/Fail)**
4.78.	To check FS mode to SH mode transition when Onboard is not in standstill. **(FRS 7.5 (f))**	1. Power on the system. 2. Make sure that no faults are present. 3. Make sure that train is in FS mode. 4. Now make sure that the Onboard is not in standstill and Loco Pilot requests the shunt mode.	FS mode is to be shown on DMI.	
4.79.	While in FS mode, KAVACH exit tag is detected and Loco Pilot given ACK. **(FRS 7.5 (h) (iii), Cond. No. 17)**	1. Power on the system. 2. Make sure that no faults are present in the system. 3. Cab is active and Onboard is in KAVACH territory and KAVACH is healthy. 4. Make sure that Onboard is in FS mode. 5. Now simulate the condition such that KAVACH exit tag is detected. 6. The Loco Pilot ACK for this is given within the configurable time period.	1. System shall remain in FS mode till exit tag. Tag linking will be up to exit tag.	
			2. The exit tag shall be reported to stationary KAVACH. This shall be checked in NMS log.	
			3. System should transit to SR mode after reading the exit tag. It can be verified on DMI and ACK request should be there.	
			4. Position report shall not be erased till the complete train has passed the last TIN (Tag).	
			5. Onboard will transmit regular packet with last reported TIN till complete train passes exit tag	
			6. Stationary KAVACH will deregister the Onboard after passage of complete train and Onboard communication shall	

	System Level TEST CASES (RDSO)			
Test ID	**Test Scenario**	**Input Specification**	**Expected Output/Values**	**Observed Output (Pass/Fail)**
			be stopped without time out.	
			7. Onboard KAVACH shall stop radio communication after complete passage of train over exit tag.	
4.80.	While in FS mode, KAVACH exit tag is detected and Loco Pilot given ACK. MA shall be up to next stop signal/ stop board. **(FRS 7.5 (h) (iii), Cond. No. 17)**	1. Power on the system. 2. Make sure that no faults are present in the system. 3. Cab is active and Onboard is in KAVACH territory and KAVACH is healthy. 4. Make sure that Onboard is in FS mode. 5. Now simulate the condition such that KAVACH exit tag is detected. 6. Simulate the tag linking up to exit tag. 7. MA shall be up to next stop signal/ stop board. 8. The Loco Pilot ACK for this is given within the configurable time period.	1. KAVACH should exit from FS mode, brakes should not apply.	
			2. KAVACH should transit to SR mode, if ACK given by Loco Pilot, brake shall not be applied.	
			3. The exit tag shall be reported to stationary KAVACH. This shall be checked in NMS log.	
			4. Position report shall not be erased till the complete train has passed the last TIN (Tag).	
			5. Onboard will transmit regular packet with last reported TIN till complete train passes exit tag.	
			6. Stationary KAVACH will deregister the Onboard after passage of complete train and Onboard communication shall be stopped without time out.	
			7. Onboard KAVACH shall stop radio communication after	

	System Level TEST CASES (RDSO)			
Test ID	**Test Scenario**	**Input Specification**	**Expected Output/Values**	**Observed Output (Pass/Fail)**
			complete passage of train.	
4.81.	While in FS mode, KAVACH exit tag is detected and Loco Pilot not given ACK. **(FRS 7.5 (h) (iii), Cond. No. 17)**	1. Power on the system. 2. Make sure that no faults are present in the system. 3. Cab is active and Onboard is in KAVACH territory and KAVACH is healthy. 4. Make sure that Onboard is in FS mode. 5. Now simulate the condition such that KAVACH exit tag is detected. 6. The ACK for this is not given within the configurable time period.	1. Onboard will exit from FS mode, brakes should be applied, traction should be cut off.	
			2. ACK for SR mode should mention proper displayed massage here display.	
			3. After ACK timeout (Configurable), brakes should be applied and loco shall continue in SR mode.	
4.82.	While in FS mode, KAVACH exit tag is detected and Loco Pilot not given ACK, brake releasing checking. **(FRS 7.5 (h) (iii), Cond. No. 17)**	1. Power on the system. 2. Make sure that no faults are present in the system. 3. Cab is active and Onboard is in KAVACH territory and KAVACH is healthy. 4. Make sure that Onboard is in FS mode. 5. Now simulate the condition such that KAVACH exit tag is detected. 6. The ACK for this is given after the configurable time period, check the brakes releasing status.	1. Onboard will exit from FS mode and should enter into SR mode. 2. Message **"Ack SR mode, KAVACH Territory Exit"** shall be displayed in DMI. 3. Brakes should be applied, traction should be cut off, if no acknowledgement is received within the configurable time, 4. Brakes should not be release until ACK is given.	
			5. After giving ACK brakes should be released.	

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	System Level TEST CASES (RDSO)			
Test ID	**Test Scenario**	**Input Specification**	**Expected Output/Values**	**Observed Output (Pass/Fail)**
4.83.	To check FS mode to SR mode transition when train traffic direction is unknown. **(FRS 7.5 (h) (iv), Cond. No. 30)**	1. Make sure that train is in FS mode. 2. Now simulate the condition such that the train traffic direction is unknown.	1. System should transit SR mode and it can be verified on DMI and ACK request should be there. Message **"Ack SR mode, Direction Unknown"** shall be displayed in DMI. 2. If the Loco pilot gives the ACK within the configurable time, brakes should not apply.	
4.84.	FS mode to SR mode when track profile is not available up to 3000m (configurable) when MA > 3000m (configurable). **(FRS 7.5 (h) (i), Cond. No. 23)**	1. Power on the system. 2. Make sure that no faults are present and system is in FS mode. 3. Now simulate the condition such that track profile is not available up to 3000m (configurable) when MA > 3000m.	1. System should transit to SR mode and it can be verified on DMI and ACK request should be there. Message **"Ack SR mode, No Track Profile Info"** shall be displayed in DMI. 2. If the Loco pilot gives the ACK within the configurable time, brakes should not apply.	
4.85.	FS mode to SR mode when track profile is not available up to MA when MA < 3000m (configurable). **(FRS 7.5 (h) (i), Cond. No. 23)**	1. Power on the system. 2. Make sure that no faults are present and system is in FS mode. 3. Now simulate the condition such that track profile is not available up to MA when MA < 3000m (configurable).	1. System should transit to SR mode and it can be verified on DMI and ACK request should be there. Message **"Ack SR mode, No Track Profile Info"** shall be displayed in DMI. 2. If the Loco pilot gives the ACK within the configurable time, brakes should not apply.	

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	System Level TEST CASES (RDSO)			
Test ID	**Test Scenario**	**Input Specification**	**Expected Output/Values**	**Observed Output (Pass/Fail)**
4.86.	To check FS mode to SR mode transition when three consecutive linked tags are missed. **(FRS 7.5 (h) (ii), Cond. No. 85)**	1. Make sure that train is in FS mode. 2. Now simulate the condition such that three consecutive linked tags are missed.	1. System should transit to SR mode and it can be verified on DMI and ACK request should be there. Message **"Ack SR mode, Tags missing"** shall be displayed in DMI. 2. If the Loco pilot gives the ACK within the configurable time, brakes should not apply.	
4.87.	To check FS mode to NL mode transition when all conditions are satisfied. **(Cond. No. 53)**	1. Power on the system. 2. Make sure that no faults are present. 3. Make sure that train is in FS mode. 4. Now make sure that the **Onboard is in standstill** and 5. Make the leading input inactive and Non Leading input is active.	NL mode is to be shown on DMI.	
4.88.	To check FS mode to NL mode transition when Onboard is not in standstill. **(Cond. No. 53)**	1. Power on the system. 2. Make sure that no faults are present. 3. Make sure that train is in FS mode. 4. Now make sure that the Onboard is in not standstill and make the leading input inactive and Non Leading input is active.	1. FS mode is to be shown on DMI. The LED on DMI panel should be in green color. 2. There shall be no mode transition on DMI, till the Onboard comes to standstill.	
4.89.	To check FS mode to SF mode transition when any	1. Power on the system. 2. Make sure that no faults are	SF mode is to be shown on DMI, brakes have to be applied. The	

	System Level TEST CASES (RDSO)			
Test ID	**Test Scenario**	**Input Specification**	**Expected Output/Values**	**Observed Output (Pass/Fail)**
	critical fault occurred other than radio communication failed. **(Cond. No. 5)**	present. 3. Make sure that train is in FS mode. 4. Now simulate critical fault (EB brake fault/two radio fail/ two GPS fail/ any card failure (except power supply and data logger card).	fault should be displayed on DMI. The LED on DMI panel should be in red color.	
4.90.	To check FS mode to SF mode transition when one of the redundant modules fail. **(Cond. No. 5)**	1. Power on the system. 2. Make sure that no faults are present. 3. Make sure that train is in FS mode. 4. Now simulate one redundant module failure. (Radio fail/ GPS fail/ reader fail/one CPU card failure in two out of three system or 2 x 2oo2 system.	FS mode should continue.	Radio1 Fails Radio-2 fails GPS-1 fails GPS-2 fails Reader1 fails Reader-2 fails CPU fails (In 2 out of 3 system)
4.91.	To check FS mode to SF mode transition when any critical fault occurred. **(Cond. No. 5)**	1. Power on the system. 2. Make sure that no faults are present. 3. Make sure that train is in FS mode. 4. Now simulate any critical fault, both RFID readers failed.	SF mode is to be shown on DMI, brakes have to apply. The fault should be displayed on DMI. Radio communication should not stop if radio is working.	
4.92.	To check FS mode to SF	1. Power on the system.	1. SF mode is to be shown on	

	System Level TEST CASES (RDSO)			
Test ID	**Test Scenario**	**Input Specification**	**Expected Output/Values**	**Observed Output (Pass/Fail)**
	mode transition when both GPS communication fail.	2. Make sure that no faults are present. 3. Make sure that train is in FS mode. 4. Now make both GPS communication fail.	DMI. 2. Fault should to be logged. 3. Fault should be communicated to NMS through GMS module.	
4.93.	To check FS mode to SR mode transition when both GPS (communication fail) view fail.	1. Power on the system. 2. Make sure that no faults are present. 3. Make sure that train is in FS mode. 4. Now make both GPS communication view failed for 30min.	1. Onboard shall transit to SR mode. 2. Fault should to be logged. 3. Fault should be communicated to NMS through GMS module.	
4.94.	To check FS mode to SF mode transition when active cab DMI communication failed. **(Cond. No. 5)**	1. Power on the system. 2. Make sure that no faults are present. 3. Make sure that train is in FS mode. 4. Now simulate any critical fault, DMI communication failed.	Fault message should be communicated to NMS through GSM module.	
4.95.	To check FS mode to SF mode transition when non active cab DMI communication failed. **(Cond. No. 5)**	1. Power on the system. 2. Make sure that no faults are present. 3. Make sure that train is in FS mode. 4. Now simulate non critical fault, Non-Active CAB communication fail.	1. System will be in FS mode only but the fault will be logged. 2. Fault should be communicated to NMS through GMS module.	
4.96.	To check FS mode to IS mode transition when	1. Power on the system. 2. Make sure that no faults are	1. IS mode is to be shown on DMI when train come to standstill.	

	System Level TEST CASES (RDSO)			
Test ID	**Test Scenario**	**Input Specification**	**Expected Output/Values**	**Observed Output (Pass/Fail)**
	KAVACH isolate input is active. **(Cond. No. 2)**	present. 3. Make sure that train is in FS mode. 4. Now make KAVACH isolate input active when train is in standstill or running.	2. The 6-digit counter for isolation mode should be incremented by one. 3. Fault should be communicated to NMS through GMS module.	
4.97.	To check that system continues in FS mode when train traffic direction is changed while passing over junction tag.	1. Make sure that train is in FS mode. 2. Now simulate the condition such that traffic direction is changed by swiping the junction tag.	1. System should continue in FS mode. 2. Direction is to be changed as defined in junction Tag.	
4.98.	Check for mode transition of KAVACH from FS to SF mode when speed sensor is failed, if single pulse type sensor is used.	1. Power on the system. 2. Make sure that no faults are present in the system. 3. Cab is active and Onboard is in KAVACH territory and KAVACH is healthy. 4. Now simulate the sensor fail condition and swipe the two tags.	1. Brakes should be applied. 2. System shall enter into failure mode. 3. Fault should be communicated to NMS through GMS module.	
4.99.	Check for mode transition of KAVACH from FS to SF mode when one speed sensor is failed, if one quadrature pulse type sensor is used.	1. Power on the system. 2. Make sure that no faults are present in the system. 3. Cab is active and Onboard is in KAVACH territory and KAVACH is healthy. 4. Now simulate the speed sensor fail condition and swipe two tags.	1. Brakes should be applied. 2. System shall enter into failure mode. 3. Fault should be communicated to NMS through GMS module.	
4.100.	Check for mode transition of KAVACH from FS to SF	1. Power on the system. 2. Make sure that no faults are present	1. Brakes should be applied. 2. System shall enter into failure	

	System Level TEST CASES (RDSO)			
Test ID	**Test Scenario**	**Input Specification**	**Expected Output/Values**	**Observed Output (Pass/Fail)**
	mode when one speed sensor is failed, if two sensors are used.	in the system. 3. Cab is active and Onboard is in KAVACH territory and KAVACH is healthy. 4. Now simulate the one sensor fail condition and swipe two tags.	mode. 3. Fault should be communicated to NMS through GMS module.	
4.101.	Check for mode transition of KAVACH from FS to SF mode when both speed sensors are failed.	1. Power on the system. 2. Make sure that no faults are present in the system. 3. Cab is active and Onboard is in KAVACH territory and KAVACH is healthy. 4. Now simulate the both sensors fail condition and swipe two tags.	1. Brakes should be applied. 2. System shall enter into failure mode. 3. Fault should be communicated to NMS through GMS module.	
4.102.	Check for mode transition of KAVACH from FS to SF mode when one speed sensor is failed, if two sensors with inbuilt redundancy are used.	1. Power on the system. 2. Make sure that no faults are present in the system. 3. Cab is active and Onboard is in KAVACH territory and KAVACH is healthy. 4. Now simulate that redundant one sensor fail condition and swipe two tags.	1. Brakes should be applied. 2. System shall enter into failure mode. 3. Fault should be communicated to NMS through GMS module.	
4.103.	To check the reverse movement operation in FS mode and driving from CAB1.	1. Power on the system. 2. Make sure that no faults are present and driving CAB is CAB1. 3. Make sure that train is in FS mode. 4. Now keep the reverser in reverse position.	1. FSB should be applied. 2. Message "**REV Movement Not Allowed, Use REV mode**" shall be displayed in DMI.	

	System Level TEST CASES (RDSO)			
Test ID	**Test Scenario**	**Input Specification**	**Expected Output/Values**	**Observed Output (Pass/Fail)**
		5. Move the Onboard.		
4.104.	To check the reverse movement operation in FS mode and driving from CAB2.	1. Power on the system. 2. Make sure that no faults are present and driving is CAB2. 3. Make sure that train is in FS mode. 4. Now keep the reverser in reverser. 5. Move the Onboard.	1. FSB should be applied. 2. Message "**REV Movement Not Allowed, Use REV mode**" shall be displayed in DMI.	
4.105.	To check the Onboard KAVACH mode when direction (reverser made neutral) is removed when Onboard is not at standstill.	1. Make sure that train is in FS mode from CAB1/CAB2. 2. Keep the Onboard in running and now keep the reverser in neutral position.	Onboard is to be continued in FS mode.	CAB1 | CAB2 |
4.106.	To check the Onboard KAVACH mode when direction (reverser made neutral) is removed when Onboard is at standstill.	1. Make sure that train is in FS mode from CAB1/CAB2. 2. Keep the Onboard in standstill and now keep the reverser in neutral position.	Onboard is to be continued in FS mode.	CAB1 | CAB2 |
4.107.	To check the speed warning limit. (Speed beyond permitted speed after which warning is to be displayed on DMI) Default is 2 kmph to be configured	1. Make sure that train is in FS mode from CAB1/CAB2. 2. Keep the Onboard running and simulate the condition such that any MRSP limit is there with respect target distance is in warning zone. 3. Increase the speed beyond permitted speed beyond 2 kmph.	1. The warning state should be displayed on DMI. 2. The speed limit should be in Light Orange & buzzer should come. 3. Check the warning state, message in data logger.	
4.108.	To check that odometer error displayed on DMI while passing signal should	1. Power on the system. 2. Make sure that no faults are present.	1. At 100kmph, the absolute location displayed and actual location difference shall be less	

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Test ID	**Test Scenario**	**Input Specification**	**Expected Output/Values**	**Observed Output (Pass/Fail)**
	not be more than 30 meters at 100kmph & 60 meters at 200 kmph.	3. Make sure that train is in FS mode. 4. Simulate such that the Onboard crosses any signal at 100kmph and then 200kmph.	than 30 meters.	
			2. At 200kmph, the absolute location displayed and actual location difference shall be less than 60 meters.	
4.109.	To check the signal aspect, signal description after crossing the signal and next signal data is available until timeout (8sec). **(FRS 24.2 & A2 19.10)**	1. System is in FS mode. 2. Radio communication and RFID communication are good. 3. Make sure that system has the data of 2 consecutive signals data. 4. Simulate the condition such that the train crossed the first signal by swiping signal foot tag and Onboard is moving towards next signal observe the signal data on DMI. 5. Next signal data is received before 8 sec.	1. Signal aspect on LP-OCIP (DMI) shall be changed to aspect of approaching signal.	
			2. Signal description shall be made blank immediately, when Onboard KAVACH detects that it has crossed the signal on reading the signal foot tag.	
			3. After crossing the signal, the signal description should be shown < 8sec.	
4.110.	To check the signal aspect, signal description after crossing the signal and next signal data is available until	1. System is in FS mode. 2. Radio communication and RFID communication are good. 3. Make sure that system has the data	1. Until crossing the first signal the signal aspect and description should be shown on DMI of first signal.	

	System Level TEST CASES (RDSO)			
Test ID	**Test Scenario**	**Input Specification**	**Expected Output/Values**	**Observed Output (Pass/Fail)**
	timeout occurred and no data is received from Station.	of 2 consecutive signals data. 4. Simulate the condition such that the Onboard crossed just the first signal and Onboard stopped after crossing the signal observe the signal data on DMI. 5. Next signal data is not received from station after 8 sec also.	2. After crossing the first signal the second signal aspect shall be shown. Signal description shall be made blank (for 8 sec). 3. After 8 sec second signal aspect shall be made blank on DMI.	
4.111.	To check the signal aspect, signal description after crossing the signal and next signal data is available until timeout (8sec) passed (signal foot tag is not missed).	1. System is in FS mode. 2. Radio communication and RFID communication are good. 3. Make sure that system has the data of 2 consecutive signals data. 4. Simulate the condition such that the Onboard crossed the first signal by detecting the signal foot tag, and Onboard is moving towards next signal observe the signal data on DMI.	Signal aspect should be updated immediately and signal description should be blank for minimum one cycle and get updated within 8 sec.	
4.112.	To check the signal aspect, signal description after crossing the signal and next signal data is available until timeout (8sec) passed (signal foot tag is missed).	1. System is in FS mode. 2. Radio communication and RFID communication are good. 3. Make sure that system has the data of 2 consecutive signals data. 4. Simulate the condition such that the Onboard crossed the first signal by not detecting the signal foot tag, and Onboard is moving towards next signal observe the signal data	Signal aspect should be updated within +30 meter after crossing the signal foot tag and signal description should be blank for minimum one cycle and get updated within 8 sec.	

	System Level TEST CASES (RDSO)			
Test ID	**Test Scenario**	**Input Specification**	**Expected Output/Values**	**Observed Output (Pass/Fail)**
		on DMI.		
4.113.	Switching interval between two radio modems, when both radios are healthy.	1. System is in FS mode. 2. Radio communication and RFID communication are good. 3. Make sure that both radio modems are healthy.	1. Radio modems should switch at interval not exceeding 3 cycles (maximum), for Tx Purpose only. 2. It is verified in NMS log or through dock lite.	
4.114.	Simulate radio-1 health fail.	1. System is in FS mode. 2. Radio communication and RFID communication are good. 3. Simulate that radio-1 modem health fail.	There shall not be change in mode. Radio-1 modem fault should be logged and sent to NMS.	
4.115.	Simulate radio2 health fail.	1. System is in FS mode. 2. Radio communication and RFID communication are good. 3. Simulate that radio-2 modem health fail.	There shall not be change in mode. Radio-2 modem fault should be logged and sent to NMS.	
4.116.	To check signal aspect when radio communication is failed & Mode transition to LS when Track profile is available. (Absolute Block Section/ Communication Mandatory area) **(SRS 5.1)**	1. Make sure that Onboard is in FS mode. 2. Simulate radio packets are not receiving. 3. Make sure that Track profile is > 3000 meter is available.	1. After 6sec the signal aspect and signal description made blank. Mode should be FS mode only. 2. After 30 sec systems should transit to LS mode in absolute block and seek ACK from Loco Pilot. 3. If Ack is not given within 7sec (configurable time) brakes should be applied.	

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	System Level TEST CASES (RDSO)			
Test ID	**Test Scenario**	**Input Specification**	**Expected Output/Values**	**Observed Output (Pass/Fail)**
4.117.	To check signal aspect when radio communication is failed & Mode transition to LS when Track profile is available. (Automatic Block section, Communication Mandatory area) **(SRS 5.1)**	1. Make sure that Onboard is in FS mode. 2. Simulate radio packets are not receiving. 3. Make sure that Track profile is > 3000 meter is available.	1. After 6sec the signal aspect and signal description made blank. Mode should be FS mode only. 2. After 10 sec system should transit to LS mode in auto section and seek ACK from Loco Pilot. 3. If Ack is not given within 7 Sec (configurable time) brakes should be applied.	
4.118.	To check signal aspect when radio communication is failed & Mode transition to LS when Track profile is available. (Station section, Communication Mandatory area) **(SRS 5.1)**	1. Make sure that Onboard is in FS mode. 2. Simulate radio packets are not receiving. 3. Make sure that Track profile is > 3000 meter is available.	1. After 6sec the signal aspect and signal description made blank. Mode should be FS mode only. 2. After 30 sec in absolute/ 10 sec in auto section (configurable) systems should transit to LS mode in station section and seek ACK from Loco Pilot. 3. If Ack is not given within 7sec (configurable time) brakes should be applied.	30 Sec 10 Sec
4.119.	To check signal aspect when radio communication is failed & Mode transition to SR when Track profile is available.	1. Make sure that Onboard is in FS mode. 2. Simulate radio packets are not receiving. 3. Make sure that Track profile is <	1. After 6sec the signal aspect and signal description made blank. Mode should be FS mode only. 2. System should transit to SR	

	System Level TEST CASES (RDSO)			
Test ID	**Test Scenario**	**Input Specification**	**Expected Output/Values**	**Observed Output (Pass/Fail)**
	(Absolute Block Section/ Communication Mandatory area) **(SRS 5.1)**	3000 meters is available.	mode after 30 sec in absolute block section and seek ACK from Loco Pilot. 3. If Ack is not given within 7 Sec (configurable time) brakes should be applied.	
4.120.	To check signal aspect when radio communication is failed & Mode transition to SR when Track profile is available. (Automatic Block section, Communication Mandatory area) **(SRS 5.1)**	1. Make sure that Onboard is in FS mode. 2. Simulate radio packets are not receiving. 3. Make sure that Track profile is < 3000 meters is available.	1. After 6sec the signal aspect and signal description made blank. Mode should be FS mode only. 2. System should transit to SR mode after 10 sec in auto section and seek ACK from Loco Pilot. 3. If Ack is not given within 7sec (configurable time) brakes should be applied.	
4.121.	To check signal aspect when radio communication is failed & Mode transition to SR when Track profile is available. (Station section, Communication Mandatory area) **(SRS 5.1)**	1. Make sure that Onboard is in FS mode. 2. Simulate radio packets are not receiving. 3. Make sure that Track profile is < 3000 meters is available.	1. After 6sec the signal aspect and signal description made blank. Mode should be FS mode only. 2. System should transit to SR mode after in absolute/ 10 sec in auto section (configurable) in station section and seek ACK from Loco Pilot. 3. If Ack is not given within 7sec (configurable time) brakes should be applied.	30 Sec 10 Sec

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	System Level TEST CASES (RDSO)			
Test ID	**Test Scenario**	**Input Specification**	**Expected Output/Values**	**Observed Output (Pass/Fail)**
4.122.	Check for FS mode to SF mode transition, when both GPS and RTC fail in Onboard KAVACH.	1. Keep the system in FS mode. 2. Simulate both GPS and RTC are fail.	1. System should enter into SF mode. 2. Communication shall be available until KAVACH is isolated to report SF status to NMS.	
4.123.	Check for TRACK PROFILE holding verification in FS mode on DMI.	1. Ensure Onboard in FS mode and before home and route is clear till next station home. 2. When Onboard moves beyond home make radio communication fail such that MA is not present.	1. Onboard should transit to LS mode when Radio communication goes bad and continue in LS mode till TRACK PROFILE available is greater than 3000 mtrs. (Use LSS and IB signal separated by 5 Km).	
			2. When track profile is <3000 meter, the Onboard should transit to SR mode. **(Use auto section or station section)**	
4.124.	Check for TRACK PROFILE calculation from Rear end of Onboard/train in FS mode.	1. Make sure Onboard in healthy condition. 2. Note the Absolute location of Onboard. 3. TRACK PROFILE data shall be sent to Onboard.	Check log, TRACK PROFILE length shall be calculated based on rear location of Onboard/train.	

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	System Level TEST CASES (RDSO)			
Test ID	**Test Scenario**	**Input Specification**	**Expected Output/Values**	**Observed Output (Pass/Fail)**
4.125.	Check for MA extension when LSS is at OFF and Line clear is not available in FS mode.	1. When LSS is at ON and Onboard is before LSS check for MA. 2. When LSS is made OFF and Line clear is not available check for MA. 3. When line clear is available and LSS is at OFF check for MA extension.	1. The MA should not get extended when LSS is at OFF and Line clear input is not available. 2. When Signal is at OFF and Line clear is available MA should get extended.	
4.126.	Check for no mode transition when one RFID reader failed.	1. Keep the Onboard in FS mode. 2. Fail any one RFID reader.	No mode transition should happen. The fault should be logged and sent to NMS.	
4.127.	Check for no mode transition, when the distance and speed correction due to wheel slip happens for less than 90 sec., when cab1 is active and in FS mode. **(SRS 3.6.7 (r))**	1. Simulate the wheel slip condition and observe the distance and speed correction. 2. Simulate the error such that wheel slip less than 90 sec.	KAVACH shall not transit to SR Mode.	
4.128.	Check for no mode transition, when the distance and speed correction due to wheel slip happens for more than 90 sec., when cab2 is active & in FS mode. **(SRS 3.6.7 (r))**	1. Simulate the wheel slip condition and observe the distance and speed correction. 2. Simulate the error such that wheel slip is happened more than 90 sec.	1. KAVACH shall transit to SR Mode and prompt for acknowledgement message as "**ACK SR Mode- Slip/Skid Detected**". 2. If loco pilot ACK, then No brake shall be applied.	
4.129.	Check for no mode transition, when the distance and speed correction due to wheel skid happens for less	1. Simulate the wheel skid condition and observe the distance and speed correction. 2. Simulate the error such that wheel	KAVACH shall not transit to SR Mode.	

	System Level TEST CASES (RDSO)			
Test ID	**Test Scenario**	**Input Specification**	**Expected Output/Values**	**Observed Output (Pass/Fail)**
	than 90 seconds, when cab1 is active and FS mode. **(SRS 3.6.7 (r))**	slip error for less than 90 seconds.		
4.130.	Check for no mode transition, when the distance and speed correction due to wheel skid happens for less than 90 seconds, when cab2 is active and in FS mode. **(SRS 3.6.7 (r))**	1. Simulate the wheel skid condition and observe the distance and speed correction. 2. Simulate the error such that wheel slip error for less than 90 seconds.	KAVACH shall not transit to SR Mode.	
4.131.	Check for no mode transition, when the distance and speed correction due to wheel skid happens for more than 90 second, when cab1 is active and in FS mode. **(SRS 3.6.7 (r))**	1. Simulate the wheel skid condition and observe the distance and speed correction. 2. Simulate the error such that wheel slip error for more than 90 seconds.	1. KAVACH shall transit to SR Mode and prompt for acknowledgement message as **"ACK SR Mode-Slip/Skid Detected**". 2. If loco pilot ACK, then No brake shall be applied.	
4.132.	Check for no mode transition from FS mode when Onboard is standstill for 6 hours.	1. Onboard shall be in FS mode. 2. Onboard shall be in standstill at any location for next 6 hours.	Onboard shall continue in FS mode only.	
4.133.	Check for Turn out speed restriction release after whole train crossed the turn out.	1. Onboard is in FS mode. 2. Onboard moving towards any turnout point and route set to respective line.	Loop line speed control (15kmph/ 30 kmph) shall display on DMI until the whole train crossed the turnout point. Message display "**TurnOut in XXXXm with Speed Limit YYYkmph**".	**Train Length** / **Pass/Fail** LE Multi 350m 750m

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	System Level TEST CASES (RDSO)				
Test ID	**Test Scenario**	**Input Specification**	**Expected Output/Values**	**Observed Output (Pass/Fail)**	
4.134.	Check for PSR release after the whole train crossed the PSR limit.	1. Onboard is in FS mode. 2. Onboard is moving towards PSR region.	PSR shall display on DMI until the whole train crossed the PSR end point. Message display "**TurnOut in XXXXm with Speed Limit YYYkmph**".	LE	
				Multi	
				350m	
				750m	
4.135.	Check for TSR release after the whole train crossed the TSR limit.	1. Onboard is in FS mode. 2. Onboard is moving towards TSR region. 3. Simulate TSR speed 30 kmph for 200 meter, 40 kmph for 300 meter & 75 kmph for 600 meters.	1. TSR shall display on DMI with speed of 30 kmph, 40 kmph & 75 kmph until the whole train crossed the TSR end point. 2. Message shall be displayed in DMI as "**TSR in XXXXm with Speed limit of YYY kmph**".	30 Kmph/ 200 m	
				40 Kmph/ 300 m	
				75 Kmph/ 600 m	
4.136.	Check that train runs for 5000km in FS mode.	1. Test to be carried out with loop line of stations. 2. Keep all signals OFF. 3. Routes are set in such a way that some stations are pass the train through loop line and others through Main line. 4. Keep two Onboard at some distance to each other and runs 5000km in a loop of stations.	Train shall be in FS mode only and all Speed supervision message shall be displayed on DMI. Event log shall be cross checked for mode change.		
4.137.	Check for brake application, when Coasting is applied at NON zero speed in FS mode.	1. Onboard KAVACH is in FS mode. 2. Loco pilot shut off traction. 3. Neutral is applied. 4. Onboard is moving @100kmph.	KAVACH shall not apply brake and there shall be no change in mode.		

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	System Level TEST CASES (RDSO)			
Test ID	**Test Scenario**	**Input Specification**	**Expected Output/Values**	**Observed Output (Pass/Fail)**
4.138.	Check for brake application, when Coasting is applied at Zero speed in FS mode.	1. Onboard KAVACH is in FS mode. 2. When Loco pilot shut off traction. 3. Neutral is applied. 4. Onboard is @ zero kmph.	KAVACH shall not apply brake and there shall be no change in mode.	
4.139.	Check for brake application, when Coasting is applied when cab input is not available at non zero speed.	1. Onboard KAVACH is in FS mode. 2. When Loco pilot shut off traction. 3. Ensure that cab input is not available. 4. Onboard is moving @ some speed say 20kmph.	KAVACH shall not apply brake and there shall be no change in mode.	
4.140.	Check for brake application, when Coasting is applied at Zero speed and cab input is not available.	1. Onboard KAVACH is in FS mode. 2. When Loco pilot shut off traction. 3. Ensure that cab input is not available. 4. Onboard is @ Zero speed.	KAVACH shall transit to SB mode and supervise standstill protection.	
4.141.	Check for no Mode transition from FS mode when train configuration is changed during standstill. **(FRS 22.1)**	1. Ensure that Onboard is in FS mode. 2. Onboard is at stand still. 3. Make the CAB active. 4. Change the train configuration.	1. Onboard KAVACH shall conduct. Brake test. 2. On successful brake test Onboard KAVACH should remain in FS mode.	
4.142.	Check for dead end approach of Onboard after reading the dead-end Tag.	1. Onboard is in FS mode. 2. Simulate the Onboard movement toward the dead end.	1. Brake shall be applied in approach of dead end. 2. Message shall be displayed in DMI "**Brake Applied, Dead End Detected"**	
4.143.	Check for dead end	1. Onboard is in FS mode.	1. Brake shall be applied in	

	System Level TEST CASES (RDSO)			
Test ID	**Test Scenario**	**Input Specification**	**Expected Output/Values**	**Observed Output (Pass/Fail)**
	approach of Onboard after reading the dead-end Tag.	2. Simulate the Onboard movement toward the dead end. 3. Switch OFF the radio and check that system transit to SR mode after time out period.	approach of dead end. 2. Message shall be displayed in DMI "**Brake Applied, Dead End Detected".** 3. Check that brake shall not be released after mode transition and both messages along with "**Ack SR mode, station Radio comm fail"** shall be displayed	
4.144.	Check for link failure of TSRMS with stationary KAVACH for time out period (10 & 2 Minute – Configurable).	1. Onboard is in FS mode. 2. Onboard is moving towards TSR region. 3. Simulate the link failure by removing the TSRMS link.	1. Onboard shall transit to SR mode after time out. 2. Message shall be displayed in DMI "**Ack SR Mode, TSR link Failure.**	
4.145.	Check for display of message "Fouling Mark Entry" when approaching fouling mark zone.	1. Onboard is in FS mode. 2. Simulate the movement of Onboard towards fouling mark zone.	1. On detection on fouling mark location, the message shall be displayed in DMI as "**Fouling Mark Entry"** at location point for 6 second. 2. The "**Fouling Mark Exit**" shall be displayed when message displayed from EOTT (Future).	
4.146.	Check for display of message "Braking System Malfunction" when MR pressure below configured value.	1. Onboard is in FS mode. 2. Configure the MR pressure more than 7.5 Kg/cm^2. 3. Now simulate the condition that MR pressure dropped below 7.5 i.e. 7 Kg/cm$^{2.}$	**1.** Check for display of message in DMI **"Braking System Malfunction"** 2. Brake shall be applied till speed become zero.	

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	System Level TEST CASES (RDSO)			
Test ID	**Test Scenario**	**Input Specification**	**Expected Output/Values**	**Observed Output (Pass/Fail)**
4.147.	Check for display of message "Ack SR Mode-SR Authorization received" when route is not known.	1. Onboard is in FS mode. 2. Remove the SKAVACH-to-SKAVACH communication. 3. Stationary KAVACH send SR authorization packet.	1. Onboard transit to SR mode on receipt of SR authorization. 2. Check for display of message "**Ack SR Mode-SR Authorization received".**	
4.148.	On detection of Odo error in a frame cycle is more than 120m.	1. Onboard is in FS mode. 2. Simulate the odo error more than 120 meters.	1. Message shall be displayed in DMI as "Ack for SR Mode-Odo error detected". 2. Onboard KAVACH shall apply brakes if not acknowledged by loco pilot within time out period. 3. On LP Acknowledge, Onboard transit to SR mode. 4. Position Report shall be removed.	
4.149.	Check for display of message "Braking System Malfunction" when BP pressure drop is not within range ie 3.15 to 3.55 Kg/cm^2 when FSB is commanded by KAVACH.	1. Onboard is in FS mode. 2. Configure the MR pressure more than 7.5 Kg/cm^2. 3. Configure FSB brake build time as 4 second. 4. FSB brake shall be applied and simulate that the BP pressure is increasing more than 3.55 Kg/cm^2 within brake build time. 5. FSB brake shall be applied and simulate that the BP pressure is dropping below 3.15 Kg/cm^2 within brake build time.	1. Check for display of message in DMI **"Braking System Malfunction" and Onboard transited to SF mode.** 2. Brake shall be applied till speed become zero.	
			1. Check for display of message in DMI **"Braking System Malfunction" and Onboard transited to SF mode.** 2. Brake shall be applied till speed become zero.	

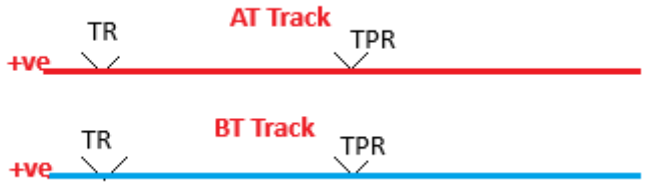
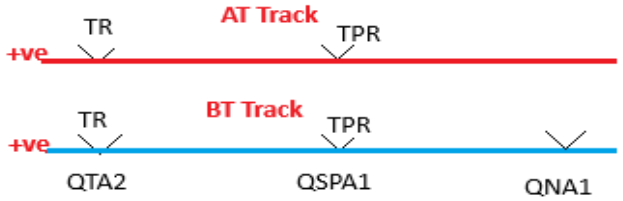
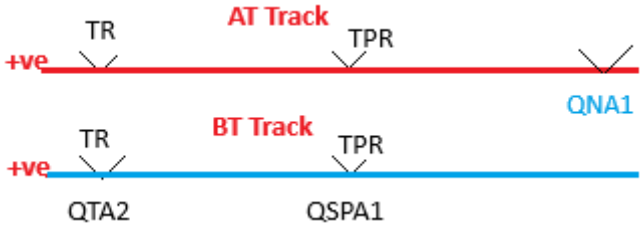
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	System Level TEST CASES (RDSO)			
Test ID	**Test Scenario**	**Input Specification**	**Expected Output/Values**	**Observed Output (Pass/Fail)**
4.150.	Check for display of message "Braking System Malfunction" when BP pressure drop is not within range ie 0.0 to 0.3 Kg/cm^2	1. Onboard is in FS mode. 2. Configure the MR pressure more than 7.5 Kg/cm^2. 3. Configure EB brake build time as 4 second. 4. EB brake shall be applied and simulate that the BP pressure is dropping and greater than >0.3 Kg/cm^2 within brake build time.	**1.** Check for display of message in DMI **"Braking System Malfunction" and Onboard transited to SF mode.** 2. Brake shall be applied till speed become zero.	
4.151.	Check for display of message "Braking System Malfunction" when BC pressure is not building within range ie 4.85 to 5.45 Kg/cm^2 (For light engine) (When FSB applied)	1. Onboard is in FS mode. 2. Configure the MR pressure more than 7.5 Kg/cm^2. 3. Configure FSB brake build time as 8 second. 4. Configure the when BC pressure range is i.e 4.85 to 5.45 Kg/cm^2 (For light engine). 5. FSB brake shall be applied and simulate that the BC pressure is dropping >4.85 Kg/cm^2 and lesser than 5.45 Kg/cm^2 within BC build time.	**1.** Check for display of message in DMI **"Braking System Malfunction" and Onboard transited to SF mode.** 2. Brake shall be applied till speed become zero.	
4.152.	Check for display of message "Braking System Malfunction" when BC pressure is not building within range ie 4.85 to 5.45 Kg/cm^2 (For light engine)	1. Onboard is in FS mode. 2. Configure the MR pressure more than 7.5 Kg/cm^2. 3. Configure EB build time as 4 second. 4. Configure the when BC pressure range is i.e 4.85 to 5.45 Kg/cm^2	**1.** Check for display of message in DMI **"Braking System Malfunction" and Onboard transited to SF mode.** 2. Brake shall be applied till speed become zero.	

	System Level TEST CASES (RDSO)			
Test ID	**Test Scenario**	**Input Specification**	**Expected Output/Values**	**Observed Output (Pass/Fail)**
	(When EB applied)	(For light engine) 5. EB shall be applied and simulate that the BC pressure is dropping >4.85 Kg/cm^2 to >5.45 Kg/cm^2 within BC build time.		
4.153.	Check for reduction of MA by collision Margin when Onboard Kavach in FS detects another Onboard Kavach in SR with position report and is occupying the same TIN **in absolute block section.** (Rear End Collision)	1. Ensure Onboard Kavach L1 in FS Mode. 2. Ensure Onboard Kavach L2 in SR Mode with position report and is occupying the berthing track in the route of L1 and has the same direction. 3. Rear end collision is detected by L1 after it enters the occupied TIN.	1. The FS MA shall reduce by collision margin and train length by Onboard Kavach L1 after occupying the same TIN as of L2. 2. Signal aspect shall not be linked by L1 till L2 crosses the next signal.	
4.154.	Check for reduction of MA by collision Margin when Onboard KAVACH in FS detects another Onboard KAVACH in SR with position report and is occupying the same TIN **in Auto section.** (Rear End Collision)	1. Ensure Onboard KAVACH L1 in FS Mode. 2. Ensure Onboard KAVACH L2 in SR Mode with position report and is occupying the berthing track in the route of L1 and has the same direction. 3. Rear end collision is detected by L1 after it enters the occupied TIN.	1. The FS MA shall reduce by collision margin and train length by Onboard KAVACH L1 after occupying the same TIN as of L2. 2. Signal aspect shall not be linked by L1 till L2 crosses the next signal.	
4.155.	Check for reduction of MA by collision Margin when Onboard Kavach in FS detects another Onboard	1. Ensure Onboard Kavach L1 in FS Mode. 2. Ensure Onboard Kavach L2 in SR Mode with position report and is	1. The FS MA shall reduce to Zero by Onboard Kavach L1 after occupying the same TIN as of L2.	

	System Level TEST CASES (RDSO)			
Test ID	**Test Scenario**	**Input Specification**	**Expected Output/Values**	**Observed Output (Pass/Fail)**
	Kavach in SR with position report and is occupying the same TIN **in absolute block section.**. (Head On Collision)	occupying the berthing track in the route of L1 and has the Opposite direction. 3. Head on collision is detected by L1 after it enters the occupied TIN.	2. Next approaching Signal aspect shall not be linked by L1.	
4.156.	Check for reduction of MA by collision Margin when Onboard KAVACH in FS detects another Onboard Kavach in SR with position report and is occupying the same TIN **in Auto section.** (Head On Collision)	1. Ensure Onboard Kavach L1 in FS Mode. 2. Ensure Onboard Kavach L2 in SR Mode with position report and is occupying the berthing track in the route of L1 and has the Opposite direction. 3. Head on collision is detected by L1 after it enters the occupied TIN.	1. The FS MA shall reduce to Zero by Onboard Kavach L1 after occupying the same TIN as of L2. 2. Next approaching Signal aspect shall not be linked by L1.	
4.157.	To check provision of configuring the time correction offset from +1000 ms to -1000 ms with resolution 10 ms to compensate for delay, if any, in clear / occupied status of track sections due to track repeater relays. **(SRS-8.1.5, 18.3)** Use cases	1. Switch on the Onboard. 2. Configure the train type as passenger train type with suitable coach selection 15 LHB coaches. 3. Note down the default train length as its length is 15x23.54= 353+22 (Loco)= 375mts say. 4. Now keep the Onboard in FS mode and train length measurement test may be carried out by keeping the train in constant speed of 60 kmph and track circuit up time as 22 second. The train length should be		

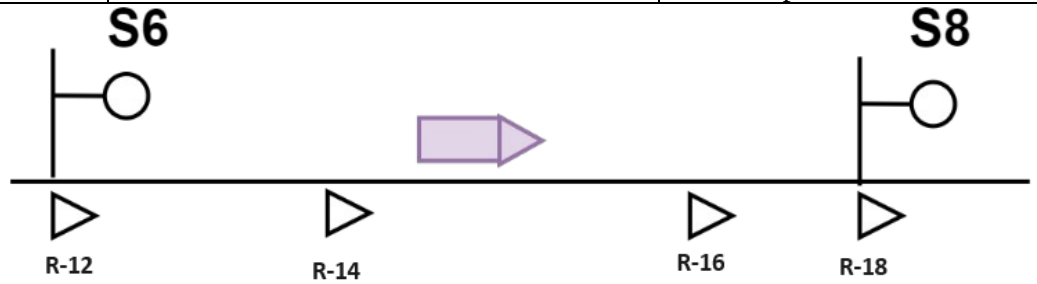
	Time correction	**Train length**
Fig-1	00	
Fig-2	-150ms	
Fig-3	+150ms	
Fig-4	280 ms	
Fig-5	-280ms	
Max	4000 ms	
Min	-4000ms	

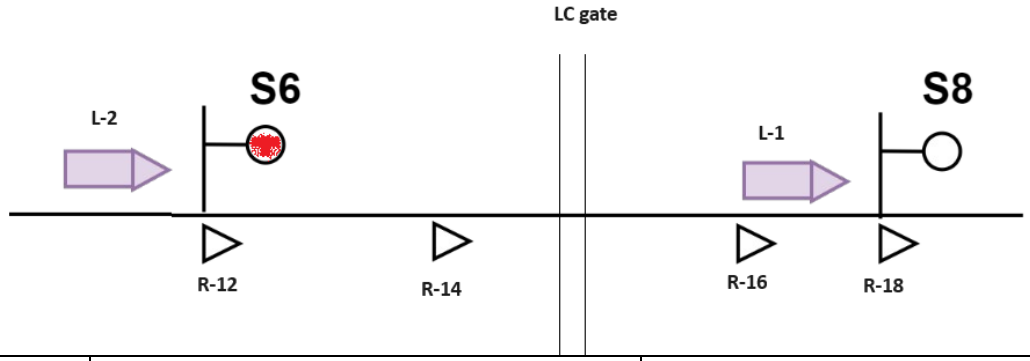
	System Level TEST CASES (RDSO)			
Test ID	**Test Scenario**	**Input Specification**	**Expected Output/Values**	**Observed Output (Pass/Fail)**
		375m. 5. The updated value should show on DMI. 6. Now simulate that the correction time of -150, 150, 280 etc. 7. Check the train length measurement.		
		 **Fig-1-** AT & BT not having any repeater relay.	 **Fig-2:** AT is not having repeater relay and BT is having repeater relay. So difference of pick up and drop away time i.e 220-70 ms= -150 ms	
		 **Fig-3:** AT is having repeater relay and BT is not having repeater relay. So difference of pick up and drop away time i.e 220-70 ms= 150 ms	 **Fig-4:** AT is having QNA1 & QN1 repeater relay and BT is not having repeater relay. So difference of pick up and drop away time i.e 220-70 + 150-20ms= 280 ms	

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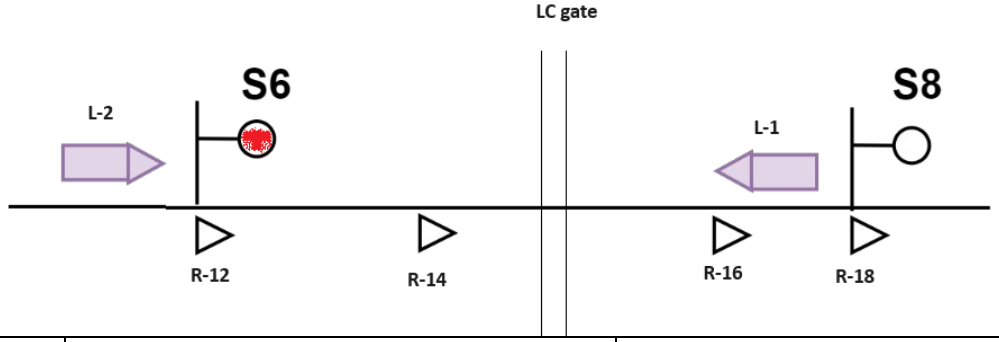
	System Level TEST CASES (RDSO)			
Test ID	**Test Scenario**	**Input Specification**	**Expected Output/Values**	**Observed Output (Pass/Fail)**
 **Fig-5:** AT is having QNA1 & QN1 repeater relay and BT is not having repeater relay. So difference of pick up and drop away time i.e 220-70 + 150-20ms= -280 ms				
4.158.	To verify Rollback protection when Onboard reads RFID Tag.	1. Make sure that the train is in FS mode with forward direction selection. 2. Let the configured rollback distance be 10m. 3. Simulate the condition such that rollback is detected in reverse direction. 4. Simulate RFID tag R-14 read during Rollback.	1. Brake should not be applied till the configured value of rollout.	
			2. MA should increase and absolute location should be decremented.	
			3. Onboard KAVACH remain in FS mode after reading R-14 and subsequent decrement of absolute location.	
			4. Brakes should be applied after a configurable distance traveled.	
			5. The message **"Rollback Protection, Brake Applied"** should be displayed on the DMI and the audio alarm should be operated.	

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	System Level TEST CASES (RDSO)			
Test ID	**Test Scenario**	**Input Specification**	**Expected Output/Values**	**Observed Output (Pass/Fail)**
			6. Brakes should be released when Onboard comes to a standstill and acknowledged by loco pilot.	
				
4.159.	To check the LC gate operation in FS mode when Rear end collision detected.	1. Make sure that both Onboards is in FS mode. 2. Simulate the condition such that Onboard L-2 read LC gate tag. 3. TIN occupied by front Onboard is same as rear Onboard TIN. 4. Override the L-2 and OSMA received.	1. After override the S-6 at Danger & OSMA received, Rear end collision SoS shall be received by L-2 2. Rear end collision message "Rear End Collision with Loco XXXXX in YYYY m" and LC gate messages shall be displayed simultaneously in DMI with auto whistling. 3. After reaching LC gate only LC gate message and auto whistling shall be stopped.	

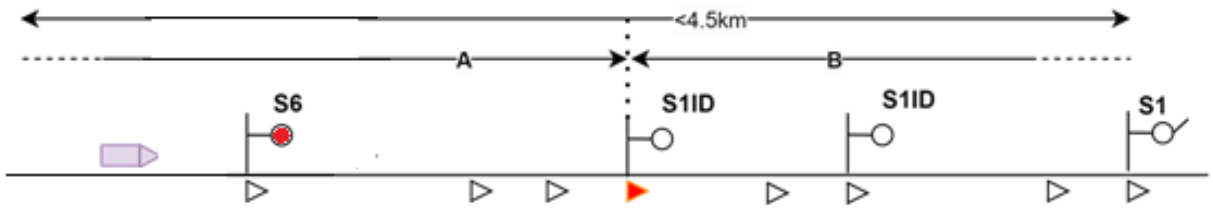
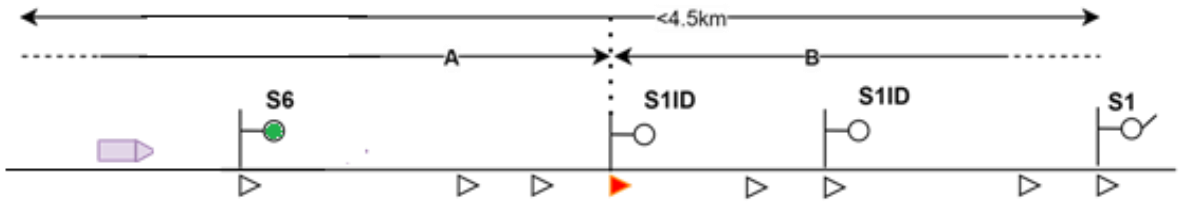
	System Level TEST CASES (RDSO)			
Test ID	**Test Scenario**	**Input Specification**	**Expected Output/Values**	**Observed Output (Pass/Fail)**
				
4.160.	To check the LC gate operation in FS mode when Head on collision detected.	1. Power ON the system of both Onboards. 2. Simulate the condition such that Onboard L-2 read LC gate tag. 3. TIN occupied by the both locos is same. 4. Override the L-2 and OSMA received.	1. After passing S-6, Both On-board shall receive head collision SoS. 2. Head ON Collision "Head On Collision with Loco XXXXX in YYYY m" and LC gate messages shall be displayed simultaneously in DMI with auto whistling. 3. Brake shall be applied in both the loco and train shall have brought to standstill. 4. LC gate whistling shall continue till the train crosses the level crossing even during braking.	

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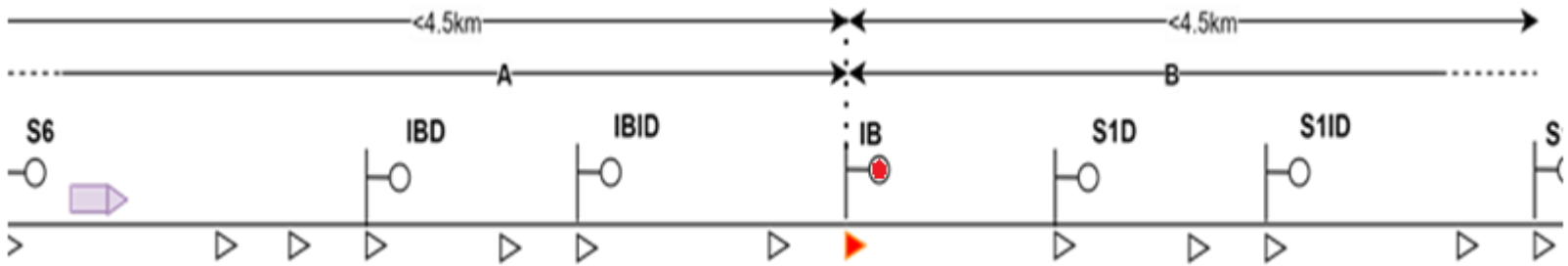
	System Level TEST CASES (RDSO)			
Test ID	**Test Scenario**	**Input Specification**	**Expected Output/Values**	**Observed Output (Pass/Fail)**
				
4.161.	Check for speed limit when Onboard received OSMA at Home signal.	1. Onboard is in FS mode and MA < 200 meter. 2. Train is at standstill before home signal. 3. Home signal is Red and starter is Yellow. 4. Press OV and CNFM button in KAVACH area. 5. Onboard receives OS MA & Track Profile.	1. The Onboard KAVACH should transit to OS mode. 2. The OS speed shall be 15 kmph. 3. The approaching signal (starter) aspect shall be linked till 200 meters before the starter signal. 4. After read signal foot tag of starter, speed limit should be relaxed without passing complete train length.	
4.162.	To check for OS MA correction when calling on signal is taken off.	1. Make sure that train is in FS mode. 2. Onboard is standstill and signal is Red. 3. Press OV and CNFM button. 4. OSMA received with speed restriction. After that, Calling on signal is taken off.	OSMA and authorized speed shall be corrected as governed by the route of calling on.	

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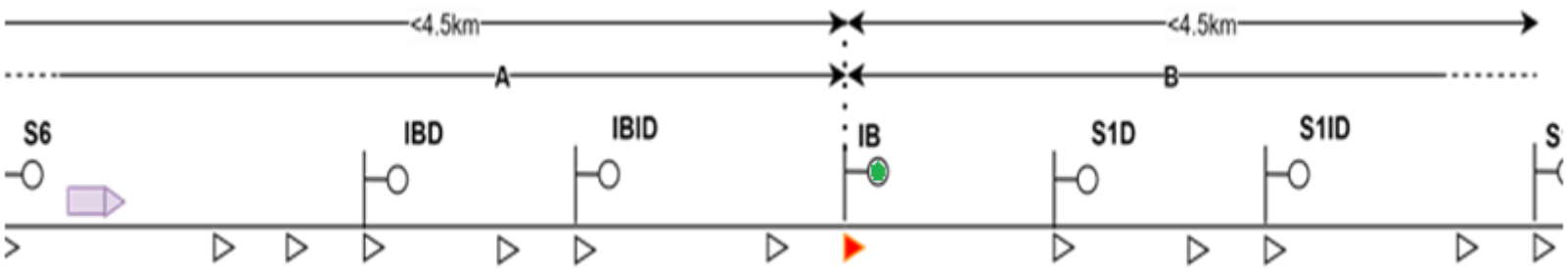
	System Level TEST CASES (RDSO)			
Test ID	**Test Scenario**	**Input Specification**	**Expected Output/Values**	**Observed Output (Pass/Fail)**
4.163.	To check that Onboard read the RFID tag with BLOCK/ AUTO-BLOCK section, but the stationary to regular packet STATION section, then the read RFID tag's information shall prevail.	1. Keep the Onboard in FS mode. 2. Simulate the condition that Onboard read the tag which is programmed as block section. 3. Simulate the condition that Stationary KAVACH send regular packet with as station section. 4. Check that Onboard prevail as absolute section. 5. Stop the loco after advanced starter.	1. Check in loco log that the Onboard to station regular packet shall send as block section. 2. Stationary KAVACH shall process the regular packet as absolute/ auto block section. 3. Check that unusual stoppage message displayed in DMI and ask for acknowledgement.	
4.164.	Only one acknowledgement (whichever is having highest priority) shall be displayed by Onboard KAVACH at any given point of time. Once this acknowledgement is received from the loco pilot, Onboard KAVACH shall present the next acknowledgement request.	1. Keep the Onboard in FS mode. 2. Simulate the condition that Onboard is in block section and mode transit to LS mode due to communication loss. 3. Onboard is stopped in block section. 4. Alternate display of message for "Ack LS mode, Station Radio Comm Fail" and "Ack Block Stop, SOS Generates in XX s".	1. Check that after 1st acknowledgement, "Ack Block Stop, SOS Generates in XX s" shall disappear. 2. Only 2nd message shall be displayed in DMI and ask for "Ack LS mode, Station Radio Comm Fail" till acknowledged by loco pilot.	
4.165.	To check the SR authorization when Onboard is in communication mandatory area and approaching Adv Str signal is RED (ON Aspect). (when SKAVACH to S-	1. Keep the Onboard in FS mode. 2. Simulate the movement of Onboard from station A to B. 3. Absolute block is having communication mandatory area. 4. Remove the link the SKAVACH to S-KAVACH communication between station A & B.	1. Check that SR authority shall not be given by stationary KAVACH-A. 2. FSMA shall be up to approaching stop signal. 3. Loco pilot presses FS+OV, then SR authority to be extended by stationary KAVACH-A.	

	System Level TEST CASES (RDSO)			
Test ID	**Test Scenario**	**Input Specification**	**Expected Output/Values**	**Observed Output (Pass/Fail)**
	KAVACH communication not available)	5. Keep the approaching stop signal S6 in ON aspect (RED).		
				
4.166.	To check the SR authorization when Onboard is in communication mandatory area and approaching Adv str signal is G (OFF Aspect). (when SKAVACH to S-KAVACH communication not available)	1 Keep the Onboard in FS mode. 2 Simulate the movement of Onboard from station A to B. 3 Absolute block is having communication mandatory area. 4 Remove the link the SKAVACH to S-KAVACH communication between station A &B. 5 Keep the approaching stop signal S6 in OFF aspect (G).	Check that SR authority shall be given by stationary KAVACH-A.	
				
4.167.	To check the SR authorization when Onboard	1 Keep the on Onboard in FS mode. 2 Simulate the movement of Onboard	1. Check that SR authority shall not be given by A stationary	

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	System Level TEST CASES (RDSO)			
Test ID	**Test Scenario**	**Input Specification**	**Expected Output/Values**	**Observed Output (Pass/Fail)**
	is in communication mandatory area and approaching IB stop signal is RED (ON Aspect). (when SKAVACH to S-KAVACH communication not available)	from station A to B. 3 Absolute block is having communication mandatory area. 4 Remove the link the S-KAVACH to S-KAVACH communication between station A & B. 5 Keep the approaching stop signal S6 in ON aspect (RED).	KAVACH. 2. FSMA shall be up to approaching stop signal. 3. Loco pilot presses FS+OV, then SR authority to be extended by stationary KAVACH by A station.	
				
4.168.	To check the SR authorization when Onboard is in communication mandatory area and approaching IB stop signal is Green (OFF Aspect). (when SKAVACH to S-KAVACH communication not available)	1 Keep the on Onboard in FS mode. 2 Simulate the movement of Onboard from station A to B. 3 Absolute block is having communication mandatory area. 4 Remove the link the SKAVACH to S-KAVACH communication between station A & B. 5 Keep the approaching IB stop signal in OFF aspect (GREEN).	1. Check that SR authority shall be given by A stationary KAVACH. 2. FSMA shall be up to approaching stop signal. 3. Loco pilot presses FS+OV, then SR authority to be extended by stationary KAVACH by A station.	

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	System Level TEST CASES (RDSO)			
Test ID	**Test Scenario**	**Input Specification**	**Expected Output/Values**	**Observed Output (Pass/Fail)**
				
4.169.	To check the movement of Onboard when approaching a border tag without change in MA, signal aspect and RF strength.	1. Keep the Onboard in FS mode, OS, FS+OV, OS+OV. 2. Simulate the condition that Onboard cross the border tag at variable speed. 3. Border tag is read by Onboard. 4. This is to be verified in all above mentioned mode.	1. Check that signal aspect is not blank if SKAVACH to SKAVACH is provided. 2. Signal aspect shall be displayed and shall not be blank. 3. RF strength shall not be affected.	Mode: FS/ OS/ FS+ OV & OS+ OV Speed: 200, 180, 160, 140, 120, 80, 45, 30, 15, 10, 5 OK/Not OK
4.170.	To check the movement of Onboard when approaching a border tag without change in MA, signal aspect and RF strength.	5. Keep the Onboard in FS mode, OS, FS+OV, OS+OV. 6. Simulate the condition that Onboard cross the border tag. 7. Border tag is not read by Onboard. 8. This is to be verified in all above mentioned mode	4. Check that signal aspect is not blank if SKAVACH to SKAVACH is provided. 5. Signal aspect shall be displayed and shall not be blank. 6. RF strength shall not be	Mode: FS/O S/FS+ OV & OS+ Speed: 200, 180, 160, 140 OK/ Not OK

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	System Level TEST CASES (RDSO)			
Test ID	**Test Scenario**	**Input Specification**	**Expected Output/Values**	**Observed Output (Pass/Fail)**
			affected.	OV: 120 / 80 / 45 / 30 / 15 / 10 / 5
4.171.	To check the aspect of permissive signal when Signal aspect is blank.	1. Keep the Onboard in FS mode, OS, 2. Simulate the condition such that Onboard approaching permissive siganl i.e (Distant/ inner distant signal)	1. Check that signal aspect blank shown in DMI as blank. 2. MA shall not be affected.	DD ID
4.172.	To check the passing of LC gate signal when aspect is ON, override at standstill.	1. Keep the Onboard in FS /OS mode. 2. Now press the OV+ confirm button at standstill within 200 meter . 3. OS MA is received from stationary KAVACH.	1. Check that loco pilot crosses the LC gate signal after receipt of OSMA with 240 second. 2. Elapse the time of 240 second and check that OSMA is withdrawn by stationary KAVACH.	FS+OV OS+OV
4.173.	To check the passing of LC gate signal when aspect is ON, override at on run.	1. Keep the Onboard in FS /OS mode. 2. Now press the OV+ confirm button at speed of 5kmph within 200 meter. 3. OV shall not be selected by Onboard.	1. OV shall be selected. 2. OSMA shall not be issued by stationary KAVACH.	

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	System Level TEST CASES (RDSO)			
Test ID	**Test Scenario**	**Input Specification**	**Expected Output/Values**	**Observed Output (Pass/Fail)**
5.	**KAVACH_Sys_05: Override Selected- This Test cases check for all functionalities that are possible in Override selected and Mode Transitions from concerned mode to other modes.**			
5.1.	Check that SR mode manual selection is not feasible when Onboard is in FS mode and OV Selected.	1. Keep the Onboard in FS mode. 2. Select OV. 3. Now press the SR and CNFM buttons on DMI.	1. Onboard KAVACH shall not transit from the existing mode. 2. "Override Selected" shall be displayed on DMI. 3. "SIG_OV" status in log shall be "1" (one) and can be verified from NMS.	
5.2.	Check that SR mode manual selection is not feasible when Onboard is in OS mode and OV Selected.	1. Keep the Onboard in OS mode. 2. Select OV. 3. Now press the SR and CNFM buttons on DMI.	1. Onboard KAVACH shall not transit from the existing mode. 2. "Override Selected" shall be displayed on DMI. 3. "SIG_OV" status in log shall be "1" (one) and can be verified from NMS.	
5.3.	Check that SR mode manual selection is not feasible when Onboard is in PT mode and OV Selected.	1. Keep the Onboard in PT mode. 2. Select OV. 3. Now press the SR and CNFM buttons on DMI.	1. Onboard KAVACH shall not transit from the existing mode. 2. "Override Selected" shall be displayed on DMI. 3. "SIG_OV" status in log shall be "1" (One) and can be verified from NMS.	
5.4.	Check that OV selection is not feasible when approaching	1. Keep the Onboard in FS mode.	1. Onboard KAVACH shall not transit from the existing	

	System Level TEST CASES (RDSO)			
Test ID	**Test Scenario**	**Input Specification**	**Expected Output/Values**	**Observed Output (Pass/Fail)**
	signal is in OFF condition in FS mode.	2. Keep approaching signal in OFF condition. 3. Now press the OV and CNFM buttons on DMI.	mode. 2. "Override Selected" shall not be displayed on DMI. 3. "SIG_OV" status in log shall be "0" (Zero) and can be verified from NMS.	
5.5.	Check that OV selection is not feasible when approaching signal is in OFF condition in OS mode.	1. Keep the Onboard in OS mode. 2. Keep approaching signal in OFF condition. 3. Now press the OV and CNFM buttons on DMI.	1. Onboard KAVACH shall not transit from the existing mode. 2. "Override Selected" shall not be displayed on DMI. 3. "SIG_OV" status in log shall be "0" (Zero) and can be verified from NMS.	
5.6.	Check that OV selection is not feasible when approaching signal is permissive signal i.e., distant or inner distant signal in FS mode when not permitted for override on run (i.e., Distant and inner distant before Home).	1. Keep the Onboard in FS mode. 2. Keep approaching permissive signal in OFF condition. 3. Now press the OV and CNFM buttons on DMI.	1. Onboard KAVACH shall not transit from the existing mode. 2. "Override Selected" shall not be displayed on DMI. 3. "SIG_OV" status in log shall be "0" (Zero) and can be verified from NMS.	
5.7.	Check that OV selection is not feasible when approaching signal is permissive signal i.e., distant or inner distant signal in OS mode when not permitted for override on run (i.e., Distant and inner distant	1. Keep the Onboard in OS mode. 2. Keep approaching permissive signal in OFF condition. 3. Now press the OV and CNFM buttons on DMI.	1. Onboard KAVACH shall not transit from the existing mode. 2. "Override Selected" shall not be displayed on DMI. 3. "SIG_OV" status in log shall be "0" (Zero) and can	

	System Level TEST CASES (RDSO)			
Test ID	**Test Scenario**	**Input Specification**	**Expected Output/Values**	**Observed Output (Pass/Fail)**
	before Home).		be verified from NMS.	
5.8.	Check that OV selection is not feasible when approaching signal is permissive signal i.e distant or inner distant signal in FS mode when permitted for override on run (i.e., IBS at OFF).	1. Keep the Onboard in FS mode. 2. Train is on run & approaching IBS and before the permissive signal. 3. Keep approaching IBS signal OFF condition. 4. Now press the OV and CNFM buttons on DMI.	1. Onboard KAVACH shall not transit from the existing mode. 2. "Override Selected" shall not be displayed on DMI. 3. "SIG_OV" status in log shall be "0" (Zero) and can be verified from NMS.	
5.9.	Check that OV selection is feasible when approaching signal is permissive signal i.e distant or inner distant signal in FS mode when permitted for override on run (i.e., IBS at ON).	1. Keep the Onboard in FS mode. 2. Train is on run & approaching IBS and before the permissive signal. 3. Keep approaching IBS signal ON condition. 4. Now press the OV and CNFM buttons on DMI.	1. Onboard KAVACH shall continue in existing mode. 2. "Override Selected" shall be displayed on DMI. 3. "SIG_OV" status in log shall be "1" (ONE) and can be verified from NMS. 4. Upon receipt of OSMA, Onboard KAVACH transit to OS mode and "SIG_OV" status shall be Zero (0).	
5.10.	Check that OV selection is not feasible when approaching signal is permissive signal i.e distant or inner distant signal in OS mode when permitted for override on run. (i.e., IBS at OFF).	1. Keep the Onboard in OS mode. 2. Train is on run & approaching IBS and before the permissive signal. 3. Keep approaching IBS	1. Onboard KAVACH shall not transit from the existing mode. 2. "Override Selected" shall not be displayed on DMI. 3. "SIG_OV" status in log shall be "0" (Zero) and can	

	System Level TEST CASES (RDSO)			
Test ID	**Test Scenario**	**Input Specification**	**Expected Output/Values**	**Observed Output (Pass/Fail)**
		signal OFF condition. 4. Now press the OV and CNFM buttons on DMI.	be verified from NMS.	
5.11.	Check that OV selection is feasible when approaching signal is permissive signal i.e., distant or inner distant signal in OS mode when permitted for override on run (i.e., IBS at ON).	1. Keep the Onboard in OS mode. 2. Train is on run & approaching IBS and before the permissive signal. 3. Keep approaching IBS signal ON condition. 4. Now press the OV and CNFM buttons on DMI.	1. Onboard KAVACH shall continue in existing mode. 2. "Override Selected" shall be displayed on DMI. 3. "SIG_OV" status in log shall be "1" (ONE) and can be verified from NMS. 4. Upon receipt of OSMA, Onboard KAVACH transit to OS mode and "SIG_OV" status shall be Zero (0).	
5.12.	Check for Mode transition to SB when CAB is changed in case of dual CAB or driving position is changed in case of single cab in FS mode. **(FRS 21.1 (d) and (e))**	1. Keep the Onboard in FS Mode. 2. Keep approaching STOP signal in ON position. 3. Press OV and CNFM button. 4. Change the CAB.	1. Onboard KAVACH shall transit to SB mode. 2. Check for mode on DMI.	
5.13.	Check for Mode transition to SB when CAB is changed in case of dual CAB or driving position is changed in case of single cab in OS mode. **(FRS 21.1 (d) and (e))**	1. Keep the Onboard in OS Mode. 2. Keep approaching STOP signal in ON position. 3. Press OV and CNFM button. 4. Change the CAB.	1. Onboard KAVACH shall transit to SB mode. 2. Check for mode on DMI	

	System Level TEST CASES (RDSO)			
Test ID	**Test Scenario**	**Input Specification**	**Expected Output/Values**	**Observed Output (Pass/Fail)**
5.14.	Check for Radio Transmission when Onboard KAVACH is in FS mode & Override selected in KAVACH Area.	1. Keep the Onboard KAVACH in FS Mode. 2. Keep approaching STOP signal in ON position. 3. Press OV and CNFM button. 4. Onboard in KAVACH area. 5. Check for Radio packets of concerned Onboard.	1. Radio Packets of concerned Onboard should be transmitted. 2. Check for RF signal on DMI.	
5.15.	Check for Radio Transmission when Onboard KAVACH is in OS mode & Override selected in KAVACH Area.	1. Keep the Onboard KAVACH in OS Mode. 2. Keep approaching STOP signal in ON position. 3. Press OV and CNFM button in KAVACH area. 4. Check for Radio packets of concerned Onboard.	1. Radio Packets of concerned Onboard should be transmitted. 2. Check for RF signal on DMI.	
5.16.	Check for Radio Transmission when Onboard KAVACH is in PT mode & Override selected in KAVACH Area.	1. Keep the Onboard KAVACH in PT Mode. 2. Press OV and CNFM button in KAVACH area. 3. Check for Radio packets of concerned Onboard.	1. Radio Packets of concerned Onboard should be transmitted. 2. Check for RF signal on DMI.	
5.17.	Check for mode transition of Onboard from FS mode & OV selected to SB mode when no CAB is Active. (**SRS-A1 cond. 7**), **(FRS**	1. Keep the Onboard in FS mode. 2. Keep approaching STOP signal in ON position. 3. Press OV and CNFM button	The Onboard KAVACH should transit to SB mode.	

	System Level TEST CASES (RDSO)			
Test ID	**Test Scenario**	**Input Specification**	**Expected Output/Values**	**Observed Output (Pass/Fail)**
	4.8(B))	in KAVACH area. 4. Both CAB inputs are to be made Inactive. 5. Train is at standstill.		
5.18.	Check for mode transition of Onboard from OS mode & OV selected to SB mode when no CAB is Active. (**SRS-A1 cond. 7**) & **(FRS 4.8(B))**	1. Keep the Onboard in OS mode. 2. Press OV and CNFM button in KAVACH area. 3. Both CAB inputs are to be made Inactive. 4. Train is at standstill.	The Onboard KAVACH should transit to SB mode.	
5.19.	Check for mode transition of Onboard from PT mode & OV selected to SB mode when no CAB is Active. (**SRS-A1 cond. 7**) & **(FRS 4.8(B))**	1. Keep the Onboard in PT mode. 2. Press OV and CNFM button in KAVACH area. 3. Both CAB inputs are to be made Inactive. 4. Train is at standstill.	The Onboard KAVACH should transit to SB mode.	
5.20.	If EM cock is closed when Onboard is in FS mode and OV selected. (**SRS-A1 cond. 7**)	1. Keep the Onboard in FS mode. 2. Keep approaching STOP signal in ON position. 3. Press OV and CNFM button in KAVACH area. 4. Now make EM cock closed.	System will enter into SB mode; it can be verified on DMI.	
5.21.	If EM cock health of EB channel failed when Onboard is in FS mode and OV	1. Keep the Onboard in FS mode. 2. Keep approaching STOP	System will enter into SF mode; it can be verified on DMI.	

	System Level TEST CASES (RDSO)			
Test ID	**Test Scenario**	**Input Specification**	**Expected Output/Values**	**Observed Output (Pass/Fail)**
	selected. (**SRS-A1 cond. 7**)	signal in ON position. 3. Press OV and CNFM button in KAVACH area. 4. Now make health of EB channel failed by removing of wires of EM cock.		
5.22.	If EM cock is closed when Onboard is in OS mode and OV selected. (**SRS-A1 cond. 7**)	1. Keep the Onboard in OS mode. 2. Press OV and CNFM button in KAVACH area. 3. Now make EM cock is closed.	System will enter into SB mode; it can be verified on DMI.	
5.23.	If EM cock health of EB channel failed when Onboard is in OS mode and OV selected. (**SRS-A1 cond. 7**)	1. Keep the Onboard in OS mode. 2. Keep approaching STOP signal in ON position. 3. Press OV and CNFM button in KAVACH area. 4. Now make health of EB channel failed by removing of wires of EM cock.	System will enter into SF mode; it can be verified on DMI.	
5.24.	If EM cock is closed when Onboard is in PT mode and OV selected. (**SRS-A1 cond. 7**)	1. Keep the Onboard in PT mode. 2. Press OV and CNFM button in KAVACH area. 3. Now make EM cock is closed.	System will enter into SB mode; it can be verified on DMI.	
5.25.	If EM cock health of EB	1. Keep the Onboard in PT	System will enter into SF mode;	

	System Level TEST CASES (RDSO)			
Test ID	**Test Scenario**	**Input Specification**	**Expected Output/Values**	**Observed Output (Pass/Fail)**
	channel failed when Onboard is in PT mode and OV selected. (**SRS-A1 cond. 7**)	mode. 2. Keep approaching STOP signal in ON position. 3. Press OV and CNFM button in KAVACH area. 4. Now make health of EB channel failed by removing of wires of EM cock.	it can be verified on DMI.	
5.26.	Check for mode transition when Onboard is in FS mode & Override selected and traffic direction goes unknown. **FRS 8.2 d(iv)**	1. Onboard is in FS mode. 2. Press OV and CNFM button in KAVACH area. 3. Onboard moves to direction which was not its previous one i.e. to reverse from nominal.	1. The Onboard KAVACH should transit to staff responsible mode. 2. Onboard should seek ACK from Loco Pilot. 3. Message to be displayed as "Ack SR mode, Direction Unknown"	
5.27.	Check for mode transition when Onboard is in FS mode & Override selected and traffic direction goes unknown. **FRS 8.2 d(iv)**	1. Onboard is in FS mode. 2. Press OV and CNFM button in KAVACH area. 3. Onboard moves to direction which was not its previous one Nominal to reverse direction.	1. The Onboard KAVACH should transit to staff responsible mode. 2. Onboard should seek ACK from Loco Pilot. 3. Message to be displayed as "Ack SR mode, Direction Unknown"	
5.28.	Check for mode transition when Onboard is in OS mode & Override selected and traffic direction goes unknown.	1. Onboard is in OS mode. 2. Press OV and CNFM button in KAVACH area. 3. Onboard moves to direction which was not its previous	1. The Onboard KAVACH should transit to staff responsible mode. 2. Onboard should seek ACK from Loco Pilot.	

	System Level TEST CASES (RDSO)			
Test ID	**Test Scenario**	**Input Specification**	**Expected Output/Values**	**Observed Output (Pass/Fail)**
	FRS 8.2 d(iv)	one i.e., to Reverse from nominal.	3. Message to be displayed as "Ack SR mode, Direction Unknown"	
5.29.	Check for mode transition when Onboard is in OS mode & Override selected and traffic direction goes unknown. **(FRS 8.2 d(iv))**	1. Onboard is in OS mode. 2. Press OV and CNFM button in KAVACH area. 3. Onboard moves to direction which was not its previous one i.e., to Nominal to reverse direction.	1. The Onboard KAVACH should transit to staff responsible mode. 2. Onboard should seek ACK from Loco Pilot. 3. Message to be displayed as "Ack SR mode, Direction Unknown"	
5.30.	Check for mode transition when Onboard is in PT mode & Override Selected and traffic direction goes unknown. **(FRS 8.2 d(iv))**	1. Onboard is in PT mode. 2. Press OV and CNFM button in KAVACH area. 3. Onboard moves to direction which was not its previous one i.e., to Reverse from nominal.	1. The Onboard KAVACH should transit to staff responsible mode. 2. Onboard should seek ACK from Loco Pilot. 3. Message to be displayed as "Ack SR mode, Direction Unknown"	
5.31.	Check for mode transition when Onboard is in PT mode & Override Selected and traffic direction goes unknown. **(FRS 8.2 d(iv))**	1. Onboard is in PT mode. 2. Press OV and CNFM button in KAVACH area. 3. Onboard moves to direction which was not its previous one i.e., to Nominal to reverse direction.	1. The Onboard KAVACH should transit to staff responsible mode. 2. Onboard should seek ACK from Loco Pilot. 3. Message to be displayed as "Ack SR mode, Direction Unknown"	
5.32.	Check for mode transition	1. Onboard is in FS Mode.	1. The Onboard KAVACH	

	System Level TEST CASES (RDSO)			
Test ID	**Test Scenario**	**Input Specification**	**Expected Output/Values**	**Observed Output (Pass/Fail)**
	when Onboard is in FS mode & Override selected and radio communication is failed. (Radio comm failed means frame offset >14 in absolute block section). **(FRS 8.2(d-i))**	2. Press OV and CNFM button in KAVACH area. 3. Onboard in KAVACH area. 4. Radio communication is bad (removed radio RX going to ONBOARD KAVACH at radio).	should transit to SR mode. 2. Onboard should seek ACK. 3. Message to be displayed as "Ack SR mode, Station Radio Comm Fail"	
5.33.	Check for mode transition when Onboard is in OS mode & Override selected and radio communication is failed. (Radio comm failed means frame offset >14 in absolute block section). **(FRS 8.2(d-i))**	1. Onboard is in OS Mode. 2. Press OV and CNFM button in KAVACH area. 3. Onboard in KAVACH area. 4. Radio communication is bad (removed radio RX going to ONBOARD KAVACH at radio).	1. The Onboard KAVACH should transit to SR mode. 2. Onboard should seek ACK 3. Message to be displayed as Ack SR mode, Station Radio Comm.	
5.34.	Check for mode transition when Onboard is in PT mode & Override selected and radio communication is failed. (Radio comm failed means frame offset >14 in absolute block section). **(FRS 8.2(d-i))**	1. Onboard is in PT Mode. 2. Onboard in KAVACH area. 3. Radio communication is bad (removed radio RX going to ONBOARD KAVACH at radio). 4. Press OV and CNFM button in KAVACH area.	1. The Onboard KAVACH should transit to SR mode. 2. Onboard should seek ACK. 3. Message to be displayed as Ack SR mode, Station Radio Comm	
5.35.	Check for mode transition when Onboard is in FS mode & OV selected and radio communication is failed. (Radio comm failed means frame offset >5 in Automatic	1. Onboard is in FS Mode. 2. Press OV and CNFM button in KAVACH area. 3. Onboard in KAVACH area. 4. Radio communication is bad (removed radio RX	1. The Onboard KAVACH should transit to SR mode. 2. Onboard should seek ACK. 3. Message to be displayed as Ack SR mode, Station Radio Comm	

	System Level TEST CASES (RDSO)			
Test ID	**Test Scenario**	**Input Specification**	**Expected Output/Values**	**Observed Output (Pass/Fail)**
	section). **(FRS 8.2(d-i))**	going to ONBOARD KAVACH at radio).		
5.36.	Check for mode transition when Onboard is in OS mode & OV selected and radio communication is failed. (Radio comm failed means frame offset >5 in Automatic section). **(FRS 8.2(d-i))**	1. Onboard is in OS Mode. 2. Press OV and CNFM button in KAVACH area. 3. Onboard in KAVACH area. 4. Radio communication is bad (removed radio RX going to ONBOARD KAVACH at radio).	1. The Onboard KAVACH should transit to SR mode. 2. Onboard should seek ACK. 3. Message to be displayed as Ack SR mode, Station Radio Comm	
5.37.	Check for mode transition when Onboard is in PT mode & OV selected and radio communication is failed. (Radio comm failed means frame offset >5 **in Automatic section.)** **(FRS 8.2(d-i))**	1. Onboard is in PT Mode. 2. Onboard in KAVACH area. 3. Radio communication is bad (removed radio RX going to ONBOARD KAVACH at radio). 4. Press OV and CNFM button. in KAVACH area.	1. The Onboard KAVACH should transit to SR mode. 2. Onboard should seek ACK. 3. Message to be displayed as Ack SR mode, Station Radio Comm	
5.38.	Check for mode transition when Onboard is in FS mode & OV selected at standstill. Radio communication is healthy, section speed available and when Onboard receives MA extension within OV timeout (previous mode is FS) < 200 meter. Signal requiring standstill for	6. Onboard is in FS mode and MA < 200 meter. 7. Train is at standstill for Home & starter signal shall be ON. 8. Press OV and CNFM button in KAVACH area. 9. Radio communication is good. 10. Section speed available. 11. Onboard receives OS MA &	1. The Onboard KAVACH should transit to OS mode. 2. SIG OV status shall be made "0" by Onboard KAVACH and it can be verified from NMS log.	Home Starter

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	System Level TEST CASES (RDSO)			
Test ID	**Test Scenario**	**Input Specification**	**Expected Output/Values**	**Observed Output (Pass/Fail)**
	OV selection (Home & Starter). **(FRS 8.2(C))**	Track Profile.		
5.39.	Check for mode transition when Onboard is in FS mode & OV selected at on run. Radio communication is healthy when MA< 200 meter and train is moving in FS mode. Signal requiring standstill for OV selection (Home & Starter). **(FRS 8.2(C))**	1. Onboard is in FS mode and MA < 200 meter. 2. Home & starter signal shall be ON. 3. Train is in movement for home and starter signal. 4. Press OV and CNFM button in KAVACH area. 5. Onboard in KAVACH area. 6. Radio communication is good.	1. OV shall not be selected. 2. SIG_OV status shall be made "0" by Onboard KAVACH and it can be verified from NMS log.	Home Stater
5.40.	Check for mode transition when Onboard is in FS mode & OV selected at on run, Radio communication is healthy when MA> 200 meter and train is moving in FS mode. Signal requiring standstill for OV selection (Home & Starter). **(FRS 8.2(C))**	1. Onboard is in FS mode and MA > 200 meter. 2. Home & starter signal shall be ON. 3. Train is in movement for home and starter signal. 4. Press OV and CNFM button & Radio communication is good.	1. OV shall not be selected. 2. SIG_OV status shall be made "0" by Onboard KAVACH and it can be verified from NMS log.	Home Stater
5.41.	Check for mode transition FS and OV selected, Radio	1. Onboard is in FS mode and MA > 200 meter.	1. OV shall not be selected. 2. SIG OV status shall be made	Home

	System Level TEST CASES (RDSO)			
Test ID	**Test Scenario**	**Input Specification**	**Expected Output/Values**	**Observed Output (Pass/Fail)**
	communication is healthy, when MA> 200 meter and train is standstill in FS mode. Signal requiring standstill for OV selection (Home & Starter). **(FRS 8.3)**	2. Home & starter signal shall be ON. 3. Train is in standstill for home and starter signal. 4. Press OV and CNFM button. in KAVACH area. 5. Radio communication is good.	"0" by Onboard KAVACH and it can be verified from NMS log.	Stater |
5.42.	Check for mode transition when OV selected, Radio communication is healthy, section speed available and when Onboard receives MA extension within OV timeout (previous mode is FS)- MA< 200m and train on movement. **SKAVACH to SKAVACH Communication is available.** Signal not requiring standstill for OV selection (LSS & IBS). **(FRS 8.3)**	1. Onboard is in FS mode and MA < 200 meter. 2. LSS/IBS signal shall be ON. 3. Train is in movement. 4. Press OV and CNFM button in KAVACH area. 5. Radio communication is good. 6. Section speed available. 7. Onboard receives OS MA & Track Profile.	1. Onboard KAVACH shall display 'Override Selected'. 2. Onboard KAVACH should keep informing this status to Stationary KAVACH till passing the signal foot or EOA or receipt of OSMA. 3. The Onboard KAVACH should transit to OS mode on receipt of OSMA. 4. The OS speed shall be authorized speed and MA section as per KAVACH TOC. 5. Permissive signal shall not be linked. 6. The Next approaching stop signal aspect shall not be linked till 200 meters before the stop signal.	Signal | MA Section | Result LSS | 1 | IBS | 2 | LSS | 2 | IBS | 2 | LSS | 3 | IBS | 3 |

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	System Level TEST CASES (RDSO)			
Test ID	**Test Scenario**	**Input Specification**	**Expected Output/Values**	**Observed Output (Pass/Fail)**
5.43.	Check for mode transition when OV selected, Radio communication is healthy, section speed available and when Onboard receives MA extension within OV timeout (previous mode is FS)- MA< 200m and train on movement. **SKAVACH to SKAVACH Communication is available.** Another Onboard is available before 100 meters of IB stop signal. Signal not requiring standstill for OV selection (LSS & IBS). **(FRS 8.3)**	1. Onboard is in FS mode and MA < 200 meter. 2. LSS/IBS signal shall be ON. 3. Train is in movement. 4. Press OV and CNFM button in KAVACH area. 5. Radio communication is good. 6. Section speed available. 7. Onboard receives OS MA & Track Profile. 8. Simulate that another Onboard before IB stop signal.	1. Onboard KAVACH shall display 'Override Selected'. 2. Onboard KAVACH should keep informing this status to Stationary KAVACH till passing the signal foot or EOA or receipt of OSMA. 3. The Onboard KAVACH should transit to OS mode on receipt of OSMA. 4. The OS speed shall be max permissible speed as per KAVACH TOC. 5. Permissive signal shall not be linked. 6. The Next approaching IB stop signal aspect shall not be linked. 7. MA upto rear end collision margin.	Signal / MA Section / Result LSS / 1 / IBS / 2 / LSS / 2 / IBS / 2 / LSS / 3 / IBS / 3 /
5.44.	Check for mode transition when OV selected, Radio communication is healthy, section speed available and when Onboard receives MA extension within OV timeout (previous mode is FS)- MA< 200m and train on movement. **SKAVACH to SKAVACH**	1. Onboard is in FS mode and MA < 200 meter. 2. LSS/IBS signal shall be ON. 3. Train is in movement. 4. Press OV and CNFM button in KAVACH area. 5. Radio communication is good. 6. Section speed available.	1. Onboard KAVACH shall display 'Override Selected. 2. Onboard KAVACH should Keep inform this status to Stationary KAVACH till passing the signal foot or EOA or receipt of OSMA. 3. The Onboard KAVACH should transit to OS mode on	

	System Level TEST CASES (RDSO)			
Test ID	**Test Scenario**	**Input Specification**	**Expected Output/Values**	**Observed Output (Pass/Fail)**
	communication is not available. Signal not requiring standstill for OV selection (LSS & IBS). **(FRS 8.3)**	7. Onboard receives OS MA & Track Profile.	receipt of OSMA. 4. The OS speed shall be max permissible speed as per KAVACH TOC. 5. Next station Permissive signal shall be linked if no another functional KAVACH equipped Onboard is available.	
5.45.	Check for mode transition when OV selected, Radio communication is healthy, section speed available and when Onboard receives MA extension within OV timeout (previous mode is FS)- MA< 200m and train on movement. **SKAVACH to SKAVACH communication is not available.** Another Onboard is available before 100 meters of IB stop signal. Signal not requiring standstill for OV selection (LSS & IBS). **(FRS 8.3)**	1. Onboard is in FS mode and MA < 200 meter. 2. LSS/IBS signal shall be ON. 3. Train is in movement. 4. Press OV and CNFM button in KAVACH area. 5. Radio communication is good. 6. Section speed available. 7. Onboard receives OS MA & Track Profile. 8. Another Onboard is available before 100 meters of IB stop signal.	1. Onboard KAVACH shall display 'Override Selected. 2. Onboard KAVACH should keep informing this status to Stationary KAVACH till passing the signal foot or EOA or receipt of OSMA. 3. The Onboard KAVACH should transit to OS mode on receipt of OSMA. 4. The OS speed shall be max permissible speed as per KAVACH TOC. 5. Next station Permissive signal shall be linked if another Onboard is not available. 6. The Next approaching IB stop signal aspect shall not be linked.	

	System Level TEST CASES (RDSO)			
Test ID	**Test Scenario**	**Input Specification**	**Expected Output/Values**	**Observed Output (Pass/Fail)**
			7. MA shall be up to rear end collision margin of another Onboard before IB stop signal.	
5.46.	Check for mode transition when OV selected, Radio communication is healthy, section speed available and when Onboard receives MA extension within OV timeout (previous mode is FS)- MA< 200m and train on movement. **SKAVACH to SKAVACH communication is not available.** Another Onboard is available in front of signal. Signal not requiring standstill for OV selection (LSS & IBS). **(FRS 8.3)**	1. Onboard is in FS mode and MA < 200 meter. 2. LSS/IBS signal shall be ON. 3. Train is in movement. 4. Press OV and CNFM button in KAVACH area. 5. Radio communication is good. 6. Section speed available. 7. Onboard receives OS MA & Track Profile. 8. Another Onboard is available in front of permissive signal.	1. Onboard KAVACH shall display 'Override Selected. 2. Onboard KAVACH should keep informing this status to Stationary KAVACH till passing the signal foot or EOA or receipt of OSMA. 3. The Onboard KAVACH should transit to OS mode on receipt of OSMA. 4. The OS speed shall be as per KAVACH TOC. 5. MA shall be up to rear end collision margin of another Onboard in front of permissive signal.	
5.47.	Check for mode transition when OV selected, Radio communication is healthy, section speed available and when Onboard receives MA extension within OV timeout (previous mode is FS)- MA< 200m and train is standstill.	1. Onboard is in FS mode and MA < 200 meter. 2. LSS/IBS signal shall be ON. 3. Train is at standstill. 4. Press OV and CNFM button in KAVACH area. 5. Radio communication is good.	1. Onboard KAVACH shall display 'Override Selected'. 2. Onboard KAVACH should keep informing this status to Stationary KAVACH till passing the signal foot or EOA or receipt of OSMA. 3. The Onboard KAVACH	LSS IBS

	System Level TEST CASES (RDSO)			
Test ID	**Test Scenario**	**Input Specification**	**Expected Output/Values**	**Observed Output (Pass/Fail)**
	Signal not requiring standstill for OV selection (LSS & IBS). **(FRS 8.3)**	6. Onboard receives OS MA & Track Profile.	should transit to OS mode on receipt of OSMA. 4. The OS speed shall be max permissible speed as per KAVACH TOC. 5. The approaching signal aspect shall not be linked till 200 meters before the stop signal.	
5.48.	Check for mode transition when OV selected, Radio communication is healthy, section speed available and when Onboard receives MA extension within OV timeout (previous mode is FS)- MA> 200m and train on movement. Signal Not requiring standstill for OV selection (LSS & IBS). **(FRS 8.3)**	1. Onboard is in FS mode and MA >200 meter. 2. LSS/IBS signal shall be ON. 3. Train is in movement. 4. Press OV and CNFM button in KAVACH area. 5. Radio communication is good. 6. Section speed available. 7. Onboard receives OS MA & Track Profile.	1. Onboard KAVACH shall display 'Override Selected'. 2. Onboard KAVACH should keep informing this status to Stationary KAVACH till passing the signal foot or EOA or receipt of OSMA. 3. The Onboard KAVACH should transit to OS mode on receipt of OSMA. 4. The OS speed shall be max permissible speed as per KAVACH TOC. 5. The approaching signal aspect shall not be linked till 200 meters before the stop signal.	LSS IBS
5.49.	Check for mode transition OV selected, Radio communication is healthy,	1. Onboard is in FS mode and MA > 200 meter. 2. LSS/IBS signal shall be	1. Onboard KAVACH shall display 'Override Selected'. 2. Onboard KAVACH should	LSS IBS

	System Level TEST CASES (RDSO)			
Test ID	**Test Scenario**	**Input Specification**	**Expected Output/Values**	**Observed Output (Pass/Fail)**
	section speed available and when Onboard receives MA extension within OV timeout (previous mode is FS)-MA>200m and train is standstill. Signal not requiring standstill for OV selection (LSS & IBS). **(FRS 8.3-(i))**	ON. 3. Train is at standstill. 4. Press OV and CNFM button in KAVACH area. 5. Radio communication is good. 6. Section speed available.	keep informing this status to Stationary KAVACH till passing the signal foot or EOA or receipt of OSMA. 3. The Onboard KAVACH should transit to OS mode on receipt of OSMA. 4. The OS speed shall be max permissible speed as per KAVACH TOC. 5. The approaching signal aspect shall not be linked till 200 meters before the stop signal.	
5.50.	Check for mode transition when OV selected, Radio communication is healthy and section speed available. (previous mode is FS). approaching signal (LSS/IBS) distance is < 200m and train on movement and signal is OFF aspect. Signal Not requiring standstill for OV selection (LSS & IBS) **(FRS 8.3-(i))**	1. Onboard is in FS mode and approaching signal (LSS/IBS) distance is < 200 meter. 2. Train is in movement. 3. LSS/IBS in OFF aspect. 4. Press OV and CNFM button in KAVACH area. 5. Radio communication is good. 6. Section speed available.	OV shall not be selected.	LSS IBS
5.51.	Check for mode transition OV selected, Radio communication is healthy and	1. Onboard is in FS mode and approaching signal (LSS/IBS) distance is < 200	OV shall not be selected.	LSS IBS

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	System Level TEST CASES (RDSO)			
Test ID	**Test Scenario**	**Input Specification**	**Expected Output/Values**	**Observed Output (Pass/Fail)**
	section speed available. (previous mode is FS) approaching signal (LSS/IBS) distance is < 200m and train on movement and signal is OFF aspect. Signal not requiring standstill for OV selection (LSS & IBS). **(FRS 8.3-(i))**	meter. 2. LSS/IBS in OFF aspect. 3. Train is in standstill. 4. Press OV and CNFM button in KAVACH area. 5. Radio communication is good. 6. Section speed available.		
5.52.	Check for mode transition OV selected, Radio communication is healthy and section speed available. (previous mode is FS) approaching signal (LSS/IBS) distance is > 200m and train on movement and signal is OFF aspect. Signal Not requiring standstill for OV selection (LSS & IBS). **(FRS 8.3-(i))**	1. Onboard is in FS mode and approaching signal (LSS/IBS) distance is >200 meter. 2. LSS/IBS in OFF aspect. 3. Train is in movement. 4. Press OV and CNFM button in KAVACH area. 5. Radio communication is good. 6. Section speed available.	OV shall not be selected.	LSS IBS
5.53.	Check for mode transition OV selected, Radio communication is healthy and section speed available. (previous mode is FS) approaching signal (LSS/IBS)	1. Onboard is in FS mode and approaching signal (LSS/IBS) distance is > 200 meter. 2. LSS/IBS in OFF aspect. 3. Train is in standstill.	OV shall not be selected.	LSS IBS

	System Level TEST CASES (RDSO)			
Test ID	**Test Scenario**	**Input Specification**	**Expected Output/Values**	**Observed Output (Pass/Fail)**
	distance is> 200m & train in standstill and signal is OFF aspect. Signal not requiring standstill for OV selection (LSS & IBS) **(FRS 8.3-(i))**	4. Press OV and CNFM button in KAVACH area. 5. Radio communication is good. 6. Section speed available.		
5.54.	Check for mode transition OV selected, Radio communication is healthy, section speed available and when Onboard receives MA extension within OV timeout (previous mode is FS). -Approaching signal is permissive. Signal not requiring standstill for OV selection (IBS) **(FRS 8.3-(i))**	1. Onboard is in FS mode. 2. LSS/IBS in ON aspect. 3. Train is on movement. 4. Press OV and CNFM button in KAVACH area. 5. Radio communication is good. 6. Section speed available.	1. Onboard KAVACH shall display 'Override Selected. 2. Onboard KAVACH should keep informing this status to Stationary KAVACH till passing the signal foot or EOA or receipt of OSMA. 3. The Onboard KAVACH should transit to OS mode on receipt of OSMA. 4. The OSMA and authorized speed shall be as per KAVACH TOC. 5. The next approaching signal aspect shall not be linked till 200 meters before the stop signal.	IBS distant IBS inner distant
5.55.	Check for mode transition OV selected, Radio communication is healthy and section speed available (previous mode is FS).	1. Onboard is in FS mode. 2. LSS/IBS in OFF aspect. 3. Train is on movement. 4. Press OV and CNFM button in KAVACH area.	1. Onboard KAVACH shall not display 'Override Selected'. 2. Signal aspect of IBS distant and IBS inner distant shall	IBS distant IBS inner distant

	System Level TEST CASES (RDSO)			
Test ID	**Test Scenario**	**Input Specification**	**Expected Output/Values**	**Observed Output (Pass/Fail)**
	-Approaching signal is permissive. Signal not requiring standstill for OV selection (IBS). **(FRS 8.3-(i))**	5. Radio communication is good. 6. Section speed available.	be displayed in DMI.	
5.56.	Check for mode transition OV selected, Radio communication is healthy, section speed available and when Onboard receives MA extension within OV timeout. (previous mode is OS)- MA<200m and train on movement. Signal not requiring standstill for OV selection (LSS & IBS). **(FRS 8.3-(i))**	1. Onboard is in OS mode and MA < 200 meter. 2. LSS/IBS in ON aspect. 3. Train is in movement. 4. Press OV and CNFM button in KAVACH area. 5. Radio communication is good. 6. Section speed available.	1. Onboard KAVACH shall display 'Override Selected'. 2. Keep informing this status to Stationary KAVACH till passing the signal foot or EOA or receipt of OSMA. 3. The Onboard KAVACH should transit to OS mode on receipt of OSMA. 4. The OSMA and authorized speed shall be as per KAVACH TOC. 5. The approaching signal aspect shall not be linked till 200 meters before the stop signal.	LSS IBS
5.57.	Check for mode transition OV selected, Radio communication is healthy, section speed available and when Onboard receives MA extension within OV timeout. (previous mode is OS)- MA< 200m and train is standstill.	1. Onboard is in OS mode and MA < 200 meter. 2. LSS/IBS in ON aspect. 3. Train is in standstill. 4. Press OV and CNFM button in KAVACH area. 5. Radio communication is good.	1. Onboard KAVACH shall display 'Override Selected. 2. Onboard KAVACH should Keep inform this status to Stationary KAVACH till passing the signal foot or EOA or receipt of OSMA. 3. The Onboard KAVACH	LSS IBS

	System Level TEST CASES (RDSO)			
Test ID	**Test Scenario**	**Input Specification**	**Expected Output/Values**	**Observed Output (Pass/Fail)**
	Signal not requiring standstill for OV selection (LSS & IBS). **(FRS 8.3-(i))**	6. Section speed available.	should transit to OS mode on receipt of OSMA. 4. The OS speed shall be max permissible speed as per KAVACH TOC. 5. The approaching signal aspect shall not be linked till 200 meters before the stop signal.	
5.58.	Check for mode transition OV selected, Radio communication is healthy, section speed available and when Onboard receives MA extension within OV timeout. (previous mode is OS)-MA>200m and train on movement. Signal Not requiring standstill for OV selection (LSS & IBS). **(FRS 8.3-(i))**	1. Onboard is in OS mode and MA >200 meter. 2. Train is in movement. 3. Press OV and CNFM button in KAVACH area. 4. Radio communication is good. 5. Section speed available.	1. Onboard KAVACH shall display 'Override Selected'. 2. Onboard KAVACH should Keep inform this status to Stationary KAVACH till passing the signal foot or EOA or receipt of OSMA. 3. The Onboard KAVACH should transit to OS mode on receipt of OSMA. 4. The OSMA and authorized speed shall be as per KAVACH TOC. 5. The approaching signal aspect shall not be linked till 200 meters before the stop signal.	LSS IBS
5.59.	Check for mode transition OV selected, Radio communication is healthy,	1. Onboard is in OS mode and MA > 200 meter. 2. LSS/IBS at ON.	1. Onboard KAVACH shall display 'Override Selected'. 2. Onboard KAVACH should	LSS IBS

	System Level TEST CASES (RDSO)			
Test ID	**Test Scenario**	**Input Specification**	**Expected Output/Values**	**Observed Output (Pass/Fail)**
	section speed available and when Onboard receives MA extension within OV timeout (previous mode is OS)-MA>200m and train is standstill. Signal not requiring standstill for OV selection (LSS & IBS). **(FRS 8.3-(i))**	3. Train is in standstill. 4. Press OV and CNFM button in KAVACH area. 5. Radio communication is good. 6. Section speed available.	Keep inform this status to Stationary KAVACH till passing the signal foot or EOA or receipt of OSMA. 3. The Onboard KAVACH should transit to OS mode on receipt of OSMA. 4. The OSMA and authorized speed shall be as per KAVACH TOC. 5. The approaching signal aspect shall not be linked till 200 meters before the stop signal.	
5.60.	Check for mode transition OV selected, Radio communication is healthy and section speed available (previous mode is OS). approaching signal (LSS/IBS) distance is <200m and train on movement and signal is OFF aspect. Signal Not requiring standstill for OV selection (LSS & IBS). **(FRS 8.3-(i))**	1. Onboard is in OS mode < 200 meter. 2. Train is in movement. 3. LSS/IBS in OFF aspect. 4. Press OV and CNFM button in KAVACH area. 5. Radio communication is good. 6. Section speed available.	OV shall not be selected.	LSS IBS
5.61.	Check for mode transition OV selected, Radio communication is healthy and	1. Onboard is in OS mode and MA < 200 meter. 2. LSS/IBS in OFF aspect	OV shall not be selected.	LSS IBS

	System Level TEST CASES (RDSO)			
Test ID	**Test Scenario**	**Input Specification**	**Expected Output/Values**	**Observed Output (Pass/Fail)**
	section speed available (previous mode is OS). approaching signal (LSS/IBS) distance is <200m and train on movement and signal is OFF aspect. Signal not requiring standstill for OV selection (LSS & IBS). **(FRS 8.3-(i))**	3. Train is in standstill. 4. Press OV and CNFM button in KAVACH area. 5. Radio communication is good. 6. Section speed available.		
5.62.	Check for mode transition OV selected, Radio communication is healthy and section speed available (previous mode is OS). approaching signal (LSS/IBS) distance is > 200m and train on movement and signal is OFF aspect. Signal Not requiring standstill for OV selection (LSS & IBS). **(FRS 8.3-(i))**	1. Onboard is in OS mode and MA >200 meter. 2. LSS/IBS in OFF aspect. 3. Train is in movement. 4. Press OV and CNFM button in KAVACH area. 5. Radio communication is good. 6. Section speed available.	OV shall not be selected.	LSS IBS
5.63.	Check for mode transition OV selected, Radio communication is healthy and section speed available (previous mode is OS). approaching signal (LSS/IBS)	1. Onboard is in OS mode and MA > 200 meter. 2. LSS/IBS in OFF aspect. 3. Train is in standstill. 4. Press OV and CNFM button in KAVACH area.	OV shall not be selected.	LSS IBS

	System Level TEST CASES (RDSO)			
Test ID	**Test Scenario**	**Input Specification**	**Expected Output/Values**	**Observed Output (Pass/Fail)**
	distance is > 200m & train in standstill and signal is OFF aspect. (Signal not requiring standstill for OV selection (LSS & IBS). **(FRS 8.3-(i))**	5. Radio communication is good. 6. Section speed available.		
5.64.	Check for exit of OV selection, Radio communication is healthy, section speed available and override timeout happened (previous mode is FS). **(FRS 8.2(a))**	1. Onboard is in FS Mode. 2. Press OV and CNFM button in KAVACH area. 3. Radio communication is good. 4. Section speed available. 5. The configured override timeout is elapsed i.e., 240 Sec. 6. Simulate that Stationary KAVACH shall not send OSMA.	OV selected message should disappear on DMI after elapsed of override time.	
5.65.	Check for exit of OV selection, Radio communication is healthy, section speed available and override timeout happened (previous mode is OS). **(FRS 8.2(a))**	1. Onboard is in OS Mode. 2. Press OV and CNFM button in KAVACH area. 3. Radio communication is good. 4. Section speed available. 5. The configured override timeout is elapsed i.e., 240 Sec.	OV selected message should disappear on DMI after elapsed of override time.	

	System Level TEST CASES (RDSO)			
Test ID	**Test Scenario**	**Input Specification**	**Expected Output/Values**	**Observed Output (Pass/Fail)**
		6. Simulate that Stationary KAVACH shall not send OSMA.		
5.66.	Check for exit of OV selection, Radio communication is healthy, section speed available and override timeout happened (previous mode is PT). **(FRS 8.2(a))**	1. Onboard is in PT Mode. 2. Press OV and CNFM button in KAVACH area. 3. Radio communication is good. 4. Section speed available. 5. The configured override timeout is elapsed i.e., 240 Sec. 6. Simulate that Stationary KAVACH shall not send OSMA.	OV selected message should disappear on DMI after elapsed of override time.	
5.67.	Check for mode transition of Onboard when OV Selected in FS mode and Onboard crosses the Signal foot when Signal is at ON. **(FRS 8.2(b), condi-91)**	1. Onboard is in FS mode. 2. Press OV and CNFM button in KAVACH area. 3. OSMA Not extended. 4. Make movement such that Onboard crosses signal foot when Signal is at ON. 5. Communication is healthy.	The Onboard KAVACH should transit to TRIP mode.	
5.68.	Check for mode transition of Onboard when OV selected in OS mode and when Onboard crosses the Signal foot when Signal is at ON. **(FRS 8.2(b), condi-91)**	1. Onboard is in OS mode. 2. Press OV and CNFM button in KAVACH area. 3. OSMA Not extended. 4. Make movement such that Onboard crosses signal foot	The Onboard KAVACH should transit to TRIP mode.	

	System Level TEST CASES (RDSO)			
Test ID	**Test Scenario**	**Input Specification**	**Expected Output/Values**	**Observed Output (Pass/Fail)**
		when Signal is at ON. 5. Communication is healthy.		
5.69.	Check for mode transition of Onboard when OV Selected in PT mode. Onboard crosses the Signal foot when Signal is at ON and Signal foot tag missed. **(FRS 10.1, 10.4)**	1. Onboard is in PT mode. 2. Press OV and CNFM button in KAVACH area. 3. OSMA extended. 4. Communication is healthy.	1. The Onboard shall enter into trip mode after passing 30 mtrs beyond the Signal at ON. 2. Stationary KAVACH shall sends MA=0 & Authorized speed=0 after passing signal location due to SPAD detection, therefore immediately entering into trip mode if communication is healthy.	
			3. The passed signal aspect only to be shown as RED.	
			4. Brake shall be released when loco speed is "0" Zero and PT selected.	
			5. After Pressing OV and confirm button, OSMA is extended and permissible speed of 15 kmph shall be observed.	
5.70.	Check for mode transition of Onboard is in FS mode and OV Selected to NL mode. When Non Leading input is	1. Onboard is in FS mode. 2. Press OV and CNFM button in KAVACH area. 3. Non Leading input is active.	The Onboard KAVACH should not transit to Non – leading mode.	

	System Level TEST CASES (RDSO)			
Test ID	**Test Scenario**	**Input Specification**	**Expected Output/Values**	**Observed Output (Pass/Fail)**
	active. Train is not at standstill. **(condi-53)**	4. Onboard is not at standstill.		
5.71.	Check for mode transition of Onboard is in OS mode and OV Selected to NL mode. When Non-Leading input is active. Train is not at standstill. **(condi-53)**	1. Onboard is in OS mode. 2. Press OV and CNFM button in KAVACH area. 3. Non Leading input is active. 4. Onboard is not at standstill.	The Onboard KAVACH should not transit to Non – leading mode.	
5.72.	Check for mode transition of Onboard is in PT mode and OV is active. Loco pilot Selected NL mode. When Non-Leading input is active. Train is not at standstill. **(condi-53)**	1. Onboard is in PT mode. 2. Simulate Non Leading input active. 3. OV and CNFM button in KAVACH area.	1. The Onboard KAVACH should not transit to Non – leading mode. 2. Override selected message is displayed on DMI. 3. OSMA shall not be extended (fail radio comm from stationary Kavach side).	
5.73.	Check for mode transition of Onboard is in FS mode and OV mode selected to NL mode when Non Leading input is active and Train is at standstill. (**condi-53)**	1. Onboard is in FS Mode. 2. Press OV and CNFM button in KAVACH area. 3. Non Leading input is active. 4. Onboard is at standstill.	1. Override selected message is displayed on DMI and OSMA shall not extended. 2. The Onboard KAVACH should transit to Non – leading mode.	
5.74.	Check for mode transition of Onboard is in OS mode and OV selected to NL mode	1. Onboard is in OS Mode. 2. Press OV and CNFM button in KAVACH area.	1. Override selected message is displayed on DMI and OSMA shall not extended.	

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	System Level TEST CASES (RDSO)			
Test ID	**Test Scenario**	**Input Specification**	**Expected Output/Values**	**Observed Output (Pass/Fail)**
	when Non Leading input is active and Train is at standstill. **(condi-53)**	3. Non Leading input is active. 4. Onboard is at standstill.	2. The Onboard KAVACH should transit to Non – leading mode.	
5.75.	Check for mode transition of Onboard in PT mode and OV selected to NL mode. when Non-Leading input is active and Train is at standstill. **(condi-53)**	1. Onboard is in PT Mode. 2. Press OV and CNFM button in KAVACH area. 3. Non Leading input is active. 4. Onboard is at standstill.	The Onboard KAVACH should not transit to Non – leading mode.	
5.76.	Check for mode transition when OV selected in FS Mode to System failure when critical fault occurs in system. **(condi-5)**	1. Onboard is in FS Mode. 2. Press OV and CNFM button in KAVACH area. 3. Create a critical fault. 4. Override selected message should display on DMI and OSMA not extended.	1. Onboard KAVACH should get changed to System failure mode. 2. Check for Onboard KAVACH on DMI.	
5.77.	Check for mode transition when OV selected in OS Mode to System failure when critical fault occurs in system. **(condi-5)**	1. Onboard is in OS Mode. 2. Press OV and CNFM button in KAVACH area. 3. Create a critical fault. 4. Override selected message should display on DMI and OSMA not extended.	1. Onboard KAVACH should get changed to System failure mode. 2. Check for Onboard KAVACH on DMI.	
5.78.	Check for mode transition when OV selected in PT Mode to System failure when	1. Onboard is in PT Mode. 2. Press OV and CNFM button in KAVACH area.	1. Onboard KAVACH should get changed to System failure mode.	

	System Level TEST CASES (RDSO)			
Test ID	**Test Scenario**	**Input Specification**	**Expected Output/Values**	**Observed Output (Pass/Fail)**
	critical fault occurs in system. **(condi-5)**	3. Create a critical fault. 4. Override selected message should display on DMI and OSMA not extended.	2. Check for mode on DMI.	
5.79.	Check for reverse movement protection in FS mode and OV Selected.	1. Onboard is in FS Mode. 2. Press OV and CNFM button in KAVACH area. 3. Change the direction of train. 4. Override selected message should display on DMI and OSMA not extended.	1. The reverse movement will not be permitted. 2. Message should be displayed “REV Movement Not Allowed, Use REV mode” in DMI.	
5.80.	Check for reverse movement protection in OS mode and OV Selected.	1. Onboard is in OS Mode. 2. Press OV and CNFM button in KAVACH area. 3. Change the direction of train. 4. Override selected message should display on DMI and OSMA not extended.	1. The reverse movement will not be permitted. 2. Message should be displayed “REV Movement Not Allowed, Use REV mode” in DMI.	
5.81.	Check for reverse movement protection in PT mode and OV Selected.	1. Onboard is in PT Mode. 2. Press OV and CNFM button in KAVACH area. 3. Change the direction of train. 4. Override selected message should display on DMI and OSMA not extended.	1. The reverse movement will not be permitted. 2. Message should be displayed “REV Movement Not Allowed, Use REV mode” in DMI.	

	System Level TEST CASES (RDSO)			
Test ID	**Test Scenario**	**Input Specification**	**Expected Output/Values**	**Observed Output (Pass/Fail)**
5.82.	Check for roll back protection when OV selected and Loco in FS mode. (**FRS 31.3) & SRS 12.1**	1. Onboard in FS mode. 2. Press OV and CNFM button in KAVACH area. 3. Override selected message should display on DMI and OSMA not extended. 4. Simulate the condition of rollback by making the rollback input high and give some speed.	Brakes should be applied after the configured distance (10m) is travelled for rollback movement.	
5.83.	Check for roll back protection when OV selected and Loco in OS mode. (**FRS 31.3) & SRS 12.1**	1. Onboard in OS mode. 2. Press OV and CNFM button in KAVACH area. 3. Override selected message should display on DMI and OSMA not extended. 4. Simulate the condition of rollback by making the rollback input high and give some speed.	Brakes should be applied after the configured distance (10m) is travelled for rollback movement.	
5.84.	Check for roll back protection when OV selected and Loco in PT mode. (**FRS 31.3) & SRS 12.1**	1. Onboard in PT mode. 2. Press OV and CNFM button in KAVACH area. 3. Override selected message should display on DMI and OSMA not extended. 4. Simulate the condition of rollback by making the rollback input high and give	Brakes should be applied after the configured distance (10m) is travelled for rollback movement.	

	System Level TEST CASES (RDSO)			
Test ID	**Test Scenario**	**Input Specification**	**Expected Output/Values**	**Observed Output (Pass/Fail)**
		some speed.		
5.85.	The train direction shall get changed when passed over the adjustment/Junction tag when override selected in FS/OS/PT.	1. Press OV and CNFM button in KAVACH area. 2. Override selected message should display on DMI and OSMA not extended. 3. Simulate the condition such that train passes over adjustment Tag. 4. In PT+OV selection, simulate the movement after receipt of OSMA.	1. The train direction shall get changed and Onboard to be continued in existing mode when override selected. 2. Override selected and no reduction in MA to be noticed.	FS OS PT+OV
5.86.	The train direction shall get changed when passed over the Junction tag when override selected in FS/OS/PT.	1. Press OV and CNFM button in KAVACH area. 2. Override selected message should display on DMI and OSMA not extended. 3. Simulate the condition such that train passes over Junction Tag. 4. In PT+ OV selection, simulate the movement after receipt of OSMA.	1. The train direction shall get changed and Onboard to be continued in existing mode when override selected. 2. Override selected and no reduction in MA to be noticed.	FS OS PT+OV
5.87.	To check SR mode transition when Onboard **exits from KAVACH territory area.** Loco is in FS mode & OV selected.	1. Loco is in FS mode. 2. Onboard is on movement. 3. Press OV and CNFM button for Advanced starter/ IB signal. 4. Make sure that OSMA is	1. System shall remain in FS mode along with Override selected status till exit tag. 2. Tag linking will be up to exit tag. 3. There shall not any spurious	LSS IB

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	System Level TEST CASES (RDSO)			
Test ID	**Test Scenario**	**Input Specification**	**Expected Output/Values**	**Observed Output (Pass/Fail)**
	(FRS 8.2 d(iii), (Cond. No. 17)	not extended. 5. On movement, Swipe the exit tag before approaching signal.	braking of this. 4. The exit tag shall be reported to stationary KAVACH. This shall be checked in NMS log. 5. System should transit to SR mode after reading the exit tag. It can be verified on DMI and ACK request should be there. 6. Position report shall not be erased till the complete train has passed the last TIN (Tag). 7. Onboard will transmit regular packet with last reported TIN till complete train passes exit tag. 8. Stationary KAVACH will deregister the Onboard after passes of complete train and Onboard communication shall be stopped without time out. 9. Onboard KAVACH shall stopp radio communication after complete passes of train.	

	System Level TEST CASES (RDSO)			
Test ID	**Test Scenario**	**Input Specification**	**Expected Output/Values**	**Observed Output (Pass/Fail)**
			10. If the Loco Pilot gives the ACK within the configurable time, brakes should not apply.	
			11. If the Loco Pilot didn't give the ACK within the configurable time, brakes should apply.	
5.88.	To check SR mode transition when Onboard is in OS mode and Override is selected and exits **from KAVACH territory area** **Loco is in OS mode & OV selected.** **(FRS 8.2 d(iii), (Cond. No. 17)**	1. Loco is in OS mode. 2. Onboard is on movement. 3. Press OV and CNFM button for Advanced starter/ IB signal. 4. Make sure that OSMA is not extended. 5. On movement, Swipe the exit tag before approaching signal.	1. System shall remain in OS mode along with Override selected status till exit tag. Tag linking will be up to exit tag. There shall not any spurious braking of this.	LSS IB
			2. The exit tag shall be reported to stationary KAVACH. This shall be checked in NMS log.	
			3. System should transit to SR mode after reading the exit tag. It can be verified on DMI and ACK request should be there.	
			4. Position report shall not be erased till the complete train has passed the last TIN (Tag).	

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	System Level TEST CASES (RDSO)			
Test ID	**Test Scenario**	**Input Specification**	**Expected Output/Values**	**Observed Output (Pass/Fail)**
			5. Onboard will transmit regular packet with last reported TIN till complete train passes exit tag.	
			6. Stationary KAVACH will deregister the Onboard after passes of complete train and Onboard communication shall be stopped without time out.	
			7. Onboard KAVACH shall stopp radio communication after complete passes of train.	
			8. If the Loco Pilot gives the ACK within the configurable time, brakes should not apply.	
			9. If the Loco Pilot didn't give the ACK within the configurable time, brakes should apply.	
5.89.	To check SR mode transition when track profile is not available up to MA. when MA < 3000m (configurable). **Loco is in FS mode & OV**	1. Make sure that Loco is in FS mode. 2. Make sure that Override selected and OSMA is not extended. 3. Now simulate the condition	1. System should transit to SR mode and it can be verified on DMI and ACK request should be there.	
			2. If the Loco pilot give the ACK within the	

	System Level TEST CASES (RDSO)			
Test ID	**Test Scenario**	**Input Specification**	**Expected Output/Values**	**Observed Output (Pass/Fail)**
	selected. **(FRS 8.2 d (i), Cond. No. 23)**	such that track profile is not available up to MA when MA < 3000m (configurable).	configurable time, brakes should not apply.	
			3. If the Loco Pilot didn't give the ACK within the configurable time, brakes should apply.	
			4. Direction shall not be erased.	
5.90.	To check SR mode transition when track profile is not available up to MA. when MA < 3000m (configurable). **Loco is in OS mode & OV selected.** **(FRS 8.2 d (i), Cond. No. 23)**	1. Make sure that Loco is in OS mode. 2. Make sure that Override selected and OSMA is not extended. 3. Now simulate the condition such that track profile is not available up to MA when MA < 3000m (configurable).	1. System should transit to SR mode and it can be verified on DMI and ACK request should be there.	
			2. If the Loco pilot give the ACK within the configurable time, brakes should not apply.	
			3. If the Loco Pilot didn't give the ACK within the configurable time, brakes should apply.	
			4. Direction shall not be erased.	
5.91.	To check SR mode transition when three consecutive linked tags are missed. Loco is in FS mode & OV	1. Make sure that Loco is in FS mode. 2. Make sure that Override selected and OSMA is not	1. System should transit to SR mode and it can be verified on DMI and ACK request should be there.	

	System Level TEST CASES (RDSO)			
Test ID	**Test Scenario**	**Input Specification**	**Expected Output/Values**	**Observed Output (Pass/Fail)**
	selected. **(FRS 8.2 (d-ii), Cond. No. 85))**	extended. 3. Now simulate the condition such that three consecutive linked tags are missed.	2. If the Loco pilot give the ACK within the configurable time, brakes should not apply.	
			3. If the Loco Pilot didn't give the ACK within the configurable time, brakes should apply.	
5.92.	To check SR mode transition when three consecutive linked tags are missed. Loco is in OS mode & OV selected. **(FRS 8.2 (d-ii), Cond. No. 85))**	1. Make sure that Loco is in OS mode. 2. Make sure that Override selected and OSMA is extended. 3. Now simulate the condition such that three consecutive linked tags are missed.	1. System should transit to SR mode and it can be verified on DMI and ACK request should be there. 2. If the Loco pilot give the ACK within the configurable time, brakes should not apply. 3. If the Loco pilot does not acknowledge, brake should have applied. 4. Direction should get erased.	
5.93.	Check for SOS acceptance from Stationary KAVACH when Onboard KAVACH is in FS mode & OV selected. **(FRS 31.4.6)**	1. Make sure that Loco is in FS mode. 2. Make sure that Override selected and OSMA is extended. 3. Onboard is moving. 4. Generate Manual SOS from station. 5. Check for Braking in	1. Brake shall be applied and train shall come to standstill. 2. Check for Increment in Counter value corresponding to SOS in both Onboard and stationary KAVACH. 3. After the loco came to standstill mode, loco shall travel with 30 kmph till SOS	

	System Level TEST CASES (RDSO)			
Test ID	**Test Scenario**	**Input Specification**	**Expected Output/Values**	**Observed Output (Pass/Fail)**
		Onboard.	is available. 4. After SOS cancel, the speed restriction shall be removed.	
5.94.	Check for SOS acceptance from Stationary KAVACH when Onboard KAVACH is in OS mode & OV selected. **(FRS 31.4.6)**	1. Make sure that Loco is in OS mode. 2. Make sure that Override selected and OSMA is extended. 3. Onboard is moving. 4. Generate Manual SOS from station. 5. Check for Braking in Onboard.	1. Brake shall be applied and train shall come to standstill.	
			2. Check for Increment in Counter value corresponding to SOS in both Onboard and stationary KAVACH.	Onboard KAVACH:
				Stationary KAVACH:
			3. After the loco came to standstill mode, loco shall travel with 30 kmph till SOS is available.	
			4. After SOS cancel, the speed restriction shall be removed.	
5.95.	Check for SOS acceptance from stationary KAVACH and Onboard KAVACH is in PT mode & OV selected. **(FRS 31.4.6)**	1. Make sure that Loco is in PT mode. 2. Make sure that Override selected and OSMA is extended. 3. Onboard is moving. 4. Generate Manual SOS from station. 5. Check for Braking in Onboard.	1. Brake shall be applied and train shall come to standstill.	
			2. Check for Increment in Counter value corresponding to SOS in both Onboard and stationary KAVACH.	Onboard KAVACH:
				Stationary KAVACH:
			3. After the loco came to standstill mode, loco shall travel with 30 kmph till SOS is available.	
			4. After SOS cancel, the speed	

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	System Level TEST CASES (RDSO)			
Test ID	**Test Scenario**	**Input Specification**	**Expected Output/Values**	**Observed Output (Pass/Fail)**
			restriction shall be removed.	
5.96.	To check mode transition from FS to SHUNT mode when Override is selected.	1. Make sure that Loco is in FS mode. 2. Make sure that Override selected and OSMA is not extended upto timeout. 3. Now press the Shunt and CNFM button.	Check that mode shall transit to Shunt mode.	
5.97.	To check mode transition from FS to RV mode when Override is selected.	1. Make sure that Loco is in FS mode. 2. Make sure that Override selected and OSMA is not extended upto timeout. 3. Now press the RV and CNFM button.	Check that mode shall transit to RV mode.	
5.98.	To check mode transition from OS to SHUNT mode when Override is selected.	1. Make sure that Loco is in OS mode. 2. Make sure that Override selected and OSMA is not extended upto timeout. 3. Now press the Shunt and CNFM button.	Check that mode shall transit to Shunt mode.	
5.99.	To check mode transition from OS to RV mode when Override is selected.	1. Make sure that Loco is in OS mode. 2. Make sure that Override selected and OSMA is not extended upto timeout. 3. Now press the RV and	Check that mode shall transit to RV mode.	

	System Level TEST CASES (RDSO)			
Test ID	**Test Scenario**	**Input Specification**	**Expected Output/Values**	**Observed Output (Pass/Fail)**
		CNFM button.		
5.100.	To check mode transition from PT to SHUNT mode when Override is selected.	1. Make sure that Loco is in PT mode. 2. Make sure that Override selected and OSMA is not extended upto timeout. 3. Now press the Shunt and CNFM button.	Check that mode shall not transit to Shunt mode.	
5.101.	To check mode transition from PT to RV mode when Override is selected.	1. Make sure that Loco is in PT mode. 2. Make sure that Override selected and OSMA is not extended upto timeout. 3. Now press the RV and CNFM button.	Check that mode shall transit to RV mode.	
5.102.	Display the train speed and the permitted speed when Loco is in FS mode & OV selected. **FRS 8.4**	1. Make sure that Loco is in FS mode. 2. Make sure that Override selected and OSMA is not extended. 3. Onboard is in communication mandatory area.	DMI shall display the train speed and the permitted speed.	
5.103.	Display the train speed and the permitted speed when Loco is in OS mode & OV selected. **FRS 8.4**	1. Make sure that Loco is in OS mode. 2. Make sure that Override selected and OSMA is not extended.	DMI shall display the train speed and the permitted speed.	

	System Level TEST CASES (RDSO)			
Test ID	**Test Scenario**	**Input Specification**	**Expected Output/Values**	**Observed Output (Pass/Fail)**
		3. Onboard is in communication mandatory area.		
5.104.	Display the train speed and the permitted speed when Loco is in PT mode & OV selected. **FRS 8.4**	1. Loco is in PT mode. 2. Make sure that Override selected and OSMA is not extended. 3. Onboard is in communication mandatory area.	Loco movement is not permitted until OSMA received. DMI shall display train speed and permitted speed as zero.	
5.105.	Check for no Mode transition when train is in FS mode & FS+OV is selected. Train configuration is changed during standstill. **(FRS 22.1)**	1. Ensure that Onboard is in FS mode. 2. Press for OV and CNFM button. 3. Onboard is at stand still. 4. Make the CAB active. 5. Change the train configuration.	1. Onboard KAVACH shall conduct brake test. 2. On successful brake-tests Onboard KAVACH should remain in FS mode and OV selected message shall be displayed.	
5.106.	Train length measurement when override is selected in OS mode for formation.	1. Make sure that train is in OS mode with default train length, and train formation is selected. 2. Simulate the condition such that Onboard is passed in block section over the track circuits so that train length calculation is happened successfully by Onboard	The default train length will be replaced with the calculated train length if it differs by more than 25m.	

	System Level TEST CASES (RDSO)			
Test ID	**Test Scenario**	**Input Specification**	**Expected Output/Values**	**Observed Output (Pass/Fail)**
		KAVACH. 3. The updated train length can be verified as follows, keep the Onboard in constant speed of 60kmph. Keep the track circuit time as 1min, the train length should be 1000m (d=s*t) 4. Approaching signal is at ON and Override is selected.		
5.107.	Train length measurement when override is selected in OS mode and it is within range of entered value while train configuration is provided. (Start of mission)	1. Power on the system, and note down the train length value which is configured (Default). 2. Make sure that no faults are present. 3. Make sure that train is in OS mode and OV selected as approaching stop signal is at ON. 4. Now simulate the condition such that Onboard KAVACH received the track circuits data from station KAVACH and Onboard KAVACH will compute the train length, the difference between the	The train length should be updated.	

	System Level TEST CASES (RDSO)			
Test ID	**Test Scenario**	**Input Specification**	**Expected Output/Values**	**Observed Output (Pass/Fail)**
		computed value and the configured value is more than 25mts.		
		5. Repeat the train length calculation step -4 but the train length should be less than the 25mts from the previous value. It is simulated as the track circuit occupation time is less than the previous scenario.	The train length should be updated.	
5.108.	Train length measurement when override is selected in OS mode and it is within range of entered value while train configuration is provided.	1. Power on the system, and note down the train length value which is configured. 2. Make sure that no faults are present. 3. Make sure that train is in OS mode and override is selected as approaching signal is at ON. 4. Now simulate the condition such that Onboard KAVACH received the track circuits data from station KAVACH and Onboard KAVACH will compute the train length, the difference between the	The train length should be updated.	

	System Level TEST CASES (RDSO)			
Test ID	**Test Scenario**	**Input Specification**	**Expected Output/Values**	**Observed Output (Pass/Fail)**
		computed value and the configured value is more than 25mts. 5. Now change the CAB inactive and make Active.		
		6. Repeat the train length calculation step4 but the train length should be less than the 25mts from the previous value. It is simulated as the track circuit occupation time is less than the previous scenario.	The train length should not be updated.	
5.109.	Train length verification when override is selected in OS mode and TLM start packet received from one station and TLM end packet received from next station.	1. Make sure that train is in OS mode with default train length, and train formation is selected. (Default) 2. Override is selected as approaching stop signal is at ON. 3. Configure the train type as passenger train type with suitable coach selection. 4. Note down the train length as its length is 400mts say. 5. Now keep the Onboard in OS mode with override selected and train length	1. Message shall be displayed on DMI that "Train length Computation Success (XXXXm)" 2. Check that updated TLM length is displayed on DMI.	

	System Level TEST CASES (RDSO)			
Test ID	**Test Scenario**	**Input Specification**	**Expected Output/Values**	**Observed Output (Pass/Fail)**
		measurement test may be carried out by keeping the train in constant speed of 60 kmph and track circuit up time as 1 minute. The train length should be 1000m. 6. TLM start packet received from 1st station. 7. After passing the signal, TLM end packet received from the next adjacent station.		
5.110.	Train length measurement when override is selected in FS mode for formation.	1. Make sure that train is in FS mode with default train length, and train formation is selected. 2. Simulate the condition such that Onboard is passed in block section over the track circuits so that train length calculation is happened successfully by Onboard KAVACH. 3. The updated train length can be verified as follows, keep the Onboard in constant speed of 60kmph. Keep the track circuit time as 1min, the train length	The default train length will be replaced with the calculated train length if it differs by more than 25m.	

	System Level TEST CASES (RDSO)			
Test ID	**Test Scenario**	**Input Specification**	**Expected Output/Values**	**Observed Output (Pass/Fail)**
		should be 1000m (d=s*t). 4. Approaching signal is at ON and Override is selected.		
5.111.	Train length measurement when override is selected in FS mode and it is within range of entered value while train configuration is provided.	1. Power on the system, and note down the train length value which is configured (Default). 2. Make sure that no faults are present. 3. Make sure that train is in FS mode and OV selected as approaching stop signal is at ON. 4. Now simulate the condition such that Onboard KAVACH received the track circuits data from station KAVACH and Onboard KAVACH will compute the train length, the difference between the computed value and the configured value is less than 25mts.	The train length should be updated.	

	System Level TEST CASES (RDSO)			
Test ID	**Test Scenario**	**Input Specification**	**Expected Output/Values**	**Observed Output (Pass/Fail)**
		5. Repeat the train length calculation step -4 but the train length should be less than the 25mts from the previous value. It is simulated as the track circuit occupation time is less than the previous scenario.	The train length should not be updated.	
5.112.	Train length measurement when override is selected in FS mode and it is within range of entered value while train configuration is provided.	1. Power on the system, and note down the train length value which is configured. 2. Make sure that no faults are present. 3. Make sure that train is in FS mode and override is selected as approaching stop signal is at ON. 4. Now simulate the condition such that Onboard KAVACH received the track circuits data from station KAVACH and Onboard KAVACH will compute the train length, the difference between the computed value and the configured value is more than 25mts.	The train length should be updated.	

	System Level TEST CASES (RDSO)			
Test ID	**Test Scenario**	**Input Specification**	**Expected Output/Values**	**Observed Output (Pass/Fail)**
		5. Now change the CAB inactive and make Active. 6. Repeat the train length calculation step4 but the train length should be less than the 25mts from the previous value. It is simulated as the track circuit occupation time is more than the previous scenario.	The train length should not be updated.	
5.113.	Train length verification when override is selected in FS mode and TLM start packet received from one station and TLM end packet received from next station.	1. Make sure that train is in FS mode with default train length, and train formation is selected. (Default) 2. Override is selected as approaching stop signal is at ON. 3. Configure the train type as passenger train type with suitable coach selection. 4. Note down the train length as its length is 400mts say. 5. Now keep the Onboard in FS mode with override selected and train length measurement test may be carried out by keeping the train in constant speed of 60	1. Message shall be displayed on DMI that "Train length Computation Success (XXXXm)". 2. Check that updated TLM length is displayed on DMI.	

	System Level TEST CASES (RDSO)			
Test ID	**Test Scenario**	**Input Specification**	**Expected Output/Values**	**Observed Output (Pass/Fail)**
		kmph and track circuit up time as 1 minute. The train length should be 1000m. 6. TLM start packet received from 1st station. 7. After passing the signal, TLM end packet received from the next adjacent station.		
5.114.	Check that shortest OSMA when override the home signal at ON aspect (RED Aspect) having multiple routes. **(FRS 9.10, Condi 86)**	1. Make sure that Onboard KAVACH in FS Mode. 2. In communication mandatory area and valid communication. 3. Approaching signal is home stop signal with ON aspect having multiple routes. 4. Select 'OVRD' and 'CNFM' buttons. 5. Next approaching Signal shall be linked within 200 m in approach next stop signal. 6. Check that no Onboard available in approach of signal.	1. OSMA shall be send by stationary KAVACH for shortest route. 2. Reference Profile shall be "00" and shall be verified in log. 3. OS speed shall be 15 Kmph. 4. After movement, the reading of RFID tag, the stationary KAVACH shall extend MA when route is ascertained. 5. Signal shall be linked only within 200 meters in approach of stop signal.	

	System Level TEST CASES (RDSO)			
Test ID	**Test Scenario**	**Input Specification**	**Expected Output/Values**	**Observed Output (Pass/Fail)**
5.115.	Check that shortest OSMA when override the home signal at ON aspect (RED Aspect) having multiple routes. **(FRS 9.10, Condi 86)**	1. Make sure that Onboard KAVACH in OS Mode. 2. In communication mandatory area and valid communication. 3. Approaching signal is home stop signal with ON aspect having multiple routes. 4. Select 'OVRD' and 'CNFM' buttons. 5. Next approaching Signal shall be linked within 200 m in approach next stop signal. 6. Check that no Onboard available in approach of signal.	1. OSMA shall be send by stationary KAVACH for shortest route. 2. Reference Profile shall be "00" and shall be verified in log. 3. OS speed shall be 15 Kmph. 4. After movement, the reading of RFID tag, the stationary KAVACH shall extend MA when route is ascertained. 5. Signal shall be linked only within 200 meters in approach of stop signal.	
5.116.	Check that shortest OSMA when override the Starter signal at ON aspect (RED Aspect) having multiple routes. **(FRS 9.10, Condi 86)**	1. Make sure that Onboard KAVACH in FS Mode. 2. In communication mandatory area and valid communication. 3. Approaching signal is Starter stop signal with ON aspect having multiple routes. 4. Select 'OVRD' and 'CNFM' buttons.	1. OSMA shall be send by stationary KAVACH for shortest route. 2. Reference Profile shall be "00" and shall be verified in log. 3. OS speed shall be 15 Kmph. 4. After movement, the reading of RFID tag, the stationary KAVACH shall extend MA when route is	

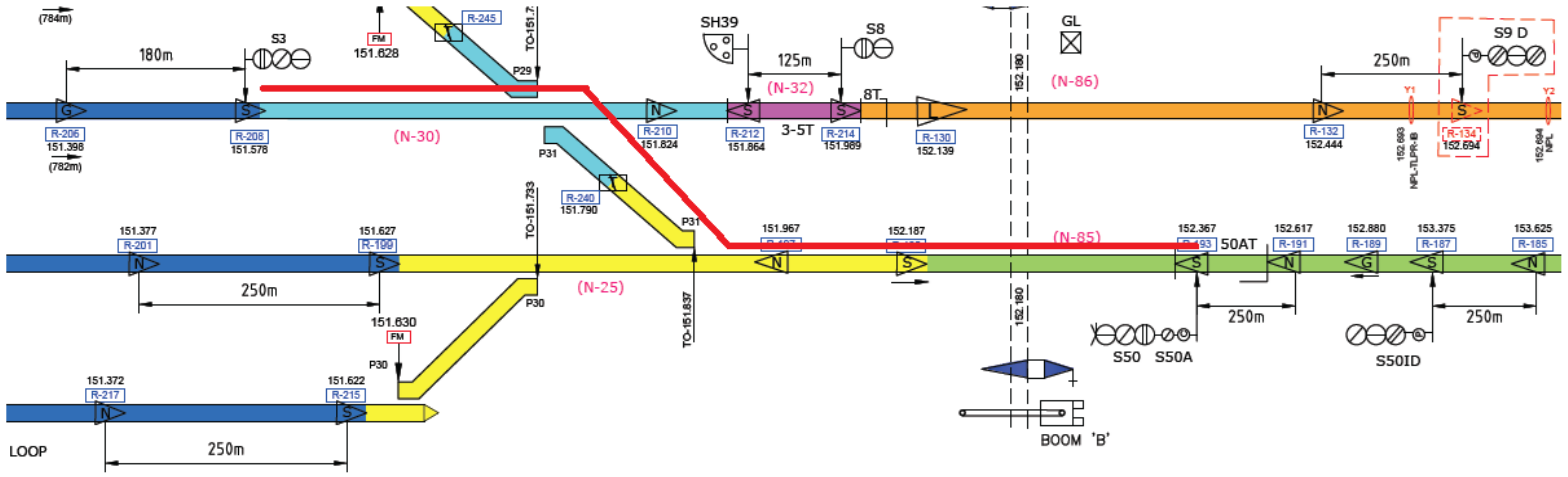
	System Level TEST CASES (RDSO)			
Test ID	**Test Scenario**	**Input Specification**	**Expected Output/Values**	**Observed Output (Pass/Fail)**
		5. Next approaching Signal shall be linked within 200 m in approach next stop signal. 6. Check that no Onboard available in approach of signal.	ascertained. 5. Signal shall be linked only within 200 meters in approach of stop signal.	
5.117.	Check that shortest OSMA when override the Starter signal at ON aspect (RED Aspect) having multiple routes. **(FRS 9.10, Condi 86)**	1. Make sure that Onboard KAVACH in OS Mode. 2. In communication mandatory area and valid communication. 3. Approaching signal is Starter stop signal with ON aspect having multiple routes. 4. Select 'OVRD' and 'CNFM' buttons. 5. Next approaching Signal shall be linked within 200 m in approach next stop signal. 6. Check that no Onboard available in approach of signal.	1. OSMA shall be send by stationary KAVACH for shortest route. 2. Reference Profile shall be "00" and shall be verified in log. 3. OS speed shall be 15 Kmph. 4. After movement, the reading of RFID tag, the stationary KAVACH shall extend MA when route is ascertained. 5. Signal shall be linked only within 200 meters in approach of stop signal.	
5.118.	To verify the rear end collision avoidance in block section. **(FRS 31.1.2, SRS 12.3)**	1. Make sure that two trainsets/EMU are in FS mode. 2. Simulate the condition such	1. Rear End Collision SOS message shall be displayed on DMI "Rear End Collision with Loco XXXXX in	

	System Level TEST CASES (RDSO)			
Test ID	**Test Scenario**	**Input Specification**	**Expected Output/Values**	**Observed Output (Pass/Fail)**
		that there are two Trainset/EMU present in block section with same direction and distance between them is more than 5km say with same TIN. 3. Configured rear end collision margin distance as 100 meters. 4. Now stop the front EMU/Train set and make movement for rear end Onboard.	YYYY m" when the distance between the two trainset is decreased to 5000m say. 2. MA shall be up to rear end collision margin i.e. 100 meters. 3. Next approaching signal shall not be linked.	
5.119.	To verify time out period of rear end collision avoidance in block section. (SoS clears after this time if SoS source not transmitting SoS) **(FRS 31.1.2, SRS 12.3 & A2-19.2**	1. Make sure that two Onboard are in FS/OS/PT/SR mode. 2. Both Onboard having valid communication. 3. Simulate the condition such that there are two Onboard presents in block section with same direction and distance between them is more than 5km say with same TIN. 4. Configured rear end collision margin distance as 300 meters. 5. Now stop the front EMU/Train set and make	1. Rear End Collision SOS message shall be displayed on DMI "Rear End Collision with Loco XXXXX in YYYY m" when the distance between the two trainset is decreased to 5000m say. 2. MA shall be up to rear end collision margin i.e. 300 meters. 3. Check that the rear end collision SOS is removed after 180 second.	

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	System Level TEST CASES (RDSO)			
Test ID	**Test Scenario**	**Input Specification**	**Expected Output/Values**	**Observed Output (Pass/Fail)**
		movement for rear end Onboard. 6. After rear end collision SOS, remove the rear Onboard RF communication cable.		
5.120.	To verify time out period of Head ON collision SOS in block section. (SoS clears after this time if SoS source not transmitting SoS) **(FRS 31.1.2, SRS 12.3 & A2-19.2**	1. Make sure that one Onboard are in FS/OS/SR mode and other Onboard in FS/OS/PT/SR mode. 2. Both Onboard having valid communication. 3. Simulate the condition such that there are two Onboard presents in block section with opposite direction and distance between them is more than 5km say with same TIN. 4. Note the configured value for Head on collision margin distance and move the two Onboard close to each other. 5. Brakes should apply in both Onboard Immediately and stop the both EMU/Train set After Head ON collision SOS, remove the any one Onboard RF communication	1. Head ON Collision SOS message shall be displayed on DMI “Head ON Collision with Loco XXXXX in YYYY m” when the distance between the two trainset is decreased to 5000m say. 2. MA shall be reduced to Zero “0” in both Onboard. 3. Check that the Head ON collision SOS is removed after 180 second.	

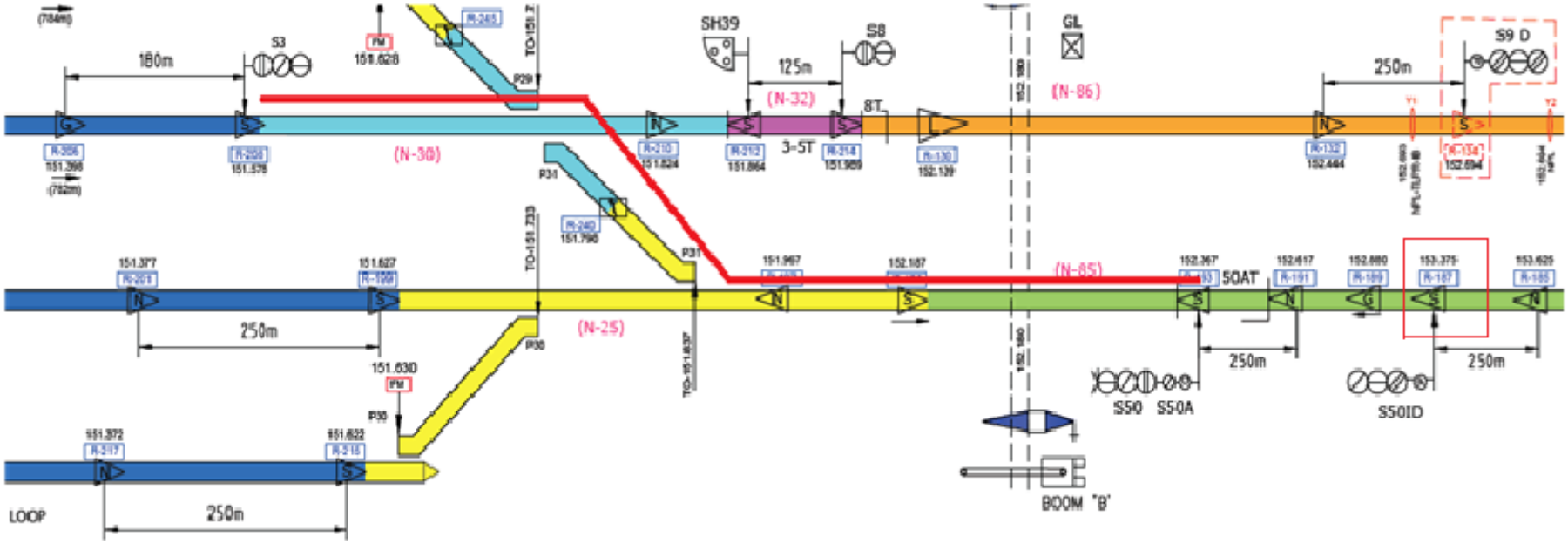
	System Level TEST CASES (RDSO)			
Test ID	**Test Scenario**	**Input Specification**	**Expected Output/Values**	**Observed Output (Pass/Fail)**
		cable.		
5.121.	Check for mode transition when Onboard is in OS mode & Override selected and route is not ascertained. **FRS 8.2 d(iv)**	1. Onboard is in OS mode. 2. Press OV and CNFM button in KAVACH area. 3. Route is not ascertained by reversing the point or normal indication not available. 4. OSMA shall be issued for shortest route without track profile as per TOC in case of multiple route 5. After expiry of OSMA, the brake shall be applied and Onboard speed shall be zero. 6. LP presses, OV and confirmed button, the Onboard transit the SR mode after receipt of SR authority.	1. Check for Onboard mode transition to staff responsible mode. 2. Check that brake is applied and Onboard in zero speed.	
			3. After passing, R-195 which is shunting limit boundary, shunting limit SOS should not be generated.	

	System Level TEST CASES (RDSO)			
Test ID	**Test Scenario**	**Input Specification**	**Expected Output/Values**	**Observed Output (Pass/Fail)**
				
5.122.	Check for Overlap Distance in addition to MA control (overlap through the application of EB) in case of light engine. **USE Cases**	1. Onboard is in FS/OS mode. 2. Configure the overlap distance in addition to MA as zero. 3. Configure the release speed as zero. 4. Approaching stop signal is RED (ON aspect) 5. FSMA /OSMA shall be extend up to Approaching signal. 6. Light engine shall stop before the RED signal	1. Check in configuration file that the Overlap Distance in addition to MA control (overlap through the application of EB) in case of light engine is configured as zero. 2. Check in configuration file that the release speed is zero. 3. Light engine shall stop with application of brake.	

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	System Level TEST CASES (RDSO)			
Test ID	**Test Scenario**	**Input Specification**	**Expected Output/Values**	**Observed Output (Pass/Fail)**
		even with application of EB brake.		
5.123.	Check for Overlap Distance in addition to MA control (overlap through the application of EB) in case of Multi light engine. **USE CASES**	1. Onboard is in FS/OS mode. 2. Configure the overlap distance in addition to MA as zero. 3. Configure the release speed as zero. 4. Approaching stop signal is RED (ON aspect). 5. FSMA /OSMA shall be extend up to Approaching signal. 6. Light engine shall stop before the RED signal even with application of EB brake.	1. Check in configuration file that the Overlap Distance in addition to MA control (overlap through the application of EB) in case of light engine is configured as zero. 2. Check in configuration file that the release speed is zero. 3. Light engine shall stop with application of brake.	
5.124.	Check for SR authorization after reading border tag when Onboard is in OS mode & Override selected and route is not ascertained. **FRS 8.2 d(iv)**	1. Onboard is in OS mode. 2. Press OV and CNFM button in KAVACH area. 3. Route is not ascertained by reversing the point or normal indication not available.	1. Check for Onboard mode transition to staff responsible mode. 2. Check that the brake is applied and Onboard at zero speed.	

	System Level TEST CASES (RDSO)			
Test ID	**Test Scenario**	**Input Specification**	**Expected Output/Values**	**Observed Output (Pass/Fail)**
		4. OSMA shall be issued for the shortest route without track profile. 5. After the expiry of OSMA, the brake shall be applied and Onboard speed shall be zero. 6. LP presses, OV and confirmed button, the Onboard transit the SR mode after receipt of SR authority from Station-1. 7. Simulate loco crossed border tag R-187.	3. After passing, border tag R-187, SR authority should be received from the next station. 4. Signal linking and OSMA received, after finding the valid route.	

	System Level TEST CASES (RDSO)			
Test ID	**Test Scenario**	**Input Specification**	**Expected Output/Values**	**Observed Output (Pass/Fail)**
				
5.125.	Check for SR authorization when Onboard is in FS/ OS mode & Override selected and route is not ascertained. (Temporary **Single line working**)	1. Onboard is in FS/ OS mode. 2. Signal S3 (Starter) is RED and route is not ascertained by reversing the point. 3. Press OV and CNFM button before S3 (Starter). 4. OSMA shall be issued upto S8 with track profile as per TOC. 5. After reading turn out tag R-	1. Check for onboard mode transition to staff responsible mode. 2. Signal linking and OSMA received, after finding the valid route as per ToC.	OS Mode FS Mode

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	System Level TEST CASES (RDSO)			
Test ID	**Test Scenario**	**Input Specification**	**Expected Output/Values**	**Observed Output (Pass/Fail)**
		240, Onboard detect as a foreign tag and brake shall be applied and onboard speed shall be zero. 6. LP presses, OV and confirmed button, the onboard transit the SR mode. 1. After reading two tags, direction shall be established and receipt of SR authority.		

System Level TEST CASES (RDSO)				
Test ID	**Test Scenario**	**Input Specification**	**Expected Output/Values**	**Observed Output (Pass/Fail)**
6.	**KAVACH_Sys_06: Onsight Mode- This Test cases check for all functionalities that are possible in Onsight mode and Mode Transitions from concerned mode to other modes.**			
6.1.	Check for Brake intervention by KAVACH when Onboard speed goes beyond Onsight speed limit.	1. Onboard KAVACH should be in Onsight mode (OS). 2. Increase the Onboard speed such that it crosses the Onsight speed Limit defined in KAVACH table of control. 3. Check for speed control. 4. Check for speed display on DMI.	1. The Onboard KAVACH should apply brakes such that the speed gets limited to Onsight speed limit. 2. Onboard speed should be visible on DMI.	
6.2.	Check that SR mode manual selection is not feasible from OS mode.	1. Keep the Onboard in OS mode. 2. Now press the SR and CNFM buttons on DMI.	Onboard KAVACH shall not transit from the existing mode.	
6.3.	Check for Mode transition to SB when CAB is changed in case of dual CAB or driving position is changed in case of single cab. **(FRS 21.1 (d) and (e))**	1. Keep the Onboard in OS mode. 2. Change the CAB.	1. Onboard KAVACH shall transit to SB mode. 2. Check for mode on DMI.	
6.4.	Check for mode transition of Onboard which is in OS mode to SB mode when no CAB is Active. **(Condi-7)**	1. Onboard is in OS mode. 2. Both CAB's input is made Inactive. 3. Onboard is at standstill.	1. The Onboard KAVACH should transit to SB mode. 2. Check for Mode on DMI Display.	
6.5.	Check for mode transition of Onboard which is in OS mode to SB mode when no CAB is	1. Onboard is in OS mode. 2. Onboard is not at standstill. 3. Both CAB's input is made	1. The Onboard KAVACH should not transit to SB mode.	

	Active. **(Condi-7)**	Inactive.		
			2. When speed of Onboard KAVACH become zero, it should transit to SB mode. 3. Check for Mode on DMI Display.	
6.6.	If EM cock (health of EB channel fail) is closed when Loco is in OS mode. **(Condi- 7)**	1. Make sure that no faults are present any one cab is occupied. 2. Make sure that train is in OS mode. 3. Now make EM cock (health of EB channel fail) is closed. 4. Train is at Standstill.	System will enter into SB mode; it can be verified on DMI.	
6.7.	If EM cock (health of EB channel fail) is closed when Loco is in OS mode. **(Condi- 7)**	1. Make sure that no faults are present any one cab is occupied. 2. Make sure that train is in OS mode. 3. Now make EM cock (health of EB channel fail) is closed. 4. Train is not at Standstill.	1. System will not enter into SB mode.	
			2. When speed of Onboard KAVACH become zero, it should transit to SB mode. 3. Check for Mode on DMI Display.	
6.8.	Check for SOS acceptance from station in OS Mode. **(FRS 31.4.6)**	1. Onboard KAVACH should be in Onsight mode. 2. Onboard is moving. 3. Generate Manual SOS from stationary KAVACH. 4. Check for Braking in Onboard.	1. Brakes should get applied and train should come to standstill.	
			2. Check for Increment in Counter value corresponding to SOS in both Onboard and stationary KAVACH.	
			3. After standstill, Loco can move at speed of 30 Kmph.	
			4. After cancellation, SoS should get released.	
6.9.	Check for Radio Transmission	1. Onboard KAVACH should be in	1. Radio Packets of concerned	

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	when Onboard KAVACH is in Onsight mode and in KAVACH Area.	Onsight mode and in KAVACH area. 2. Check for Radio packets of concerned Onboard.	Onboard should be transmitted from station every cycle for an hour. 2. Radio packet from loco should be transmitted to station every cycle for an hour.	
6.10.	Check for mode transition of Onboard which is in OS mode to NL mode. **(Condi :53)**	1. Onboard is in OS mode. 2. Non Leading input is active on Active DMI. 3. Onboard is not at standstill.	1. The Onboard KAVACH should not transit to Non leading mode. 2. Check for Mode on DMI Display.	
6.11.	Check for mode transition of Onboard which is in OS mode to NL mode. **(Condi :53)**	1. Onboard is in OS mode. 2. Non Leading input is active on inactive DMI. 3. Onboard is not at standstill.	1. The Onboard KAVACH should not transit to Non leading mode. 2. Check for Mode on DMI Display.	
6.12.	Check for mode transition of Onboard which is in OS mode to NL mode. (**Condi :53)**	1. Onboard is in OS mode. 2. Non Leading input is active on active DMI. 3. Onboard is at standstill.	1. The Onboard KAVACH should transit to Non leading mode. 2. Check for Mode on DMI Display.	
6.13.	Check for mode transition of Onboard which is in OS mode to NL mode. (**Condi :53)**	1. Onboard is in OS mode. 2. Non Leading input is active on inactive DMI. 3. Onboard is at standstill.	1. The Onboard KAVACH should not transit to Non leading mode. 2. Check for Mode on DMI Display.	
6.14.	Check for mode transition from OS to System failure when critical fault occurs in system. **(Condi :5)**	1. When Onboard is in OS mode. 2. Create a critical fault.	1. Onboard KAVACH should get changed to System failure mode and brake shall apply. 2. Check for Onboard KAVACH on DMI. 3. Fault message shall be sent through GSM.	
6.15.	Check for mode transition from	1. Onboard is in OS mode.	Onboard KAVACH should get	

	OS to Shunt when Onboard is standstill. (**Condi 56)**	2. Onboard is at standstill. 3. Select Shunt and CNFM button on active DMI.	changed from OS mode to shunt mode.	
6.16.	Check for mode transition from OS to Shunt when Onboard is standstill. (**Condi 56)**	1. Onboard is in OS mode. 2. Onboard is at standstill. 3. Select Shunt and CNFM button on inactive DMI.	Onboard KAVACH should not get changed from OS mode to shunt mode.	
6.17.	Check for mode transition from OS to Shunt when Onboard is on movement. (**Condi 56)**	1. Onboard is in OS mode. 2. Onboard is at not standstill. 3. Select Shunt and CNFM button on active DMI.	Onboard KAVACH should not get changed from OS mode to shunt mode.	
6.18.	Check for mode transition from OS to Shunt when Onboard is on movement. (**Condi 56)**	1. Onboard is in OS mode. 2. Onboard is at not standstill. 3. Select Shunt and CNFM button on inactive DMI.	Onboard KAVACH should not get changed from OS mode to shunt mode.	
6.19.	Check for mode transition from OS to Reverse when Onboard is standstill. **(FRS 9.11 (C) Condi 58))**	1. Onboard is in OS mode. 2. Onboard is at standstill and in reversing area. 3. Select Reverse mode and CNFM button.	Onboard KAVACH should get changed from OS mode to Reverse mode.	
6.20.	Check for mode transition from OS to Reverse when Onboard is on movement. **(FRS 9.11 (C) Condi 58))**	1. Onboard is in OS mode. 2. Onboard is at not standstill. 3. Select Reverse and CNFM button.	Onboard KAVACH should not get changed from OS mode to Reverse mode.	
6.21.	To check the LC gate operation in OS mode when entered from LS mode with available TRACK PROFILE. **(Condi :90)**	1. Onboard is in OS mode. 2. OSMA received. 3. Swipe a tag that is linked with approaching signal and is containing LC gate within the route.	1. Check for distance being displayed for LC gate from Onboard position.	
			2. MA< gate distance, horn shall not blow.	
			3. MA is > gate distance and gate distance is >600 meter, no horn.	

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			4. MA is > gate distance and gate distance ≤ 600 meter, the horn shall blow.	
6.22.	To check the LC gate operation in OS mode.	1. Onboard is OS mode. 2. Swipe a tag that is linked with approaching signal and is containing LC gate within the route.	1. Check for distance being displayed for LC gate from Onboard position.	
			2. MA< gate distance, horn shall not blow.	
			3. MA is > gate distance and gate distance is >600 meter, no horn.	
			4. MA is > gate distance and gate distance ≤ 600 meter, the horn shall blow.	
6.23.	To check the LC gate operation in OS mode when entered from FS mode and LC gate tag is not read but LC gate information is in TRACK PROFILE.	1. Onboard is in OS mode. 2. Don't swipe LC tag that is linked with approaching signal and is containing LC gate within the route. 3. TRACK PROFILE is available.	1. Check for distance being displayed for LC gate from Onboard position.	
			2. MA< gate distance, horn shall not blow.	
			3. MA is > gate distance and gate distance is >600 meter, no horn.	
			4. MA is > gate distance and gate distance ≤ 600 meter, the horn shall blow.	
6.24.		1.		
6.25.	The train direction shall get changed when passed over adjustment/ Junction tag in OS mode.	1. Make sure that the train is OS mode. 2. Now simulate the condition such that the train passes over Junction tag.	1. The direction shall get changed and Onboard to be continued in the existing condition without change in MA. 2. No special message shall be displayed on DMI.	
6.26.	Test of Signal aspect info to be	1. Make sure the Onboard in FS	1 Signal Aspect and Signal	

	displayed in OS mode, due to signal Override and No KAVACH equipped functional loco available till approaching stop signal. Previous mode is FS Mode. (FRS 9.9)	mode. 2. The approaching stop signal is ON. 3. Press OV and CNFM button. 4. Loco received OSMA and transit to OS mode. 5. Now Run the Onboard towards Stop Signal being overridden. 6. Stop the Onboard less than 200 m rear of Signal foot of next stop signal.	information shall be blank on DMI for overridden signal up to foot tag. 2 After crossing stop signal overridden also Signal Aspect and description shall be made blank. 3 Signal shall be linked within 200 meters of next approaching stop signal.	
6.27.	Test of Signal aspect info to be displayed in OS mode and if KAVACH equipped functional loco is available till approaching stop signal. Previous mode is FS Mode. **(FRS 9.9)**	1. Make sure the Onboard in FS mode. 2. The approaching stop signal is ON. 3. Press OV and CNFM button. 4. Loco received OSMA and transit to OS mode. 5. Now Run the Onboard towards Stop Signal being overridden 6. Simulate another loco just before the foot of next stop signal. 7. Configure rear end collision margin distance of 100 meter. 8. Stop the Onboard at around 50 m rear of Signal foot of next stop signal.	1. Signal Aspect and Signal information shall be blank on DMI for overridden signal up to foot tag. 2. After crossing stop signal overridden also Signal Aspect and description shall be made blank. 3. Signal shall not be linked even it is within 200 meter of next stop signal and rear end collision message **"Rear End Collision with loco XXXX in YYYYm"** shall be displayed on DMI in rear loco.	
6.28.	Test of Signal aspect info to be displayed in OS mode, due to signal Override and No KAVACH equipped functional loco available till approaching	1. Make sure the Onboard in OS mode. 2. The approaching stop signal is ON. 3. Press OV and CNFM button.	1 Signal Aspect and Signal information shall be blank on DMI for overridden signal up to foot tag. 2 After crossing stop signal	

	stop signal. Previous mode is OS Mode. **(FRS 9.9)**	4. Loco received OSMA and transit to OS mode. 5. Now Run the Onboard towards Stop Signal being overridden. 6. Stop the Onboard less than 200 m rear of Signal foot of next stop signal.	overridden. Signal Aspect and description shall be made blank. 3 Signal shall be linked within 200 meters of approaching stop signal.	
6.29.	Test of Signal aspect info to be displayed in OS mode and if KAVACH equipped functional loco is available till approaching stop signal. Previous mode is OS Mode. **(FRS 9.9)**	1. Make sure the Onboard in OS mode. 2. The approaching stop signal is ON. 3. Press OV and CNFM button. 4. Now Run the Onboard towards Stop Signal being overridden. 5. Simulate another loco just before the foot of next stop signal. 6. Make rear end collision margin distance of 100 meter. 7. Stop the Onboard at around 50 m rear of Signal foot of next stop signal.	1. Signal Aspect and Signal information shall be blank on DMI for overridden signal up to foot tag. 2. After crossing stop signal overridden Signal Aspect and description shall be made blank. 3. Signal shall not be linked even it is within 200 meter of next stop signal and rear end collision message shall be displayed on DMI.	
6.30.	Test of Signal aspect info to be displayed in OS mode, due to signal Override and No KAVACH equipped functional loco available till approaching stop signal. Previous mode is PT Mode. **(FRS 9.9)**	1. Make sure the Onboard in PT mode. 2. Press OV and CNFM button. 3. Loco received OSMA and transit to OS mode. 4. Now Run the Onboard towards Stop Signal being overridden. 5. Stop the Onboard less than 200 m rear of Signal foot of next stop signal.	1. Signal Aspect and Signal information shall be blank on DMI for overridden signal up to foot tag. 2. After crossing stop signal overridden. Signal Aspect and description shall be made blank. 3. Signal shall be linked within 200 meters of approaching stop signal.	
6.31.	Test of Signal aspect info to be	1. Make sure the Onboard in PT	1. Signal Aspect and Signal	

	displayed in OS mode and if KAVACH equipped functional loco is available till approaching stop signal. Previous mode is PT Mode. **(FRS 9.9)**	mode. 2. Press OV and CNFM button. 3. Loco received OSMA and transit to OS mode. 4. Now Run the Onboard towards Stop Signal being overridden. 5. Simulate another loco just before the foot of next stop signal. 6. Configure rear end collision margin distance of 100 meter. 7. Stop the Onboard less than 100 m rear of Signal foot of next stop signal.	information shall be blank on DMI for overridden signal up to foot tag. 2. After crossing stop signal overridden. Signal Aspect and description shall be made blank. 3. Signal shall not be linked even it is within 200 meters of next stop signal and rear end collision message shall be displayed on DMI.	
6.32.	Transition of OS mode to FS mode. (**FRS 9.11(a)) Condi :81**	1. Make sure the Onboard in OS mode. 2. Now move the Onboard and cross the Signal foot in OFF condition. 3. In communication mandatory area and valid communication. 4. TRACK PROFILE is available. 5. Receipt of FS MA.	1. Onboard shall not transit to FS mode until Signal foot tag. 2. FSMA shall be extended only after passing of signal foot tag. 3. Onboard shall transit to FS mode.	
6.33.	Transition of OS mode to FS mode. TRACK PROFILE is not available. **(FRS 9.11(a)) Condi :81**	1. Make sure the Onboard in OS mode. 2. Now move the Onboard and cross the approaching stop signal aspect in OFF condition. 3. In communication mandatory area and valid communication. 4. TRACK PROFILE is not available. 5. Receipt of FS MA.	1. Onboard shall transit to SR mode on receipt of FSMA without track profile.	

6.34.	Transition of OS mode to FS mode and signal foot tag missed. **(FRS 9.11(a)) Condi :81**	1. Make sure the Onboard in OS mode. 2. Now move the Onboard. 3. Cross the Signal. 4. In communication mandatory area and valid communication. 5. Approaching stop Signal is taken OFF. 6. Signal foot tag is not read by Onboard KAVACH.	1. Onboard shall not transit to FS mode until +30 meters beyond signal. 2. FSMA shall be extended only after passing +30 meters beyond signal.	
6.35.	Transition of OS mode to TRIP mode. **(FRS 9.11(b)) Condi :81**	1. Make sure the Onboard in OS mode. 2. Now move the Onboard toward LSS. 3. Cross the signal foot tag. 4. In communication mandatory area and valid communication. 5. Approaching stop Signal is at ON (REB/Blank). 6. Signal foot tag is read by Onboard KAVACH.	1. Onboard shall transit to TRIP mode after reading signal foot tag. 2. Stationary KAVACH shall sends MA=0 & Authorized speed=0 after passing signal location due to SPAD detection, therefore immediately entering into trip mode.	RED Blank
6.36.	Transition of OS mode to TRIP mode and signal foot tag missed. **(FRS 9.11(b)) Condi :81)**	1. Make sure the Onboard in OS mode. 2. Now move the Onboard cross the Signal foot tag. 3. In communication mandatory area and valid communication. 4. Approaching stop Signal is at ON (RED/Blank). 5. Signal foot tag is not read by Onboard KAVACH.	1. Onboard shall transit to TRIP mode after passing +30 meters beyond signal. 2. Stationary KAVACH shall sends MA=0 & Authorized speed=0 after passing signal location due to SPAD detection, therefore immediately entering into trip mode.	RED Blank

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6.37.	To check OS mode to SR mode transition when Onboard **exits from KAVACH territory area.** **(Cond. No. 17)**	1. Make sure that train is in OS mode. 2. Now simulate such that the Onboard read exit tag.	1. System shall remain in OS mode till exit tag. Tag linking will be up to exit tag. OS MA shall be up to next stop signal. There shall not any spurious braking of this.	
			2. The exit tag shall be reported to stationary KAVACH. This shall be checked in NMS log.	
			3. System should transit to SR mode after reading exit tags. It can be verified on DMI and ACK request should be there.	
			4. Position report shall not be erased till the complete train has passed the last TIN (Tag).	
			5. Onboard will transmit regular packet with last reported TIN till complete train passes exit tag.	
			6. Stationary KAVACH will deregister the Onboard after passes of complete train and Onboard communication shall be stopped without time out.	
			7. Onboard KAVACH shall be stopped radio communication after complete passes of train.	
			8. If the Loco Pilot give the ACK within the configurable time, brakes should not apply.	

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			9. If the Loco Pilot didn't give the ACK within the configurable time, brakes should apply.	
6.38.	To check OS mode to SR mode transition when track profile is not available up to 3000m (configurable) when MA > 3000m (configurable). **(FRS 9.11 (F), Cond. No. 23)**	1. Power on the system. 2. Make sure that no faults are present and system is in OS mode. 3. Now simulate the condition such that track profile is not available up to 3000m (configurable) when MA > 3000m.	1. System should transit to SR mode and it can be verified on DMI and ACK request should be there.	
			2. If the Loco pilot give the ACK within the configurable time, brakes should not apply.	
			3. If the Loco pilot does not give the ACK, brakes should apply.	
6.39.	To check OS mode to SR mode transition when track profile is not available up to MA when MA < 3000m (configurable) **9FRS 9.11 (F), Cond. No. 23)**	1. Power on the system 2. Make sure that no faults are present and system is in OS mode 3. Now simulate the condition such that track profile is not available up to MA when MA < 3000m (configurable)	1. System should transit SR mode and it can be verified on DMI and ACK request should be there.	
			2. If the Loco pilot give the ACK within the configurable time, brakes should not apply.	
			3. If the Loco pilot does not give the ACK, brakes should apply.	
			4. Loco pilot gives the ACK during application of brake. Brake should be released.	
6.40.	To check OS mode to SR mode transition when three consecutive linked tags are missed. **(FRS 9.11 (F), Cond. No. 85)**	1. Make sure that train is in OS mode. 2. Now simulate the condition such that three consecutive linked tags are missed.	1. System should transit SR mode and it can be verified on DMI and ACK request should be there.	
			2. TIN will be held upto deregistration time out	

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			3. Stationary KAVACH will deregistered after time out period i. 30 second (Auto section) or 120 second (Absolute section)	
			4. If the Loco pilot give the ACK within the configurable time, brakes should not apply.	
			5. If the Loco pilot does not give the ACK, brakes should apply.	
			6. Direction should become unknown.	
			7. After reading two next tags, the direction is established and OSMA will be issued by stationary KAVACH.	
6.41.	To check mode transition when OS MA holding time 240 seconds (configurable) is expired in communication mandatory area. Signal requiring standstill override and Previous mode is OS mode. **(FRS 9.11 (F) Cond. No. 89 & 87)**	1. Make sure that train is in OS Mode 2. OSMA Extended through override selection. 3. Now simulate the condition such that OS MA is expired by more than 240 seconds in communication mandatory area.	1. After receipt of OSMA, the message shall be displayed as "**Override Selected, Pass signal in XXXXs"** if Onboard is in stand still. (No movement).	
			2. Stationary KAVACH shall withdraw OS MA upto signal foot.	
			3. Loco shall remain OS mode after expiry of time out.	
6.42.	To check mode transition when OS MA holding time 240 seconds (configurable) is	1. Make sure that train is in FS Mode 2. Select OV.	1. Stationary KAVACH shall withdraw OS MA upto signal foot.	

	expired in communication mandatory area. Signal requiring standstill override and Previous mode is FS mode. **(FRS 9.11 (F) Cond. No. 89 & 87)**	3. OSMA Extended through override selection. 4. Now simulate the condition such that OS MA is expired by more than 240 seconds in communication mandatory area.	2. Loco shall remain in FS mode after expiry of time out.	
6.43.	To check mode transition when OS MA holding time 240 seconds (configurable) is expired in communication mandatory area. Signal requiring standstill override and Previous mode is PT mode. **(FRS 9.11 (F) Cond. No. 89 & 90)**	1. Make sure that train is in PT Mode. 2. OSMA Extended through override selection. 3. Communication is healthy and in communication mandatory area. 4. Now simulate the condition such that OS MA is not expiring even after 240 seconds.	1. Stationary KAVACH shall not withdraw OS MA. 2. Onboard transit to OS mode.	
6.44.	To check SR to OS mode transition when OSMA is received along with applicable track profile. **(FRS 9.3, 9.6.1, Condi No 87)**	1. Make sure that Onboard KAVACH is in SR Mode. 2. In communication mandatory area and valid communication. 3. Track profile available. 4. OS MA is received as per control table with speed.	1. Mode shall transit to OS mode.	
			2. Check the dynamic speed display on DMI.	Home Starter LSS IBS
6.45.	To check SR to OS mode transition when OSMA is received along with applicable track profile KAVACH equipped functional loco available before	1. Make sure that Onboard KAVACH in SR Mode. 2. In communication mandatory area and valid communication. 3. Track profile available. 4. Simulate KAVACH equipped	1. Mode shall transit to OS mode.	
			2. Approaching Signal description and Aspect shall not be displayed in LP-OCIP.	Home Starter LSS

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	approaching stop signal. **(FRS 9.3, 9.6.1, Condi No 87)**	functional loco just before approaching signal. 5. OS MA is received till rear end collision margin.		IBS
			3. Check the dynamic speed display on DMI.	
6.46.	To check SR to OS mode transition when OSMA is received and no track profile received. **(FRS 9.3, 9.6.1, Condi No 87)**	1. Make sure that Onboard KAVACH in SR Mode. 2. In communication mandatory area and valid communication. 3. Track profile not available up to MA. 4. OS MA is received as per control table with speed.	1. Mode shall not transit and shall remain in SR mode.	
			2. Check the dynamic speed display on DMI.	
6.47.	To check SR to OS mode transition when OSMA is >3000 meter. **(FRS 9.3, 9.6.1, Condi No 87)**	1. Make sure that Onboard KAVACH in SR Mode. 2. In communication mandatory area and valid communication. 3. Track profile not available up to 3000 meters. 4. OS MA is received as per control table with speed.	1. Mode shall not transit and shall remain in SR mode. 2. Check the dynamic speed display on DMI.	
6.48.	To check SR to OS mode transition when track profile is received and OSMA not received. **(FRS 9.3, 9.6.1, Condi No 87)**	1. Make sure that Onboard KAVACH in SR Mode. 2. In communication mandatory area and valid communication. 3. Track profile available. 4. OS MA is not received.	1. Mode shall not transit and shall remain in SR mode. 2. Check the dynamic speed display on DMI.	
6.49.	To check Override of Main Stop Signals and receipt of OSMA (other than LSS/ IBS/ Auto) & Loco standstill.	1. Make sure that Onboard KAVACH in FS Mode. 2. In communication mandatory area and valid communication.	1. Check that Onboard KAVACH transit to OS mode.	

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	(**FRS 9.6.2, Condi :71)**	3. Select 'OVRD' and 'CNFM' buttons. 4. MA is < 200m (configurable). 5. Onboard is stand still.	2. Check OSMA and OS Authorized Speed as per KAVACH table of control.	Home Starter
6.50.	To check Override of Main Stop Signals and receipt of OSMA (other than LSS/ IBS/ Auto) and Loco On run. (**FRS 9.6.2, Condi :71)**	1. Make sure that Onboard KAVACH in FS Mode. 2. In communication mandatory area and valid communication. 3. Select 'OVRD' and 'CNFM' buttons 4. MA is < 200m (configurable). 5. Onboard is not stand still.	Check that Onboard KAVACH shall not transit to OS mode.	Home Starter
6.51.	To check Override of Main Stop Signals and receipt of OSMA (other than LSS/IBS/Auto) & MA is > 200m. (**FRS 9.6.2, Condi :71)**	1. Make sure that Onboard KAVACH in FS Mode. 2. In communication mandatory area and valid communication. 3. Select 'OVRD' and 'CNFM' buttons 4. MA is > 200m (configurable). 5. Onboard is stand still.	Check that Onboard KAVACH shall not transit to OS mode.	Home Starter
6.52.	To check Override of LSS/IBS signal and loco is standstill. **(FRS 9.6.3, Condi :71)**	1. Make sure that Onboard KAVACH in FS Mode. 2. In communication mandatory area and valid communication. 3. Select 'OVRD' and 'CNFM' buttons 4. Onboard is stand still. 5. MA is irrelevant.	1. Check that Onboard KAVACH transit to OS mode. 2. Check OSMA and OS Authorized Speed as per KAVACH table of control.	 LSS IBS
6.53.	To check Override of LSS/IBS	1. Make sure that Onboard	1. Check that Onboard KAVACH	

	signal and loco is not standstill. **(FRS 9.6.3, Condi :71)**	KAVACH in FS Mode. 2. In communication mandatory area and valid communication. 3. Select 'OVRD' and 'CNFM' buttons. 4. Onboard is not stand still. 5. MA is irrelevant.	transit to OS mode. 2. Check OSMA and OS Authorized Speed as per KAVACH table of control.	 LSS | IBS |
6.54.	To check Override of LSS/IBS signal when train is moving and brake application is under progress. **(FRS 9.6.3, Condi :71)**	1. Make sure that Onboard KAVACH is in FS Mode. 2. In communication mandatory area and valid communication. 3. MA is available up to approaching stop signal. 4. Train is moving, brake application under progress. 5. Select 'OVRD' and 'CNFM' buttons. 6. OSMA is received.	1. Check that Onboard KAVACH transit to OS mode. 2. Check OSMA and OS Authorized Speed as per KAVACH table of control. 3. Brake shall be released on receipt of OSMA and as per dynamic speed profile.	 LSS | IBS |
6.55.	Check for Override of Auto signals when approaching auto signal is ON (Red Aspect) in day time. **(FRS:9.6.4, Condi :71)**	1. Make sure that Onboard KAVACH is in FS Mode. 2. In communication mandatory area and valid communication. 3. Onboard is standstill. 4. Select 'OVRD' and 'CNFM' buttons. 5. OSMA shall be received after standstill in elapse of 1 minute in day i.e 06 AM to 06 PM.	1. Check that Onboard KAVACH transit to OS mode after standstill time of 1 minute. 2. Check OSMA and OS Authorized Speed as per KAVACH table of control (10 Kmph). 3. Check the standstill time of 1 minute in log.	
6.56.	Check for Override of Auto signals when approaching auto signal is ON (Red Aspect) in	1. Make sure that Onboard KAVACH in FS Mode. 2. In communication mandatory	1. Check that Onboard KAVACH transit to OS mode. 2. Check OSMA and OS	

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	night time. **(FRS:9.6.4, Condi :71)**	area and valid communication. 3. Onboard is standstill. 4. Select 'OVRD' and 'CNFM' buttons. 5. OSMA shall be received after standstill in elapse of 2 minute in day i.e 06:01 PM to 05:59 AM.	Authorized Speed as per KAVACH table of control (08 Kmph). 3. Check the standstill time of 2 minute in log.	
6.57.	Check for Override of Auto signals when approaching auto signal is ON (Red Aspect) in night time. **(FRS:9.6.4, Condi :71)**	1. Make sure that Onboard KAVACH is in FS Mode. 2. In communication mandatory area and valid communication. 3. Onboard is standstill. 4. Select 'OVRD' and 'CNFM' buttons. 5. OSMA shall not be received if time is <2 minute in night. (Night i.e 06:01 PM to 05:59 AM).	1. Check that Onboard KAVACH shall not transit to OS mode and OSMA shall not be received. 2. Check the standstill time of <2 minute in log.	
6.58.	Check for Override of Auto signals when approaching auto signal is ON (Red Aspect) in day time. **(FRS:9.6.4, Condi :71)**	1. Make sure that Onboard KAVACH is in FS Mode. 2. In communication mandatory area and valid communication. 3. Onboard is standstill. 4. Select 'OVRD' and 'CNFM' buttons immediately after stopping. 5. Check that OSMA shall not be received immediately. (Day i.e 06 AM to 06 PM).	1. Check that Onboard KAVACH shall not transit to OS mode. 2. Check the standstill time of 1 minute in log.	

<table>
<tr><td>6.59.</td><td>Check for Override of Auto signals when approaching auto signal is ON (Red Aspect) when Loco is not standstill. (FRS:9.6.4, Condi :71)</td><td>1. Make sure that Onboard KAVACH in FS Mode.
2. In communication mandatory area and valid communication.
3. Onboard is not standstill.
4. Select ‘OVRD’ and ‘CNFM’ buttons.</td><td>Check that Onboard shall not transit to OS mode.</td><td></td></tr>
<tr><td rowspan="2">6.60.</td><td rowspan="2">To check Override of Main Stop Signals and receipt of OSMA (other than LSS/IBS/Auto). (FRS 9.6.2, Condi :71)</td><td rowspan="2">1. Make sure that Onboard KAVACH is in FS/ OS Mode.
2. In communication mandatory area and valid communication.
3. Select ‘OVRD’ and ‘CNFM’ buttons.
4. MA is < 200m (configurable).
5. Onboard is stand still.</td><td>1. Check that Onboard KAVACH transit to OS mode.</td><td></td></tr>
<tr><td>2. Check OSMA and authorized speed as per KAVACH table of control.</td><td><table><tr><td></td><td>FS</td><td>OS</td></tr><tr><td>Home with single valid route</td><td></td><td></td></tr><tr><td>Home with multiple route</td><td></td><td></td></tr><tr><td>Starter with single valid route</td><td></td><td></td></tr><tr><td>Starter with multiple route</td><td></td><td></td></tr></table></td></tr>
<tr><td>6.61.</td><td>To check Override of Main Stop Signals and receipt of OSMA (other than LSS/IBS/Auto).</td><td>1. Make sure that Onboard KAVACH is in FS/ OS Mode.
2. In communication mandatory area and valid communication.</td><td>Check that OSMA and Authorized speed should not be extended.</td><td><table><tr><td></td><td>FS</td><td>OS</td></tr><tr><td>Home</td><td></td><td></td></tr></table></td></tr>
</table>

	Loco is in FS/ OS mode and not standstill. (**FRS 9.6.2, Condi :71)**	3. Select 'OVRD' and 'CNFM' buttons. 4. MA is < 200m (configurable). 5. Onboard is not stand still.		Starter
6.62.	To check Override of Main Stop Signals and receipt of OSMA (other than LSS/IBS/Auto). Loco is in FS/ OS mode and MA>200. (**FRS 9.6.2, Condi :71)**	1. Make sure that Onboard KAVACH is in FS/ OS Mode. 2. In communication mandatory area and valid communication. 3. Select 'OVRD' and 'CNFM' buttons. 4. MA is > 200m (configurable). 5. Onboard is stand still.	Check that OSMA and Authorized speed should not be extended.	FS / OS Home Starter
6.63.	To check Override of LSS/IBS signal when Onboard is in FS/OS mode and standstill. **(FRS 9.6.3, Condi :71)**	1. Make sure that Onboard KAVACH is in FS/OS Mode. 2. In communication mandatory area and valid communication. 3. Select 'OVRD' and 'CNFM' buttons. 4. Onboard is stand still.	Check OSMA and Authorized Speed as per KAVACH table of control.	FS / OS LSS IBS
6.64.	To check Override of LSS/IBS signal when Onboard KAVACH in FS/ OS mode and not standstill. **(FRS 9.6.3, Condi :71)**	1. Make sure that Onboard KAVACH is in FS/ OS Mode. 2. In communication mandatory area and valid communication. 3. Select 'OVRD' and 'CNFM' buttons. 4. Onboard is not stand still.	Check OSMA and Authorized Speed as per KAVACH table of control.	FS / OS LSS IBS
6.65.	To check Override of LSS/IBS signal when Onboard KAVACH in FS/ OS mode and brake application under	1. Make sure that Onboard KAVACH is in FS/ OS Mode. 2. In communication mandatory area and valid communication.	1. Check OSMA and Authorized Speed as per KAVACH table of control.	FS / OS LSS IBS

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	progress. **(FRS 9.6.3, Condi :71)**	3. MA is available up to approaching stop signal and brake application under progress. 4. Select 'OVRD' and 'CNFM' buttons. 5. OSMA is received.	2. Brake shall be released on receipt of OSMA and as per dynamic speed profile.	
			3. Make LSS/IBS OFF, the Onboard KAVACH should transit to FS mode with FSMA if it was in FS mode earlier to override.	
			4. Make LSS/IBS OFF, the Onboard KAVACH should transit to FS mode with FSMA, after passing signal at OFF, if it was in OS mode earlier to override.	
6.66.	Check for Override of Auto signals when approaching auto signal is ON (Red Aspect) in day time and Onboard KAVACH is in OS mode. **(FRS:9.6.4, Condi :71)**	1. Make sure that Onboard KAVACH in OS Mode. 2. In communication mandatory area and valid communication. 3. Onboard is standstill. 4. Select 'OVRD' and 'CNFM' buttons. 5. OSMA shall be received after standstill in elapse of 1 minute in day i.e 06 AM to 06 PM.	1. Check that Onboard KAVACH transit to OS mode. 2. Check OSMA and OS Authorized Speed as per KAVACH table of control. 3. Check the standstill time of 1 minute in log.	
6.67.	Check for Override of Auto signals when approaching auto signal is ON (Red Aspect) in day time and Onboard KAVACH is in OS mode.	1. Make sure that Onboard KAVACH is in OS Mode. 2. In communication mandatory area and valid communication. 3. Onboard is standstill.	1. Check that Onboard KAVACH shall transit to OS mode and OSMA shall be received. 2. Check the standstill time of <1 minute in log.	

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	(FRS:9.6.4, Condi :71)	4. Select 'OVRD' and 'CNFM' buttons. 5. OSMA shall not be received if time is <1 minute in day i.e 06 AM to 06 PM.		
6.68.	Check for Override of Auto signals when approaching auto signal is ON (Red Aspect) in Night time and Onboard KAVACH is in OS mode. **(FRS:9.6.4, Condi :71)**	1. Make sure that Onboard KAVACH is in OS Mode. 2. In communication mandatory area and valid communication. 3. Onboard is standstill. 4. Select 'OVRD' and 'CNFM' buttons. 5. OSMA shall not be received if time is <2 minute in night i.e 06:01 PM to 05:59 AM.	1. Check that Onboard KAVACH shall not transit to OS mode and OSMA shall not be received. 2. Check the standstill time of <2 minute in log.	
6.69.	Check for Override of Auto signals when approaching auto signal is ON (Red Aspect). on-board KAVACH is in OS mode and not standstill. **(FRS:9.6.4, Condi :71)**	1. Make sure that Onboard KAVACH in OS Mode. 2. In communication mandatory area and valid communication. 3. Onboard is not standstill. 4. Select 'OVRD' and 'CNFM' buttons.	Check that Onboard KAVACH shall not transit to OS mode.	
6.70.	Check for Override of consecutive stop signals when approaching auto signal is ON (Red Aspect). and Onboard KAVACH is in OS mode and loco is standstill for home/Starter and on run beforeAdvancedd Starter /IBS distant and IBS inner distant/ IBS.	1. Make sure that Onboard KAVACH in OS Mode. 2. In communication mandatory area and valid communication. 3. Onboard is standstill. 4. Select 'OVRD' and 'CNFM' buttons.	1. Check OSMA and Authorized Speed as per KAVACH table of control. Signal | Authorized Speed | Loco Condition | Status Home | 15 | Standstill |	

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	(FRS:9.6.5, Condi :71)		<table><tr><td>Starter</td><td>15</td><td>Standstill</td><td></td></tr><tr><td>Adv STR</td><td>MPS</td><td>On run</td><td></td></tr><tr><td>IBS Dist</td><td>MPS</td><td>On run</td><td></td></tr><tr><td>IBS ID</td><td>MPS</td><td>On run</td><td></td></tr><tr><td>IBS</td><td>MPS</td><td>On run</td><td></td></tr></table>	
6.71.	Check for Override of consecutive stop signals (Other than LSS & IBS) when approaching Home signal is ON (Red Aspect). Onboard KAVACH is in OS mode and loco is not standstill for home and starter. **(FRS:9.6.5, Condi :71)**	1. Make sure that Onboard KAVACH is in OS Mode. 2. In communication mandatory area and valid communication. 3. Onboard is not standstill. 4. Select 'OVRD' and 'CNFM' buttons.	Check that OSMA and Authorized Speed should not be extended.	<table><tr><td>Home</td><td>On run</td><td></td></tr><tr><td>Starter</td><td>On run</td><td></td></tr></table>
6.72.	Check for override of stop signal leading to multiple valid routes as per ToC. (**FRS 9.6.6 (I, ii, iii), Condi 71))**	1. Make sure that Onboard KAVACH is in OS Mode. 2. In communication mandatory area and valid communication. 3. Onboard is standstill. 4. Approaching signal is home with multiple routes. 5. Select 'OVRD' and 'CNFM' buttons. 6. Check that no track profile is available.	1. On Sight Movement Authority shall be extended up to the approaching danger signal up to next nearest (where there are multiple routes) approaching stop signal. 2. Speed restriction shall be 15 Kmph & as specified for each signal in KAVACH table of control. 3. Stationary KAVACH shall also convey '**Route not Known'**	

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			information by making Profile ID "0000" to the Onboard KAVACH.	
6.73.	Check for override of stop signal leading to multiple routes. To check update of OSMA while loco is moving. **(FRS 9.6.6 (iv), Condi 71))**	1. Make sure that Onboard KAVACH is in OS Mode. 2. In communication mandatory area and valid communication. 3. Onboard is standstill. 4. Approaching signal is home with multiple routes. 5. Select 'OVRD' and 'CNFM' buttons. 6. Move the Onboard next approaching stop signal in ON condition.	1. MA shall get augmented based on the route. 2. Signal Aspect to be linked only when it within 200 meters approaching stop signal.	
6.74.	Check for override of stop signal leading to multiple routes. Loco is in movement and next approaching stop signal is OFF. **(FRS 9.6.6 (iv), Condi 71))**	1. Make sure that Onboard KAVACH is in OS Mode. 2. In communication mandatory area and valid communication. 3. Onboard is standstill. 4. Approaching signal is home with multiple routes. 5. Select 'OVRD' and 'CNFM' buttons. 6. Move the Onboard next approaching stop signal in OFF condition.	1. MA shall get augmented based on the route, up to the foot of approaching stop signal. 2. Signal Aspect and MA beyond approach stop signal are to be linked only when it within 200 meters approaching stop signal.	
6.75.	Check for override of stop signal leading to multiple	1. Make sure that Onboard KAVACH in OS Mode.	1. MA shall get updated based on the route.	

	routes. Check for multiple overrides. **(FRS 9.6.6 (iv& v), Condi 71))**	2. In communication mandatory area and valid communication. 3. Onboard is standstill. 4. Approaching signal is home with multiple routes followed by starter with multiple routes. 5. Select 'OVRD' and 'CNFM' buttons. 6. Move the Onboard to the next approaching stop signal in ON condition. 7. In case, On Sight Movement Authority is not updated, when it is less than Override Selectable distance (default: 200m which is configurable). 8. Loco pilot shall select OV again.	2. Signal Aspect and MA beyond approach stop signal are to be linked only when it within 200 meters approaching stop signal.	
6.76.	Check for override of stop signal leading to multiple routes. Transition to FS mode after passing next approaching stop signal in OFF condition. **(FRS 9.6.6 (vi), Condi 71))**	1. Make sure that Onboard KAVACH in OS Mode. 2. In communication mandatory area and valid communication. 3. Onboard is standstill. 4. Approaching signal is home with multiple routes. 5. Select 'OVRD' and 'CNFM' buttons. 6. Move the Onboard next approaching stop signal in OFF condition.	1. MA shall get augmented based on the route. 2. Next approaching Signal Aspect and MA beyond it to be linked only when it within 200 meters approaching stop signal 3. Transited to FS mode after crossing next approaching stop signal in OFF condition.	
6.77.	Check for erasing of OSMA on communication time out in communication mandatory	1. Make sure that Onboard KAVACH in FS Mode. 2. In communication mandatory	Check that OSMA has been erased and Onboard shall enter into SR mode.	

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	area in absolute block section.	area. 3. Approaching signal is stop signal. 4. Select 'OVRD' and 'CNFM' buttons. 7. Receipt of OSMA from stationary KAVACH. 8. Onboard standstill. 9. No communication with stationary KAVACH for >30 second.		
6.78.	Check for erasing of OSMA on communication time out in communication mandatory area in Automatic block section.	1. Make sure that Onboard KAVACH in FS Mode. 2. In communication mandatory area. 3. Approaching signal is stop signal. 4. Select 'OVRD' and 'CNFM' buttons. 5. Receipt of OSMA from stationary KAVACH. 6. Onboard standstill. 7. No communication with stationary KAVACH for >10 second.	Check that OSMA has been erased and Onboard shall enter into SR mode.	
6.79.	Check for erasing of OSMA on communication time out in communication mandatory area in station section.	1. Make sure that Onboard KAVACH in FS Mode. 2. In communication mandatory area. 3. Approaching signal is stop signal. 4. Select 'OVRD' and 'CNFM' buttons. 5. Receipt of OSMA from stationary KAVACH.	Check that OSMA has been erased and Onboard shall enter into SR mode.	

		6. Onboard standstill. 7. No communication with stationary KAVACH for >30 second.		
6.80.	On Sight Movement Authority extension up to the foot of the stop signal (irrespective of its aspect) **(FRS 9.9)**	1. Make sure that Onboard KAVACH in FS Mode. 2. In communication mandatory area and valid communication. 3. Approaching signal is stop signal is in ON aspect. 4. MA is <200 meters. 5. Select 'OVRD' and 'CNFM' buttons. 6. No Onboard available in approach of next signal.	1. Stop signal Next to stop signal Aspect Green/Double yellow, Yellow, Red or blank OSMA shall be extended up to the foot of next stop signal. 2. Check that next stop signal aspect, marker and description shall be linked only within 200m in approach of next signal.	GREEN YY Y RED Blank
6.81.	On Sight Movement Authority extension up to the foot of the stop signal (irrespective of its aspect) **(FRS 9.9)**	1. Make sure that Onboard KAVACH in FS Mode. 2. In communication mandatory area and valid communication. 3. Approaching signal is stop signal is in ON aspect. 4. MA is <200 meters. 5. Select 'OVRD' and 'CNFM' buttons. 6. No Onboard available in approach of next signal.	1. Stop signal Next to LC gate stop signal Aspect Green/Double yellow, Yellow, Red or blank OSMA shall be extended up to the foot of next stop signal. 2. Check that next stop signal aspect, marker and description shall be linked only within 200m in approach of next signal.	GREEN YY Y RED Blank
6.82.	On Sight Movement Authority extension up to the foot of the stop signal (irrespective of its aspect). **(FRS 9.9)**	1. Make sure that Onboard KAVACH in FS Mode. 2. In communication mandatory area and valid communication. 3. Approaching signal is stop signal is in ON aspect.	1. Auto Stop signal Next to Auto stop signal Aspect Green/Double yellow, Yellow, Red or blank OSMA shall be extended up to the foot of Auto next stop signal.	GREEN YY Y RED Blank

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		4. MA is <200 meter 5. Select 'OVRD' and 'CNFM' buttons. 6. No Onboard available in approach of next signal.	2. Check that next stop signal aspect, marker and description shall be linked only within 200m in approach of next signal.	
6.83.	On Sight Movement Authority extension up to the foot of the stop signal (irrespective of its aspect). **(FRS 9.9)**	1. Make sure that Onboard KAVACH in FS Mode. 2. In communication mandatory area and valid communication. 3. Approaching signal is stop signal is in ON aspect. 4. MA is <200 meter 5. Select 'OVRD' and 'CNFM' buttons. 6. No Onboard available in approach of next signal.	1. Auto Stop signal Next to LC Gate stop signal Aspect Green/Double yellow, Yellow, Red or blank OSMA shall be extended up to the foot of Auto next stop signal. 2. Check that next stop signal aspect, marker and description shall be linked only within 200m in approach of next signal.	GREEN YY Y RED Blank
6.84.	On Sight Movement Authority extension up to the foot of the stop signal (irrespective of its aspect) starter to advanced starter signal being overridden when there is KAVACH equipped loco in front of next advanced starter signal. **(FRS 9.9)**	1. Make sure that Onboard KAVACH in FS Mode. 2. In communication mandatory area and valid communication. 3. Approaching signal is stop signal. 4. MA is <200 meters. 5. Select 'OVRD' and 'CNFM' buttons. 6. Onboard available in approach of next signal.	1. Starter signal to Next advanced starter signal Aspect Green/Double yellow, Yellow, Red or blank OSMA shall be extended up to the rear end collision margin of train ahead only. 2. Next stop signal aspect marker and description shall not be linked.	
6.85.	On Sight Movement Authority extension up to the foot of the stop signal (irrespective of its aspect) advanced starter to next station IBS or Home signal being overridden when there is	1. Make sure that Onboard KAVACH in FS Mode. 2. In communication mandatory area and valid communication. 3. Approaching signal is stop signal. 4. MA is <200 meters.	1. Advanced Starter signal to Next IBS or Home Signal Aspect Green/Double yellow, Yellow, Red or blank OSMA shall be extended up to the rear end collision margin of train	

	KAVACH equipped loco in front of next IBS or home. **(FRS 9.9)**	5. Select 'OVRD' and 'CNFM' buttons to override advanced starter. 6. Another Onboard is available in front of next approaching signal (IBS/Home signal).	ahead only. 2. Next stop signal aspect marker and description shall not be linked.	
6.86.	On Sight Movement Authority extension up to the foot of the stop signal (irrespective of its aspect) auto signal to next auto signal being overridden when there is KAVACH equipped loco in front of next auto signal. **(FRS 9.9)**	1. Make sure that Onboard KAVACH in FS Mode. 2. In communication mandatory area and valid communication. 3. Approaching signal is stop signal. 4. MA is <200 meter. 5. Select 'OVRD' and 'CNFM' buttons. 6. Onboard available in approach of next signal.	1. Auto signal to Next auto signal Aspect Green/Double yellow, Yellow, Red or blank OSMA shall be extended up to the rear end collision margin of train ahead only. 2. Next stop signal aspect marker and description shall not be linked.	
6.87.	On Sight Movement Authority extension up to the foot of the stop signal (irrespective of its aspect) starter to advanced starter signal being overridden. **(FRS 9.9)**	1. Make sure that Onboard KAVACH in FS Mode. 2. In communication mandatory area and valid communication. 3. MA is <200 meter. 4. Select 'OVRD' and 'CNFM' buttons.	1. OSMA shall be extended up to the signal foot, irrespective of the next signal aspect. 2. Next stop signal aspect marker and description shall not be linked up to 200m of next stop signal.	
6.88.	On Sight Movement Authority extension up to the foot of the stop signal (irrespective of its aspect) starter to advanced starter signal being overridden when there is KAVACH equipped loco in front of next advanced starter signal. **(FRS 9.9)**	1. Make sure that Onboard KAVACH in OS Mode. 2. In communication mandatory area and valid communication. 3. Approaching signal is stop signal. 4. MA is <200 meter. 5. Select 'OVRD' and 'CNFM' buttons to override starter signal. 6. Another Onboard is available in	1. Irrespective of the aspect of next approaching signal, OSMA shall be extended up to the rear end collision margin of train ahead only. 2. Next stop signal aspect marker and description shall not be linked.	

		front of next approaching signal (advanced starter signal).		
6.89.	Check that OSMA extension up to the foot of approaching stop signal from PT mode. (**FRS 9.10, 11.4 (a-i), Condi 86**)	1. Make sure that Onboard KAVACH in PT Mode. 2. In communication mandatory area and valid communication. 3. Approaching signal is stop signal with ON /OFF aspect. 4. Onboard KAVACH is standstill. 5. Select 'OVRD' and 'CNFM' buttons.	1. OSMA shall be extended up to next approaching stop signal. 2. OS speed shall be 15 KMPH & current signal aspect & next signal Aspect "Undefined" message shall be sent by stationary KAVACH.	
6.90.	Check that OSMA extension up to the foot of approaching stop signal from PT mode. (**FRS 9.10, Condi 86**)	1. Make sure that Onboard KAVACH in PT Mode. 2. In communication mandatory area and valid communication. 3. Approaching signal is stop signal with ON/OFF aspect. 4. Onboard KAVACH is not standstill. 5. Select 'OVRD' and 'CNFM' buttons.	Onboard KAVACH shall remain in PT mode.	
6.91.	Check that OSMA extended up to the foot of approaching stop signal from PT mode, with multiple routes. **(FRS 9.10, Condi 86, 39)**	1. Make sure that Onboard KAVACH in PT Mode. 2. In communication mandatory area and valid communication. 3. Approaching signal is stop signal with ON/OFF aspect. 4. Select 'OVRD' and 'CNFM' buttons. 5. Signal shall be linked within 200 m in approach next stop signal. 6. Check that no Onboard available	1. OSMA shall be extended up to next approaching stop signal for the shortest route. 2. OS speed shall be 15 Kmph. 3. Stationary KAVACH shall send REF_PROF_ID as "0000". 4. Signal shall be linked only within 200 meters in approach of stop signal.	

		in approach of signal.	5. If no signal is linked and OS MA is less than 200m, On selection of override, Stationary Kavach shall send SR Authorization.	
			6. If the OS MA is crossed and Onboard KAVACH enters trip mode, After entering PTRIP, On selection of override, Stationary Kavach shall send SR Authorization.	
6.92.	Check that OSMA extended up to the foot of approaching stop signal from PT mode. **(FRS 9.10, Condi 86)**	1. Make sure that Onboard KAVACH in PT Mode. 2. In communication mandatory area and valid communication. 3. Approaching signal is stop signal with ON/OFF aspect. 4. Select 'OVRD' and 'CNFM' buttons. 5. Check that Onboard available in approach of signal.	1. Check for OSMA up to rear end margin distance of 300 meter.	
			2. Check that next stop signal aspect, marker and description shall not be linked.	
6.93.	Display the train speed and the permitted speed in OS mode in communication mandatory area. **FRS 9.4**	1. Power on the system. 2. Make sure that no faults are present and Onboard system is in OS mode. 3. Onboard is in communication mandatory area.	DMI shall display the train speed and the permitted speed.	
6.94.	Display the train speed and the permitted speed in OS mode in communication mandatory and linking of permissive signal. **FRS 9.4**	1. Power on the system. 2. Make sure that no faults are present and Onboard system is in OS mode. 3. Onboard is in communication	1. Permissive Signal shall not be linked, if OS is due to override.	
			2. Otherwise, permissive signal shall be linked.	

		mandatory area. 4. Simulate the train movement between LSS to IBS.		
6.95.	Display the train speed and the permitted speed in OS mode in non-communication mandatory area. **FRS 9.4**	1. Power on the system. 2. Make sure that no faults are present and Onboard system is in OS mode. 3. Onboard is in non-communication mandatory area.	DMI shall display the train speed and the permitted speed.	
6.96.	Check for no Mode transition when train is in OS mode & OS+OV is selected. Train configuration is changed during standstill. **(FRS 22.1)**	1. Ensure that Onboard is in OS mode. 2. Press for OV and CNFM button. 3. Onboard is at stand still. 4. Make the CAB active. 5. Change the train configuration.	1. Onboard KAVACH shall conduct brake test. 2. On successful brake-tests Onboard KAVACH should remain in OS mode and OV selected message shall be displayed.	
6.97.	Train length measurement in OS mode for formation.	1. Make sure that train is in OS mode with default train length, and train formation is selected. 2. Simulate the condition such that Onboard is passed in block section over the track circuits so that train length calculation is happened successfully by Onboard KAVACH. 6. The updated train length can be verified as follows, keep the Onboard in constant speed of 60kmph. Keep the track circuit time as 1min, the train length should be 1000m (d=s*t).	The default train length will be replaced with the calculated train length if it differs by more than 25m.	
6.98.	Train length verification in OS	1. Power cycle the Onboard	The default train length will be	

	mode after system restart.	KAVACH and configure the same train type. 2. Configure the train type as passenger train type with suitable coach selection. 3. Note down the train length as its length is 400mts say. 4. Now keep the Onboard in OS mode and train length measurement test may be carried out by keeping the train in constant speed of 60 kmph and track circuit up time as 1 minute. The train length should be 1000m. 5. The updated value should show on DMI.	present, after system restarts and reconfiguration.	
6.99.	Train length verification in OS mode after cab change.	1. Power cycle the Onboard KAVACH and configure the same train type as at previous cab. 2. Configure the train type as passenger train type with suitable coach selection. 3. Note down the default train length as its length is 400mts say. 4. Now keep the Onboard in OS mode and train length measurement test may be carried out by keeping the train in constant speed of 60 kmph and track circuit up time as 1 minute. The train length should be	The default train length will be present in Standby mode.	

		1000m. 5. The updated value should show on DMI. 6. Change the CAB, select the train configuration as above and check the train length.		
6.100.	Train length measurement in OS mode and it is within range of entered value while train configuration is provided. (Start of mission)	1. Power on the system, and note down the train length value which is configured (Default). 2. Make sure that no faults are present. 3. Make sure that train is in OS mode. 4. Now simulate the condition such that Onboard KAVACH received the track circuits data from stationary KAVACH and Onboard KAVACH will compute the train length, the difference between the computed value and the configured value is more than 25mts.	The train length should be updated.	
		5. Repeat the train length calculation step -4 but the train length should be less than the 25mts from the previous value. It is simulated as the track circuit occupation time is less than the previous scenario.	The train length should be updated.	
6.101.	Train length measurement in OS mode and it is within range of entered value while train configuration is provided.	1. Power on the system, and note down the train length value which is configured. 2. Make sure that no faults are	The train length should be updated.	

		present. 3. Make sure that train is in OS mode. 4. Now simulate the condition such that Onboard KAVACH received the track circuits data from stationary KAVACH and Onboard KAVACH will compute the train length, the difference between the computed value and the configured value is more than 25mts. 5. Now change the CAB inactive and make Active.		
		6. Repeat the train length calculation step4 but the train length should be less than the 25mts from the previous value. It is simulated as the track circuit occupation time is less than the previous scenario.	The train length should not be updated.	
6.102.	Train length verification in OS mode after system restart and TLM start packet received from one station and TLM end packet received from next station.	1. Make sure that train is in OS mode with default train length, and train formation is selected. (Default) 2. Configure the train type as passenger train type with suitable coach selection. 3. Note down the train length as its length is 400mts say. 4. Now keep the Onboard in OS mode and train length	1. Message shall be displayed on DMI that "Train length Computation Success". 2. Check that updated TLM length is displayed on DMI. 3. Record the following observations: **Handing over station** i) frame no.: ii) TLM_start_frame: iii) TLM_start_frame-ack frame	

		measurement test may be carried out by keeping the train in constant speed of 60 kmph and track circuit up time as 1 minute. The train length should be 1000m. 5. TLM start packet received from 1st station. 6. TLM end packet received from the next adjacent station.	ovk: **Taking over station:** i) Frame no.: ii) TLM_End_frame: iii) TLM_End_frame-ack from ovk:	
6.103.	Train length verification in OS mode after system restart and TLM start packet received from adjacent station and TLM end packet received from same adjacent station.	1. Make sure that train is in OS mode with default train length, and train formation is selected. (Default) 2. Configure the train type as passenger train type with suitable coach selection. 3. Note down the train length as its length is 400mts say. 4. Now keep the Onboard in OS mode and train length measurement test may be carried out by keeping the train in constant speed of 60 kmph and track circuit up time as 1 minute. The train length should be 1000m. 5. TLM start packet received adjacent station. 6. TLM end packet received from the same adjacent station.	1. Message shall be displayed on DMI that "Train length Computation Success". 2. Check that updated TLM length is displayed on DMI.	
6.104.	Train length verification in OS mode after system restart and TLM start and TLM end packet	1. Make sure that train is in OS mode with default train length, and train formation is selected.	1. Message shall be displayed on DMI that "Train length Computation Success".	

	received from same station.	(Default) 2. Configure the train type as passenger train type with suitable coach selection. 3. Note down the train length as its length is 400mts say. 4. Now keep the Onboard in OS mode and train length measurement test may be carried out by keeping the train in constant speed of 60 kmph and track circuit up time as 1 minute. The train length should be 1000m. 7. TLM start and end packet received from same station.	2. Check that updated TLM length is displayed on DMI.	
6.105.	Check for display of message "Braking System Malfunction" when BP pressure drop is not within range ie 3.15 to 3.55 Kg/cm^2 when FSB is commanded by KAVACH.	1. Onboard is in OS mode. 2. Configure the MR pressure more than 7.5 Kg/cm^2. 3. Configure FSB build time as 4 second. 4. FSB shall be applied and simulate that the BP pressure is not dropping to 3.15 Kg/cm^2 within brake build time.	**1.** Check for display of message in DMI **"Braking System Malfunction" and transited to SF mode.** 2. Brake shall be applied till speed become zero.	
		5. FSB shall be applied and simulate that the BP pressure is not dropping to 3.55 Kg/cm^2 within brake build time.	**1.** Check for display of message in DMI **"Braking System Malfunction" and transited to SF mode.** 2. Brake shall be applied till speed become zero.	
6.106.	Check for display of message "Braking System Malfunction"	1. Onboard is in OS mode. 2. Configure the MR pressure more	1. Check for display of message in DMI **"Braking System**	

	when BP pressure drop is not within range ie 0.0 to 0.3 Kg/cm^2. (When EB applied)	than 7.5 Kg/cm^2. 3. Configure EB build time as 6 second. 4. EB shall be applied and simulate that the BP pressure is not dropping to 0.3 Kg/cm^2 within brake build time.	**Malfunction" and transited to SF mode.** 2. Brake shall be applied till speed become zero.	
6.107.	Check for display of message "Braking System Malfunction" when BC pressure is not building within range ie 4.85 to 5.45 Kg/cm^2 (**For light engine WAP-5**). (When FSB applied)	1. Onboard is in FS mode. 2. Configure the MR pressure more than 7.5 Kg/cm^2. 3. Configure FSB build time as 8 second. 4. Configure the when BC pressure range is i.e 4.85 to 5.45 Kg/cm^2 (For light engine). 5. FSB shall be applied and simulate that the BC pressure is dropping below 4.85 Kg/cm^2 within BC build time.	1. Check for display of message in DMI **"Braking System Malfunction" if BC pressure not building and transited to SF mode.** 2. Brake shall be applied till speed become zero.	
		6. FSB shall be applied and simulate that the BC pressure is above 5.45 Kg/cm^2 within BC build time.	3. Check for display of message in DMI **"Braking System Malfunction"** if BC pressure not building **and transited to SF mode.** 4. Brake shall be applied till speed become zero.	
6.108.	Check for display of message "Braking System Malfunction" when BC pressure is not building within range ie 4.85 to 5.45 Kg/cm^2 (For light engine).	1. Onboard is in OS mode. 2. Configure the MR pressure more than 7.5 Kg/cm^2. 3. Configure EB build time as 4 second. 4. Configure the when BC pressure	1. Check for display of message in DMI **"Braking System Malfunction" and transited to SF mode.** 2. Brake shall be applied till speed	

	(When EB applied)	range is i.e 4.85 to 5.45 Kg/cm^2 (For light engine). 5. EB shall be applied and simulate that the BC pressure is dropping below 4.85 Kg/cm^2 within BC build time.	become zero.	
		6. EB shall be applied and simulate that the BC pressure is above 5.45 Kg/cm^2 within BC build time.	1. Check for display of message in DMI **"Braking System Malfunction" and transited to SF mode.** 2. Brake shall be applied till speed become zero.	
6.109.	To check for OS MA extension when calling on signal is taken off. **(FRS 7.5 (c))**	1. Make sure that train is in OS mode. 2. Onboard is standstill. 3. Calling on signal is taken off. 4. OS MA received from the station.	OS MA extended with speed restriction of 15 kmph and the same is to be shown on DMI.	
			Next approaching signal shall not be linked.	
			Next approaching signal shall be linked within 200m only when there is no Kavach Equipped loco.	
6.110.	To check for OS MA and authorized speed holding, when loco transits from OS to SR due to radio comm fail and then back to OS before passing the route within deregistration time out. (Calling ON Signal)	1. Make sure that train is in OS mode. 2. Onboard is standstill. 3. Calling on signal is taken off. 4. OS MA received from the station.	OS MA extended with speed restriction of 15 kmph and the same is to be shown on DMI.	
		5. Simulate radio comm fail	Onboard Kavach enters SR mode.	
		6. Restore communication within deregistration time out and train did not pass the route.	OS MA extended with speed restriction of 15 kmph and the same is to be shown on DMI.	
		7. Restore communication within deregistration time out and route	OS MA extended with speed permitted for the new route.	

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		is passed.		
		8. Restore communication after deregistration time out.	OS MA extended with speed permitted as per track profile.	
6.111.	To check for OS MA and authorized speed holding, when loco transits from OS to SR due to radio comm fail and then back to OS before passing the route within deregistration time out (Override an Auto Signal)	1. Make sure that train is in OS mode. 2. Onboard is standstill. 3. Override an Auto Signal. 4. OS MA received from the station.	OS MA extended with speed restriction of 10 kmph and the same is to be shown on DMI.	
		5. Simulate radio comm fail.	Onboard Kavach enters SR mode.	
		6. Restore communication within deregistration time out and train did not pass the route.	OS MA extended with speed restriction of 10 kmph and the same is to be shown on DMI.	
		7. Restore communication within deregistration time out and route is passed.	OS MA extended with speed permitted for the new route.	
		8. Restore communication after deregistration time out.	OS MA extended with speed permitted as per track profile.	
6.112.	To check for OS MA and authorized speed holding, when loco transits from OS to SR due to S2S comm fail and then back to OS before passing the route within deregistration time out (Adjacent Stationary Kavach)	1. Make sure that train is in OS mode. 2. Onboard is standstill. 3. Override an Auto Signal at border. 4. OS MA received from the adjacent station.	OS MA extended with speed restriction of 10 kmph and the same is to be shown on DMI.	
		5. Simulate S2S communication fail.	Onboard Kavach enters SR mode.	
		6. Restore communication within deregistration time out and train did not pass the route.	OS MA extended with speed restriction of 10 kmph and the same is to be shown on DMI.	
		7. Restore communication within deregistration time out and route is passed.	OS MA extended with speed permitted for the new route.	

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		8. Restore communication after deregistration time out.	OS MA extended with speed permitted as per track profile.	
6.113.	Check for reduction of MA by collision Margin when Onboard Kavach in OS detects another Onboard Kavach in SR with position report and is occupying the same TIN.	1. Ensure Onboard Kavach L1 in OS Mode. 2. Ensure Onboard Kavach L2 in SR Mode with position report and is occupying the berthing track in the route of L1. 3. Rear end collision is detected by L1 after it enters the occupied TIN.	1. The OS MA shall reduce by collision margin and train length by L1 after occupying the same TIN as of L2.	
			2. Signal aspect shall not be linked by L1 till L2 crosses the next signal.	
6.114.	Check for reduction of MA by collision Margin when Onboard Kavach in OS detects another Onboard Kavach in SR with position report and is occupying the same TIN.	1. Ensure Onboard Kavach L1 in OS Mode. 2. Ensure Onboard Kavach L2 in SR Mode with position report and is occupying the berthing track in the route of L1 and has the Opposite direction. 3. Head on collision is detected by L1 after it enters the occupied TIN.	1. The OS MA shall reduce to Zero by Onboard Kavach L1 after occupying the same TIN as of L2.	
			2. Next approaching Signal aspect shall not be linked by L1.	

System Level TEST CASES (RDSO)				
Test ID	**Test Scenario**	**Input Specification**	**Expected Output/Values**	**Observed Output (Pass/Fail)**
7.	**KAVACH_SYS_07: Trip Mode- This Test cases check for all functionalities that are possible in Trip mode and Mode Transitions from concerned mode to other modes.**			
7.1.	Check for Standstill protection in Trip mode. Loco is in FS mode previously. Signal foot tag missed. **(FRS 10.1, 10.4)**	1. Onboard KAVACH should be in FS. 2. Try for Onboard movement. 3. Onboard enters trip mode when Onboard crosses EOA (MA+ 30mts). 4. SPAD detected by Station and result in MA =0.	1. The Onboard shall enter into trip mode & Movement should not be possible (Signal crossed at **ON**). 2. The passed signal aspect only to be shown as RED. 3. Brakes shall be released after PT mode selection.	
7.2.	Check for Standstill protection in Trip mode. Loco is in FS mode previously. Signal foot tag missed. **(FRS 10.1, 10.4)**	1. Onboard KAVACH should be in FS mode. 2. Simulate the onboard movement toward the Approaching stop signal as Blank. 3. Onboard enters trip mode when Onboard crosses EOA (MA+ 30mts). 4. SPAD detected by Stationary KAVACH and result in MA =0.	1. The Onboard shall enter into trip mode & Movement should not be possible (**Stop Signal crossed at blank**). 2. The passed signal aspect only to be shown as RED (Blank). 3. Brakes shall be released after PT mode selection.	
7.3.	Check for Standstill protection in Trip mode. Loco is in FS mode previously. Signal foot tag missed. **(FRS 10.1, 10.4)**	1. Onboard KAVACH should be in FS mode. 2. Simulate the onboard movement toward the permissive signal at blank condition. 3. Signal foot tag of permissive signal is missed.	1. The Onboard shall remain in FS mode & Movement should be possible up to MA. 2. The passed permissive signal aspect only to be shown as Yellow (blank).	

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System Level TEST CASES (RDSO)				
Test ID	**Test Scenario**	**Input Specification**	**Expected Output/Values**	**Observed Output (Pass/Fail)**
7.4.	Check for Standstill protection in Trip mode. Loco is in OS mode previously. Signal foot tag missed. **(FRS 10.1, 10.4)**	1. Onboard KAVACH should be in OS mode. 2. Try for Onboard movement. 3. Onboard enters trip mode when Onboard crosses EOA (MA+ 30mts).	1. The Onboard shall enter into trip mode & Movement should not be possible (Signal crossed at ON). 2. The passed signal aspect only to be shown as RED. 3. Brakes shall be released after PT mode selection.	
7.5.	Check for Standstill protection in Trip mode. Loco is in OS mode previously. Signal foot tag missed. **(FRS 10.1, 10.4)**	1. Onboard KAVACH should be in OS mode. 2. Simulate the onboard movement toward the Approaching stop signal as Blank. 3. Onboard enters trip mode when Onboard crosses EOA (MA+ 30mts). 4. SPAD detected by Station and result in MA =0.	1. The Onboard shall enter into trip mode & Movement should not be possible (**Stop Signal crossed at blank**). 2. The passed signal aspect only to be shown as RED (blank). 3. Brakes shall be released after PT mode selection.	
7.6.	Check for Standstill protection in Trip mode. Loco is in OS mode previously. Signal foot tag missed. **(FRS 10.1, 10.4)**	1. Onboard KAVACH should be in OS mode. 2. Simulate the onboard movement toward the Approaching permissive signal as Blank. 3. Signal foot tag of permissive signal is missed.	1. The Onboard shall remain in OS mode & Movement should be possible up to MA. 2. The passed permissive signal aspect only to be shown as Yellow (blank).	
7.7.	Check for mode transition when unlink tag is read in trip mode.	1. Onboard KAVACH should be in OS/FS mode. 2. Approaching stop signal passed	1. Unlinked tag read after trip, shall not be considered as a foreign tag.	

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System Level TEST CASES (RDSO)				
Test ID	**Test Scenario**	**Input Specification**	**Expected Output/Values**	**Observed Output (Pass/Fail)**
		in ON condition. 3. Simulate unlinked tag is read in trip mode.	2. The Onboard shall remain in Trip Mode after read unlinked tag.	
			3. Red Signal shall be displayed in DMI in Trip mode.	
7.8.	Check for Standstill protection in Trip mode. Loco is in FS mode previously. Signal foot tag read. **(FRS 10.1, 10.4)**	1. Onboard KAVACH should be in FS mode. 2. Try for Onboard movement. 3. Onboard enters trip mode when Onboard crosses stop signal at ON i.e Signal foot tag read.	1. The Onboard shall enter into trip mode & Movement should not be possible (Signal crossed at ON).	
			2. The passed signal aspect only to be shown as RED.	
			3. Brakes shall be released after PT mode selection.	
7.9.	Check for Standstill protection in Trip mode. Loco is in OS mode previously. Signal foot tag read. **(FRS 10.1, 10.4)**	1. Onboard KAVACH should be in OS mode. 2. Try for Onboard movement. 3. Onboard enters trip mode when Onboard crosses stop signal at ON i.e Signal foot tag read.	1. The Onboard shall enter into trip mode & Movement should not be possible (Signal crossed at ON).	
			2. The passed signal aspect only to be shown as RED.	
			3. Brakes shall be released after PT mode selection.	
7.10.	Check that SR mode manual selection is not feasible from Trip mode.	1. Keep the Onboard in Trip mode. 2. Now press the SR and CNFM buttons on DMI.	Onboard KAVACH shall not transit from the existing mode.	
7.11.	Check for Radio Transmission when Onboard KAVACH is in Trip mode and in KAVACH Area.	1. Onboard KAVACH should be in Trip mode and in KAVACH area. 2. Check for Radio packets of concerned Onboard.	1. Radio Packets of concerned Onboard should be transmitted. 2. Note the difference in frame cycle from SVK to OVK not differ by 2. Same shall verify from the log.	
7.12.	Check for Acknowledgement	1. Onboard is in Trip Mode.	Onboard KAVACH should not	

System Level TEST CASES (RDSO)				
Test ID	**Test Scenario**	**Input Specification**	**Expected Output/Values**	**Observed Output (Pass/Fail)**
	request when in Trip mode and Onboard is not at standstill. **FRS 11.1**	2. EB got applied. 3. Train has not come to standstill. 4. Check for Acknowledgement request.	accept the request, as it is not in standstill. It should continue in Trip mode.	
7.13.	Check for Onboard KAVACH brake command of emergency brakes in case of trip. (**FRS 10.5)**	1. Move the Onboard towards the Stop Signal. 2. Cross the signal in ON condition. 3. Onboard shall trip.	1. Check that EB application. 2. "**Train Tripped, Select P_Trip**" shall be displayed on DMI after standstill.	
7.14.	Check for Onboard KAVACH brake command of emergency brakes in case of trip. **(FRS 10.3 (C)**	1. Onboard in FS mode. 2. Onboard in communication mandatory area with valid communication. 3. Move the Onboard towards in Stop Signal in OFF aspect. 4. Suddenly fly back the signal to ON aspect.	1. Check for EB application till the train come to standstill.	
			2. Message **"Brake Applied-SPAD detected"** shall be display in DMI.	
			3. All target monitoring shall be erased.	
			4. Permitted speed shall be zero.	
7.15.	Check for Onboard KAVACH brake command of emergency brakes in case of trip, when FS+OV pressed & OSMA not extended. (**FRS 10.3 (C))**	1. Onboard in FS mode. 2. Press OV and CNFM button and OSMA not extended. 3. Move the Onboard towards in Stop Signal in ON aspect.	Check for transition to trip mode and EB application till the train come to standstill.	

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System Level TEST CASES (RDSO)				
Test ID	**Test Scenario**	**Input Specification**	**Expected Output/Values**	**Observed Output (Pass/Fail)**
7.16.	Check for Onboard KAVACH brake command of emergency brakes in case of trip, when OS+OV pressed & OSMA not extended. **(FRS 10.3 (C))**	1. Onboard in OS mode. 2. Press OV & CNFM button. 3. OSMA not extended. 4. Move the Onboard towards in Stop Signal in ON aspect.	Check for transition to trip mode and EB application till the train come to standstill.	
7.17.	Check for Onboard KAVACH brake command of emergency brakes in case of trip, when OV pressed & OSMA not extended. (**FRS 10.3 (C))**	1. Onboard in PT mode. 2. Press OV & CNFM button. 3. OSMA not extended. 4. Move the Onboard forward.	Check for transition to trip mode and EB application till the train come to standstill.	
7.18.	Check for that Closing the desk (no Cab is active) while being in Trip mode shall not cause a mode change. **(FRS 10.6)**	1. Onboard is in Trip Mode. 2. Train has come to standstill. 3. Closing the desk.	1. Mode shall not change and remain in only TRIP mode. 2. No interaction with the Loco pilot shall be possible as long as the desk is closed. 3. Select PT mode. The Onboard KAVACH shall remain in Trip mode.	
7.19.	Check for PT request when in Trip mode and Onboard is at standstill. (**FRS 10.8)**	1. Onboard is in Trip Mode. 2. EB got applied. 3. Train has come to standstill. 4. Check for PT+ CNFM buttons.	Onboard KAVACH should accept the request and it should enter to **Post Trip mode.**	
7.20.	Check for PT request when in Trip mode and Onboard is at standstill. (**FRS 10.8)**	1. Onboard is in Trip Mode. 2. EB got applied and press ACK button.	Brake is not released.	
		3. After standstill, again press the	Brake is not released.	

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System Level TEST CASES (RDSO)				
Test ID	**Test Scenario**	**Input Specification**	**Expected Output/Values**	**Observed Output (Pass/Fail)**
		ACK button and check brake that brake is not released.		
7.21.	Check for mode transition of Onboard which is in Trip mode to SB mode when no CAB is Active.	1. Onboard is in Trip mode. 2. CAB input is made Inactive.	1. The Onboard KAVACH should **not transit** to SB mode. 2. Check for Mode on DMI Display.	
7.22.	Check for mode transition of Onboard which is in Trip mode to SB mode when no CAB is Active when communication failed.	1. Onboard is in Trip mode. 2. CAB input is made Inactive. 3. Simulate the communication fail.	1. The Onboard KAVACH should **not transit** to SB mode. 2. Check for Mode on DMI display.	
7.23.	If EM cock (health of EB channel fail) is open.	1. Make sure that no faults are present any one cab is occupied. 2. Make sure that train is in TR mode. 3. Now open EM cock (health of EB channel fail is closed. 4. Train is at Standstill.	1. There shall not be change in mode. 2. Check for mode on DMI display.	
7.24.	Check for mode transition from Trip to Isolation mode. **(Condi -02)**	1. When Onboard is in TR mode. 2. Onboard is isolated.	1. Onboard KAVACH should get changed to isolation mode. 2. Check for Onboard KAVACH mode on DMI.	
7.25.	Check for mode transition from Trip to System failure when critical fault occurs in system	When Onboard is in TR mode create a critical fault	1. Onboard KAVACH should get changed to System failure mode. 2. Check for Onboard KAVACH mode on DMI.	
7.26.	Check for mode transition from Trip to NL mode.	1. When Onboard is in TR mode make the Non Leading input	1. Onboard KAVACH mode should not get changed to Non Leading	

System Level TEST CASES (RDSO)				
Test ID	**Test Scenario**	**Input Specification**	**Expected Output/Values**	**Observed Output (Pass/Fail)**
		active.	mode. 2. Check for Onboard KAVACH on DMI, it should be TR mode only.	
7.27.	Check for display the train speed and permitted speed in TRIP mode. **(FRS 10.7)**	1. Onboard is in Trip Mode. 2. EB got applied. 3. Train has come to standstill.	1. Check that DMI shall display Train Speed. 2. Check that DMI shall display permitted speed as zero. 3. All targets to be set to zero.	
7.28.	Check for manual SOS from stationary KAVACH in TRIP/PT mode.	1. Onboard is in Trip /PT mode. 2. Generate the manual SOS from stationary KAVACH, onboard is within the range of 3000 meter.	4. SOS shall be received. 5. After selection of PT mode, the brake shall be applied after reception of SoS.	TRIP PT
7.29.	Check for manual SOS from other onboard KAVACH in TRIP/PT mode.	1. Onboard is in Trip /PT mode. 2. Generate the manual SOS from other onboard KAVACH which is in FS/OS mode. 3. Both Onboard is within the range of 3000 meter.	1. SOS shall be received. 2. After selection of PT mode, the brake shall be applied after reception of SoS.	TRIP PT
7.30.	Check for receipt of unusual stoppage SOS in trip mode.	1. Onboard is in Trip /PT mode in block section. 2. Simulate the condition that other onboard stopped in other line block section with available > 300-meter MA. 3. Both Onboard is within the range of 3000 meter.	3. Unusual stoppage SOS shall be received. 4. After selection of PT mode, the brake shall be applied after reception of Unusual stoppage SOS.	TRIP PT
7.31.	Check for unusual stoppage	1. Simulate the movement toward	usual stoppage SOS shall not be	

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System Level TEST CASES (RDSO)				
Test ID	**Test Scenario**	**Input Specification**	**Expected Output/Values**	**Observed Output (Pass/Fail)**
	SOS in block section in TRIP mode.	the advance starter in RED aspect 2. Onboard TRIPPED after reading the signal foot tag and stopped in block section.	generated by onboard. .	

System Level TEST CASES (RDSO)				
Test ID	**Test Scenario**	**Input Specification**	**Expected Output/Values**	**Observed Output (Pass/Fail)**
8.	**KAVACH_FRS_08: Post Trip Mode- This Test cases check for all functionalities that are possible in Post trip mode and Mode Transitions from concerned mode to other modes.**			
8.1.	Check for Release of emergency brakes when Onboard enters to Post trip Mode. (**FRS 11.1 & 11.2**)	1. Onboard is in Trip Mode and at standstill. 2. Check for Emergency brakes release. 3. Check for mode of Onboard. 4. Check for release of brakes. 5. Select PT mode.	1. Check that, in Trip mode Emergency brakes should not be released and when Onboard is not standstill. 2. P_TRIP should not be allowed to be activated before standstill. 3. P_TRIP should be selected in stand still condition only. 4. Onboard KAVACH should transit to Post Trip. 5. Check for Mode and Brake status on DMI display.	
8.2.	Check that SR mode manual selection is not feasible from any other mode, when Onboard KAVACH is in Post Trip mode.	1. Keep the Onboard in Post Trip mode. 2. Now press the SR and CNFM buttons on DMI.	Onboard KAVACH shall not transit from the existing mode.	
8.3.	Check for Mode transition to SB when CAB is changed in case of dual CAB or driving position is changed in case of single cab. **(FRS 21.1 (d) and (e))**	1. Keep the Onboard in Post Trip mode. 2. Change the CAB.	1. Onboard KAVACH shall transit to SB mode. 2. Check for mode on DMI.	Change / Output Driving Position Dual Cab
8.4.	Check for Brake intervention by KAVACH when Onboard	1. Onboard KAVACH should be in Post trip mode.	The Onboard KAVACH should apply brakes immediately.	

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System Level TEST CASES (RDSO)				
Test ID	**Test Scenario**	**Input Specification**	**Expected Output/Values**	**Observed Output (Pass/Fail)**
	in Post trip.	2. Increase the speed of Onboard. 3. Check for brake application.		
8.5.	Check for mode transition from PT mode to OS mode when OV Selected.	1. Onboard KAVACH should be in Post trip mode. 2. Onboard shall be standstill. 3. Onboard is in communication mandatory area with a valid communication. 4. Select Override mode by pressing “OV” and CNFM button.	1. OSMA shall be received from Stationary KAVACH. 2. The Onboard KAVACH should transit to OS mode.	
8.6.	Check for mode transition from PT mode to SR Mode when OV is selected and communication fails.	1. Onboard KAVACH should be in Post trip mode. 2. Onboard shall be standstill. 3. Onboard is in communication mandatory area. 4. Communication shall be failed by removing stationary Tx. 5. Select Override mode by pressing “OV” and CNFM button.	1. The Onboard KAVACH should transit to SR mode. 2. If LP does not ACK within applicable time, brake shall be applied. 3. Brake shall not be applied when Onboard is at standstill.	
8.7.	Check for forward movement protection in PT mode.	1. Onboard is in PT mode. 2. Make Onboard movement in forward direction. 3. Check for brakes	Brakes should get applied; Onboard movement should not be allowed in forward direction.	

System Level TEST CASES (RDSO)				
Test ID	**Test Scenario**	**Input Specification**	**Expected Output/Values**	**Observed Output (Pass/Fail)**
		application.		
8.8.	Check for Reverse movement protection in PT mode.	1. Onboard is in PT mode. 2. Make Onboard movement in reverse direction. 3. Check for brakes application.	Brakes should get applied, Onboard movement should be not be allowed in reverse direction.	
8.9.	Check for distance allowed in PT mode, by selecting RV mode for reverse direction and train is standstill. **(FRS 11.4(b), Cond. 58)**	1. Onboard is in PT mode. 2. Onboard Standstill. 3. Make Onboard movement in Reverse direction by selecting RV mode. 4. Check for distance after which the brakes get applied.	1. The Onboard movement should allow in Reverse direction after selecting the RV mode. 2. Reverse distance allowed should be as given in configuration data After the given distance travelled brakes should apply.	
8.10.	Station SOS acceptance by the Onboard, when it is Post Trip mode.	1. Onboard KAVACH should be in Post trip mode. 2. Onboard is standstill. 3. Generate Manual SOS from station.	1. The Onboard KAVACH shall accept the SoS.	
			2. Check for Increment in Counter value corresponding to SOS is stationary KAVACH.	
8.11.	Station SOS acceptance by the Onboard when Loco is in OS mode after post Trip.	1. Onboard KAVACH should be in Post trip mode. 2. Select “OV” and CNFM button & make sure that OSMA received. 3. Move the Onboard KAVACH. 4. Generate Manual SOS from station.	1. The Onboard KAVACH should apply brakes and train should come to standstill.	
			2. Check for Increment in Counter value corresponding to SOS.	

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System Level TEST CASES (RDSO)				
Test ID	**Test Scenario**	**Input Specification**	**Expected Output/Values**	**Observed Output (Pass/Fail)**
		5. Check for Braking in Onboard.		
8.12.	Check for Radio Transmission when Onboard KAVACH is in Post-trip mode and in KAVACH Area.	1. Onboard KAVACH should be in post trip mode and in KAVACH area. 2. Check for Radio packets of concerned Onboard.	1. Radio Packets of concerned Onboard should be transmitted. 2. Note the difference in frame cycle from SVK to OVK not differ by 2. Same shall verify from the log.	
8.13.	Check for mode transition of Onboard which is in PT mode to SB mode when no CAB is Active. **(Condi - 7)**	1. Onboard is in PT mode. 2. CAB input is made Inactive in standstill.	1. The Onboard KAVACH should transit to SB mode. 2. Check for Mode on DMI Display.	
8.14.	If EM cock (health of EB channel fail) is open.	1. Make sure that no faults are present any one cab is occupied. 2. Make sure that train is in PT mode. 3. Now make EB cock (health of EB channel fail) is closed. 4. Train is at Standstill.	System will enter into SB mode; it can be verified on DMI.	
8.15.	Check for mode transition when Onboard is in PT mode and Loco Pilot presses SR mode and train is not at standstill.	1. Onboard is in PT mode. 2. Onboard is not at standstill. 3. Onboard in Communication mandatory area and have valid communication. 4. Loco Pilot presses SR & CNFM button.	1. The Onboard KAVACH should not transit to staff responsible mode. 2. Check for Mode on DMI Display.	

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System Level TEST CASES (RDSO)				
Test ID	**Test Scenario**	**Input Specification**	**Expected Output/Values**	**Observed Output (Pass/Fail)**
8.16.	Check for mode transition when Onboard is in PT mode and train crosses the KAVACH Exit tag. (**FRS 11.4 C(i), Condi.17)**	1. Onboard KAVACH is in FS mode. 2. Cross signal at ON aspect. 3. It enters into TRIP mode. 4. It reads KAVACH territory Exit Tag while braking.	1. The Onboard KAVACH should not transit to staff responsible mode. 2. Upon Pressing PT and CNFM button after come to stand still, Onboard should transit to SR mode, erase direction and location. 3. Check for Mode on DMI display.	
8.17.	Check for mode transition when Onboard is in PT mode and train crosses the KAVACH Exit tag. (**FRS 11.4 C(i), Condi.17)**	1. Onboard KAVACH is in OS mode. 2. Cross signal at ON aspect. 3. It enters into TRIP mode. 4. It reads KAVACH territory Exit Tag while braking.	1. The Onboard KAVACH should not transit to staff responsible mode. 2. Upon Pressing PT and CNFM button after come to stand still, Onboard should transit to SR mode, erase direction and location. 3. Radio communication shall be stopped. 4. Check for Mode on DMI display.	
8.18.	Check for mode transition when Onboard is in PT mode and traffic direction goes unknown. **((FRS 11.4 C(ii), Condi. 30)**	1. Onboard is in FS mode. 2. Cross signal at ON aspect. 3. It enters into TRIP mode. 4. Simulate that it shall encounters tag of different direction.	1. The Onboard KAVACH should not transit to staff responsible mode.	
			2. Upon Pressing PT and CNFM button after come to stand still, Onboard should transit to SR mode, erase direction and location.	
			3. Check for Mode on DMI Display.	

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System Level TEST CASES (RDSO)				
Test ID	**Test Scenario**	**Input Specification**	**Expected Output/Values**	**Observed Output (Pass/Fail)**
8.19.	Check for mode transition when Onboard is in PT mode and traffic direction goes unknown. **((FRS 11.4 C(ii), Condi. 30)**	1. Onboard is in OS mode. 2. Cross signal at ON aspect. 3. It enters into TRIP mode. 4. Simulate that it shall encounter, Tag of different direction.	1. The Onboard KAVACH should not transit to staff responsible mode. 2. Upon Pressing PT and CNFM button after come to stand still, Onboard should transit to SR mode, erase direction and location. 3. Check for Mode on DMI Display.	
8.20.	Check for mode transition when Onboard is in PT mode and Onboard reads adjustment tag. **((FRS 11.4 C(ii), Condi. 30)**	1. Onboard is in FS mode. 2. Cross signal at ON aspect. 3. It enters into TRIP mode. 4. Simulate that it shall encounter the adjustment Tag before stopping.	1. The Onboard KAVACH should transit to TRIP mode. 2. Upon Pressing PT and CNFM button, Onboard should transit to PT mode. 3. Location shall be displayed as per adjustment tag. 4. Check for Mode on DMI Display.	
8.21.	Check for mode transition when Onboard is in PT mode and Onboard reads adjustment tag. **((FRS 11.4 C(ii), Condi. 30)**	1. Onboard is in OS mode. 2. Cross signal at ON aspect. 3. It enters into TRIP mode. 4. Simulate that it shall encounter the adjustment Tag before stopping.	1. The Onboard KAVACH should transit to TRIP mode. 2. Upon Pressing PT and CNFM button, Onboard should transit to PT mode. 3. Location shall be displayed as per adjustment tag. 4. Check for Mode on DMI Display.	
8.22.	Check for mode transition when Onboard is in PT mode and Onboard reads Junction tag. **((FRS 11.4 C(ii), Condi. 30)**	1. Onboard is in FS mode. 2. Cross signal at ON aspect. 3. It enters into TRIP mode. 4. Simulate that it shall encounter the Junction Tag before stopping.	1. The Onboard KAVACH should transit to TRIP mode. 2. Upon Pressing PT and CNFM button, Onboard should transit to PT mode. 3. Direction and location shall be displayed as per junction tag. 4. Check for Mode on DMI Display.	

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System Level TEST CASES (RDSO)				
Test ID	**Test Scenario**	**Input Specification**	**Expected Output/Values**	**Observed Output (Pass/Fail)**
8.23.	Check for mode transition when Onboard is in PT mode and Onboard reads Junction tag. **((FRS 11.4 C(ii), Condi. 30)**	1. Onboard is in OS mode. 2. Cross signal at ON aspect. 3. It enters into TRIP mode. 4. Simulate that it shall encounter the junction Tag before stopping.	1. The Onboard KAVACH should transit to TRIP mode. 2. Upon Pressing PT and CNFM button, Onboard should transit to PT mode. 3. Direction and location shall be displayed as per Junction tag. 4. Check for Mode on DMI Display.	
		1.	1.	
8.24.	Check for mode transition of Onboard which is in PT mode to NL mode when Non Leading input is active and Train is at standstill.	1. Onboard is in PT mode. 2. Non Leading input is active. 3. Onboard is at standstill.	1. The Onboard KAVACH should not transit to Non – leading mode. 2. Check for Mode on DMI Display.	
8.25.	Check for mode transition from PT to System failure when critical fault occurs in system.	When Onboard is in PT mode create a critical fault.	1. Onboard KAVACH should get changed to System failure mode. Check for Onboard KAVACH on DMI. 2. Check that SMS is transmitted over GSM.	
8.26.	To check the LC gate operation in PT mode when LC gate tag is read.	1. Onboard is in PT mode. 2. Swipe the tag that is linked with approaching signal and is containing LC gate information within the route.	Check that no horn when Onboard is standstill (when MA is < distance to LC gate).	
8.27.	To check the LC gate operation in PT mode when entered from FS mode and LC	1. Onboard is in PT mode. 2. Don't swipe the tag that is linked with approaching	Check for no horn when MA is < distance to LC gate as Onboard is standstill.	

System Level TEST CASES (RDSO)				
Test ID	**Test Scenario**	**Input Specification**	**Expected Output/Values**	**Observed Output (Pass/Fail)**
	gate tag is not read but LC gate information is in TRACK PROFILE.	signal.		
8.28.	Check for display the train speed and permitted speed in POST TRIP mode. **(FRS 11.3)**	Onboard is in PT Mode.	1. DMI shall display "0" as permitted speed in this mode. 2. All other targets are to be disable.	
8.29.	Check for no Mode transition mode when train is in PT mode & PT+OV is selected. Train configuration is changed during standstill. **(FRS 22.1)**	1. Ensure that Onboard is in PT mode. 2. Press for OV and CNFM button. 3. Onboard is at stand still. 4. Make the CAB active. 5. Change the train configuration.	1. Onboard KAVACH shall conduct self-tests. 2. On successful self-tests Onboard KAVACH should remain in PT mode and OV selected message shall be displayed.	
8.30.	Check for OS MA extension when train is in PT Mode and OV is selected and route is not known.	1. Ensure that Onboard is tripped and read a Tag T1 beyond the Signal at ON. 2. Ensure that Onboard is in PT mode. 3. Press for OV and CNFM button. 4. Onboard is at stand still. 5. Make the CAB active. 6. Stationary Kavach has multiple routes diverging from Tag T1. 7. Tag T1 is reported to Stationary Kavach.	1. Stationary Kavach shall extend possible MA without track profile from the valid Tag and restricted speed of 15 Km/h. 2. If the shortest MA is expired and route is still not ascertained on the second override, then Stationary Kavach can extend SR Authorization (39 mode transition condition). 3. If route is ascertained, OSMA and track profile shall be extended	

System Level TEST CASES (RDSO)				
Test ID	**Test Scenario**	**Input Specification**	**Expected Output/Values**	**Observed Output (Pass/Fail)**
			accordingly.	

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System Level TEST CASES (RDSO)				
Test ID	**Test Scenario**	**Input Specification**	**Expected Output/Values**	**Observed Output (Pass/Fail)**
9.	**KAVACH_FRS_09: Non Leading Mode- This Test cases check for all functionalities that are possible in Non Leading mode and Mode Transitions from concerned mode to other modes.**			
9.1.	Selection of Non leading mode when loco is in movement.	1. Keep the Onboard in moving condition. 2. Select the NL mode.	NL mode shall not be selected.	
9.2.	Selection of Non leading mode when loco is standstill.	1. Keep the Onboard in stand still. 2. Select the NL mode	NL mode shall be selected.	
9.3.	Check that SR mode manual selection is not feasible from NL mode.	1. Keep the Onboard in Non Leading mode. 2. Now press the SR and CNFM buttons on DMI.	Onboard KAVACH shall not transit from the existing mode.	
9.4.	Check for Mode transition to SB when CAB is changed in case of dual CAB or driving position is changed in case of single cab.	1. Keep the Onboard in both cab in NL mode. 2. Change the CAB.	Onboard KAVACH shall remain in NL mode.	
9.5.	Check for Onboard speed on DMI.	1. Onboard is in NL mode. 2. Onboard is not standstill.	Speed of Onboard should be available on DMI.	
9.6.	Check for radio transmission when Onboard is in KAVACH area and in NL mode. (**FRS 12.3)**	1. Make an Onboard CAB input inactive which is in NL mode, in KAVACH area. 2. Check for radio packets of concerned Onboard.	1. Radio packets should be transmitted to station for every 2 min after crossing any tag (except LC gate tag) in random time slot. 2. NMS update to be checked.	

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System Level TEST CASES (RDSO)				
Test ID	**Test Scenario**	**Input Specification**	**Expected Output/Values**	**Observed Output (Pass/Fail)**
9.7.	Check for Onboard forward movement protection when Onboard Cab1 is in Non Leading mode.	1. When Onboard in Cab-1 is in Non Leading mode. 2. Make Reverse movement from active Cab-1. 3. Check for reverse movement protection.	The Non Leading Onboard should not command any brakes as no train movement protection is done in Non – leading mode.	
9.8.	Check for Onboard Reverse movement protection when Onboard Cab1 is in Non Leading mode.	4. When Onboard in Cab-1 is in Non Leading mode. 5. Make forward movement from active Cab-1. 6. Check for forward movement protection.	The Non Leading Onboard should not command any brakes as no train movement protection is done in Non – leading mode.	
9.9.	Check for mode transition of Onboard which is in NL mode to SB mode when Non leading input is Inactive. Onboard is moving. **(Condi -82)**	1. Onboard is in NL mode. 2. System healthy. 3. Onboard in not in standstill. 4. Make NL input Inactive.	Onboard KAVACH should not get changed from NL to SB.	Inactive DMI Active DMI
9.10.	Check for Mode transition of Onboard which is in NL mode to SB mode when Non leading input is Inactive and Onboard in at standstill. (**Condi. 82**)	1. Onboard is in NL mode. 2. System healthy. 3. Onboard is in standstill. 4. Make NL input Inactive.	Onboard KAVACH should get changed from NL to SB Brakes test should be done and request for configuration should be displayed on DMI.	Inactive DMI Active DMI
9.11.	Check for mode transition from NL to System failure when critical fault occurs in system.	1. When Onboard is in NL mode create a critical fault.	1. Onboard KAVACH should continue in NL mode, till NL input is active and transit to SF when NL input	

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System Level TEST CASES (RDSO)				
Test ID	**Test Scenario**	**Input Specification**	**Expected Output/Values**	**Observed Output (Pass/Fail)**
		2. Onboard is at standstill. 3. Make NL input inactive.	is not active and Onboard is at standstill. 2. Check for Onboard KAVACH on DMI.	
9.12.	When SOS is received in NL mode.	1. Keep the Onboard in NL mode. 2. Another Onboard is in 3km region with FS mode. 3. Now simulate a SOS from FS mode Onboard.	No SOS should receive in NL Onboard and no brakes should apply.	Loco generated manual SoS Station generated manual SoS Unusual Stoppage
9.13.	To check mode transition to SF when Onboard KAVACH is in NL mode and active CAB DMI fails.	1. Onboard KAVACH is NL. 2. Remove communication port of Active cab DMI. 3. Make active DMI communication fail. 4. Reconnect the communication port of Active Cab.	System should not enter into system failure mode.	
9.14.	Check for train trip when Onboard is in NL mode. **(FRS 12.6)**	1. Onboard KAVACH is functional. 2. Select the NL mode. 3. Move the Onboard & cross the approaching STOP signal.	1. Onboard shall not trip. 2. Onboard shall display only speed.	
9.15.	Check for Non leading mode selection when loco is in	1. Keep the Onboard is in SB/SR/LS/FS/OS/RV/SH	Result shall be as per below table:	

<table>
<tr><th colspan="5">System Level TEST CASES (RDSO)</th></tr>
<tr><th>Test ID</th><th>Test Scenario</th><th>Input Specification</th><th colspan="2">Expected Output/Values</th><th>Observed Output (Pass/Fail)</th></tr>
<tr><td></td><td>SB/SR/LS/FS/OS/RV/SH mode and is at standstill.</td><td>mode.
2. Keep the Onboard in standstill.
3. Select the Knob position on Active and Inactive DMI as per table.</td><td colspan="2"><table><tr><th>Position of Knob on active DMI</th><th>Position of Knob on inactive DMI</th><th>Loco Mode</th></tr><tr><td>Non-Leading</td><td>Non-Leading</td><td>NL</td></tr><tr><td>Leading</td><td>Leading</td><td>NL not selected</td></tr><tr><td>Non-Leading</td><td>Leading</td><td>NL</td></tr><tr><td>Leading</td><td>Non-Leading</td><td>NL not selected</td></tr></table></td><td></td></tr>
</table>

	System Level TEST CASES (RDSO)			
Test ID	**Test Scenario**	**Input Specification**	**Expected Output/Values**	**Observed Output (Pass/Fail)**
10.	**KAVACH_FRS_10: Reverse Mode- This Test cases check for all functionalities that are possible in Reverse mode and Mode Transitions from concerned mode to other modes.**			
10.1.	Check for Brake intervention by KAVACH when Onboard speed goes beyond Reverse mode speed limit (25KMPH). (**FRS 13.2 (a))**	1. Onboard KAVACH should be in Reverse mode. 2. Increase the Onboard speed such that it crosses the reverse mode speed Limit. 3. Check for display of Permitted speed and current speed on DMI. 4. Check for speed control when Onboard is in FS/LS mode and at standstill this mode is available for selection on DMI to enter this mode selects RV on DMI.	The Permitted speed and current speed of Onboard should be visible on DMI and the Onboard KAVACH should apply brakes when the speed is more than the reverse mode speed limit.	
10.2.	Check that SR mode manual selection is not feasible from Reverse mode.	1. Keep the Onboard in Reverse mode. 2. Now press the SR and CNFM buttons on DMI.	Onboard KAVACH shall not transit from the existing mode.	
10.3.	Check for Mode transition to SB mode when CAB is changed in case of dual CAB or driving position is changed in case of single cab. **(FRS 21.1 (d) and (e))** **Condition -7**	1. Keep the Onboard in Rev Mode. 2. Onboard is standstill. 3. Change the CAB.	1. Onboard KAVACH shall transit to SB mode. 2. Check for mode on DMI.	

	System Level TEST CASES (RDSO)			
Test ID	**Test Scenario**	**Input Specification**	**Expected Output/Values**	**Observed Output (Pass/Fail)**
10.4.	Check for Brake intervention by KAVACH when Onboard goes beyond Reverse Mode Distance Limit. **(FRS 13.2 (b) & Condi-35)**	1. Onboard KAVACH should be in Reverse mode. 2. Make Onboard movement such that it crosses the Reverse mode distance Limit (Default :500 m configurable)	1. Check that the Onboard movement shall not be allowed beyond the configured value i.e., 500 meter and brakes should apply. 2. The mode should transit to SB Mode.	
10.5.	Check for Brake intervention by KAVACH when Onboard tries to move in forward Direction (Reverse movement protection). (**FRS:13.8, Condi :7 &35)**	1. Onboard KAVACH should be in Reverse mode. 2. Make the Onboard movement in Forward direction. (By making the reverser in forward direction). 3. Check for Brakes application.	1. Message shall display on DMI **"No Forward Dir in REV mode**" for 10 second (configurable). 2. The Onboard KAVACH should exit from RV mode and it should change to SB mode.	
10.6.	Check for Absolute location on DMI in reverse mode and moving in Reverse traffic direction.	1. Onboard in Reverse mode. 2. Traffic direction in Reverse. 3. Check for Absolute location on DMI.	The Absolute location should be Incremented.	
10.7.	Check for Absolute location on DMI in reverse mode and moving in nominal traffic direction.	1. Ensure Onboard in FS mode move in nominal direction. 2. Change Onboard KAVACH to reverse mode. 3. Traffic direction in nominal. 4. Check for Absolute location on DMI.	The Absolute location should be decremented.	

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	System Level TEST CASES (RDSO)			
Test ID	**Test Scenario**	**Input Specification**	**Expected Output/Values**	**Observed Output (Pass/Fail)**
10.8.	Check for SOS acceptance from station.	1. Onboard KAVACH should be in Reverse mode. 2. Onboard is moving. 3. Generate Manual SOS from station.	1. The SoS LED shall be RED. 2. Onboard KAVACH shall apply the brake and come to standstill, the speed should be monitored for 25 kmph only. 3. After cancellation, the SoS shall be removed and SoS LED shall be Green.	
10.9.	Check for Radio Transmission when Onboard KAVACH is in reverse mode and in KAVACH Area.	1. Onboard KAVACH should be in reverse mode and in KAVACH area. 2. Check for Radio packets of concerned Onboard.	1. Radio Packets of concerned Onboard should be transmitted. 2. Note the difference in frame cycle from SVK to OVK not differ by 2. Same shall verify from the log.	
10.10.	Check for mode transition of Onboard which is in RV mode to SB mode when no CAB is Active. **(Condi -7)**	1. Onboard is in RV mode. 2. CAB input is made Inactive in standstill condition.	1. The Onboard KAVACH should transit to SB mode. 2. Check for Mode on DMI Display.	
10.11.	If EM cock (health of EB channel fail) is closed when Loco is standstill. **(Condi-7)**	1. Make sure that no faults are present. 2. Any one cab is occupied. 3. Make sure that train is in RV mode. 4. Now make EM cock is closed. 5. Train is at Standstill.	1. System will enter into SB mode; it can be verified on DMI. 2. After recovery system should enter into previous mode.	

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	System Level TEST CASES (RDSO)			
Test ID	**Test Scenario**	**Input Specification**	**Expected Output/Values**	**Observed Output (Pass/Fail)**
10.12.	If EM cock (health of EB channel fail) is closed and when loco is in movement. **(Condi-7)**	1. Make sure that no faults are present any one cab is occupied. 2. Make sure that train is in RV mode. 3. Now make EM cock is closed. 4. Train is not at Standstill.	1. Onboard should apply brakes and come to stand still. 2. System will enter into SB mode after speed become zero; it can be verified on DMI. 3. After recovery system should enter into previous mode.	
10.13.	Check for mode transition when Onboard is in RV mode. **(FRS 13.2 (c) & Condi -35)**	1. Onboard is in RV mode and standstill. 2. Onboard is in KAVACH area. 3. Reverse mode timeout occurs >300 second.	1. The Onboard KAVACH should transit to SB mode. 2. Check for Mode on DMI Display.	
10.14.	Check for mode transition when Onboard is in RV mode. **(FRS 13.2 (c) & Condi -35)**	1. Onboard is in RV mode and not standstill. 2. Onboard is in KAVACH area. 3. Reverse mode timeout occurs >300 second.	1. The Onboard KAVACH should transit to SB mode. 2. Check for Mode on DMI Display.	
10.15.	Check for mode transition when Onboard is in RV mode and reverser move to forward direction. **(FRS 13.8)**	1. Onboard is in RV mode. 2. Onboard is in KAVACH area. 3. Timeout not occurred; reverse movement max distance not crossed. 4. Reverser moved to forward direction.	1. The Onboard KAVACH should transit to Standby mode. 2. Check for Mode on DMI Display.	

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	System Level TEST CASES (RDSO)			
Test ID	**Test Scenario**	**Input Specification**	**Expected Output/Values**	**Observed Output (Pass/Fail)**
10.16.	Check for mode transition when Onboard is in RV mode and exit from KAVACH area. **(FRS 13.60**	1. Onboard is in RV mode. 2. Onboard is in KAVACH area. 3. Now exit from KAVACH area by swiping Exit tag.	1. The Onboard KAVACH should remain in RV Mode. 2. In RV mode, no RFID tag shall be read.	
10.17.	Check for mode transition when Onboard is in RV mode and traffic direction is unknown. (**FRS 13.6)**	1. Onboard is in RV mode. 2. Onboard is in KAVACH area. 3. Now simulate the condition such that traffic direction is unknown.	1. Onboard KAVACH remain in REVERSE mode.	
10.18.	Check for mode transition when Onboard is in RV mode and Onboard has travelled 500 meters within the reverse mode time limit **(FRS 13.2 (c) & Condi-35)**	1. Onboard is in RV mode. 2. Make Onboard movement such that it travels 500 meters within Reverse mode time limit. 3. Radio communication fails	1. Onboard KAVACH shall transit to SB mode. 2. Check for Mode on DMI Display.	
10.19.	Check for mode transition when Onboard is in RV mode and 5 mins have not elapsed **(FRS 13.2 (c) & Condi -35)**	1. Onboard is in RV mode. 2. Time elapsed is < 5min (configurable). 3. Train is at standstill. 4. Distance moved is < 500meters	1. The Onboard KAVACH should be in RV mode until time elapse. 2. Check for Mode on DMI Display.	
10.20.	Check for mode transition when Onboard is in RV mode and 5 mins have elapsed. **(FRS 13.2 (c) & Condi -35)**	1. Onboard is in RV mode. 2. Time elapsed is 5min. 3. Train is at standstill. 4. Distance moved is < 500meters	1. The Onboard KAVACH should transit to SB mode. 2. Check for Mode on DMI Display.	
10.21.	Check for mode transition of	1. Onboard is in RV mode.	1. The Onboard KAVACH	

	System Level TEST CASES (RDSO)			
Test ID	**Test Scenario**	**Input Specification**	**Expected Output/Values**	**Observed Output (Pass/Fail)**
	Onboard which is in RV mode to NL mode when Non Leading input is active System is healthy and Train is not at standstill **(Condi-53)**	2. System Healthy. 3. Make Non Leading input is active. 4. Onboard is not at standstill.	should not transit to Non – leading mode. 2. Check for Mode on DMI Display.	
10.22.	Check for mode transition of Onboard which is in RV mode to NL mode when Non Leading input is active. System is healthy and Train is at standstill. **(Condi-53)**	1. Onboard is in RV mode. 2. System Healthy. 3. Make Non Leading input is active on Active DMI. 4. Onboard is at standstill.	1. The Onboard KAVACH should transit to Non – leading mode. 2. Check for Mode on DMI Display.	
10.23.	Check for mode transition from RV to System failure when critical fault occurs in system. **(Condi-5)**	When Onboard is in RV mode create a critical fault.	1. Onboard KAVACH should get changed to System failure mode. 2. Check for Onboard KAVACH on DMI.	
10.24.	Check for Train Speed and permitted speed for Onboard or train in RV mode. (**FRS 13.3)**	1. Power on the system 2. Make sure that no faults are present and select the train configuration 3. Make sure that Onboard KAVACH is in RV mode 4. Note down the configured speed limit of RV mode. 5. Now keep the train in running with the speed up to the configured value	1. Train has to run with the speed without any brake application. 2. The permitted speed limit on DMI should be the lower of LE/ train maximum speed/ Reverse mode speed. 3. The permitted speed and train speed shall be displayed.	

	System Level TEST CASES (RDSO)			
Test ID	**Test Scenario**	**Input Specification**	**Expected Output/Values**	**Observed Output (Pass/Fail)**
10.25.	Check that position reports being sent by Onboard KAVACH when in reverse mode selected (before reversing). Previous Direction Nominal **(FRS:13.4)**	1. Power on the system. 2. Make sure that no faults are present and select the train configuration. 3. Make sure that Onboard KAVACH is in RV mode. 4. In communication mandatory area with valid communication. 5. Move the Onboard for 200 m in reverse direction.	1. Check in station log that position report Abs location. 2. Tag shall not be read.	
10.26.	Check that position reports being sent by Onboard KAVACH when in reverse mode selected (before reversing). Previous direction Reverse. **(FRS:13.4)**	1. Power on the system. 2. Make sure that no faults are present and select the train configuration. 3. Make sure that Onboard KAVACH is in RV mode. 4. In communication mandatory area with valid communication. 5. Move the Onboard for 200 m in reverse direction.	1. Check in station log that position report Abs location. 2. Tag shall not be read.	
10.27.	Check that when reverse mode is not selected, reverse movement shall be detected based on Cab input and Wheel Sensor direction and direction is nominal in FS mode. (**FRS: 13.5)**	1. Power on the system. 2. Make sure that no faults are present and select the train configuration. 3. Make sure that Onboard KAVACH is in FS mode. 4. In communication mandatory area with valid communication. 5. Move the Onboard backward	1. MA, approaching signal distance and other targets should increase and absolute location should be decremented. 2. Brake shall be applied within a distance of 5 meter (Configurable). 3. The message "**REV**	

	System Level TEST CASES (RDSO)			
Test ID	**Test Scenario**	**Input Specification**	**Expected Output/Values**	**Observed Output (Pass/Fail)**
		without RV selection.	**Movement Not Allowed, Use REV mode**" will display and brakes should apply.	
10.28.	Check that when reverse mode is not selected, reverse movement shall be detected based on Cab input and Wheel Sensor direction and direction is nominal in OS mode. (**FRS: 13.5)**	1. Power on the system. 2. Make sure that no faults are present and select the train configuration. 3. Make sure that Onboard KAVACH is in OS mode. 4. In communication mandatory area with valid communication. 5. Move the Onboard backward without RV selection.	1. MA, approaching signal distance and other targets should increase and absolute location should be decremented. 2. Brake shall be applied within a distance of 2 meter (Configurable). 3. The message "**REV Movement Not Allowed, Use REV mode**" will display and brakes should apply.	
10.29.	Check that when reverse mode is not selected, reverse movement shall be detected based on Cab input and Wheel Sensor direction and direction is nominal in LS mode. (**FRS: 13.5)**	1. Power on the system. 2. Make sure that no faults are present and select the train configuration. 3. Make sure that Onboard KAVACH is in LS mode. 4. Move the Onboard backward without RV selection.	1. MA should be undefined. 2. The other targets distance shall be increased. 3. Brake shall be applied within a distance of 2 meter (Configurable). 4. The message "**REV Movement Not Allowed, Use REV mode**" will display and brakes should apply.	
10.30.	Check that when reverse	1. Power on the system.	1. MA, approaching signal	

	System Level TEST CASES (RDSO)			
Test ID	**Test Scenario**	**Input Specification**	**Expected Output/Values**	**Observed Output (Pass/Fail)**
	mode is not selected, reverse movement shall be detected based on Cab input and Wheel Sensor direction and direction is REVERSE direction in FS mode. (**FRS: 13.5)**	2. Make sure that no faults are present and select the train configuration. 3. Make sure that Onboard KAVACH is in FS mode. 4. In communication mandatory area with valid communication. 5. Move the Onboard backward without RV selection.	distance and other targets should increase and absolute location should be incremented. 2. Brake shall be applied within a distance of 2 meter (Configurable). 3. The message "**REV Movement Not Allowed, Use REV mode**" will display and brakes should apply.	
10.31.	Check that when reverse mode is not selected, reverse movement shall be detected based on Cab input and Wheel Sensor direction and direction is REVERSE in OS mode. (**FRS: 13.5)**	1. Power on the system. 2. Make sure that no faults are present and select the train configuration. 3. Make sure that Onboard KAVACH is in OS mode. 4. In communication mandatory area with valid communication. 5. Move the Onboard backward without RV selection.	1. MA, approaching signal distance and other targets should increase and absolute location should be incremented. 2. Brake shall be applied within a distance of 2 meter (Configurable). 3. The message "**REV Movement Not Allowed, Use REV mode**" will display and brakes should apply.	
10.32.	Check that when reverse mode is not selected, reverse movement shall be detected based on Cab input and	1. Power on the system. 2. Make sure that no faults are present and select the train configuration.	1. MA should be undefined. 2. The other targets distance shall be increased. 3. Brake shall be applied	

	System Level TEST CASES (RDSO)			
Test ID	**Test Scenario**	**Input Specification**	**Expected Output/Values**	**Observed Output (Pass/Fail)**
	Wheel Sensor direction and direction is REVERSE in LS mode. (**FRS: 13.5)**	3. Make sure that Onboard KAVACH is in LS mode. 4. Move the Onboard backward without RV selection.	within a distance of 2 meter (Configurable). 4. The message "**REV Movement Not Allowed, Use REV mode**" will display and brakes should apply.	
10.33.	Check that Onboard KAVACH shall ignore the RFID tag information received in Reverse mode. (**FRS: 13.6)**	1. Power on the system. 2. Make sure that no faults are present and select the train configuration. 3. Make sure that Onboard KAVACH is in RV mode. 4. In communication mandatory area with valid communication. 5. Move the Onboard REVERSE direction.	RFID tag info (i.e. absolute location, Tag No etc.) shall be ignored.	
10.34.	Onboard KAVACH shall blow horn in Reverse Mode. (**FRS 13.7)**	1. Power on the system. 2. Make sure that no faults are present and select the train configuration. 3. Make sure that Onboard KAVACH is in RV mode. 4. Move the Onboard reverse direction.	Onboard shall blow horn.	
10.35.	Check for Brake intervention by KAVACH when Onboard goes beyond Reverse Mode	1. Onboard KAVACH should be in Reverse mode. 2. Configure the time out period of	1. Check that Onboard transit the previous mode after time out period.	

	System Level TEST CASES (RDSO)			
Test ID	**Test Scenario**	**Input Specification**	**Expected Output/Values**	**Observed Output (Pass/Fail)**
	Distance Limit and time out. **(FRS 13.2 (b) & Condi-35)**	300 second and distance as 500 meters. 3. Movement of Onboard shall not be initiated for time out period of 300 second.	2. The message shall be displayed in DMI as **"Rev Mode expires in 500 meter and 300s".**	
10.36.	Check for Brake intervention by KAVACH when Onboard goes beyond Reverse Mode Distance Limit and time out. **(FRS 13.2 (b) & Condi-35)**	1. Onboard KAVACH should be in Reverse mode. 2. Configure the time out period of 600 second and distance as 400 meters. 3. Movement of Onboard shall not be initiated for time out period of 600 second.	1. Check that Onboard transit the previous mode after time out period. 2. The message shall be displayed in DMI as **"Rev Mode expires in 400 meter and 600s".**	
10.37.	To verify the communication time out i.e. 15 cycles when Onboard in RV mode.	1. Power on the system. 2. Make sure that no faults are present and select the train configuration. 3. Make sure that Onboard KAVACH is in RV mode. 4. In communication mandatory area with valid communication. 5. Remove the Radio MODEM cable to fail communication.	Check that, after 30 second Onboard shall remain in RV mode only.	

	System Level TEST CASES (RDSO)			
Test ID	**Test Scenario**	**Input Specification**	**Expected Output/Values**	**Observed Output (Pass/Fail)**
11.	**KAVACH_FRS_11: Shunt Mode- This Test cases check for all functionalities that are possible in shunt mode and Mode Transitions from concerned mode to other modes.**			
11.1.	Check for Brake intervention by KAVACH when Onboard speed goes beyond shunt mode speed limit (15 KMPH). **(FRS:9.11 (d), 14.3, 14.5, 14.7.1)**	1. Shunt mode is available for selection on DMI and can be selected when Onboard is at standstill and in mode SB/SR/LS/FS/ OS. 2. Select SH on DMI to enter shunt mode. 3. Increase the Onboard speed such that it crosses the shunt mode speed Limit. 4. Check for display of Permitted speed and current speed of Onboard. 5. Check for speed control.	1. The Permitted speed and current speed should be displayed on DMI. 2. Onboard KAVACH should apply brakes such that the speed gets limited to shunt mode speed limit when Onboard speed goes beyond shunt speed limit.	SB-SH SR-SH LS-SH FS-SH OS-SH
11.2.	Check for mode transition of Onboard when in TR/PT/NL/IS/SF to SH mode. **(FRS 14.3)**	1. Onboard is in TR/PT/NL/IS/SF mode. 2. Onboard is at standstill. 3. Press SH and CNFM button.	1. The Onboard should not transit SH mode. 2. Check for Mode on DMI Display.	TR-SH PT-SH NL-SH IS-SH SF-SH
11.3.	Check that position reports being sent by Onboard KAVACH when in SH mode. Traffic direction is nominal.	1. Power on the system. 2. Make sure that no faults are present and select the train configuration. 3. Make sure that Onboard KAVACH is in SH mode.	Check in station log that position report location shall be incremented as per direction (Nominal) for about 200m.	

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	System Level TEST CASES (RDSO)			
Test ID	**Test Scenario**	**Input Specification**	**Expected Output/Values**	**Observed Output (Pass/Fail)**
	(FRS:14.4)	4. In communication mandatory area with valid communication. 5. Move the Onboard for 200 m.		
11.4.	Check that position reports being sent by Onboard KAVACH when in SH mode. Traffic direction is reverse. **(FRS:14.4)**	1. Power on the system. 2. Make sure that no faults are present and select the train configuration. 3. Make sure that Onboard KAVACH is in SH mode. 4. In communication mandatory area with valid communication. 5. Move the Onboard for 200 m.	Check in station log that position report location shall be decremented as per direction (Reverse) for about 200m.	
11.5.	Check for change in train configuration when driving cab/desk is changed. **(FRS 20.1 (c))**	1. Onboard KAVACH should be in shunt mode. 2. Onboard is at stand still. 3. Change the driving/desk.	(i) Onboard KAVACH shall transit to SB when no desk is active (ii) Transit to Shunt mode after the desk is active in the other cab. (iii)It shall not prompt for train configuration.	
11.6.	Check that SR mode manual selection is not feasible from Shunt mode.	1. Keep the Onboard in Shunt mode. 2. Ensure that loco is standstill. 3. Now press the SR and CNFM buttons on DMI.	Onboard KAVACH shall remain in shunt mode.	
11.7.	Check for SOS acceptance from station.	1. Onboard KAVACH should be in shunt mode. 2. Onboard is moving. 3. Generate manual SOS from	1. The STATIONARY KAVACH should generate Manual SOS. 2. The Onboard KAVACH	

	System Level TEST CASES (RDSO)			
Test ID	**Test Scenario**	**Input Specification**	**Expected Output/Values**	**Observed Output (Pass/Fail)**
		station. 4. Check for Braking in Onboard.	should apply brakes and train should come to standstill.	
			3. Check for Increment in Counter value corresponding to SOS. The SoS LED shall be RED color.	
			4. When SoS is cancelled. The SoS LED shall change to GREEN color.	
11.8.	Check for Radio Transmission when Onboard KAVACH is in SH mode and in KAVACH Area.	1. Onboard KAVACH should be in shunt mode and in KAVACH area. 2. Check for Radio packets of concerned Onboard.	1. Radio Packets of concerned Onboard should be transmitted. 2. Note the difference in frame cycle from SVK to OVK not differ by 2. Same shall verify from the log.	
11.9.	Check for Onboard specific SOS when registered Onboard is in shunt mode and the Onboard crosses the Shunt section limits. **(FRS 14.7.1)**	1. Onboard KAVACH should be in shunt mode and in KAVACH area. 2. Make Onboard movement such that it crosses the shunt section limits.	1. The Onboard should receive Onboard specific SOS and brakes should get applied. 2. Check for Increment in Counter value corresponding to SOS.	
11.10.	Check for no SOS when movements are made by Onboard in shunt mode	1. Onboard KAVACH should be in shunt mode. 2. Make sure that no Onboard are	No SOS should be sent by STATIONARY KAVACH as no signal linking or RFID	

	System Level TEST CASES (RDSO)			
Test ID	**Test Scenario**	**Input Specification**	**Expected Output/Values**	**Observed Output (Pass/Fail)**
	on different tracks whose TIN are not occupied by other Onboard in all possible patterns without crossing shunt limits (No RFID sequence check or signal linking).	available on Tracks which can be used for shunting possibilities. 3. Make all possible movements in different combinations without crossing shunt Limits. 4. Check for any SOS from STATIONARY KAVACH for concerned Onboard.	sequence check should be performed for Onboard which is in shunt mode.	
11.11.	Check for no SOS when movements are made by Onboard in shunt mode on different tracks whose TIN are occupied by other Onboard in all possible patterns without crossing shunt limits (No RFID sequence check or signal linking).	1. Onboard KAVACH should be in shunt mode. 2. Make sure that no Onboard are available on Tracks which can be used for shunting possibilities. 3. Make all possible movements in different combinations without crossing shunt Limits. 4. Check for any SOS from STATIONARY KAVACH for concerned Onboard.	No SOS should be sent by STATIONARY KAVACH to the Onboard in SH mode. But Onboard in other than SH mode such as OS/FS should receive SOS, if they are in moving condition in conflicting route.	
11.12.	Check for mode transition of Onboard in shunt mode which is in SH mode to SB mode when no CAB is Active & loco is in movement. **(Condi -7)**	1. Onboard is in SH mode. 2. CAB input is made Inactive and Onboard is not in standstill condition	1. The Onboard KAVACH should continue in SH mode. 2. Check for Mode on DMI Display.	
11.13.	Check for mode transition of Onboard which is in SH mode to SB mode	1. Onboard is in SH mode. 2. CAB input is made Inactive in standstill condition.	1. The Onboard KAVACH should transit to SB mode. 2. Check for Mode on DMI	

	System Level TEST CASES (RDSO)			
Test ID	**Test Scenario**	**Input Specification**	**Expected Output/Values**	**Observed Output (Pass/Fail)**
	when no CAB is Active & loco is standstill. **Condi -7**		Display.	
11.14.	Check for mode transition of Onboard which is in SH mode to SB mode when Onboard is in standstill & Shunt + CNFM button is pressed. **(Condi-56)**	1. Onboard is in SH mode. 2. CAB input is made active in standstill condition. 3. Now press shunt button.	1. The Onboard KAVACH should transit to SB mode. 2. Check for Mode on DMI Display.	
11.15.	Check for mode transition of Onboard which is in SH mode to SB mode when Onboard is not in standstill & Shunt + CNFM button is pressed. **(Condi-56)**	1. Onboard is in SH mode. 2. CAB input is made active and not in standstill condition. 3. Now press shunt button.	1. The Onboard KAVACH should not transit to SB mode. It should be in SH mode only. 2. Check for Mode on DMI Display.	
11.16.	If EM cock (health of EB channel fail) is closed. **(FRS 14.6 (a))**	1. Make sure that no faults are present any one cab is occupied. 2. Make sure that train is in SH mode. 3. Now make EM cock (health of EB channel fail) is closed. 4. Train is at Standstill.	System will enter into SB mode; it can be verified on DMI.	
11.17.	Check for mode transition of Onboard which is in SH mode to NL mode when Non Leading input	1. Onboard is in SH mode. 2. System is made healthy. 3. Non Leading input is active. 4. Onboard is not at standstill.	1. The Onboard KAVACH should not transit to Non – leading mode. 2. Check for Mode on DMI	

	System Level TEST CASES (RDSO)			
Test ID	**Test Scenario**	**Input Specification**	**Expected Output/Values**	**Observed Output (Pass/Fail)**
	is active System is healthy and Train is not at standstill.		Display.	
11.18.	Check for mode transition of Onboard which is in SH mode to NL mode when Non Leading input is active System is healthy and Train is at standstill.	1. Onboard is in SH mode. 2. System is made healthy. 3. Non Leading input is active. 4. Onboard is at standstill.	1. The Onboard KAVACH should transit to Non – leading mode. 2. Check for Mode on DMI Display.	
11.19.	Check for mode transition from SH to System failure when critical fault occurs in system.	When Onboard is in SH mode create a critical fault.	1. Onboard KAVACH should get changed to System failure mode. 2. Check for Onboard KAVACH on DMI.	
11.20.	To check the brake test for new train formation (exit from SH mode).	1. Make sure that no brake interface related faults. 2. System is in SH mode. 3. Exit from SH mode to SB mode. 4. Enter New train configuration.	Brake test should happen and the result should be checked on DMI.	
11.21.	Exit from Shunt mode when Onboard is standstill. (**FRS:14.6 (b))**	1. Make sure Onboard in Shunt mode. 2. Onboard is standstill. 3. Now press Shunt key and CNFM key together.	Onboard shall exit from Shunt mode and transit to SB mode.	
11.22.	Check for Brake intervention by KAVACH when Onboard	1. Onboard KAVACH should be in SH mode. 2. Increase the Onboard speed such	The Permitted speed and current speed of Onboard should be visible on DMI and	

	System Level TEST CASES (RDSO)			
Test ID	**Test Scenario**	**Input Specification**	**Expected Output/Values**	**Observed Output (Pass/Fail)**
	speed goes beyond SH mode speed limit (15KMPH). (**FRS 14.5)**	that it crosses the SH Limit > 15 kmph. 3. Check for display of Permitted speed and current speed on DMI.	the Onboard KAVACH should apply brakes when the speed more than shunt mode speed limit.	
11.23.	To check Shunt mode to SR mode transition when Onboard **exits from KAVACH territory area.**	1. Make sure that train is in Shunt mode 2. Now simulate such that the Onboard read exit tag.	1. System shall remain in Shunt mode even after reading the exit tag.	
			2. The exit tag shall be reported to stationary KAVACH. This shall be checked in NMS log.	
			3. Position report shall not be erased till the complete train has passed the last TIN (Tag).	
			4. Onboard will transmit regular packet with last reported TIN till complete train passes exit tag.	
			5. Stationary KAVACH will deregister the Onboard after passes of complete train and Onboard communication shall be stopped without time out.	
			6. Onboard KAVACH shall be stopped radio communication after	

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	System Level TEST CASES (RDSO)			
Test ID	**Test Scenario**	**Input Specification**	**Expected Output/Values**	**Observed Output (Pass/Fail)**
			complete passes of train.	
11.24.	To verify the communication time out i.e 15 cycle when Onboard in SH mode.	1. Power on the system. 2. Make sure that no faults are present and select the train configuration. 3. Make sure that Onboard KAVACH is in SH mode. 4. In communication mandatory area with valid communication. 5. Remove the Radio MODEM cable to fail communication.	Check that, after 30 second Onboard shall remain in SH mode only.	

	System Level TEST CASES (RDSO)			
Test ID	**Test Scenario**	**Input Specification**	**Expected Output/Values**	**Observed Output (Pass/Fail)**
12.	**KAVACH_FRS_12: System failure Mode- This Test cases check for all functionalities that are possible in System failure mode and Mode Transitions from concerned mode to other modes.**			
12.1.	Check for Standstill protection in System failure mode.	1. Onboard KAVACH should be in System failure mode. 2. To enter SF mode when ONBOARD KAVACH is in any Mode create critical fault. 3. Try for Onboard movement.	1. The Onboard Movement should not be possible as EB should get applied continuously. 2. Check for EB symbol on DMI	
12.2.	Check that SR mode manual selection is not feasible from system failure mode.	1. Keep the Onboard in System Failure mode. 2. Now press the SR and CNFM buttons on DMI.	Onboard KAVACH shall not transit from the existing mode.	
12.3.	Check for Radio Transmission when Onboard KAVACH is in SF mode and in KAVACH Area. (RFID reader, Radio MODEM & GPS are working).	1. Onboard KAVACH should be in System failure mode and in KAVACH area with position report. 2. Check for Radio packets of concerned Onboard. 3. RFID reader, radio modems & GPS are working. 4. Check for transmission of System failure message in Access request packet.	1. Radio Packets of concerned Onboard should be transmitted. 2. Check in log that ARP is transmitted with SF mode.	
			3. Check in log of stationary KAVACH.	
			4. Stationary KAVACH shall transmit access authority packet. 5. After registration Onboard KAVACH shall send Onboard regular packet in SF mode. Verify in log. 6. Stationary KAVACH shall	

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			send regular packet to Onboard with MA = 0.	
12.4.	Check for mode transition of Onboard which is in SF mode to SB mode. when Leading input is active. System is healthy. **(Condi-79)**	1. System is in FS mode. 2. System is made healthy. 3. Remove the Vital module. 4. Leading input is active.	1. The Onboard KAVACH should be in SF mode. 2. Check for Mode on DMI Display.	
12.5.	Check for mode transition of Onboard which is in SF mode to NL mode when Non-Leading input is active. System is healthy and Train is not at standstill. **(Condi-54**)	1. Onboard is in SF mode. 2. System is made healthy. 3. , select train configuration and enter to SR mode. 4. Make the Non-Leading input active. 5. Onboard is not at standstill.	1. The Onboard KAVACH should not transit to Non – leading mode. 2. Check for Mode on DMI Display.	
12.6.	Check for mode transition of Onboard which is in SF mode to NL mode when Non Leading input is active System is healthy and Train is at standstill. **(Condi-54)**	1. Onboard is in SF mode. 2. System is made healthy. 3. Non Leading input is active. 4. Onboard is at standstill.	1. The Onboard KAVACH should transit to Non – leading mode. 2. Check for Mode on DMI Display.	
12.7.	Check for mode transition of Onboard which is in SF mode to Isolation mode (In SF mode, loco is standstill). **(Condi-2)**	1. Onboard is in SF mode. 2. KAVACH is isolated.	1. The Onboard KAVACH should transit to isolation mode. brakes should be released. 2. Isolation counter should be incremented by one. 3. Check for Mode on DMI Display.	

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12.8.	Check for mode transition of Onboard which is in SF mode to Isolation mode (In SF mode, loco is not standstill). **(Condi-2)**	1. Onboard is in SF mode. 2. Loco is on movement. 3. KAVACH is isolated.	1. The Onboard KAVACH should not transit to isolation mode Until loco come to standstill. 2. Check for Mode on DMI Display. 3. After standstill Onboard shall transit of isolation.	
12.9.	To check the brake test for new train formation (Exit from SF Mode).	1. Make sure that no brake interface related faults. 2. System is in SF mode; NL input is not active. 3. Exit from SF mode.	Brake test should happen and the result should be checked on DMI.	
12.10.	If both radios health is failed while the system is in SR/LS/FS/OS/TRIP/PTRIP/ REV/SH mode.	1. Power on the system. 2. Make sure that no faults are present and radio communication is healthy. 3. Simulate both radio health fail.	1. System should enter into SF mode and it should be verified on DMI screen. 2. Check in DMI that Message **"System Fault, Isolate or Restart KAVACH".**	SB SR LS FS OS FS+OV OS+OV TRIP P_TRIP REV SH
12.11.	If both GPS are failed for GPS time out i.e > 30 minute (Configurable) while the system is in SR/ LS/ FS/ OV/ OS/ PTRIP/ REV/ SH mode.	1. Power on the system. 2. Make sure that no faults are present and radio communication is healthy. 3. simulate both GPS fail.	System should enter into SF mode and it should be verified on DMI screen.	SB SR LS FS OS FS+OV

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					OS+OV	
					TRIP	
					P_TRIP	
					REV	
					SH	
12.12.	If both GSM are failed while the system is in SB/SR/LS/FS/OS/TRIP/PTRIP/REV/SH mode.	1. Power on the system. 2. Make sure that no faults are present and radio communication is healthy. 3. Simulate both GSM fail.	No action shall be taken. Fault shall be logged.		SB	
					SR	
					LS	
					FS	
					OS	
					FS+OV	
					OS+OV	
					TRIP	
					P_TRIP	
					REV	
					SH	
12.13.	If health of vital cards and Active LP-OCIP are failed while the system is in SB/SR/LS/FS/OS/TRIP/PTRIP/REV/SH mode.	1. Power on the system. 2. Make sure that no faults are present and radio communication is healthy. 3. Simulate that vital cards and LP-OCIP fail.	System should enter into SF mode and it should be verified on inactive DMI screen Fault shall be logged.		SB	
					SR	
					LS	
					FS	
					OS	
					FS+OV	
					OS+OV	
					TRIP	
					P_TRIP	
					REV	
					SH	

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12.14.	If health of vital cards and inactive LP-OCIP are failed while the system is in SB/SR/LS/FS/OS/TRIP/PTRIP/REV/SH mode.	1. Power on the system. 2. Make sure that no faults are present and radio communication is healthy. 3. Simulate that vital cards fail.	1. Fault LED shall be RED blinking. 2. it should be verified on active DMI screen Fault shall be logged. 3. Fault message shall be sent to NMS.	SB SR LS FS OS FS+OV OS+OV TRIP P_TRIP REV SH
12.15.	If health of vital cards and active LP-OCIP are failed while the system is in NL mode. **(FRS cl. No.19.3.1)**	1. Power on the system. 2. Make sure that no faults are present and radio communication is healthy. 3. Simulate that vital cards and LP OCIP fail.	1. Fault LED shall be RED blinking. 2. It should be verified on active DMI screen Fault shall be logged. 3. Fault message shall be sent to NMS. 4. No brake shall be applied in Onboard KAVACH.	
12.16.	If health of vital cards and active LP-OCIP are failed while the system is in IS mode. **(FRS cl. No.19.3.1)**	1. Power on the system. 2. Make sure that no faults are present and radio communication is healthy. 3. Simulate vital cards and LP-OCIP fail.	1. Fault LED shall be RED blinking. 2. It should be verified on DMI screen. 3. Fault shall be logged in NMS. 4. No brake shall be applied in Onboard KAVACH.	

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	System Level TEST CASES (RDSO)			
Test ID	**Test Scenario**	**Input Specification**	**Expected Output/Values**	**Observed Output (Pass/Fail)**
13.	**KAVACH_FRS_13: Isolation Mode-This Test cases check for all functionalities that are possible in Isolation Mode and Mode Transitions from concerned mode to other modes.**			
13.1.	Check for Indication for Isolation mode on DMI.	1. Onboard KAVACH should be Isolated. 2. Check for indication of Isolation.	The Isolated mode should be visible on DMI.	
13.2.	Check that SR mode manual selection is not feasible from Isolation mode and train is standstill.	1. Keep the Onboard in Isolation mode. 2. Train is standstill. 3. Now press the SR and CNFM buttons on DMI.	Onboard KAVACH shall not transit from Isolation mode.	
13.3.	When a SOS is received in isolation mode.	1. Keep the Onboard in isolation mode. 2. Another Onboard is in 3km region with FS mode. 3. Now simulate a SOS from FS mode Onboard.	No SOS should receive in isolation mode and no brakes should apply.	
13.4.	Check for Mode transition from the following modes: 1) SB 2) SR 3) LS 4) FS 5) OV 6) OS 7) TR 8) PT 9) RV	1. When Onboard is in 1) SB Mode: 2. Make the Isolation input active and check for Onboard KAVACH mode. 3. Check for the transition when Onboard is at standstill and when moving. 4. Repeat the test cases when Onboard is in the following modes:	1. The Onboard KAVACH mode should transit to Isolation Mode in standstill and when in movement the Onboard shall continue in same mode. 2. Check for Mode Display on DMI. 3. Check for Increment in Counter value corresponding to Isolation.	SB SR LS FS OV OS TR PT REV SH

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	System Level TEST CASES (RDSO)			
Test ID	**Test Scenario**	**Input Specification**	**Expected Output/Values**	**Observed Output (Pass/Fail)**
	10) SH 11) NL 12) SF To Isolation Mode.	2) SR 3) LS 4) FS 5) FS+OV 6) OS 7) OS+OV 8) PT 9) RV 10) SH 11) NL 12) SF		NL SF
13.5.	Check for Radio Transmission when Onboard KAVACH is in Isolation mode and in KAVACH Area. **(FRS 16.4)**	1. Observe the Onboard KAVACH. 2. Packets being transmitted by configuring a Radio Onboard frequency in Access Request Packet in selected time slot.	For every 2 min, one packet should be transmitted to station.	
13.6.	Check for Mode transition of Onboard from IS to SB when System is healthy, Non Leading Input is not active and Isolation is removed and Onboard is in standstill.	1. Onboard KAVACH is in Isolation Mode. 2. System is healthy. 3. Non-Leading input is not active. 4. Remove Isolation in standstill. 5. Check for Mode of Onboard KAVACH.	1. The Onboard KAVACH mode should transit from IS to SB. 2. Check for Mode on DMI the default train length and default brake characteristics should present.	
13.7.	Check for Mode transition of Onboard from IS to NL when System is healthy, Non Leading Input is active and Isolation is removed.	1. Onboard KAVACH is in Isolation Mode. 2. System is healthy. 3. Onboard is at standstill. 4. Non-Leading input is active.	1. The Onboard KAVACH mode should transit from IS to NL. 2. Check for Mode on DMI.	

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	System Level TEST CASES (RDSO)			
Test ID	**Test Scenario**	**Input Specification**	**Expected Output/Values**	**Observed Output (Pass/Fail)**
		5. Remove Isolation. 6. Check for Mode of Onboard KAVACH.		
13.8.	Check for Mode transition of Onboard from IS to SB when System is healthy, Non Leading Input is not active and Isolation is removed and Onboard is not in standstill.	1. Onboard KAVACH in Isolation Mode. 2. System is healthy with some speed. 3. Non-Leading input is not active. 4. Remove Isolation. 5. Check for Mode of Onboard KAVACH.	1. The Onboard KAVACH mode should remain in IS mode only. 2. Check for Mode on DMI	
13.9.	To check the brake test for new train formation (exit from IS mode)	1. Make sure that no brake interface related faults. 2. System is in IS mode, NL is inactive. 3. Exit from IS mode to SB Mode. 4. New Train configuration to be selected.	1. Brake test should be happened and the result should be check on DMI. 2. Upon brake test success, system should prompt for mode selection.	
13.10.	To check mode transition to SF when Onboard KAVACH is in IS mode and active CAB DMI fails.	1) Onboard KAVACH is in IS mode. 2) Remove communication port of Active cab DMI. 3) Make active DMI communication fail. 4) Reconnect the communication port of Active Cab.	System should not enter into SF mode.	

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System Level TEST CASES (RDSO)

<table>
<tr><th>Test ID</th><th>Test Scenario</th><th>Input Specification</th><th>Expected Output/Values</th><th>Observed Output (Pass/Fail)</th></tr>
<tr><td>14.</td><td colspan="4">KAVACH _FRS_14: - RFID Tag Missing- This test case checks to verify that onboard KAVACH send TAG LINK INFO based on the RFID tag missed. (RFID Reader -1 as R-1 & RFID Reader -2 as R-2)</td></tr>
<tr><td>14.1.</td><td>When duplicate Tag is in Nominal direction to main Tag.</td><td>1. Stationary KAVACH shall send “DUP_TAG_DIR” as ‘0’.
2. Simulate such that Onboard KAVACH read the following Tags.

<table><tr><th>Main Tag Abs Loc</th><th>Dup Tag Abs loc</th></tr><tr><td>48400</td><td>48404</td></tr></table></td><td>• Check on DMI for No Tag missing.
• Message shall be verified in stationary KAVACH Log.
• Onboard shall send “TAG_LINK_INFO” as ‘000” for no Tag missing.
• SR mode is applicable only when position report is available.
• Correction of length of onboard OFF set shall be deducted from the absolute location programmed in RFID tag based on the direction.</td><td><table><tr><td></td><td>R-1 ON & R-2 OFF</td><td>R-2 ON & R-1 OFF</td></tr><tr><td>SR</td><td></td><td></td></tr><tr><td>FS</td><td></td><td></td></tr><tr><td>FS+OV</td><td></td><td></td></tr><tr><td>OS</td><td></td><td></td></tr><tr><td>OS+OV</td><td></td><td></td></tr><tr><td>PT+OV</td><td></td><td></td></tr><tr><td>SH</td><td></td><td></td></tr></table>Result-</td></tr>
<tr><td>14.2.</td><td>When duplicate Tag is in Nominal direction to main Tag & duplicate Tag missing.</td><td>1. Stationary KAVACH shall send “DUP_TAG_DIR” as ‘0’.
2. Simulate such that Onboard KAVACH read the following Tags.

<table><tr><th>Main Tag Abs loc</th><th>Dup Tag Abs loc</th></tr><tr><td>48400</td><td>Missing</td></tr></table></td><td>• Check on DMI for NO Tag missing.
• Message shall be verified in stationary KAVACH Log.
• Duplicate Tag missing –‘001’ shall be sent in the field TAG_LINK_INFO by Onboard KAVACH.
• SR mode is applicable only when position report is</td><td><table><tr><td>SR</td><td></td></tr><tr><td>FS</td><td></td></tr><tr><td>FS+OV</td><td></td></tr><tr><td>OS</td><td></td></tr><tr><td>OS+OV</td><td></td></tr><tr><td>PT+OV</td><td></td></tr><tr><td>SH</td><td></td></tr></table>Result-</td></tr>
</table>

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<table>
<tr><th colspan="4">System Level TEST CASES (RDSO)</th></tr>
<tr><th>Test ID</th><th>Test Scenario</th><th>Input Specification</th><th>Expected Output/Values</th><th>Observed Output (Pass/Fail)</th></tr>
<tr><td></td><td></td><td>3. Duplicate Tag missing shall be declared beyond 15 m of main tag.
4. Stationary KAVACH shall receive the packet and log it</td><td>available.</td><td></td></tr>
<tr><td>14.3.</td><td>When duplicate Tag is in Nominal direction to main Tag & main Tag missing.</td><td>1. Stationary KAVACH shall send “DUP_TAG_DIR” as ‘0’.
2. Simulate such that Onboard KAVACH read the following Tags.
<table>
<tr><th>Main Tag Abs loc</th><th>Dup Tag Abs loc</th></tr>
<tr><td>Missing</td><td>48400</td></tr>
</table>
5. Main Tag missing shall be declared beyond 15 m of duplicate tag.
3. Stationary KAVACH shall receive the packet and log it.</td><td>• Check on DMI for NO Tag missing.
• Message shall be verified in stationary KAVACH Log.
• Main Tag missing –‘010’ shall be sent in the field TAG_LINK_INFO by Onboard KAVACH.
• SR mode is applicable only when position report is available.
• Correction of length of onboard OFF set shall be deducted from the absolute location programmed in RFID tag based on the direction.</td><td>
<table>
<tr><th></th><th>R-1 ON & R-2 OFF</th><th>R-2 ON & R-1 OFF</th></tr>
<tr><td>SR</td><td></td><td></td></tr>
<tr><td>FS</td><td></td><td></td></tr>
<tr><td>FS+OV</td><td></td><td></td></tr>
<tr><td>OS</td><td></td><td></td></tr>
<tr><td>OS+OV</td><td></td><td></td></tr>
<tr><td>PT+OV</td><td></td><td></td></tr>
<tr><td>SH</td><td></td><td></td></tr>
</table>
Result-</td></tr>
<tr><td>14.4.</td><td>When duplicate Tag is in Nominal direction to main Tag & Both Tag missing.</td><td>1. Stationary KAVACH shall send “DUP_TAG_DIR” shall be sent as ‘0’.
2. Simulate such that Onboard KAVACH read the following Tags.</td><td>• Check on DMI for NO Tag missing.
• Message shall be verified in stationary KAVACH Log.
• Both Tag missing –‘011’ shall be sent in the field TAG_LINK_INFO by</td><td>
<table>
<tr><td>SR</td><td></td></tr>
<tr><td>FS</td><td></td></tr>
<tr><td>FS+OV</td><td></td></tr>
<tr><td>OS</td><td></td></tr>
<tr><td>OS+OV</td><td></td></tr>
<tr><td>PT+OV</td><td></td></tr>
<tr><td>SH</td><td></td></tr>
</table>
</td></tr>
</table>

System Level TEST CASES (RDSO)

Test ID	Test Scenario	Input Specification	Expected Output/Values	Observed Output (Pass/Fail)
		Main Tag Abs loc / **Dup Tag Abs loc**: Missing / Missing 3. Both Tag missing shall be declared beyond 50 m of absolute location. 4. Stationary KAVACH shall receive the packet and log it.	Onboard KAVACH and Tag read shall be made, which shall be used to identify the missed Tag. • SR mode is applicable only when position report is available.	Result-
14.5.	When duplicate Tag is in Nominal direction to main Tag and Tag position interchange.	1. Stationary KAVACH shall send "DUP_TAG_DIR" shall be sent as '0'. 2. Simulate such that Onboard KAVACH read the following Tags. **Main Tag Abs loc**: 48404; **Dup Tag Abs loc**: 48400	• Message shall be verified in stationary KAVACH Log. • Tag Position Interchanged – '100' shall be sent in the field TAG_LINK_INFO by Onboard KAVACH. • Onboard KAVACH shall retain the higher value of the absolute location to be on safer side in nominal direction. • SR mode is applicable only when position report is available.	SR FS OS SH
14.6.	When duplicate Tag is in Nominal direction to main Tag and both Tag have same location.	1. Stationary KAVACH shall send "DUP_TAG_DIR" shall be sent as '0'. 2. Simulate such that Onboard	• Message shall be verified in stationary KAVACH Log. • Both Tags have same location info–'101' shall be sent in the	SR FS OS

<table>
<tr><th colspan="5">System Level TEST CASES (RDSO)</th></tr>
<tr><th>Test ID</th><th>Test Scenario</th><th>Input Specification</th><th>Expected Output/Values</th><th>Observed Output (Pass/Fail)</th></tr>
<tr><td></td><td></td><td>KAVACH read the following Tags.
<table><tr><th>Main Tag Abs loc</th><th>Dup Tag Abs loc</th></tr><tr><td>48400</td><td>48400</td></tr></table></td><td>field TAG_LINK_INFO by Onboard KAVACH.
• The absolute location to be updated by Onboard KAVACH.
• SR mode is applicable only when position report is available.</td><td></td></tr>
<tr><td>14.7.</td><td>When duplicate Tag is in Nominal direction to main Tag and main & duplicate tag location based on data is less than 4 meters.</td><td>1. Stationary KAVACH shall send “DUP_TAG_DIR” shall be sent as ‘0’.
2. Simulate such that Onboard KAVACH read the following Tags.
<table><tr><th>Main Tag Abs loc</th><th>Dup Tag Abs loc</th></tr><tr><td>48400</td><td>48402</td></tr></table></td><td>• Message shall be verified in stationary KAVACH Log.
• Inter-Tag distance less–‘110’ shall be sent in the field TAG_LINK_INFO by Onboard KAVACH.
• The absolute location to be updated by Onboard KAVACH.
• SR mode is applicable only when position report is available.</td><td><table><tr><td>SR</td><td></td></tr><tr><td>FS</td><td></td></tr><tr><td>FS+OV</td><td></td></tr><tr><td>OS</td><td></td></tr><tr><td>OS+OV</td><td></td></tr><tr><td>PT+OV</td><td></td></tr></table></td></tr>
<tr><td>14.8.</td><td>When duplicate Tag is in Nominal direction to main Tag & duplicate tag actual location is less than 4 meters.</td><td>1. Stationary KAVACH shall send “DUP_TAG_DIR” shall be sent as ‘0’.
2. Simulate such that Onboard KAVACH read the following Tags.
<table><tr><th>Main Tag</th><th>Dup Tag</th></tr></table></td><td>• Message shall be verified in stationary KAVACH Log.
• Inter-Tag distance less–‘110’ shall be sent in the field TAG_LINK_INFO by Onboard KAVACH.
• The absolute location to be updated by Onboard</td><td><table><tr><td>SR</td><td></td></tr><tr><td>FS</td><td></td></tr><tr><td>OS</td><td></td></tr></table></td></tr>
</table>

System Level TEST CASES (RDSO)

Test ID	Test Scenario	Input Specification	Expected Output/Values	Observed Output (Pass/Fail)
		Abs loc / **Abs loc**: 48400 / 48404	KAVACH. • SR mode is applicable only when position report is available.	
14.9.	When duplicate Tag is in Nominal direction to main Tag, and main & duplicate tag location based on data is more than 4 meters.	1. Stationary KAVACH shall send "DUP_TAG_DIR" shall be sent as '0'. 2. Simulate such that Onboard KAVACH read the following Tags. **Main Tag Abs loc**: 48400; **Dup Tag Abs loc**: 48408	• Message shall be verified in stationary KAVACH Log. • Inter-Tag distance more–'111' shall be sent in the field TAG_LINK_INFO by Onboard KAVACH. • The absolute location to be updated by Onboard KAVACH. • SR mode is applicable only when position report is available.	SR FS OS
14.10	When duplicate Tag is in Nominal direction to main Tag, and main & duplicate tag location based on actual position is more than 4 meters.	1. Stationary KAVACH shall send "DUP_TAG_DIR" shall be sent as '0'. 2. Simulate such that Onboard KAVACH read the following Tags. **Main Tag Abs loc**: 48400; **Dup Tag Abs loc**: 48404	• Message shall be verified in stationary KAVACH Log. • Inter-Tag distance more–'111' shall be sent in the field TAG_LINK_INFO by Onboard KAVACH. • The absolute location to be updated by Onboard KAVACH. • SR mode is applicable only when position report is available.	SR FS OS

System Level TEST CASES (RDSO)

<table>
<tr><th>Test ID</th><th>Test Scenario</th><th>Input Specification</th><th>Expected Output/Values</th><th>Observed Output (Pass/Fail)</th></tr>
<tr>
<td>14.11</td>
<td>When duplicate Tag is in Reverse direction to main Tag.</td>
<td>1. Stationary KAVACH shall send “DUP_TAG_DIR” shall be sent as ‘1’.
2. Simulate such that Onboard KAVACH read the following Tags.
<table>
<tr><th>Main Tag Abs loc</th><th>Dup Tag Abs loc</th></tr>
<tr><td>48404</td><td>48400</td></tr>
</table>
</td>
<td>• Check on DMI for No Tag missing.
• Message shall be verified in stationary KAVACH Log.
• Onboard shall send “TAG_LINK_INFO” as ‘000” for no Tag missing.
• SR mode is applicable only when position report is available.
• Correction of length of onboard OFF set shall be deducted from the absolute location programmed in RFID tag based on the direction.</td>
<td>
<table>
<tr><th></th><th>R-1 ON & R-2 OFF</th><th>R-2 ON & R-1 OFF</th></tr>
<tr><td>SR</td><td></td><td></td></tr>
<tr><td>FS</td><td></td><td></td></tr>
<tr><td>FS+OV</td><td></td><td></td></tr>
<tr><td>OS</td><td></td><td></td></tr>
<tr><td>OS+OV</td><td></td><td></td></tr>
<tr><td>PT+OV</td><td></td><td></td></tr>
<tr><td>SH</td><td></td><td></td></tr>
</table>
</td>
</tr>
<tr>
<td>14.12</td>
<td>When duplicate Tag is in Reverse direction to main Tag & duplicate Tag missing.</td>
<td>1. Stationary KAVACH shall send “DUP_TAG_DIR” shall be sent as ‘1’.
2. Simulate such that Onboard KAVACH read the following Tags.
<table>
<tr><th>Main Tag Abs loc</th><th>Dup Tag Abs loc</th></tr>
<tr><td>48404</td><td>Missing</td></tr>
</table>
3. Duplicate Tag missing shall be declared in a window of 15m.</td>
<td>• Check on DMI for No Tag missing.
• Message shall be verified in stationary KAVACH Log.
• Duplicate Tag missing –‘001’ shall be sent in the field TAG_LINK_INFO by Onboard KAVACH.
• SR mode is applicable only when position report is available.</td>
<td>
<table>
<tr><td>SR</td><td></td></tr>
<tr><td>FS</td><td></td></tr>
<tr><td>OS</td><td></td></tr>
<tr><td>SH</td><td></td></tr>
</table>
</td>
</tr>
</table>

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Test ID	Test Scenario	Input Specification	Expected Output/Values	Observed Output (Pass/Fail)
14.13	When duplicate Tag is in Reverse direction to main Tag & main Tag missing.	1. Stationary KAVACH shall send "DUP_TAG_DIR" shall be sent as '1'. 2. Simulate such that Onboard KAVACH read the following Tags. **Main Tag Abs loc**: Missing; **Dup Tag Abs loc**: 48400 3. Main Tag missing shall be declared in a window of 15m.	• Check on DMI for NO Tag missing. • Message shall be verified in stationary KAVACH Log. • Main Tag missing –'010' shall be sent in the field TAG_LINK_INFO by Onboard KAVACH. • SR mode is applicable only when position report is available.	SR FS OS SH
14.14	When duplicate Tag is in Reverse direction to main Tag & Both Tag missing.	1. Stationary KAVACH shall send "DUP_TAG_DIR" shall be sent as '1' 2. Simulate such that Onboard KAVACH read the following Tags. **Main Tag Abs loc**: Missing; **Dup Tag Abs loc**: Missing 3. Both Tag missing shall be declared in a window of 15m.	• Check on DMI for NO Tag missing. • Message shall be verified in stationary KAVACH Log. • Both Tag missing –'011' shall be sent in the field TAG_LINK_INFO by Onboard KAVACH and Tag read shall be made, which shall be used to identify the missed Tag. • SR mode is applicable only when position report is available.	SR FS OS SH
14.15	When duplicate Tag is in Reverse direction to main	1. Stationary KAVACH shall send "DUP_TAG_DIR" shall be sent	• Message shall be verified in stationary KAVACH Log.	SR FS

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<table>
<tr><th>Test ID</th><th>Test Scenario</th><th>Input Specification</th><th>Expected Output/Values</th><th colspan="2">Observed Output (Pass/Fail)</th></tr>
<tr><td></td><td>Tag KAVACH and Tag position interchange.</td><td>as ‘1’.
2. Simulate such that Onboard KAVACH read the following Tags.
<table><tr><th>Main Tag Abs loc</th><th>Dup Tag Abs loc</th></tr><tr><td>48404</td><td>48400</td></tr></table></td><td>• Tag Position Interchanged – ‘100’ shall be sent in the field TAG_LINK_INFO by Onboard KAVACH.
• Onboard KAVACH shall retain the lower value of the absolute location to be on safer side in nominal direction.
• SR mode is applicable only when position report is available.</td><td>OS
SH</td><td>
</td></tr>
<tr><td>14.16</td><td>When duplicate Tag is in Reverse direction to main Tag and both Tags have same location.</td><td>1. Stationary KAVACH shall send “DUP_TAG_DIR” shall be sent as ‘1’.
2. Simulate such that Onboard KAVACH read the following Tags.
<table><tr><th>Main Tag Abs loc</th><th>Dup Tag Abs loc</th></tr><tr><td>48400</td><td>48400</td></tr></table></td><td>• Message shall be verified in stationary KAVACH Log.
• Both Tags have same location info–‘101’ shall be sent in the field TAG_LINK_INFO by Onboard KAVACH.
• The absolute location to be updated by Onboard KAVACH.
• SR mode is applicable only when position report is available.</td><td>SR
FS
OS
SH</td><td>

</td></tr>
<tr><td>14.17</td><td>When duplicate Tag is in Reverse direction to main Tag and main & duplicate</td><td>1. Stationary KAVACH shall send “DUP_TAG_DIR” shall be sent as ‘1’.</td><td>• Message shall be verified in stationary KAVACH Log.
• Inter-Tag distance less–‘110’</td><td>SR
FS
OS</td><td>

</td></tr>
</table>

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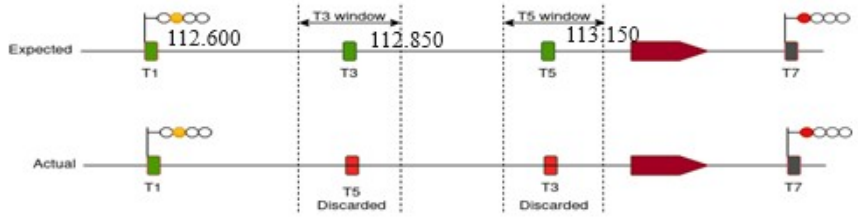
<table>
<tr><th>Test ID</th><th>Test Scenario</th><th>Input Specification</th><th>Expected Output/Values</th><th>Observed Output (Pass/Fail)</th></tr>
<tr><td></td><td>tag location based on data is less than 4 meters.</td><td>2. Simulate such that Onboard KAVACH read the following Tags.
<table><tr><th>Main Tag Abs loc</th><th>Dup Tag Abs loc</th></tr><tr><td>48402</td><td>48400</td></tr></table></td><td>shall be sent in the field TAG_LINK_INFO by Onboard KAVACH.
• The absolute location to be updated by Onboard KAVACH.
• SR mode is applicable only when position report is available.</td><td></td></tr>
<tr><td>14.18</td><td>When duplicate Tag is in Reverse direction to main Tag and main & duplicate tag actual location is less than 4 meters.</td><td>1. Stationary KAVACH shall send “DUP_TAG_DIR” shall be sent as ‘1’.
2. Simulate such that Onboard KAVACH read the following Tags.
<table><tr><th>Main Tag Abs loc</th><th>Dup Tag Abs loc</th></tr><tr><td>48404</td><td>48400</td></tr></table></td><td>• Message shall be verified in stationary KAVACH Log.
• Inter-Tag distance less–‘110’ shall be sent in the field TAG_LINK_INFO by Onboard KAVACH.
• The absolute location to be updated by Onboard KAVACH.
• SR mode is applicable only when position report is available.</td><td><table><tr><td>SR</td><td></td></tr><tr><td>FS</td><td></td></tr><tr><td>OS</td><td></td></tr></table></td></tr>
<tr><td>14.19</td><td>When duplicate Tag is in Reverse direction to main Tag and main & duplicate tag location based on data is more than 4 meters.</td><td>1. Stationary KAVACH shall send “DUP_TAG_DIR” shall be sent as ‘1’.
2. Simulate such that Onboard KAVACH read the following Tags.</td><td>• Message shall be verified in stationary KAVACH Log.
• Inter-Tag distance more–‘111’ shall be sent in the field TAG_LINK_INFO by Onboard KAVACH.</td><td><table><tr><td>SR</td><td></td></tr><tr><td>FS</td><td></td></tr><tr><td>OS</td><td></td></tr></table></td></tr>
</table>

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Test ID	Test Scenario	Input Specification	Expected Output/Values	Observed Output (Pass/Fail)
		Main Tag Abs loc / **Dup Tag Abs loc**: 48408 / 48400	• The absolute location to be updated by Onboard KAVACH. • SR is applicable when position report is available.	
14.20	When duplicate Tag is in Reverse direction to main Tag and main & duplicate tag location based on actual position is more than 4 meters.	1. Stationary KAVACH shall send "DUP_TAG_DIR" shall be sent as '1'. 2. Simulate such that Onboard KAVACH read the following Tags. **Main Tag Abs loc**: 48404 / **Dup Tag Abs loc**: 48400	• Message shall be verified in stationary KAVACH Log. • Inter-Tag distance more–'111' shall be sent in the field TAG_LINK_INFO by Onboard KAVACH. • The absolute location to be updated by Onboard KAVACH. • SR is applicable when position report is available.	SR FS OS
14.21	Check for SPAD prevention, when Signal Approach tag is detected beyond the limit of 50m in OS/FS mode and when override is not selected.	1. Simulate a scenario where Onboard Kavach at a speed of 100kmph towards an approaching stop signal at ON. 2. The signal approach tag is shifted beyond 50m from its original position.	• The MA shall not get updated based on the location details received from Signal Approach Tag. • The SPAD prevention shall be effective.	OS Mode FS Mode OS Mode FS Mode
14.22	Check for SR mode transition when exit tag is missed beyond the limit of 50m in OS/FS mode.	1. Simulate a scenario where Onboard Kavach at a speed of 100kmph. 2. Ensure track condition of	• Onboard Kavach shall remain in the current mode till the exit tag location is read or reached. There shall not any spurious	

System Level TEST CASES (RDSO)				
Test ID	**Test Scenario**	**Input Specification**	**Expected Output/Values**	**Observed Output (Pass/Fail)**
		"Kavach territory exit" is received by Onboard Kavach. 3. The exit tag is shifted beyond 50m from its original position.	braking of this.	
			• The exit tag shall be reported to stationary KAVACH. This shall be checked in NMS log.	
			• Onboard Kavach shall transit to SR mode after passes of complete train. It can be verified on DMI and ACK request should be there.	
			• Position report shall not be erased till the complete train has passed the last TIN (Tag).	
			• Onboard will transmit regular packet with last reported TIN till complete train passes exit tag.	
			• Stationary KAVACH will deregister the onboard after passes of complete train and onboard communication shall be stopped without time out.	
			• Onboard KAVACH shall stop radio communication after complete passes of train.	
			• If the Loco Pilot presses the ACK within the configurable time, brakes should not apply.	

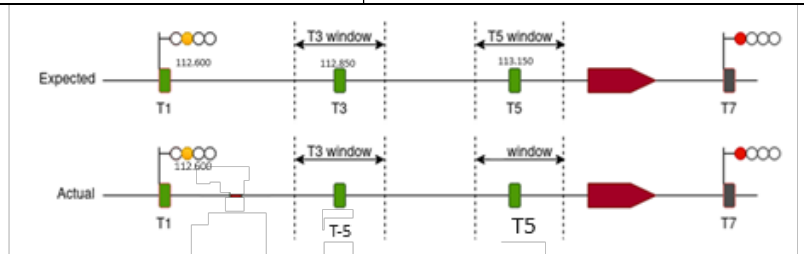
System Level TEST CASES (RDSO)				
Test ID	**Test Scenario**	**Input Specification**	**Expected Output/Values**	**Observed Output (Pass/Fail)**
			• If the Loco Pilot didn't give the ACK within the configurable time, brakes should apply.	
14.23	To check the jumbling of RFID tag read by onboard as below: When onboard in Communication mandatory area.	1. Onboard is in FS/OS mode. 2. Tag linking is available with onboard. 3. Onboard read the tag which is in jumbled as below figure. 4. Simulate the movement and swipe the tag as T5 before Tag T3.	• Check that tag T5 & T3 are read by onboard. • Onboard KAVACH shall not report Tag T5 &T3 to stationary KAVACH. • Onboard shall ignore the tag T5 & T3. • Absolute location shall be updated based on valid RFID T1 read earlier.	Onboard KAVACH shall remain in FS/OS mode. Check the NMS log for missing tag. Check the NMS log for invalid Tag reported by onboard KAVACH.
			• Stationary KAVACH shall send message to NMS as missing tag for T3 & T5.	
			• Onboard KAVACH shall report these Tag to NMS as invalid tags through GPRS.	

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System Level TEST CASES (RDSO)				
Test ID	**Test Scenario**	**Input Specification**	**Expected Output/Values**	**Observed Output (Pass/Fail)**
14.24	To check the jumbling of RFID tag read by onboard as below: When onboard not in Communication mandatory area.	1. Onboard is in FS/OS mode. 2. Tag linking is available with onboard. 3. Onboard read the tag which is in jumbled. 4. Simulate the movement and swipe the tag as T5 before Tag T3.	• Check that tag T5 & T3 are read by onboard. • Onboard shall ignore the tag T5 &T3. • Absolute location shall be updated based on valid RFID T1 read earlier. • Onboard KAVACH shall report these Tag to NMS as invalid tags through GPRS.	Onboard KAVACH shall remain in FS/OS mode. Check the NMS log for missing tag. Check the NMS log for invalid Tag reported by onboard KAVACH. Result-
				
14.25	To check the jumbling of RFID tag read by onboard which is not in T5 window location. When onboard in Communication mandatory area.	1. Onboard is in FS/OS mode. 2. Tag linking is available with onboard. 3. Onboard read the tag which is in jumbled. 4. Simulate the movement and swipe the tag as T5 before Tag T3.	• Check that tag T5 is read by onboard. • Onboard shall ignore the tag T5. • Absolute location shall be updated based on valid RFID T1 read earlier.	Onboard KAVACH shall remain in FS/OS mode. Check the NMS log for missing tag. Check the NMS log for

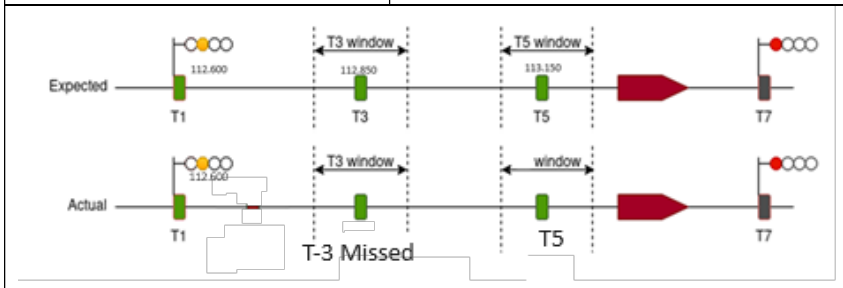
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System Level TEST CASES (RDSO)

Test ID	Test Scenario	Input Specification	Expected Output/Values	Observed Output (Pass/Fail)
			• Onboard KAVACH shall report this Tag to NMS as invalid tag through GPRS. • Further read the Tag T3 & T5 as usual. • Onboard KAVACH shall report the Tag to NMS as invalid tags through GPRS.	invalid Tag reported by onboard KAVACH. Result-
14.2(	To check the T5 RFID tag read by onboard which is in T3 window location. When onboard in Communication mandatory area.	1. Onboard is in FS/OS mode. 2. Tag linking is available with onboard. 3. Onboard read the tag the T5 tag in T3 window. 4. Simulate the movement and swipe the tag as T5 tag at T3 window.	• Check that tag T5 is read by onboard. • Onboard shall ignore the tag T5. • Absolute location shall not be updated on reading the RFID tag T-5 in T-3 window. • Onboard KAVACH shall report this Tag to NMS as invalid tag through GPRS. • Further read the T5 as usual. • Correction of length of onboard OFF set shall be deducted from the absolute location programmed in RFID tag based on the direction.	• Onboard KAVACH shall remain in FS/OS mode. • Check the NMS log for missing tag of T3. • Check the NMS log for invalid Tag reported by onboard KAVACH. R-1 ON & R-2 OFF / R-2 ON & R-1 OFF FS OS Result-
				

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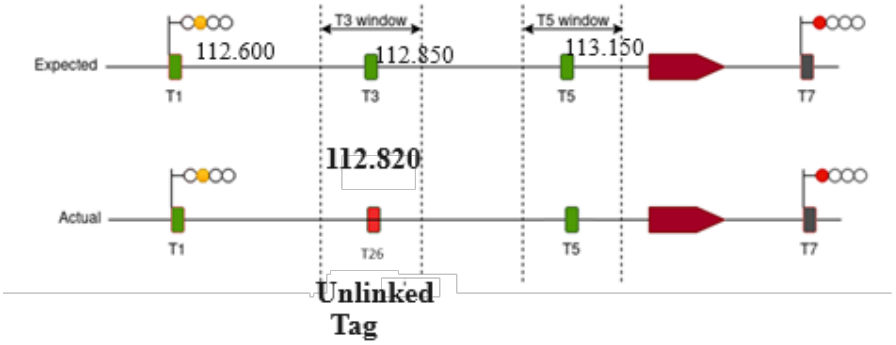
System Level TEST CASES (RDSO)

Test ID	Test Scenario	Input Specification	Expected Output/Values	Observed Output (Pass/Fail)
14.27	To check that RFID tag is not read by onboard which is in T3 window location. When onboard in Communication mandatory area. 	1. Onboard is in FS/OS mode. 2. Tag linking is available with Onboard. 3. Onboard not read the tag the T3 tag in T3 window. 4. Simulate the movement and swipe the tag as T5 tag at T5 window.	• Check that tag T3 is not read by onboard and report to stationary KAVACH. • Check that T3 tag displayed in DMI. • Absolute location shall be updated on reading the RFID tag T-5. • Correction of length of onboard OFF set shall be deducted from the absolute location programmed in RFID tag based on the direction.	• Onboard KAVACH shall remain in FS/OS mode. • Check the NMS log for missing tag of T3. R-1 ON & R-2 OFF / R-2 ON & R-1 OFF FS OS Result-
14.28.	To check that onboard reads Unlinked RFID tag within the location accuracy window. **(Cond. No -44)**	Onboard is in FS/OS mode. Tag linking is available with onboard. Onboard read the tag which is in not in route. Simulate the movement and swipe the tag as T26 which is **within location accuracy of onboard Kavach**. T26 tag in the same location as T3.	• Check that tag T26 is read by onboard which is not in RFID tag linking. • Tag T26 shall be reported to stationary KAVACH.	CMA / Non-CMA OS FS
			• Onboard KAVACH shall be made to transit to SR mode, **position report to be erased** and apply brakes to standstill. • The message "**ACK SR Mode-Foreign Tag Detected**" shall be displayed	CMA / Non-CMA OS FS

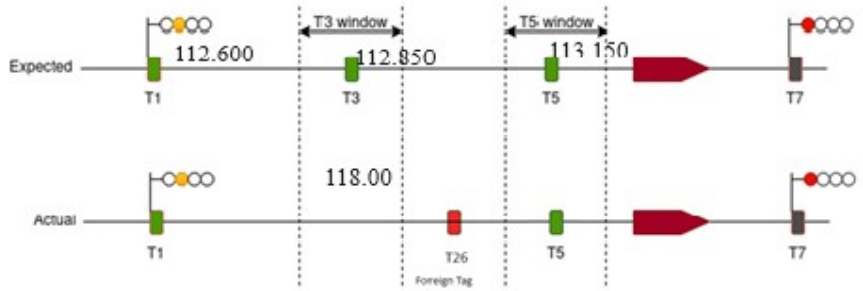
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System Level TEST CASES (RDSO)

Test ID	Test Scenario	Input Specification	Expected Output/Values	Observed Output (Pass/Fail)
			on DMI.	
			• Next tag read by onboard before standstill or before acknowledgement shall not be considered for position establishment.	CMA / Non-CMA OS FS
			• If loco pilot acknowledges, brakes and SoS shall be released. • The position report shall be established subsequently after reading two tags.	CMA / Non-CMA OS FS
			• If the train comes to standstill, the SoS shall be released. • The position report shall be established subsequently after reading two tags.	CMA / Non-CMA OS FS
14.2	To check that onboard reads Unlinked RFID tag beyond the location accuracy window which is not in a valid route. **When onboard in Communication mandatory**	1. Onboard is in FS/OS mode. 2. Tag linking is available with onboard. 3. Onboard read the tag which is in not in route. 4. Simulate the movement and swipe the tag as T26 which is	• Check that tag T26 is read by onboard which is not in RFID tag linking. • Tag T26 shall be reported to NMS.	CMA / Non-CMA OS FS

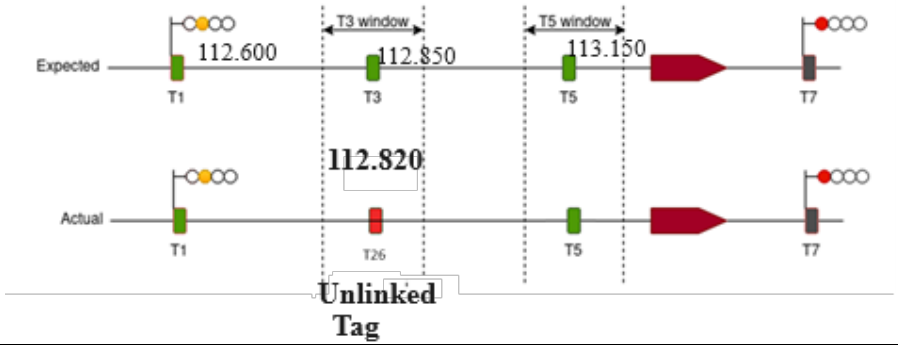


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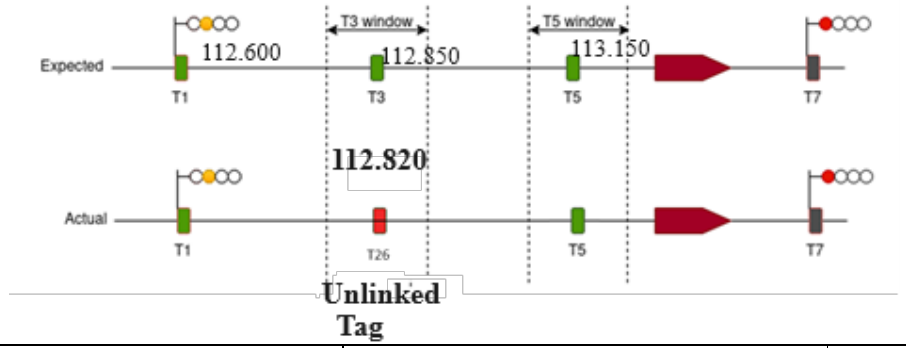
System Level TEST CASES (RDSO)				
Test ID	**Test Scenario**	**Input Specification**	**Expected Output/Values**	**Observed Output (Pass/Fail)**
	area. **(Cond. No -44)**	**beyond location accuracy of onboard Kavach**. 5. T26 tag in the same location as T3.		
				
14.3(	To check that onboard reads Unlinked RFID tag within the location accuracy window when SPAD prevention scenario is in progress. **(Cond. No -44)**	1. Onboard is in FS/OS mode. 2. SPAD Prevention is in execution and brakes are applied. 3. Onboard read the tag which is in not in route. 4. Simulate the movement and swipe the tag as T26 which is **within location accuracy of onboard Kavach**. 5. T26 tag in the same location as T3.	• Onboard KAVACH shall be made to transit to SR mode, **position report to be erased** and keep applying brakes.	

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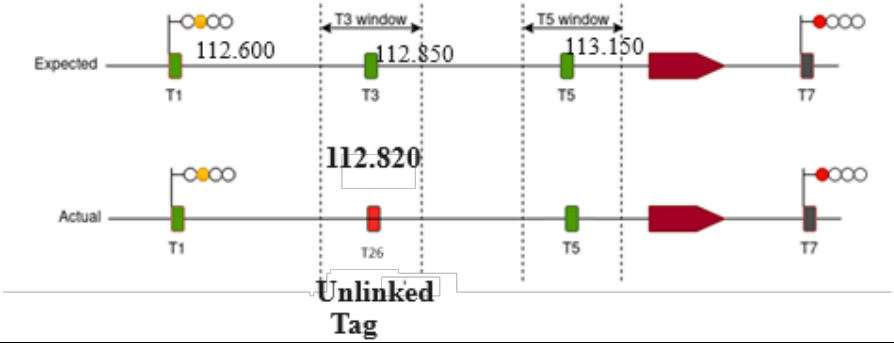
System Level TEST CASES (RDSO)

Test ID	Test Scenario	Input Specification	Expected Output/Values	Observed Output (Pass/Fail)
			If loco pilot acknowledges, brakes and SoS shall be released. The position report shall be established subsequently after reading two tags.	
14.3	To check that onboard reads Unlinked RFID tag within the location accuracy window when rear end collision scenario is in progress. **(Cond. No -44)**	1. Onboard L1 and L2 is in FS/OS mode and rear end collision is being monitored in L2. 2. Tag linking is available with onboard. 3. Onboard L1 read the tag which is in not in route. 4. Simulate the movement and swipe the tag as T26 which is **within location accuracy of onboard Kavach**. 5. T26 tag in the same location as T3.	• Onboard KAVACH L1 shall be made to transit to SR mode, **position report to be erased**.	
			• Onboard KAVACH L2 shall monitor the rear end collision for SoS timeout (180 seconds).	<table><tr><th></th><th>OS (L2)</th><th>FS (L2)</th></tr><tr><td>OS (L1)</td><td></td><td></td></tr><tr><td>FS (L1)</td><td></td><td></td></tr></table>
			• After SoS timeout, 180 seconds, Onboard KAVACH L2 shall release the SoS.	<table><tr><th></th><th>OS (L2)</th><th>FS (L2)</th></tr><tr><td>OS (L1)</td><td></td><td></td></tr><tr><td>FS (L1)</td><td></td><td></td></tr></table>

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System Level TEST CASES (RDSO)				
Test ID	**Test Scenario**	**Input Specification**	**Expected Output/Values**	**Observed Output (Pass/Fail)**
14.3	To check that onboard reads Unlinked RFID tag within the location accuracy window when it is LS Mode. **(Cond. No -44)**	1. Simulate that communication failed with stationary KAVACH and Onboard Kavach transits to LS Mode. 2. Tag linking is available with Onboard. 3. Onboard read the tag which is in not in route. 4. Simulate the movement and swipe the tag as T26 **which is within location accuracy of onboard Kavach.** 5. T26 tag in the same location as T3.	1. Onboard KAVACH shall be made to transit to SR mode, position report to be erased. 2. Message shall be displayed as "ACK SR mode- Foreign Tag Detected".	
				
14.3	To check that onboard reads Unlinked RFID tag within the location accuracy window when it is LS Mode	1. Simulate that communication failed with stationary KAVACH and Onboard KAVACH transits to LS Mode.	1. Message shall be displayed as "ACK SR mode- Foreign Tag Detected" 2. Brake shall not be released till	

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System Level TEST CASES (RDSO)				
Test ID	**Test Scenario**	**Input Specification**	**Expected Output/Values**	**Observed Output (Pass/Fail)**
	and PSR braking supervision under progress. **(Cond. No -44)**	2. Tag linking is available with Onboard. 3. Simulate the condition that PSR of 50 Kmph is under progress. 4. Onboard read the tag which is in not in route. 5. Simulate the movement and swipe the tag as T26 **which is within location accuracy of onboard Kavach.** 6. T26 tag in the same location as T3.	supervision of PSR of 50 Kmph even though ACK by onboard. 3. Onboard KAVACH shall be made to transit to SR mode.	
				
14.3	To check that onboard reads Unlinked RFID tag within the location accuracy window when rear end	1. Onboard L1 and L2 is in FS/OS mode and rear end collision is being monitored in L2. 2. Tag linking is available with	Onboard KAVACH L2 shall be made to transit to SR mode, **position report to be erased**.	

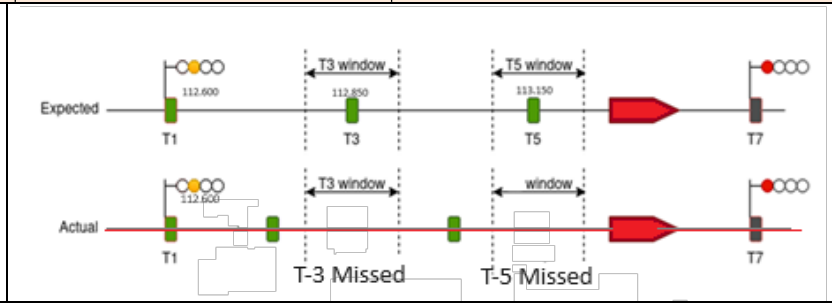
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System Level TEST CASES (RDSO)						
Test ID	**Test Scenario**	**Input Specification**	**Expected Output/Values**	**Observed Output (Pass/Fail)**		
	collision scenario is in progress. **(Cond. No -44)**	onboard. 3. Onboard L2 read the tag which is in not in route. 4. Simulate the movement and swipe the tag as T26 which is within location accuracy of onboard Kavach.	Onboard KAVACH L2 shall monitor the rear end collision for SoS timeout (180 seconds).		OS (L2)	FS (L2)
				OS (L1)		
				FS (L1)		
			After SoS timeout, 180 seconds, Onboard KAVACH L2 shall release the SoS.		OS (L2)	FS (L2)
				OS (L1)		
				FS (L1)		
14.3	To check that onboard reads Unlinked RFID tag within the location accuracy window when Head on collision scenario is in progress. **(Cond. No -44)**	1. Onboard L1 and L2 is in FS/OS mode and Head on collision is being monitored in L2. 2. Tag linking is available with onboard. 3. Onboard L2 read the tag which is in not in route. 4. Simulate the movement and swipe the tag as T26 which is within location accuracy of onboard Kavach.	Onboard KAVACH L2 shall be made to transit to SR mode, **position report to be erased**.			
			Onboard KAVACH L1 and L2 shall monitor the Head On collision for SoS timeout (180 seconds).		OS (L2)	FS (L2)
				OS (L1)		
				FS (L1)		
			After SoS timeout, 180 seconds, Onboard KAVACH L1 and L2 shall release the SoS.		OS (L2)	FS (L2)
				OS (L1)		
				FS (L1)		

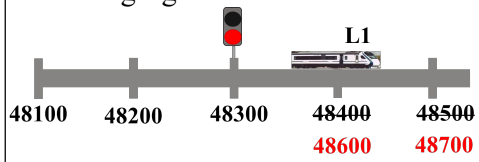
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System Level TEST CASES (RDSO)				
Test ID	**Test Scenario**	**Input Specification**	**Expected Output/Values**	**Observed Output (Pass/Fail)**
14.3(	To check that RFID tag is T3 & T5 are not read by onboard which is in T3 & T5 window location. When onboard in Communication mandatory area.	1. Onboard is in FS/OS mode. 2. Tag linking is available with onboard. 3. Onboard does not read the tag which are in T3 & T5 tag window. 4. Simulate the movement and swipe the RFID Tag T-7.	• Check that tag T3 & T5 are not read by onboard. • Check that T3 & T5 tag displayed in DMI as a missed tag. • Absolute location shall be updated based on reading the RFID tag T-1. • Check that T-7 tag read by onboard and location shall be updated based tag T-7.	• Onboard KAVACH shall remain in FS/OS mode. • Check the NMS log for missing tag of T3 &T5. • Missed Tag shall be displayed in DMI. Result-
				
14.3(	To check that RFID tag is T3 & T5 are not read by onboard which is not in T3 & T5 window location. When onboard in Communication mandatory area.	1. Onboard is in FS/OS mode. 2. Tag linking is available with onboard. 3. Simulate the movement and swipe the RFID Tag T-3 and T5 before window location.	• Check that tag T3 & T5 are not read by onboard. • Check that T3 & T5 tag displayed in DMI as a missed tag. • Absolute location shall be	• Onboard KAVACH shall remain in FS/OS mode. • Check the NMS log for missing tag of T3 &T5.

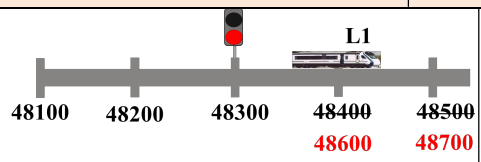
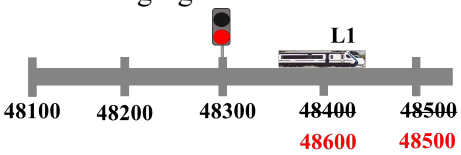
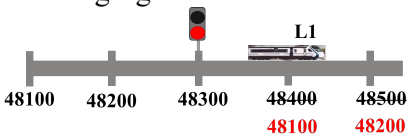
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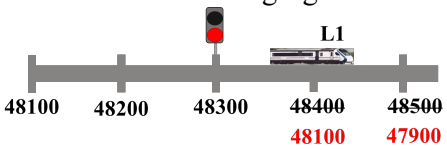
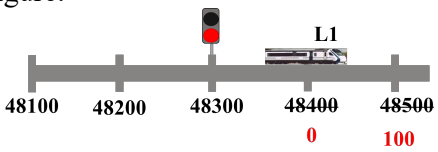
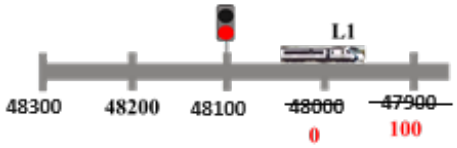
System Level TEST CASES (RDSO)				
Test ID	**Test Scenario**	**Input Specification**	**Expected Output/Values**	**Observed Output (Pass/Fail)**
			updated based on reading the RFID tag T-1. • Check that T-7 tag read by onboard and location shall be updated based tag T-7.	• Missed Tag shall be displayed in DMI. Result-

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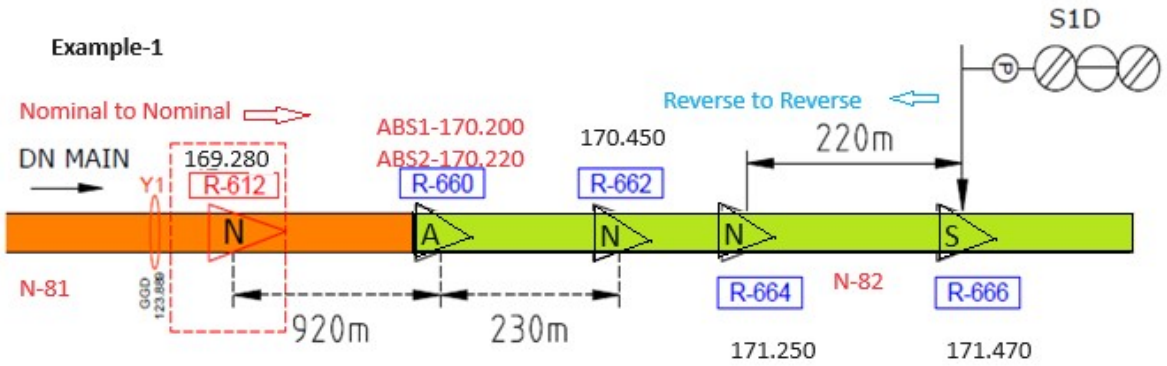
System Level TEST CASES (RDSO)				
Test ID	**Test Scenario**	**Input Specification**	**Expected Output/Values**	**Observed Output (Pass/Fail)**
15.	**KAVACH _FRS_15: - Testing for ABS_LOC_RESET by Onboard KAVACH when radio communication is available. Adjustment details incorporated tag is read.**			
15.1.	Stationary KAVACH shall send '0' in a particular packet, where there is no absolute location reset.	No location correction.	1 The Onboard KAVACH should process the packet. 2 The Onboard KAVACH should not read the fields START_DIST_TO_LOC_RESET, ADJ_LOCO_DIR & ABS_LOC_CORRECTION.	SR FS FS+OV OS OS+OV
15.2.	**Where the location error is positive**: When new location is greater than the current absolute location then location error is positive as shown in the following figure.  	1. Stationary KAVACH shall send ABS_LOC_RESET as "1" followed by location correction of 200 meter. 2. No tag is missing. 3. Existing direction is nominal. 4. New direction is nominal.	1. The Onboard KAVACH should process the packet and update the location and direction (Nominal) as received from stationary KAVACH. 2. It shall be noted that Movement Authority shall not be reduced by the same amount after reading the adjustment tag.	
15.3.	**Where the location error is positive:** When new location is greater than the current absolute location then location error is positive as shown in the following figure.	1. Stationary KAVACH shall send ABS_LOC_RESET as "1" followed by location correction of 200 meter. 2. No tag is missing. 3. Existing Direction is nominal. 4. New direction is unknown.	Onboard KAVACH should not process the packet.	SR FS FS+OV OS OS+OV

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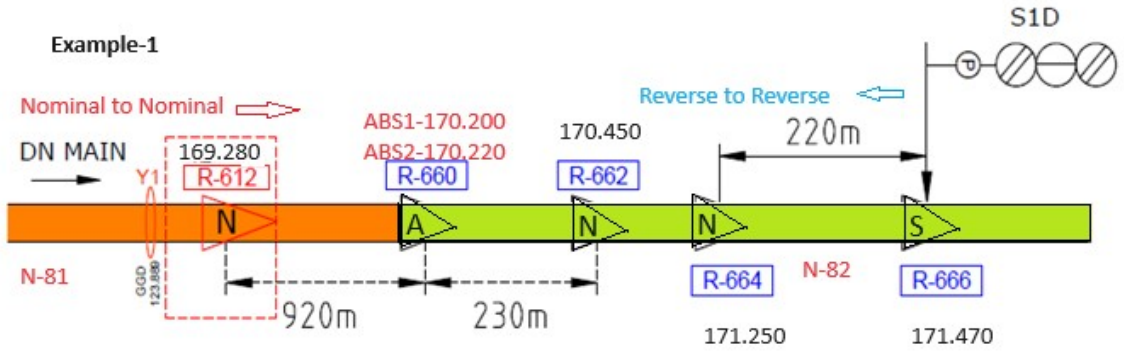
System Level TEST CASES (RDSO)				
Test ID	**Test Scenario**	**Input Specification**	**Expected Output/Values**	**Observed Output (Pass/Fail)**
				
15.4.	Where the location error is positive. When new location is greater than the **current absolute location** then location error is positive as shown in the following figure. 	1. Stationary KAVACH shall send ABS_LOC_RESET as "1" followed by location correction of 200 meter. 2. No tag is missing. 3. Existing Direction is nominal. 4. New direction is reverse.	1. The Onboard KAVACH should process the packet and update the location and direction (Reverse) as received from stationary KAVACH. 2. It shall be noted that Movement Authority shall not be reduced by the same amount after reading the adjustment tag.	SR FS FS+OV OS OS+OV
15.5.	***Where the location error is negative:*** When new location is less than the current absolute location then location error is negative as shown in the following figure. 	1. Stationary KAVACH shall send ABS_LOC_RESET as "1" followed by location correction of 200 meter. 2. No tag is missing. 3. Existing Direction is nominal. 4. New direction is Nominal.	1. The Onboard KAVACH should process the packet and update the location and direction (Nominal) as received from stationary KAVACH. 2. It shall be noted that Movement Authority shall not be affected after reading the adjustment tag.	SR FS FS+OV OS OS+OV
15.6.	Where there is location error is negative. When new location is **less than the current absolute location**	1. Stationary KAVACH shall send ABS_LOC_RESET as "1" followed by location	1. The Onboard KAVACH should process the packet and update the location and	SR FS FS+OV

System Level TEST CASES (RDSO)				
Test ID	**Test Scenario**	**Input Specification**	**Expected Output/Values**	**Observed Output (Pass/Fail)**
	then location error is negative as shown in the following figure.  	correction of 200 meter. 2. No tag is missing. 3. Existing Direction is nominal. 4. New direction is Reverse.	direction (Reverse) as received from stationary KAVACH. 2. It shall be noted that Movement Authority shall not be affected after reading the adjustment tag. 3. Absolute location is on decreasing to be shown in DMI.	OS OS+OV
15.7.	Where there is complete location reset to zero as shown in the following figure.  	1. Stationary KAVACH shall send ABS_LOC_RESET as "1" followed by location correction to "0" meter. 2. No tag is missing. 3. Existing Direction is nominal. 4. New direction is Nominal.	1. The Onboard KAVACH should process the packet and update the location and direction (Nominal) as received from stationary KAVACH. 2. It shall be noted that Movement Authority shall not be affected after reading the adjustment tag.	SR FS FS+OV OS OS+OV
15.8.	Where there is complete location reset to zero as shown in the following figure.  	1. Stationary KAVACH shall send ABS_LOC_RESET as "1" followed by location correction to "0" meter. 2. No tag is missing. 3. Existing Direction is Reverse. 4. New direction is nominal.	1. The Onboard KAVACH should process the packet and update the location and direction (Nominal) as received from stationary KAVACH. 2. It shall be noted that Movement Authority shall not be affected after reading the adjustment tag.	SR FS FS+OV OS OS+OV

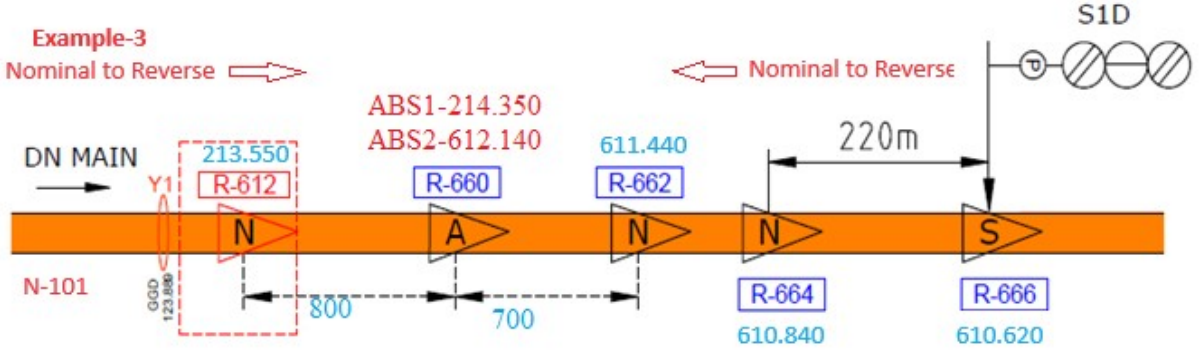
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System Level TEST CASES (RDSO)				
Test ID	**Test Scenario**	**Input Specification**	**Expected Output/Values**	**Observed Output (Pass/Fail)**
15.9.	**Location correction after read the Adjustment Tag:** When onboard travel in nominal direction and new location is also in nominal direction as shown in the following figure. **Travel direction is Nominal to Nominal.**	1. Stationary KAVACH shall send ABS_LOC_RESET as "1" followed by location correction of 20 meters. 2. No tag is missing. 3. Existing direction is nominal. 4. New direction is nominal.	1. Direction shall remain same along with previous mode. 2. MA shall not change. 3. In SR mode, if position report is undefined. The Direction shall not be established by reading adjustment tag.	SR FS OS
				
15.10	**Location correction after read the Adjustment Tag:** When onboard travel in Reverse direction and new location is also in Reverse direction as shown in the following figure. **Travel direction is REVERSE to REVERSE**	1. Stationary KAVACH shall send ABS_LOC_RESET as "1" followed by location correction of 20 meters. 2. No tag is missing. 3. Existing direction is Reverse. 4. New direction is reverse.	1. Direction shall remain same along with previous mode. 2. MA shall not change. 3. In SR mode, if position report is undefined. The Direction shall not be established by reading adjustment tag.	SR FS OS

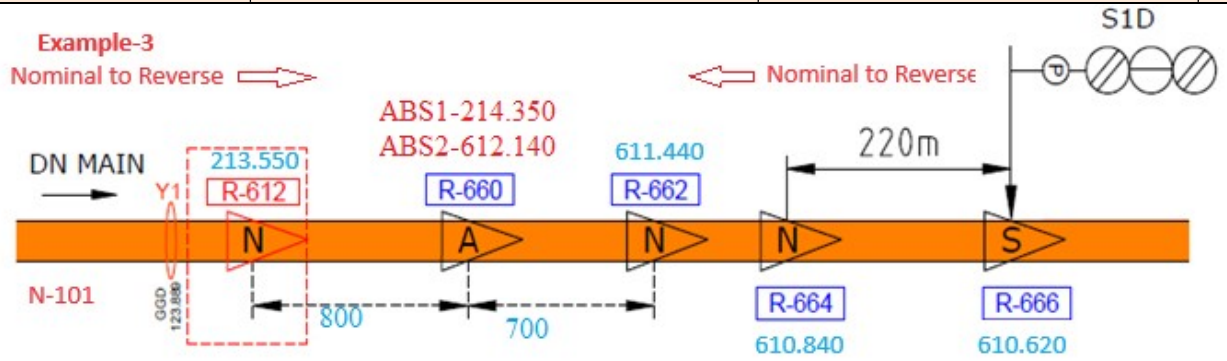
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System Level TEST CASES (RDSO)				
Test ID	**Test Scenario**	**Input Specification**	**Expected Output/Values**	**Observed Output (Pass/Fail)**
				
15.1	**Location correction after read the Adjustment Tag:** When onboard travel in nominal direction and new location is in reverse direction as shown in the following figure. **Travel direction is Nominal to REVERSE.**	1. Stationary KAVACH shall send ABS_LOC_RESET as "1" followed by location correction of 397.790 meters. 2. No tag is missing. 3. Existing Direction is nominal. 4. New direction is reverse.	1. Direction shall get change as REVERSE. 2. Mode shall be as previous mode. 3. MA shall not change. 4. In SR mode, if position report is undefined. The Direction shall not be established by reading adjustment tag.	SR FS OS

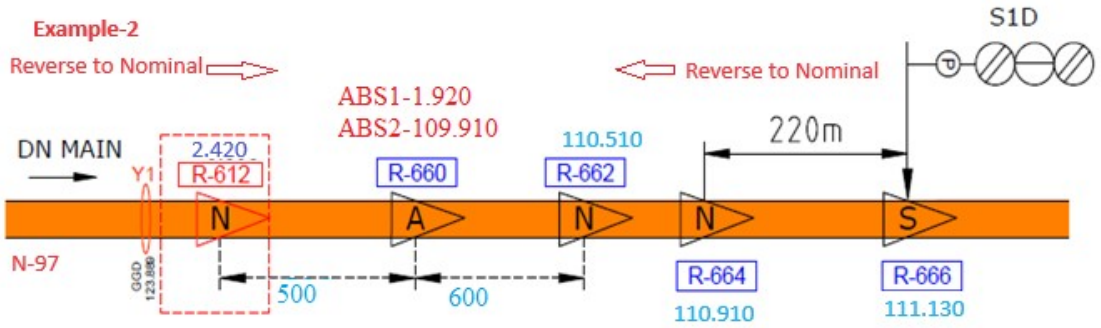
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System Level TEST CASES (RDSO)				
Test ID	**Test Scenario**	**Input Specification**	**Expected Output/Values**	**Observed Output (Pass/Fail)**
				
15.11	**Location correction after read the Adjustment Tag:** When onboard travel in reverse direction and new location is in Nominal direction as shown in the following figure. **Travel direction is Reverse to Nominal.**	1. Stationary KAVACH shall send ABS_LOC_RESET as "1" followed by location correction of 397.790 meters. 2. No tag is missing. 3. Existing Direction is REVERSE. 4. New direction is Nominal.	1. Direction shall get change as Nominal. 2. Mode shall be as previous mode. 3. MA shall not change. 4. In SR mode, if position report is undefined. The Direction shall not be established by reading adjustment tag.	SR FS OS

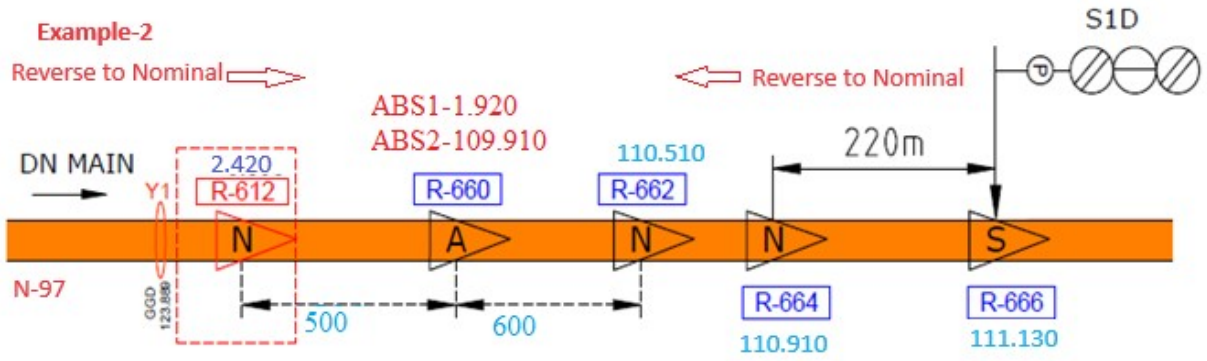
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System Level TEST CASES (RDSO)				
Test ID	**Test Scenario**	**Input Specification**	**Expected Output/Values**	**Observed Output (Pass/Fail)**
				
15.11	**Location correction after read the Adjustment Tag:** When onboard travel in reverse direction and new location is in nominal direction as shown in the following figure. **Travel direction is Reverse to Nominal.**	1. Stationary KAVACH shall send ABS_LOC_RESET as "1" followed by location correction of 107.99 meters. 2. No tag is missing. 3. Existing Direction is reverse. 4. New direction is nominal.	1. Direction shall get change as Nominal. 2. Mode shall be as previous mode. 3. MA shall not change. In SR mode, if position report is undefined. The Direction shall not be established by reading adjustment tag.	SR FS OS

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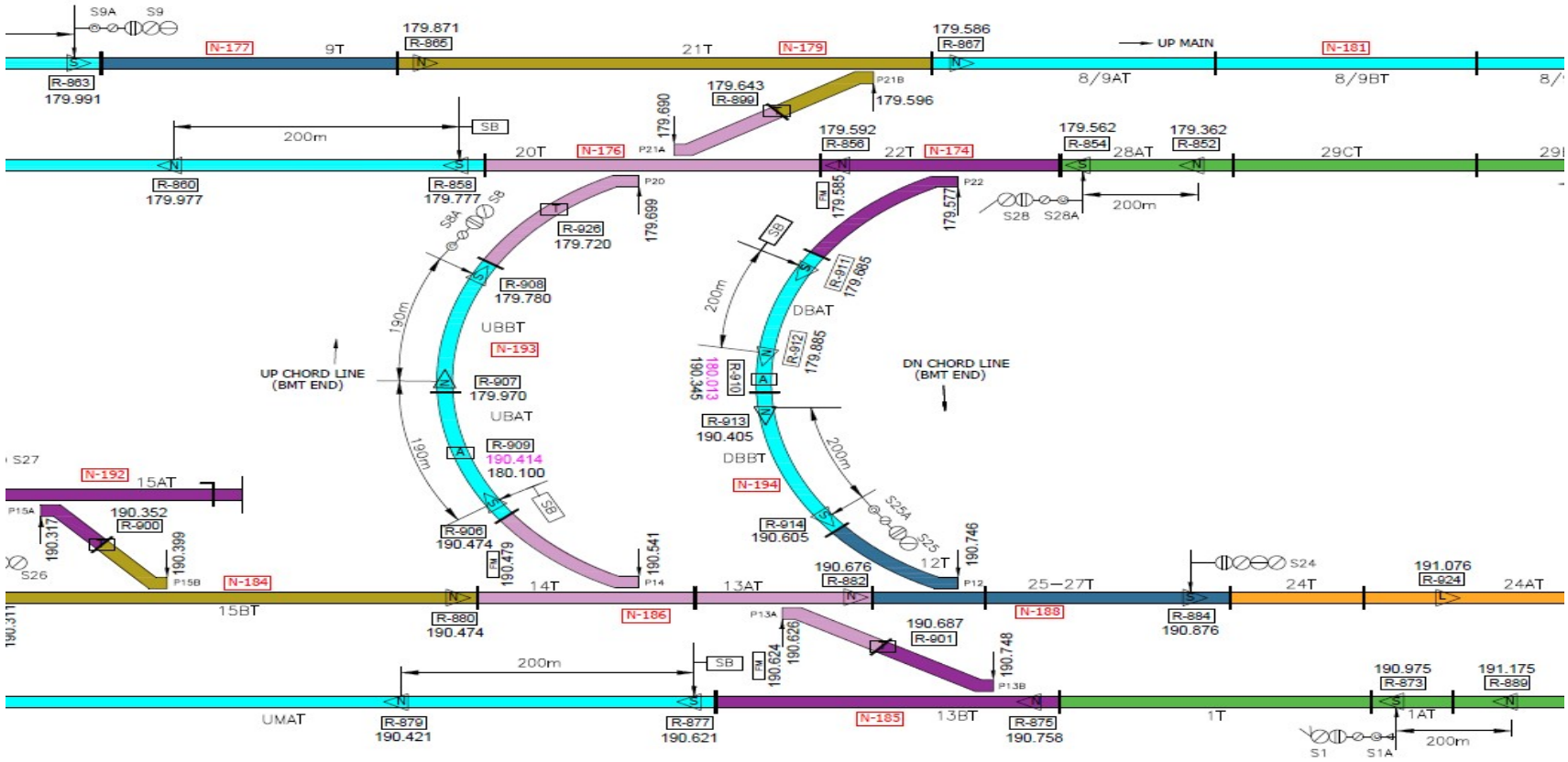
System Level TEST CASES (RDSO)				
Test ID	**Test Scenario**	**Input Specification**	**Expected Output/Values**	**Observed Output (Pass/Fail)**
				
5.14.	**Location correction after read the Adjustment Tag:** When onboard travel in Nominal direction and new location is in Reverse direction as shown in the following figure. **Travel direction is Nominal to Reverse**	1. Stationary KAVACH shall send ABS_LOC_RESET as "1" followed by location correction of 107.99 meters. 2. No tag is missing. 3. Existing Direction is Nominal. 4. New direction is Reverse.	1. Direction shall get change as Reverse. 2. Mode shall be as previous mode. 3. MA shall not change. 4. In SR mode, if position report is undefined. The Direction shall not be established by reading adjustment tag.	SR FS OS

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System Level TEST CASES (RDSO)				
Test ID	**Test Scenario**	**Input Specification**	**Expected Output/Values**	**Observed Output (Pass/Fail)**
				
15.1	**Location correction after read the Adjustment Tag:** When onboard travel in REVERSE direction and new location is in REVERSE direction as shown in the following figure. **Travel direction is REVERSE to REVERSE (S1 to S8)**	1. Stationary KAVACH shall send ABS_LOC_RESET as "1" followed by location correction of 10.314 meters. 2. No tag is missing. 3. Existing Direction is REVERSE. 4. New direction is Reverse.	1. Direction shall not get change. 2. Mode shall be as previous mode. 3. MA shall not change. 4. In SR mode, if position report is undefined. The Direction shall not be established by reading adjustment tag.	SR FS OS

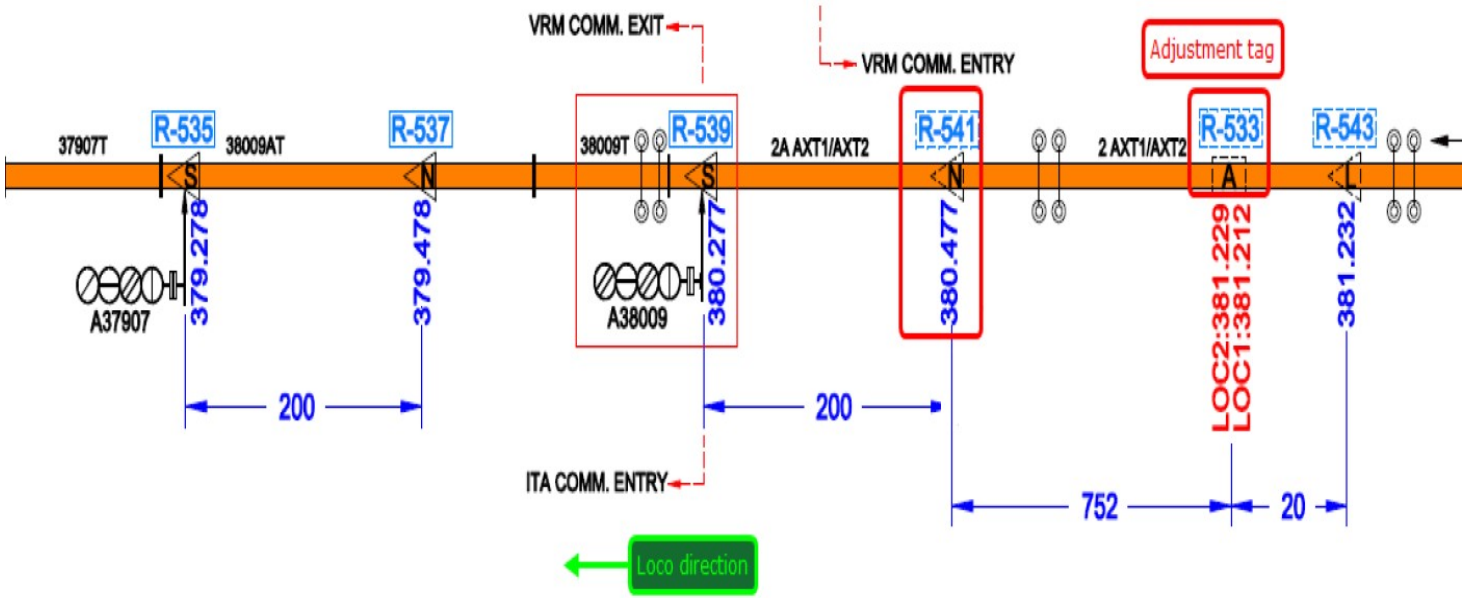
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System Level TEST CASES (RDSO)				
Test ID	**Test Scenario**	**Input Specification**	**Expected Output/Values**	**Observed Output (Pass/Fail)**

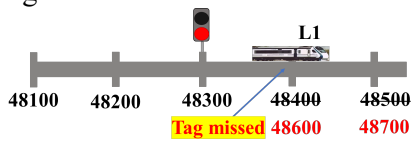
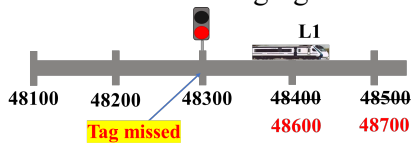


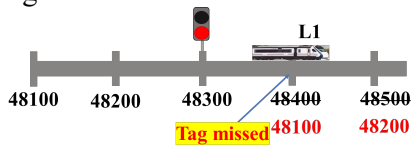
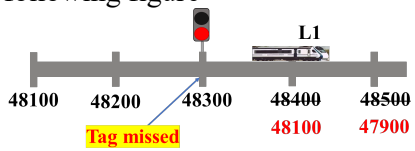
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System Level TEST CASES (RDSO)				
Test ID	**Test Scenario**	**Input Specification**	**Expected Output/Values**	**Observed Output (Pass/Fail)**
15.16.	Check the Onboard KAVACH calculate approaching tag distance (window) after passed over adjustment tag. **USE CASES**	1. Make sure that the train is FS mode. 2. Now simulate the condition such that the train passes over adjustment tag R-533.	1. The Onboard KAVACH shall update the location correction after reading R-533. 2. Onboard KAVACH calculate accurate distance of next approaching tag R-541. 3. Next approaching tag shall be read by the Onboard KAVACH.	

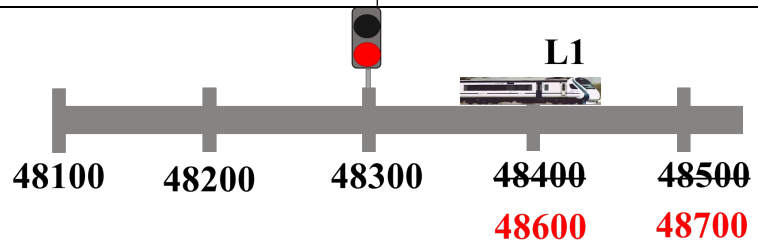


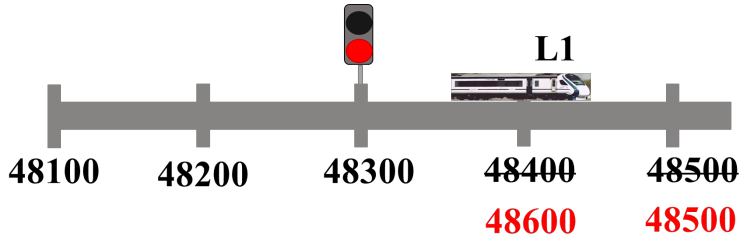
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System Level TEST CASES (RDSO)				
Test ID	**Test Scenario**	**Input Specification**	**Expected Output/Values**	**Observed Output (Pass/Fail)**
16.	**KAVACH _FRS_16: - Testing for ABS_LOC_RESET by Onboard KAVACH when radio communication is available and adjustment details incorporated tag is missing.**			
16.1.	Where the location error is positive. When new location is greater than the current absolute location then location error is positive and adjustment tag is missing as shown in the following figure 	1. Stationary KAVACH shall send ABS_LOC_RESET as "1" followed by location correction of "200" meter. 2. Adjustment tag is missing 3. Existing Direction is nominal. 4. New direction is Nominal.	1. The Onboard KAVACH shall maintain the same absolute location and direction as read from the previous tag i.e at 48300 till it reads next tag. 2. The Onboard KAVACH shall correct the direction and location after the reading the tag at 48500/48700 m. 3. The Movement Authority shall not be reduced by the same amount.	SR FS FS+OV OS OS+OV
16.2.	Where the location error is positive. When new location is greater than the current absolute location then location error is positive and tag before adjustment tag is missing as shown in the following figure 	1. Stationary KAVACH shall send ABS_LOC_RESET as "1" followed by location correction of "200" meter. 2. Previous tag is missing 3. Existing Direction is nominal. 4. New direction is Nominal.	1. The Onboard KAVACH shall maintain the same absolute location and direction as read from the previous tag i.e at 48200 till it reads next tag. 2. The Onboard KAVACH shall correct the direction and location after the reading the adjustment tag. 3. The Movement Authority shall not be reduced by the same amount.	SR FS FS+OV OS OS+OV
16.3.	Where the location error is negative. When new location is	1. Stationary KAVACH shall send ABS_LOC_RESET as	1. The Onboard KAVACH shall update the same absolute	SR

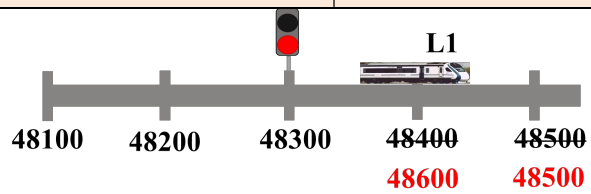
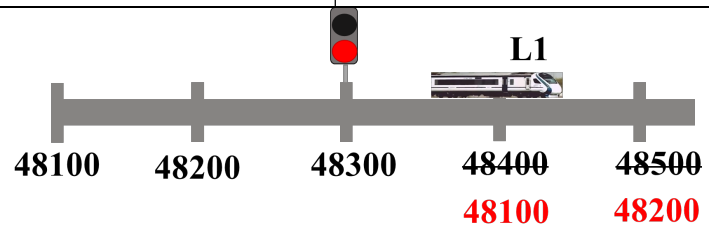
System Level TEST CASES (RDSO)				
Test ID	**Test Scenario**	**Input Specification**	**Expected Output/Values**	**Observed Output (Pass/Fail)**
	less than the current absolute location then location error is negative and adjustment tag is missed as shown in the following figure 	"1" followed by location correction of "200" meter. 2. adjustment tag is missing 3. Existing Direction is nominal. 4. New direction is Nominal.	location and direction as read from the previous tag i.e at 48300 till it reads next tag. 2. The Onboard KAVACH shall correct the direction and location after the reading the tag at 48500/48200 m. 3. It shall be noted that Movement Authority shall not be reduced by the same amount.	FS FS+OV OS OS+OV
16.4.	Where the location error is negative. When new location is less than the current absolute location then location error is negative and tag before adjustment tag is missed as shown in the following figure 	1. Stationary KAVACH shall send ABS_LOC_RESET as "1" followed by location correction of "200" meter. 2. Previous tag is missing 3. Existing Direction is nominal. 4. New direction is Reverse.	1. The Onboard KAVACH shall update the absolute location and direction as read from the previous tag i.e at 48200 till it reads next tag. 2. The Onboard KAVACH shall correct the direction and location after the reading the tag at 48100m. 3. It shall be noted that Movement Authority shall not be reduced by the same amount.	SR FS FS+OV OS OS+OV TRIP

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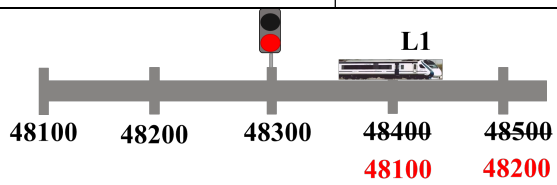
System Level TEST CASES (RDSO)				
Test ID	**Test Scenario**	**Input Specification**	**Expected Output/Values**	**Observed Output (Pass/Fail)**
17.	**KAVACH _FRS_17:- Testing for ABS_LOC_RESET by Onboard KAVACH when radio communication is not available. (No Transmission of packets from Stationary KAVACH). Adjustment details incorporated tag is available.**			
17.1.	Where the location error is positive and direction nominal, the track side details are as shown in the following figure.  	1. Existing Direction is nominal. 2. No communication with station. 3. In LS, onboard is in FS and communication failed and loco transited to LS mode. 4. New direction is Nominal. 5. Location correction is 200 meters.	1. The Onboard KAVACH is not receiving the packet and direction is available. 2. Process location when the location is within the window (LDOUBTOVER and LDOUBTUNDER). 3. When the derived location from tag is different from current absolute location calculated by Onboard KAVACH by more than 100 m, and direction of travel as obtained from tag is matching, Onboard KAVACH shall update the new absolute location and new direction.	SR LS
17.2.	Where the location error is positive. When new location is greater than the current	1. Existing Direction is nominal. 2. No communication with	1. The Onboard KAVACH is not receiving the packet and direction is available.	SR LS

System Level TEST CASES (RDSO)				
Test ID	**Test Scenario**	**Input Specification**	**Expected Output/Values**	**Observed Output (Pass/Fail)**
	absolute location then location error is positive as shown in the following figure.	station. 3. In LS, onboard is in FS and communication failed and loco transited to LS mode. 4. New direction is Reverse. 5. Location correction is 200 meters.	2. Process location when the location is within the window (LDOUBTOVER and L LDOUBTUNDER). 3. When the derived location from tag is different from current absolute location calculated by Onboard KAVACH by more than 100 m, and direction of travel as obtained from tag is matching, Onboard KAVACH shall update the new absolute location and new direction.	
				
17.3.	Where the location error is positive. When new location is greater than the current absolute location then location error is positive as shown in the following figure.	1. Existing Direction is unknown. 2. No communication with station. 3. New direction is Reverse. 4. Location correction is 200 meters.	1. The Onboard KAVACH is not receiving the packet and direction is not available. 2. Reject **adjustment** tag and it shall not be used for Direction determination.	SR LS

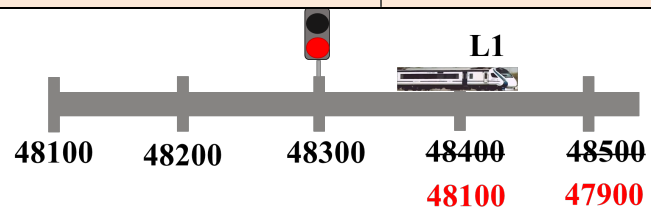
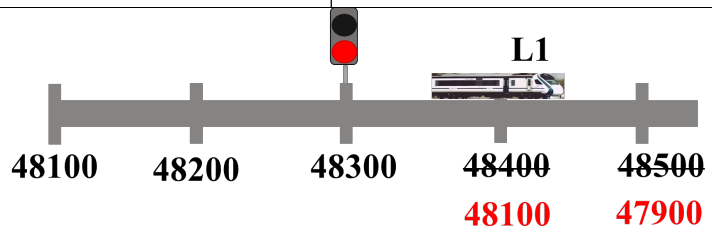
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System Level TEST CASES (RDSO)				
Test ID	**Test Scenario**	**Input Specification**	**Expected Output/Values**	**Observed Output (Pass/Fail)**
				
17.4.	Where the location error is negative and direction nominal, the track side details are as shown in the following figure.	1. Existing Direction is nominal. 2. No communication with station. 3. In LS, onboard is in FS and communication failed and loco transited to LS mode. 4. New direction is Nominal. 5. Location correction is 200 meters.	1. The Onboard KAVACH is not receiving the packet and direction is available. 2. When the derived location from tag is different from current absolute location calculated by Onboard KAVACH by more than 100 m, and direction of travel as obtained from tag is matching, Onboard KAVACH shall update the new absolute location and new direction.	SR LS
				

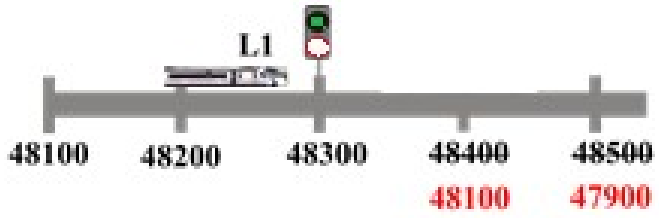
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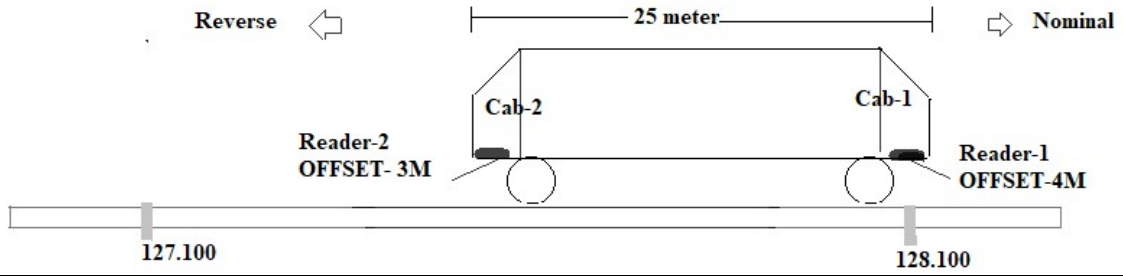
System Level TEST CASES (RDSO)				
Test ID	**Test Scenario**	**Input Specification**	**Expected Output/Values**	**Observed Output (Pass/Fail)**
17.5.	Where the location error is negative and direction nominal, the track side details are as shown in the following figure.  	1. Existing Direction is unknown. 2. No communication with station. 3. New direction is Nominal. 4. Location correction is 200 meters.	1. The Onboard KAVACH is not receiving the packet and direction is available. 2. Reject **adjustment** tag and it shall not be used for Direction determination.	SR LS
17.6.	Where the location error is negative and direction reverse, the track side details are as shown in the following figure.	1. Existing Direction is nominal. 2. No communication with station. 3. Onboard is in FS and communication failed and loco transited to LS mode. 4. New direction is Reverse. 5. Location correction is 200 meters.	1. The Onboard KAVACH is not receiving the packet and direction is available. 2. When the derived location from tag is different from current absolute location calculated by Onboard KAVACH by more than 100 m, and direction of travel as obtained from tag is matching, Onboard KAVACH shall update	SR LS

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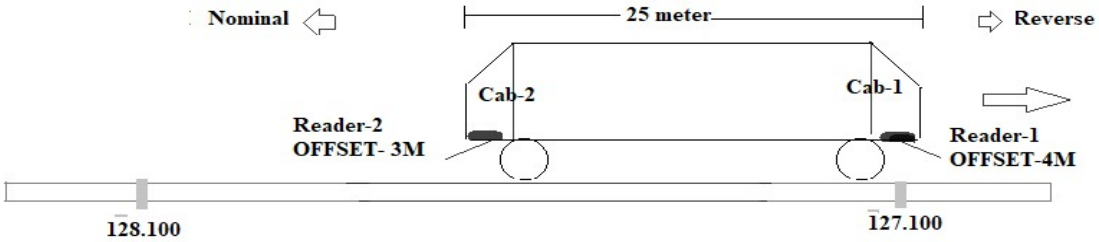
System Level TEST CASES (RDSO)				
Test ID	**Test Scenario**	**Input Specification**	**Expected Output/Values**	**Observed Output (Pass/Fail)**
			the new absolute location and new direction.	
17.7.	Where the location error is negative and direction reverse, the track side details are as shown in the following figure.	1. Existing Direction is unknown. 2. No communication with station. 3. New direction is Reverse. 4. Location correction is 200 meters.	1. The Onboard KAVACH is not receiving the packet and direction is not available. 2. Reject Adjustment/ junction tag and it shall not be used for Direction determination.	SR
				

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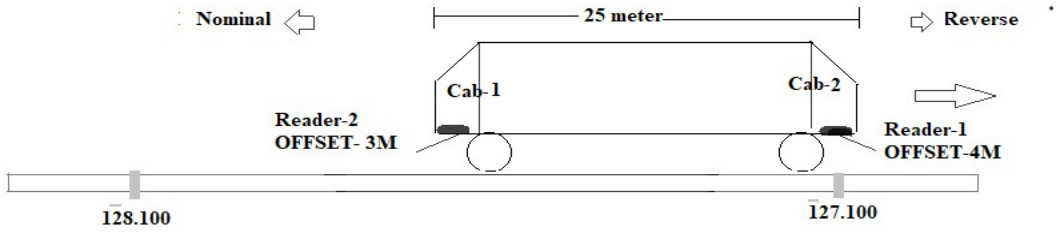
System Level TEST CASES (RDSO)				
Test ID	**Test Scenario**	**Input Specification**	**Expected Output/Values**	**Observed Output (Pass/Fail)**
17.8.	Reported Loco Front End (LFE) position is after approaching signal but physically occupied previous section.	1. Make sure that Onboard KAVACH in FS/OS/OV Mode. 2. Make sure that no faults are present. 3. Valid communication with station. 4. Simulate that loco is in before the signal and signal is in OFF condition. 5. Reported location is after the signal foot Tag.	1. The Onboard KAVACH is receiving the packet and direction is available.	FS FS+OV OS OS+OV
				
17.9.	The objective of test to report the position of front end on onboard. To check RFID reader-1 & Reader-2 offset measurement of absolute location from	1. Make sure that Onboard KAVACH in FS/OS Mode. 2. Make sure that no faults are present. 3. Cab-1 is active. 4. Reader -1 is active & Reader-2 is switched OFF. 5. Program the RFID Tag for	Check for reported location by Reader-1 is as 128.104 Km if the direction is nominal.	

System Level TEST CASES (RDSO)				
Test ID	**Test Scenario**	**Input Specification**	**Expected Output/Values**	**Observed Output (Pass/Fail)**
	front end of on-board when Cab 1 is active.	absolute location as 128.100. 6. Swipe the Tag in Reader -1 and check that reported absolute location as 128.100 with 4-meter OFFSET is configured from front end. 7. Move the loco in nominal direction.		
		1. Now, Reader -2 is active & Reader-1 is switched OFF. 2. Swipe the Tag in Reader -2 and check that reported absolute location as 128.100 with 22-meter OFFSET is configured from front end.	Check for reported location by Reader-1 is as 128.122 Km if the direction is nominal.	
				

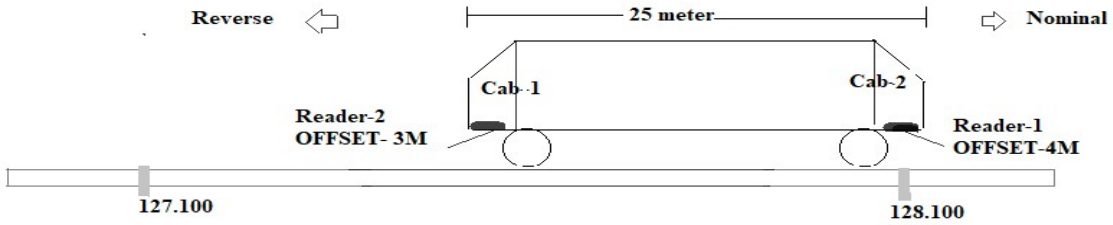
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System Level TEST CASES (RDSO)				
Test ID	**Test Scenario**	**Input Specification**	**Expected Output/Values**	**Observed Output (Pass/Fail)**
17.10.	The objective of test to report the position of front end on onboard. To check RFID reader-1 &2 offset measurement of absolute location from front end of on-board when cab-1 is active.	1. Make sure that Onboard KAVACH in FS/OS Mode. 2. Make sure that no faults are present. 3. Cab-1 is active. 4. Reader-1 is active and reader-2 is switched OFF. 5. Program the RFID Tag for absolute location as 127.100. 6. Swipe the Tag in Reader -1 and check that reported absolute location as 127.100 with 4-meter OFFSET is configured from front end. 7. Move the Loco with Cab-1.	Check for reported location by Reader-1 is as 127.096 Km if the direction is reverse.	
		1. Reader-2 is active and reader-1 is switched OFF. 2. Swipe the Tag in Reader -2 and check that reported absolute location as 127.100 with 22-meter OFFSET is configured from front end.	Check for reported location by Reader-1 is as 127.078 Km if the direction is reverse.	
				

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System Level TEST CASES (RDSO)				
Test ID	**Test Scenario**	**Input Specification**	**Expected Output/Values**	**Observed Output (Pass/Fail)**
17.11.	The objective of test to report the position of front end on onboard. To check RFID reader-1 & 2 offset measurement of absolute location from front end of on-board when cab-2 is active.	1. Make sure that Onboard KAVACH in FS/OS Mode. 2. Make sure that no faults are present. 3. Cab-2 is active. 4. Reader-1 is active and reader-2 is switched OFF. 5. Program the RFID Tag for absolute location as 127.100. 6. Swipe the Tag in Reader -1 and check that reported absolute location as 127.100 with 4-meter OFFSET is configured from front end. 7. Move the Loco with Cab-2.	Check for reported location by Reader-1 is as 127.096 Km if the direction is reverse.	
		1. Reader-2 is active and reader-1 is switched OFF. 2. Swipe the Tag in Reader -2 and check that reported absolute location as 127.100 with 22 meters OFFSET is configured from front end.	Check for reported location by Reader-1 is as 127.078 Km if the direction is reverse.	
				

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System Level TEST CASES (RDSO)				
Test ID	**Test Scenario**	**Input Specification**	**Expected Output/Values**	**Observed Output (Pass/Fail)**
17.12.	The objective of test to report the position of front end on onboard. To check RFID reader-1 & Reader-2 offset measurement of absolute location from front end of on-board when Cab 2 is active.	1. Make sure that Onboard KAVACH in FS/OS Mode. 2. Make sure that no faults are present. 3. Cab-2 is active. 4. Reader -1 is active & Reader-2 is switched OFF. 5. Program the RFID Tag for absolute location as 128.100. 6. Swipe the Tag in Reader -1 and check that reported absolute location as 128.100 with 4-meter OFFSET is configured from front end. 7. Move the loco in nominal direction.	Check for reported location by Reader-1 is as 128.104 Km if the direction is nominal.	
		1. Now, Reader -2 is active & Reader-1 is switched OFF. 2. Swipe the Tag in Reader -2 and check that reported absolute location as 128.100 with 22-meter OFFSET is configured from front end.	Check for reported location by Reader-1 is as 128.122 Km if the direction is nominal.	
				

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System Level TEST CASES (RDSO)				
Test ID	**Test Scenario**	**Input Specification**	**Expected Output/Values**	**Observed Output (Pass/Fail)**
17.13.	To check that onboard is in SR mode with position report and no communication with station and Adjustment Tag missed.	1 Keep the on onboard in SR mode with position report. 2 Direction of movement is in nominal. 3 Simulate the movement such that it crosses the Adjustment tag and Adjustment tag is not read by onboard. 4 Next tag is read by onboard having direction as reverse.	1 Check that after reading the next tag, onboard transit to position report as unknown. 2 After, next tag reading onboard derive the position report.	

<table>
<tr><th colspan="5">System Level TEST CASES (RDSO)</th></tr>
<tr><th>Test ID</th><th>Test Scenario</th><th>Input Specification</th><th>Expected Output/Values</th><th>Observed Output (Pass/Fail)</th></tr>
<tr><td>18.</td><td colspan="4">KAVACH _FRS_18: - Direction Determination test based on Tag read: This test case checks for direction determination by Tag read by RFID reader-1 and RFID reader-2 for various combination.</td></tr>
<tr><td>18.1.</td><td>To verify the Direction determination based on the RFID tag read by RFID reader -1 and reader-2 in sequence.</td><td>1) Make sure that Onboard KAVACH in SR Mode.
2) Make sure that no faults are present.
3) Swipe the tag as below in reader -1 & 2 as per table in sequence.

<table><tr><th>Reader-1</th><th>Reader-2</th></tr><tr><td>R1 (100000 mtr)</td><td>R1 (100000 mtr)</td></tr><tr><td>R2 (100100 mtr)</td><td>R2 (100100 mtr)</td></tr><tr><td>R3 (100200 mtr)</td><td>R3 (100200 mtr)</td></tr></table></td><td>Check that direction determined by the reader-1 and reader -2 shall be as:

<table><tr><th>Reader-1 Direction</th><th>Reader-2 Direction</th><th>OVK Direction</th><th>Tag Reported to SVK</th><th>OK/ Not OK</th></tr><tr><td>U</td><td>U</td><td>U</td><td>R1</td><td></td></tr><tr><td>N</td><td>N</td><td>N</td><td>R2</td><td></td></tr><tr><td>N</td><td>N</td><td>N</td><td>R3</td><td></td></tr></table>
Tag reported to Stationary KAVACH shall be verified from the SVK Log</td><td></td></tr>
<tr><td>18.2.</td><td>To verify the Direction determination based on the RFID tag when RFID reader -1 read all tag in sequence and reader-2 does not read the Tag-R1.</td><td>1) Make sure that Onboard KAVACH in SR Mode.
2) Make sure that no faults are present.
3) Swipe the tag as below in reader -1 & 2 as per table in sequence.

<table><tr><th>Reader-1</th><th>Reader-2</th></tr><tr><td>R1 (100000 mtr)</td><td>Not Read</td></tr><tr><td>R2 (100100 mtr)</td><td>R2 (100100 mtr)</td></tr><tr><td>R3 (100200 mtr)</td><td>R3 (100200 mtr)</td></tr></table></td><td>Check that direction determined by the reader-1 and reader -2 shall be as:

<table><tr><th>Reader-1 Direction</th><th>Reader-2 Direction</th><th>OVK Direction</th><th>Tag Reported to SVK</th><th>OK/ Not OK</th></tr><tr><td>U</td><td>U</td><td>U</td><td>R1</td><td></td></tr><tr><td>N</td><td>U</td><td>N</td><td>R2</td><td></td></tr><tr><td>N</td><td>N</td><td>N</td><td>R3</td><td></td></tr></table>
Tag reported to Stationary KAVACH shall be verified from the SVK Log.</td><td></td></tr>
</table>

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System Level TEST CASES (RDSO)

<table>
<tr><th>Test ID</th><th>Test Scenario</th><th>Input Specification</th><th>Expected Output/Values</th><th>Observed Output (Pass/Fail)</th></tr>
<tr><td>18.3.</td><td>To verify the Direction determination based on the RFID tag read by RFID reader -1 does not read the Tag and reader-2 read the Tag-R1 & R2 in sequence.</td><td>1) Onboard is on SR mode.
2) Make sure that no faults are present.
3) Swipe the tag as below in reader -1 & 2 as per table in sequence
<table>
<tr><th>Reader-1</th><th>Reader-2</th></tr>
<tr><td>Not Read</td><td>R1 (100000 km)</td></tr>
<tr><td>R2 (100100 km)</td><td>R2 (100100 km)</td></tr>
<tr><td>R3 (100200 km)</td><td>R3 (100200 km)</td></tr>
</table></td><td>Check that direction determined by the reader-1 and reader -2 shall be as:
<table>
<tr><th>Reader-1 Direction</th><th>Reader-2 Direction</th><th>OVK Direction</th><th>Tag Reported to SVK</th><th>OK/ Not OK</th></tr>
<tr><td>U</td><td>U</td><td>U</td><td>R1</td><td></td></tr>
<tr><td>U</td><td>N</td><td>N</td><td>R2</td><td></td></tr>
<tr><td>N</td><td>N</td><td>N</td><td>R3</td><td></td></tr>
</table>
Tag reported to Stationary KAVACH shall be verified from the SVK Log.</td><td></td></tr>
<tr><td>18.4.</td><td>To verify the Direction determination based on the RFID tag read by RFID reader -1 read the Tag R-2 first and reader-2 read the Tag-R1 & R2 in sequence.</td><td>1) Make sure that Onboard KAVACH in SR Mode.
2) Make sure that no faults are present.
3) Swipe the tag as below in reader -1 & 2 as per table in sequence
<table>
<tr><th>Reader-1</th><th>Reader-2</th></tr>
<tr><td>R2 (100100 mtr)</td><td></td></tr>
<tr><td></td><td>R1 (100000 mtr)</td></tr>
<tr><td></td><td>R2 (100100 mtr)</td></tr>
<tr><td>R3 (100200 mtr)</td><td>R3 (100200 mtr)</td></tr>
</table></td><td>Check that direction determined by the reader 1 and reader -2 shall be as:
<table>
<tr><th>Reader-1 Direction</th><th>Reader-2 Direction</th><th>OVK Direction</th><th>Tag Reported to SVK</th><th>OK/ Not OK</th></tr>
<tr><td>U</td><td>U</td><td>U</td><td>R2</td><td></td></tr>
<tr><td>U</td><td>U</td><td>U</td><td>R1</td><td></td></tr>
<tr><td>U</td><td>N</td><td>N</td><td>R2</td><td></td></tr>
<tr><td>N</td><td>N</td><td>N</td><td>R3</td><td></td></tr>
</table>
Tag reported to Stationary KAVACH shall be verified from the SVK Log.</td><td></td></tr>
</table>

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System Level TEST CASES (RDSO)

<table>
<tr><th>Test ID</th><th>Test Scenario</th><th>Input Specification</th><th>Expected Output/Values</th><th>Observed Output (Pass/Fail)</th></tr>
<tr><td>18.5.</td><td>To verify the Direction determination based on the RFID tag read by RFID reader -1 does not read the Tag R2 and reader-2 read the Tag-R1 not in sequence.</td><td>1) Onboard is on SR mode.
2) Make sure that no faults are present.
3) Swipe the tag as below in reader -1 & 2 as per table in sequence.

<table><tr><th>Reader-1</th><th>Reader-2</th></tr><tr><td>R1 (100000 km)</td><td></td></tr><tr><td></td><td>R2 (100100 km)</td></tr><tr><td>R3 (100200 km)</td><td></td></tr><tr><td></td><td>R3 (100200 km)</td></tr></table></td><td>Check that direction determined by the reader 1 and reader -2 shall be as:

<table><tr><th>Reader-1 Direction</th><th>Reader-2 Direction</th><th>OVK Direction</th><th>Tag Reported to SVK</th><th>OK/ Not OK</th></tr><tr><td>U</td><td>U</td><td>U</td><td>R1</td><td></td></tr><tr><td>U</td><td>U</td><td>U</td><td>R2</td><td></td></tr><tr><td>N</td><td>U</td><td>N</td><td>R3</td><td></td></tr><tr><td>N</td><td>N</td><td>N</td><td></td><td></td></tr></table>
Tag reported to Stationary KAVACH shall be verified from the SVK Log.</td><td></td></tr>
<tr><td>18.6.</td><td>To verify the Direction determination based on the RFID tag read by RFID when reader-2 read the Tag-R1 after reader -1 read the Tag R2.</td><td>1) Make sure that Onboard KAVACH in SR Mode.
2) Make sure that no faults are present.
3) Swipe the tag as below in reader -1 & 2 as per table in sequence.

<table><tr><th>Reader-1</th><th>Reader-2</th></tr><tr><td>R1 (100000 mtr)</td><td></td></tr><tr><td>R2 (100100 mtr)</td><td>R1 (100000 mtr)</td></tr><tr><td>R3 (100200 mtr)</td><td>R2 (100100 mtr)</td></tr><tr><td></td><td>R3 (100200 mtr)</td></tr></table></td><td>Check that direction determined by the reader 1 and reader -2 shall be as:

<table><tr><th>Reader-1 Direction</th><th>Reader-2 Direction</th><th>OVK Direction</th><th>Tag Reported to SVK</th><th>OK/ Not OK</th></tr><tr><td>U</td><td>U</td><td>U</td><td>R1</td><td></td></tr><tr><td>N</td><td>U</td><td>N</td><td>R2</td><td></td></tr><tr><td>N</td><td>N</td><td>N</td><td>R3</td><td></td></tr><tr><td>N</td><td>N</td><td>N</td><td></td><td></td></tr></table>
Tag reported to Stationary KAVACH shall be verified from the SVK Log.</td><td></td></tr>
</table>

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System Level TEST CASES (RDSO)

<table>
<tr><th>Test ID</th><th>Test Scenario</th><th>Input Specification</th><th>Expected Output/Values</th><th>Observed Output (Pass/Fail)</th></tr>
<tr><td>18.7.</td><td>To verify the Direction determination based on the RFID tag read when reader-2 read the Tag-R1 after RFID Reader -1 read tag R3.</td><td>1) Make sure that Onboard KAVACH in SR Mode.
2) Make sure that no faults are present.
3) Swipe the tag as below in reader -1 & 2 as per table in sequence.

<table>
<tr><th>Reader-1</th><th>Reader-2</th></tr>
<tr><td>R1 (100000 mtr)</td><td></td></tr>
<tr><td>R2 (100100 mtr)</td><td></td></tr>
<tr><td>R3 (100200 mtr)</td><td>R1 (100000 mtr)</td></tr>
<tr><td></td><td>R2 (100100 mtr)</td></tr>
<tr><td></td><td>R3 (100200 mtr)</td></tr>
<tr><td></td><td>R4 (100300 Mtr)</td></tr>
<tr><td>R4 (100300 mtr)</td><td></td></tr>
</table></td><td>Check that direction determined by the reader 1 and reader -2 shall be as:

<table>
<tr><th>Reader -1 Direction</th><th>Reader-2 Direction</th><th>OVK Direction</th><th>Tag Reported to SVK</th><th>OK/ Not OK</th></tr>
<tr><td>U</td><td>U</td><td>U</td><td>R1</td><td></td></tr>
<tr><td>N</td><td>U</td><td>N</td><td>R2</td><td></td></tr>
<tr><td>N</td><td>U</td><td>N</td><td>R3</td><td></td></tr>
<tr><td>N</td><td>N</td><td>N</td><td></td><td></td></tr>
<tr><td>N</td><td>N</td><td>N</td><td></td><td></td></tr>
<tr><td>N</td><td>N</td><td>N</td><td>R4</td><td></td></tr>
<tr><td>N</td><td>N</td><td>N</td><td></td><td></td></tr>
</table>
Tag reported to Stationary KAVACH shall be verified from the SVK Log.</td><td></td></tr>
</table>

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System Level TEST CASES (RDSO)				
Test ID	**Test Scenario**	**Input Specification**	**Expected Output/Values**	**Observed Output (Pass/Fail)**
19.	**KAVACH_FRS_19-Handling during Start of mission: This test case to check that stationary KAVACH and Onboard KAVACH handling of MA, Track profile during start of mission.**			
19.1.	Display of absolute location, movement authority and signal aspect in LP-OCIP during start of mission.	1) Make sure that Onboard KAVACH in SR Mode after configuration & brake test. 2) Make sure that no faults are present. 3) Swipe the reported 1st normal tag. 4) After verification of 1st tag, swipe the next tag.	1. Check that display of absolute location in LP-OCIP shall be blank when no tag is read. 2. Display of Movement authority shall be blank. 3. After swipe of 1st tag, the absolute location shall not be shown and direction as (U) and Tag ID to be displayed. 4. Check that after swipe of 2nd tag, direction is shown as (N) or (R) based on direction.	
19.2.	In start of mission, Onboard KAVACH reported Tag is entry signal foot Tag and Loco Front End (LFE) is between entry and exit signals. If approaching Signal aspect – RED, the OSMA & Track profile shall be sent up to approaching signal foot distance. 	1) Make sure that Onboard KAVACH in SR Mode. 2) Make sure that no faults are present. 3) Swipe the reported tag as a SIGNAL FOOT tag. 4) Direction of travel in single route.	1. The Onboard KAVACH should receive the packet and transit to OS mode. 2. Onboard KAVACH shall supervise the profile from the front end of the train. The Onboard KAVACH shall keep radiating the latest profile ID available with it. 3. If there is no KAVACH equipped onboard is available before signal S-8, the signal shall be displayed on LP-OCIP. 4. If KAVACH equipped onboard available, that signal shall not be	

System Level TEST CASES (RDSO)				
Test ID	**Test Scenario**	**Input Specification**	**Expected Output/Values**	**Observed Output (Pass/Fail)**
			displayed. 5. Stationary KAVACH should send DIST_PKT_START as 0 with MA and Track Profile information from the reported entry signal foot.	
19.3.	In start of mission, Onboard Kavach reported Tag is entry signal foot Tag and Loco Front End (LFE) is between entry and exit signals. if approaching Signal aspect – YELLOW and exit signal aspect is RED, the OSMA & Track profile shall be sent for occupied & next section. 	1) Make sure that Onboard KAVACH in SR Mode. 2) Make sure that no faults are present. 3) Swipe the reported tag as a SIGNAL FOOT tag. 4) Direction of travel in single route.	1) The Onboard KAVACH should receive the packet and transit to OS mode& supervise the profile from the FRONT end of the train. 2) Onboard KAVACH shall transit FS mode after crossing of next stop signal & supervise the profile from the REAR end of the train. 3) The Onboard KAVACH shall keep radiating the latest profile ID available with it. 4) If there is no KAVACH equipped onboard is available before signal S-8, the signal shall be displayed on LP-OCIP. 5) If KAVACH equipped onboard available, that signal shall not be displayed. 6) Stationary KAVACH should send DIST_PKT_START as 0 with MA and Track Profile information from the reported entry signal foot tag upto 01 section beyond the approaching stop signal.	

System Level TEST CASES (RDSO)				
Test ID	**Test Scenario**	**Input Specification**	**Expected Output/Values**	**Observed Output (Pass/Fail)**
19.4.	In start of mission, Onboard Kavach reported Tag is entry signal foot Tag and Loco Front End (LFE) is between entry and exit signals. if approaching Signal aspect – YELLOW and exit signal aspect is Blank, the OSMA & Track profile shall be sent for occupied & next section.  	1) Make sure that Onboard KAVACH in SR Mode. 2) Make sure that no faults are present. 3) Swipe the reported tag as a SIGNAL **FOOT tag.** 4) Direction of travel in single route.	1) The Onboard KAVACH should receive the packet and transit to OS mode& supervise the profile from the FRONT end of the train. 2) Onboard KAVACH shall transit FS mode after crossing of next stop signal & supervise the profile from the REAR end of the train. 3) The Onboard KAVACH shall keep radiating the latest profile ID available with it. 4) If there is no KAVACH equipped onboard is available before signal S-8, the signal shall be displayed on LP-OCIP. 5) If KAVACH equipped onboard available, that signal shall not be displayed. 6) Stationary KAVACH should send DIST_PKT_START as 0 with MA and Track Profile information from the reported entry signal foot tag upto 01 section beyond the approaching stop signal.	
19.5.	In start of mission, Onboard Kavach reported Tag is entry signal foot Tag and Loco Front End (LFE) is between entry and exit signals.	1) Make sure that Onboard KAVACH in SR Mode. 2) Make sure that no faults are present. 3) Swipe the reported tag as a	1) The Onboard KAVACH should receive the packet and transit to OS mode & supervise the profile from the FRONT end of the train. 2) Onboard KAVACH shall transit FS	

System Level TEST CASES (RDSO)				
Test ID	**Test Scenario**	**Input Specification**	**Expected Output/Values**	**Observed Output (Pass/Fail)**
	if approaching Signal aspect – YELLOW and exit signal aspect is YELLOW, the OSMA & Track profile shall be sent for minimum two sections.  	SIGNAL **FOOT tag.** 4) Direction of travel in single route.	mode after crossing of next stop signal & supervise the profile from the REAR end of the train. 3) The Onboard KAVACH shall keep radiating the latest profile ID available with it. 4) If there is no KAVACH equipped onboard is available before signal S-8, the signal shall be displayed on LP-OCIP. 5) If KAVACH equipped onboard available, that signal shall not be displayed. 6) Stationary KAVACH should send DIST_PKT_START as 0 with MA and Track Profile information from the reported entry signal foot tag upto 02 section beyond the approaching stop signal.	
19.6.	In start of mission, Onboard Kavach reported Tag is entry signal foot Tag and Loco Front End (LFE) is between entry and exit signals. if approaching Signal aspect – YELLOW and exit signal aspect is Double YELLOW, the OSMA & Track profile shall be sent for minimum three sections.	1) Make sure that Onboard KAVACH in SR Mode. 2) Make sure that no faults are present. 3) Swipe the reported tag as a SIGNAL **FOOT tag.** 4) Direction of travel in single route.	1) The Onboard KAVACH should receive the packet and transit to OS mode & supervise the profile from the FRONT end of the train. 2) Onboard KAVACH shall transit FS mode after crossing of next stop signal & supervise the profile from the REAR end of the train. 3) The Onboard KAVACH shall keep radiating the latest profile ID	

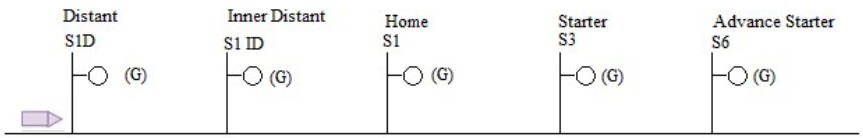
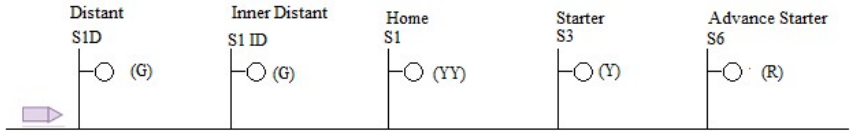
System Level TEST CASES (RDSO)				
Test ID	**Test Scenario**	**Input Specification**	**Expected Output/Values**	**Observed Output (Pass/Fail)**
			available with it. 4) If there is no KAVACH equipped onboard is available before signal S-8, the signal shall be displayed on LP-OCIP. 5) If KAVACH equipped onboard available, that signal shall not be displayed. 6) Stationary KAVACH should send DIST_PKT_START as 0 with MA and Track Profile information from the reported entry signal foot tag upto 03 section beyond the approaching stop signal.	
19.7.	In start of mission, Onboard Kavach reported Tag is entry signal foot Tag and Loco Front End (LFE) is between entry and exit signals. if approaching Signal aspect – YELLOW and exit signal aspect is GREEN, the OSMA & Track profile shall be sent for minimum four sections.	1) Make sure that Onboard KAVACH in SR Mode. 2) Make sure that no faults are present. 3) Swipe the reported tag as a SIGNAL **FOOT tag.** 4) Direction of travel in single route.	1) The Onboard KAVACH should receive the packet and transit to OS mode & supervise the profile from the FRONT end of the train. 2) Onboard KAVACH shall transit FS mode after crossing of next stop signal & supervise the profile from the REAR end of the train. 3) The Onboard KAVACH shall keep radiating the latest profile ID available with it. 4) If there is no KAVACH equipped onboard is available before signal S-8, the signal shall be displayed on LP-OCIP.	

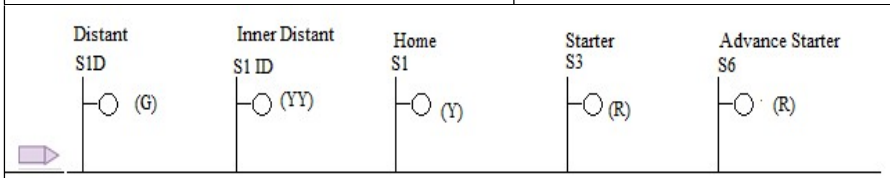
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System Level TEST CASES (RDSO)				
Test ID	**Test Scenario**	**Input Specification**	**Expected Output/Values**	**Observed Output (Pass/Fail)**
			5) If KAVACH equipped onboard available, that signal shall not be displayed. 6) Stationary KAVACH should send DIST_PKT_START as 0 with MA and Track Profile information from the reported entry signal foot tag upto 04 section beyond the approaching stop signal.	
19.8.	In start of mission, Onboard KAVACH reported Tag is entry signal foot Tag and Loco Front End (LFE) is between entry and exit signals. If approaching Signal aspect – double YELLOW, the OSMA & Track profile shall be sent for occupied & next 02 section. 	1) Make sure that Onboard KAVACH in SR Mode. 2) Make sure that no faults are present. 3) Swipe the reported tag as a SIGNAL **FOOT tag.** 4) Direction of travel in single route.	1) The Onboard KAVACH should receive the packet and transit to OS mode & supervise the profile from the FRONT end of the train. 2) Onboard KAVACH shall transit FS mode after crossing of next stop signal & supervise the profile from the REAR end of the train. 3) The Onboard KAVACH shall keep radiating the latest profile ID available with it. 4) If KAVACH equipped onboard available, that signal shall not be displayed. 5) Stationary KAVACH should If there is no KAVACH equipped onboard is available before signal S-8, the signal shall be displayed on LP-OCIP.	

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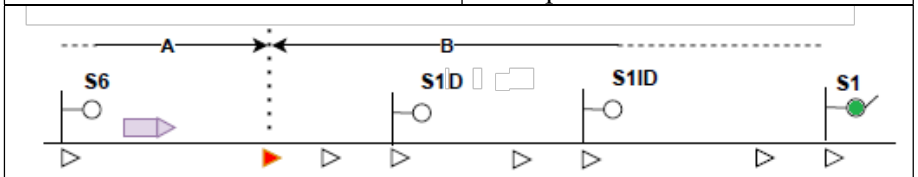
System Level TEST CASES (RDSO)				
Test ID	**Test Scenario**	**Input Specification**	**Expected Output/Values**	**Observed Output (Pass/Fail)**
			6) send DIST_PKT_START as 0 with MA and Track Profile information from the reported entry signal foot tag upto 02 section beyond the approaching stop signal.	
19.9.	In start of mission, Onboard KAVACH reported Tag is entry signal foot Tag and Loco Front End (LFE) is between entry and exit signals. If approaching stop Signal aspect GREEN, the OSMA & Track profile shall be sent for occupied section upto approaching stop signal & next 03 section after stop signal. 	1) Make sure that Onboard KAVACH in SR Mode. 2) Make sure that no faults are present. 3) Swipe the reported tag as a SIGNAL **FOOT tag.** 4) Direction of travel in single route. 5) Stationary KAVACH should send DIST_PKT_START as 0 with MA and Track Profile information from the reported entry signal foot.	1) The Onboard KAVACH should receive the packet and transit to OS mode & supervise the profile from the FRONT end of the train. 2) Onboard KAVACH shall transit FS mode after crossing of next stop signal & supervise the profile from the REAR end of the train. 3) The Onboard KAVACH shall keep radiating the latest profile ID available with it till border tag. 4) Stationary Kavach should send DIST_PKT_START as 0 with MA and Track Profile information from the reported entry signal foot tag upto 03 section beyond the approaching stop signal...	
19.10.	In start of mission, Onboard KAVACH reported Tag is entry signal foot Tag and Loco Front End (LFE) is between entry and exit signals. If approaching Signal aspect	**1)** Make sure that Onboard KAVACH in SR Mode. **2)** Make sure that no faults are present. **3)** Swipe the reported tag as a SIGNAL **FOOT tag.**	1) The Onboard KAVACH should receive the packet and transit to OS mode & supervise the profile from the FRONT end of the train. 2) Onboard KAVACH shall transit FS mode after crossing of next stop	

System Level TEST CASES (RDSO)				
Test ID	**Test Scenario**	**Input Specification**	**Expected Output/Values**	**Observed Output (Pass/Fail)**
	(S1D) GREEN, the OSMA & Track profile shall be sent for occupied section upto approaching stop signal & next 03 section upto next station stop signal.	**4)** Direction of travel in single route.	signal & supervise the profile from the REAR end of the train. 3) The Onboard KAVACH shall keep radiating the latest profile ID available with it till border tag. 4) After border tag, the onboard KAVACH shall radiate the track profile ID as "0" till receipt of new track profile. 5) Stationary KAVACH should send DIST_PKT_START as 0 with MA and Track Profile information from the reported entry signal foot.	
				
19.11.	In start of mission, Onboard KAVACH reported Tag is entry signal foot Tag and Loco Front End (LFE) is between entry and exit signals. If approaching Signal aspect (S1D) GREEN, the OSMA & Track profile shall be sent for occupied section upto approaching stop signal & next 02 section (Upto LSS).	Make sure that Onboard KAVACH in SR Mode. Make sure that no faults are present. Swipe the reported tag as a SIGNAL **FOOT tag.** Direction of travel in single route.	1) The Onboard KAVACH should receive the packet and transit to OS mode& supervise the profile from the FRONT end of the train. 2) Onboard KAVACH shall transit FS mode after crossing of next stop signal & supervise the profile from the REAR end of the train. 3) The Onboard KAVACH shall keep radiating the latest profile ID available with it. 4) Stationary KAVACH should send DIST_PKT_START as 0 with MA and Track Profile information from the reported entry signal foot.	
				

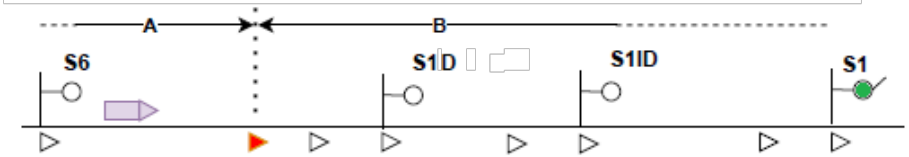
System Level TEST CASES (RDSO)				
Test ID	**Test Scenario**	**Input Specification**	**Expected Output/Values**	**Observed Output (Pass/Fail)**
19.12.	In start of mission, Onboard KAVACH reported Tag is entry signal foot Tag and Loco Front End (LFE) is between entry and exit signals. If approaching Signal aspect (S1D) GREEN, the OSMA & Track profile shall be sent for occupied section upto approaching stop signal & next 01 section.  	Make sure that Onboard KAVACH in SR Mode. Make sure that no faults are present. Swipe the reported tag as a SIGNAL **FOOT tag.** Direction of travel in single route.	1) The Onboard KAVACH should receive the packet and transit to OS mode & supervise the profile from the FRONT end of the train. 2) Onboard KAVACH shall transit FS mode after crossing of next stop signal& supervise the profile from the REAR end of the train. 3) The Onboard KAVACH should receive the packet and onboard KAVACH shall supervise the profile from the REAR end of the train. 4) Stationary KAVACH should send DIST_PKT_START as 0 with MA and Track Profile information from the reported entry signal foot.	
19.13.	In start of mission, Onboard KAVACH reported Tag is entry signal foot Tag of advance starter of A station (Absolute block section) and Loco Front End (LFE) is between entry and exit signals. SKAVACH to SKAVACH communication not provided.	1) Make sure that Onboard KAVACH in SR Mode. 2) Make sure that no faults are present. 3) Swipe the reported tag as a SIGNAL FOOT tag. 4) Direction of travel in single route.	1. The Onboard KAVACH should receive the packet and transit to OS mode & supervise the profile from the FRONT end of the train. 2. OS speed shall be MPS. 3. Onboard KAVACH shall supervise the profile from the front end of the train. The Onboard KAVACH shall keep radiating the latest profile ID available with it till border tag.	

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System Level TEST CASES (RDSO)				
Test ID	**Test Scenario**	**Input Specification**	**Expected Output/Values**	**Observed Output (Pass/Fail)**
			4. After border tag, the onboard KAVACH shall radiate the track profile ID as "0". 5. Stationary KAVACH should send DIST_PKT_START as 0 with MA and Track Profile information from the reported entry signal foot to approaching stop signal i.e. S1.	
		5) Upon registration with next station OSMA shall be extended up to S-1 incase aspect is RED.	1. S1D of B station will be displayed as blank till registration of onboard KAVACH with B station. 2. Onboard shall continue in OS mode and shall supervise station B track profile. 3. Onboard KAVACH shall not transit to SR while when new track profile received from station B.	
19.14.	In start of mission, Onboard Kavach reported Tag is entry signal foot Tag of advance starter of A station (Absolute block section) and Loco Front End (LFE) is between entry and exit signals. SKAVACH to SKAVACH communication not provided.	1. Make sure that Onboard KAVACH in SR Mode. 2. Make sure that no faults are present. 3. Swipe the reported tag as a SIGNAL FOOT tag. 4. Direction of travel in single route.	1. The Onboard KAVACH should receive the packet and transit to OS mode & supervise the profile from the FRONT end of the train. 2. OS speed shall be MPS. 3. The Onboard KAVACH shall keep radiating the latest profile ID available with it. 4. Stationary KAVACH should send DIST_PKT_START as 0 with MA and Track Profile information from the reported entry signal foot to	

System Level TEST CASES (RDSO)				
Test ID	**Test Scenario**	**Input Specification**	**Expected Output/Values**	**Observed Output (Pass/Fail)**
			approaching stop signal i.e. S1.	
		5. Upon registration with next station OSMA shall be extended beyond S-1 incase aspect is OFF.	1. S1D of B station will be displayed as blank till registration of onboard KAVACH with B station. 2. Onboard shall continue in OS mode and shall merge with station B track profile. 3. After crossing of S1, Onboard KAVACH shall transit FS mode & supervise the profile from the REAR end of the train.	
				
19.15.	In start of mission, Onboard KAVACH reported Tag is entry signal foot Tag of advance starter of A station (Absolute block section) and Loco Front End (LFE) is between entry and exit signals. SKAVACH to SKAVACH communication provided.	1. Make sure that Onboard KAVACH in SR Mode. 2. Make sure that no faults are present. 3. Swipe the reported tag as a SIGNAL FOOT tag. 4. Direction of travel in single route.	1. The Onboard KAVACH should receive the packet and transit to OS mode & supervise the profile from the FRONT end of the train. 1. OS speed shall be MPS. 2. The Onboard KAVACH shall keep radiating the latest profile ID available with it. 3. S1D of B station shall be displayed even before registration. 4. After border tag, the onboard KAVACH shall radiate the track profile ID as “0”. 5. Stationary KAVACH should send DIST_PKT_START as 0 with MA and Track Profile information from the reported entry signal foot to	

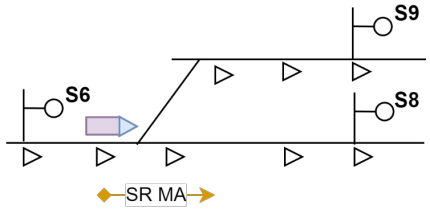
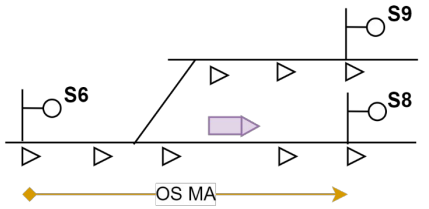
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System Level TEST CASES (RDSO)				
Test ID	**Test Scenario**	**Input Specification**	**Expected Output/Values**	**Observed Output (Pass/Fail)**
			approaching stop signal i.e. S1.	
		5. Upon registration with next station OSMA shall be extended beyond S-1 incase aspect is OFF.	1. Onboard shall continue in OS mode and shall supervise station B track profile. 2. Onboard KAVACH shall not transit to SR while when new track profile received from station B. 1. After crossing of S1, Onboard KAVACH shall transit FS mode & supervise the profile from the REAR end of the train.	
				
19.16.	In start of mission, if the 1st Tag read as signal Approach Tag, the DIST_PKT_START shall be the distance between this approach Tag and applicable Signal foot Tag for that route in "- xxx m" (2's complement form). After passing the next Signal foot Tag, if approaching Signal aspect– YELLOW, the OSMA & Track profile shall be sent for occupied &	1) Make sure that Onboard KAVACH in SR Mode. 2) Make sure that no faults are present. 3) Swipe the reported tag as a SIGNAL **approach tag.** 4) Direction of travel in single route.	1. Stationary KAVACH should send DIST_PKT_START as -Ve (starts from entry signal foot tag) with MA and Track Profile information starts from entry signal foot. 2. The Onboard KAVACH should receive the packet and transit to OS mode& supervise the profile from the FRONT end of the train. 3. OS speed shall be MPS. 4. The Onboard KAVACH shall keep radiating the latest profile ID	

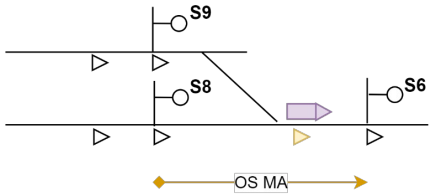
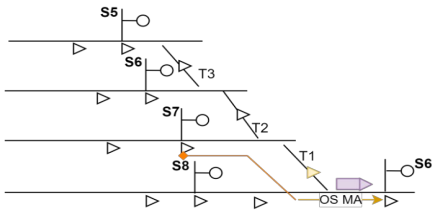
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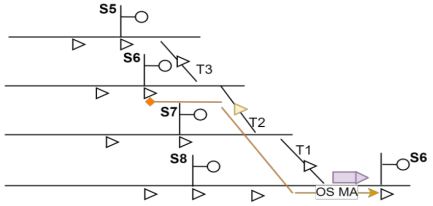
System Level TEST CASES (RDSO)				
Test ID	**Test Scenario**	**Input Specification**	**Expected Output/Values**	**Observed Output (Pass/Fail)**
	next section.  		available with it. 5. Onboard KAVACH shall transit FS mode after crossing of next stop signal & supervise the profile from the REAR end of the train.	
19.17.	In start of mission, if the 1st Tag read as signal Approach Tag, the DIST_PKT_START shall be the distance between this approach Tag and applicable Signal foot Tag for that route in "- xxx m" (2's complement form). After passing the next Signal foot Tag, if approaching Signal aspect double YELLOW, the OSMA & Track profile shall be sent for occupied & next 02 section.  	1) Make sure that Onboard KAVACH in SR Mode. 2) Make sure that no faults are present. 3) Swipe the reported tag as a SIGNAL **approach tag.** 4) Direction of travel in single route.	1. Stationary KAVACH should send DIST_PKT_START as -Ve (starts from entry signal foot tag) with MA and Track Profile information starts from entry signal foot. 2. The Onboard KAVACH should receive the packet and transit to OS mode& supervise the profile from the FRONT end of the train. 3. OS speed shall be MPS. 4. The Onboard KAVACH shall keep radiating the latest profile ID available with it. 5. Onboard KAVACH shall transit FS mode after crossing of next stop signal & supervise the profile from the REAR end of the train.	
19.18.	In case of Start of mission, the entry of a station if first tag encountered falls in single route in	1) Make sure that Onboard KAVACH in SR Mode. 2) Make sure that no faults are	1) Stationary KAVACH should send DIST_PKT_START as -Ve (starts from entry signal foot tag) with MA	

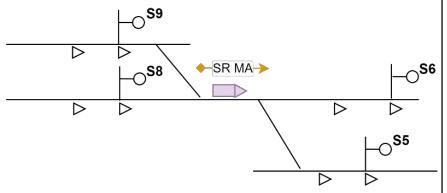
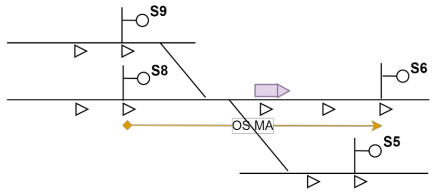
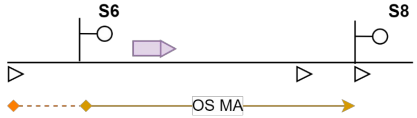
System Level TEST CASES (RDSO)				
Test ID	**Test Scenario**	**Input Specification**	**Expected Output/Values**	**Observed Output (Pass/Fail)**
	the direction of travel; MA and TP shall be given from the virtual location (stationary KAVACH entry point before the approaching signal or previous station exit signal) in the rear of the train. With DIST_PKT_START as negative.  	present. 3) Swipe the reported tag as a KAVACH entry tag (Inline Tag or exist Tag) 4) Direction of travel in single route. 5) Stationary KAVACH should send.	and Track Profile information starts from entry signal foot. 2) The Onboard KAVACH should receive the packet and transit to OS mode& supervise the profile from the FRONT end of the train. 3) OS speed shall be MPS. 4) The Onboard KAVACH shall keep radiating the latest profile ID available with it. 5) Onboard KAVACH shall transit FS mode after crossing of next stop signal & supervise the profile from the REAR end of the train.	
19.19.	In start of mission, first tag encountered falls under multiple exit routes in the direction of travel, SR authorization shall be extended until single exit route is detected. Thereafter, MA and TP shall be given from rear end signal foot tag with DIST_PKT_START as negative.	1) Make sure that Onboard KAVACH in SR Mode. 2) Make sure that no faults are present. 3) Swipe the reported tag as inline tag that falls in multiple routes. 4) Direction of travel in multiple routes.	1) SR authorization shall be extended until single exit route is detected. 2) Upon detection of single route, the Stationary KAVACH should send DIST_PKT_START as -Ve (starts from entry signal foot tag) with OSMA, authorized speed based on TOC and Track Profile information starts from entry signal foot.	

System Level TEST CASES (RDSO)				
Test ID	**Test Scenario**	**Input Specification**	**Expected Output/Values**	**Observed Output (Pass/Fail)**
			3) Authorized speed to be checked for main line and loop line. 4) The Onboard KAVACH should receive the packet and transit to OS mode& supervise the profile from the FRONT end of the train. 5) The Onboard KAVACH shall keep radiating the latest profile ID available with it. 6) Onboard KAVACH shall transit FS mode after crossing of next stop signal at OFF & supervise the profile from the REAR end of the train.	
				
19.20.	In start of mission, first tag encountered is on main line and falls under MULTIPLE ENTRY ROUTES in the direction of travel, MA and TP shall be given from main line starter signal foot tag with DIST_PKT_START as negative. OS Speed = MPS	1) Make sure that Onboard KAVACH in SR Mode. 2) Make sure that no faults are present. 3) Swipe the reported tag as inline tag on main line and fall under multiple entry routes in the direction of travel.	1) Stationary KAVACH should send DIST_PKT_START as -Ve (starts from S-8 signal foot tag) with OSMA, authorized speed (MPS) and Track Profile information. 2) The Onboard KAVACH should receive the packet and transit to OS mode & supervise the profile from the FRONT end of the train. 3) The Onboard KAVACH shall keep radiating the latest profile ID available with it. 4) Onboard KAVACH shall transit FS mode after crossing of next stop	

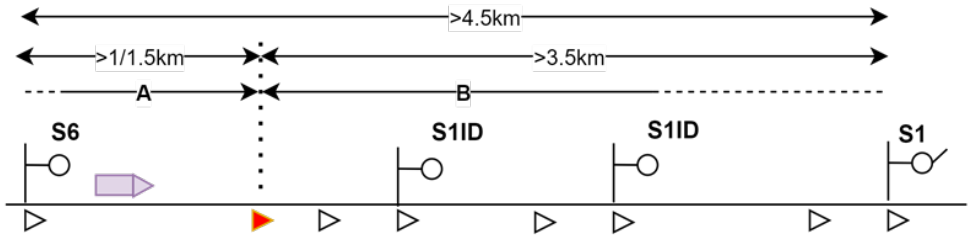
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System Level TEST CASES (RDSO)				
Test ID	**Test Scenario**	**Input Specification**	**Expected Output/Values**	**Observed Output (Pass/Fail)**
			signal at OFF & supervise the profile from the REAR end of the train.	
19.21.	In start of mission, first tag encountered is in first turnout zone and falls under multiple entry routes in the direction of travel, MA and TP shall be given from first loop line starter (S7) signal foot tag with DIST_PKT_START as negative. OS Speed = 30kmph. 	1) Make sure that Onboard KAVACH in SR Mode. 2) Make sure that no faults are present. 3) Swipe the reported tag is in first turnout zone and falls under multiple entry routes in the direction of travel.	1) Stationary KAVACH should send DIST_PKT_START as -Ve (starts from S-7 signal foot tag) with OSMA, authorized speed (30 Kmph) and Track Profile information. 2) The Onboard KAVACH should receive the packet and transit to OS mode & supervise the profile from the FRONT end of the train. 3) The Onboard KAVACH shall keep radiating the latest profile ID available with it. 4) Onboard KAVACH shall transit FS mode after crossing of next stop signal at OFF & supervise the profile from the REAR end of the train.	
19.22.	In start of mission, first tag encountered is in ahead of first turnout zone and falls under multiple entry routes in the	1) Make sure that Onboard KAVACH in SR Mode. 2) Make sure that no faults are present.	1) Stationary KAVACH should send DIST_PKT_START as -Ve (starts from S-6 signal foot tag when reported tag is T-2, start from S-5	

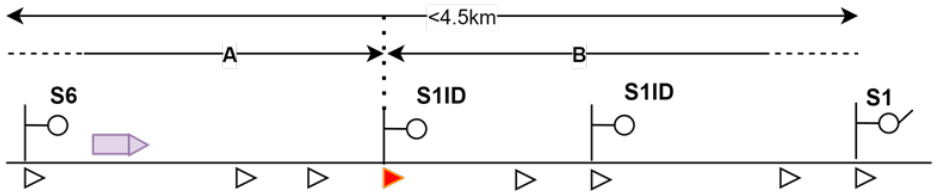
System Level TEST CASES (RDSO)				
Test ID	**Test Scenario**	**Input Specification**	**Expected Output/Values**	**Observed Output (Pass/Fail)**
	direction of travel, MA and TP shall be given from nearest loop line starter (eg. If reported tag is in T2 region then S6 becomes reference, if reported tag is in T3 region then S5 becomes reference signal) signal foot tag with DIST_PKT_START as negative. OS Speed = 15kmph.  	3) Swipe the reported tag is in first tag encountered is in ahead of first turnout zone and falls under multiple entry routes in the direction of travel. 4) Stationary KAVACH should send DIST_PKT_START as –Ve. MA and TP shall be given from nearest loop line starter (eg. If reported tag is in T2 region then S6 becomes reference, if reported tag is in T3 region then S5 becomes reference signal) signal foot tag with DIST_PKT_START as negative. OS Speed = 15kmph.	signal foot tag when reported tag is T-3) with OSMA, authorized speed (15 Kmph) and Track Profile information. 2) The Onboard KAVACH should receive the packet and transit to OS mode & supervise the profile from the FRONT end of the train. 3) The Onboard KAVACH shall keep radiating the latest profile ID available with it. 4) Onboard KAVACH shall transit FS mode after crossing of next stop signal at OFF & supervise the profile from the REAR end of the train.	
19.23.	In start of mission, first tag encountered falls under multiple entry routes and exit routes in the direction of travel, SR authorization shall be extended until single exit route is detected. Thereafter, MA and TP shall be given from nearest starter signal foot tag with DIST_PKT_START as negative. OS Speed = As per TOC.	1) Make sure that Onboard KAVACH in SR Mode. 2) Make sure that no faults are present. 3) Swipe the reported tag as inline tag that encountered falls under multiple entry routes and exit routes in the direction of travel. 4) Direction of travel in multiple routes.	1) SR authorization shall be extended until single exit route is detected. 2) Upon detection of single route, the Stationary KAVACH should send DIST_PKT_START as -Ve (starts from entry signal foot tag) with OSMA, authorized speed based on TOC and Track Profile information. 3) Authorized speed to be checked for main line and loop line. 4) The Onboard KAVACH should	

System Level TEST CASES (RDSO)				
Test ID	**Test Scenario**	**Input Specification**	**Expected Output/Values**	**Observed Output (Pass/Fail)**
	 		receive the packet and transit to OS mode& supervise the profile from the FRONT end of the train. 5) The Onboard KAVACH shall keep radiating the latest profile ID available with it. 6) Onboard KAVACH shall transit FS mode after crossing of next stop signal at OFF & supervise the profile from the REAR end of the train.	
19.24.	In start of mission, If signal foot tag is missed and reported tag in previous section. **In OS/FS mode:** MA and TP shall be given from the last reported tag with DIST_PKT_START as positive. Onboard KAVACH shall ensure that the data given upto entry signal (S6) foot tag shall be maintained if already received. OS Speed = MPS. 	1) Make sure that Onboard KAVACH in OS/FS Mode. 2) Make sure that no faults are present. 3) Swipe the reported tag of previous section, i.e signal approach tag. 4) Stationary KAVACH should send DIST_PKT_START as +Ve. MA and TP shall be given from the last reported tag with DIST_PKT_START as positive.	1. Onboard KAVACH shall ensure that the data given up to entry signal (S6) foot tag shall be maintained if already received. 2. The Onboard KAVACH should receive the packet and onboard KAVACH shall supervise the profile from the REAR end of the train. The Onboard KAVACH shall keep radiating the latest profile ID available with it.	

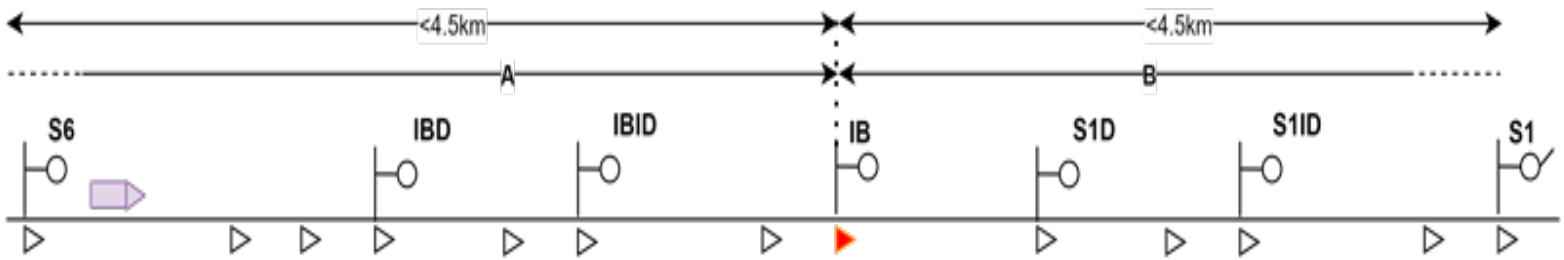
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System Level TEST CASES (RDSO)				
Test ID	**Test Scenario**	**Input Specification**	**Expected Output/Values**	**Observed Output (Pass/Fail)**
20.	**KAVACH _FRS_20: Border Tag handling-This test case to check that stationary KAVACH and Onboard KAVACH handling of Border tag**			
20.1.	Handling of border tag by stationary KAVACH and onboard KAVACH when:- (i) Two stations distance is >4.5 km (LSS to Home). (ii) Border Tag can be either STN-B entry point or Communication point of the two towers. (iii) Exit limit for STN-A is 1 to 1.5km after S6. Exit of Radio Communication with STN-A. (iv) Entry limit for STN-B is > 3.5km from S1. Entry of Radio Communication with STN-B. (v) No Communication Mandatory Zone between Entry and Exit locations to be introduced. (vi) No Relays Status exchange is required between stations (vii)No TLM information exchange is required between stations.	1. Make sure loco is in FS/ OS mode. 2. Simulate the loco movement from A station to B station.	1. Check that onboard send access request packet with station "B" after reading Border Tag. 2. Check that loco get registered with station "B" without any mode transition. 3. Check the proper TLM measurement in LPOCIP.	
				

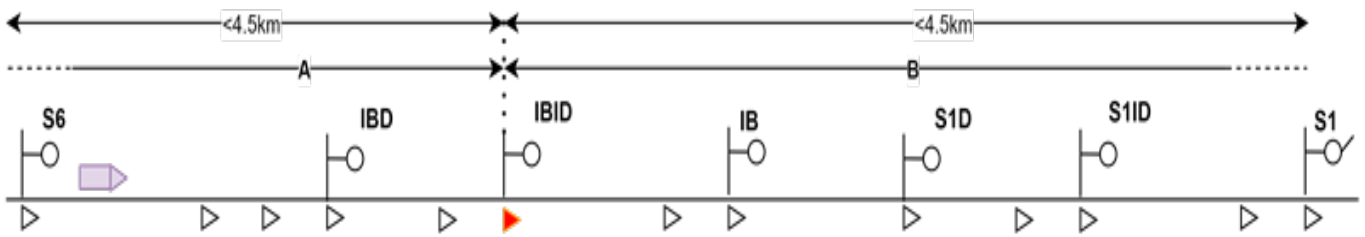
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System Level TEST CASES (RDSO)				
Test ID	**Test Scenario**	**Input Specification**	**Expected Output/Values**	**Observed Output (Pass/Fail)**
20.2.	Handling of border tag by Stationary KAVACH and Onboard KAVACH when:- (i) STN-A to STN-B communication is required. (ii) Border Tag shall be at entry signal foot of STN-B. (iii) Exit limit for STN-A is Border Tag. (iv) Entry limit for STN-B is Border Tag. (v) Communication is Mandatory in entire block section. (vi) No Relays Status exchange is required between stations. (vii) TLM information exchange is required between stations when distance between STN-A TLM signal and STN-B entry signal is < 1km.	1. Make sure loco is in FS/ OS mode. 2. Simulate the loco movement from A station to B station.	1. Check that onboard send access request packet with station "B" after reading Border Tag. 2. Check that loco get registered with station "B" without any mode transition. 3. Check the proper TLM measurement in LP-OCIP.	
				
20.3.	Handling of border tag by Stationary KAVACH and Onboard KAVACH when: - (i) STN-A to STN-B communication is required. (ii) Border Tag shall be at IB Stop signal foot. (iii) Exit limit for STN-A is Border Tag. (iv) Entry limit for STN-B is Border Tag. (v) Communication is Mandatory in entire block section.	1. Make sure loco is in FS/OS mode. 2. Simulate the loco movement from A station to B station.	1. Check that onboard send access request packet with station "B" after reading Border Tag. 2. Check that loco gets registered with station "B" without any mode transition.	

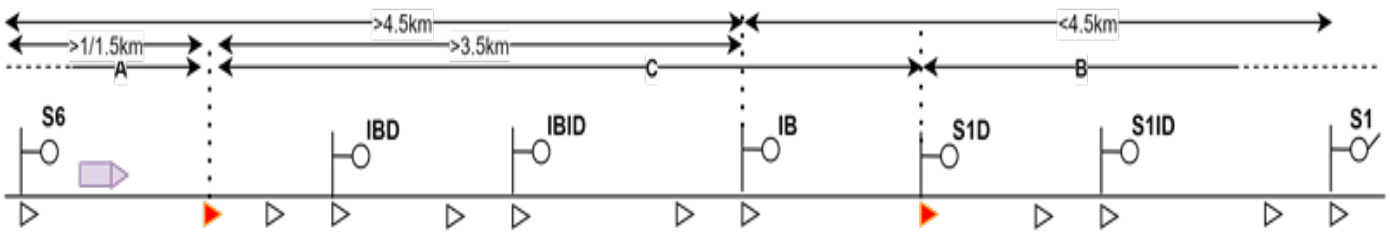
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System Level TEST CASES (RDSO)				
Test ID	**Test Scenario**	**Input Specification**	**Expected Output/Values**	**Observed Output (Pass/Fail)**
	(vi) IB Signal Relays Status exchange is required from STN-A to STN-B. (vii) TLM information exchange is not required.			
				
20.4.	Handling of border tag by Stationary KAVACH and Onboard KAVACH when: - (i) STN A to STN-B communication is required. (ii) Border Tag shall be at IB inner distant signal foot. (iii) Exit limit for STN-A is Border Tag (iv) Entry limit for STN-B is Border Tag (v) Communication is Mandatory in entire block. (vi) IBID and IB Signals Relays Status exchange is required from STN-A to STN-B. (vii) TLM information exchange is not required.	1. Make sure loco is in FS/ OS mode. 2. Simulate the loco movement from A station to B station.	1. Check that onboard send access request packet with station "B" after reading Border Tag. 2. Check that loco get registered with station "B" without any mode transition.	

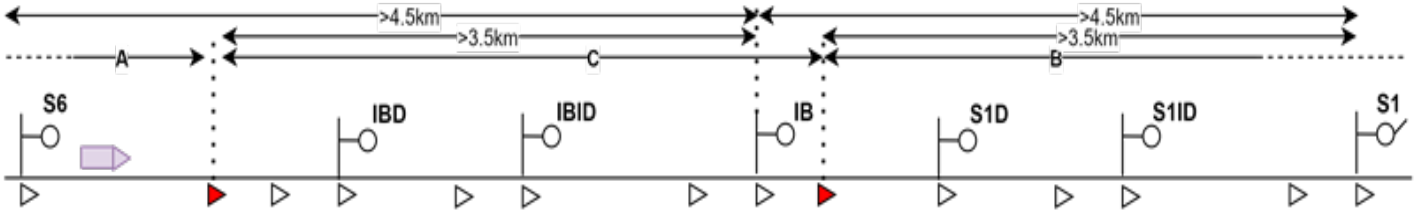
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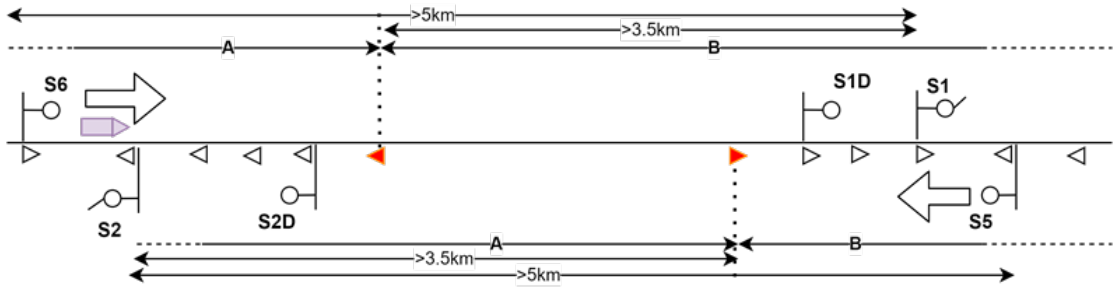
System Level TEST CASES (RDSO)				
Test ID	**Test Scenario**	**Input Specification**	**Expected Output/Values**	**Observed Output (Pass/Fail)**
				
20.5.	Handling of border tag by Stationary KAVACH and Onboard KAVACH when: - (i) Separate IB KAVACH is required at IB Signals hut (say STN-C). (ii) STN-A to STN-C communication is not required. STN-C to STN-B communication is required. (iii) Border Tag shall be at entry signal foot STN-B. (iv) Exit limit for STN-A is 1.5km after S6. Entry limit for STN-C is >3.5km before IB stop signal. (v) Exit limit for STN-C is Border Tag. Entry limit for STN-B is Border Tag. (vi) Exit limit for STN-C is Border Tag. Entry limit for STN-B is Border Tag. (vii) Communication is not Mandatory in after STN-A exit and before STN-C entry in block section.	1. Make sure loco is in FS/ OS mode. 2. Simulate the loco movement from A station to B station.	1. Check that onboard send access request packet with station "B" after reading Border Tag. 2. Check that loco get registered with station "B" without any mode transition. 3. Check the proper TLM measurement in LP-OCIP after passing STN-A.	

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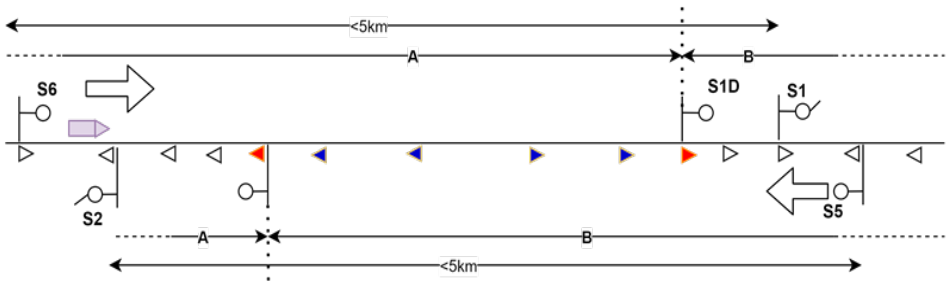
System Level TEST CASES (RDSO)				
Test ID	**Test Scenario**	**Input Specification**	**Expected Output/Values**	**Observed Output (Pass/Fail)**
	(viii) No Relays Status exchange is required between STN-A and STN-C. (ix) Relays (RRI) Status exchange is required between STN-C and STN-B. (x) TLM information exchange is not required after passing STN-C.			
				
20.6.	Handling of border tag by Stationary KAVACH and Onboard KAVACH when: - (i) Separate IB KAVACH is required at IB Signals hut (say STN-C). (ii) STN-A to STN-C communication is not required. STN-C to STN-B communication is not required. (iii) Border Tag between STN-A and STN-C can be either STN-C entry point or Communication point of the two towers. (iv) Border Tag between STN-C and STN-B can be either STN-B entry point or C.P of the two towers. (v) Exit limit for STN-A is 1 - 1.5km after S6. Entry limit for STN-C is >3.5km before IB stop signal. (vi) Exit limit for STN-C is 1 - 1.5km after IB Stop Signal. Entry limit for STN-B is >3.5km before its first stop signal. (vii) Communication is not Mandatory between STN-A exit and	1. Make sure loco is in FS/OS mode. 2. Simulate the loco movement from A station to B station.	1. Check that onboard send access request packet with station "B" after reading Border Tag. 2. Check that loco get registered with station "B" without any mode transition.	

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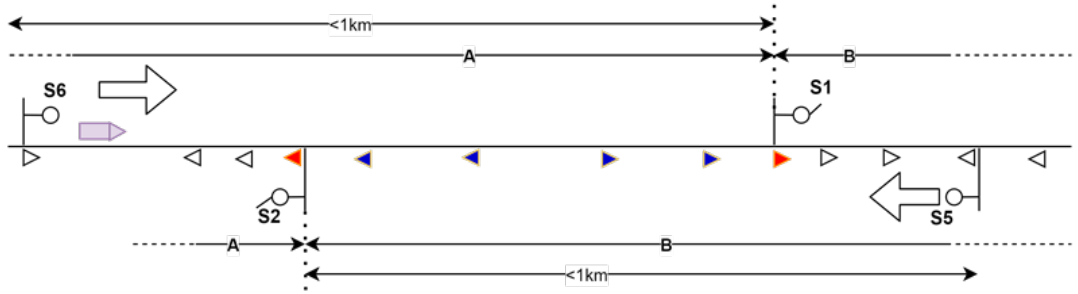
System Level TEST CASES (RDSO)				
Test ID	**Test Scenario**	**Input Specification**	**Expected Output/Values**	**Observed Output (Pass/Fail)**
	STN-C entry in block section. (viii) Communication is not Mandatory between STN-C exit and STN-B entry in block section. (ix) No Relays Status exchange is required between STN-A and STN-C. No Relays Status exchange is required between STN-C and STN-B. (x) TLM information exchange is not required.			
				
20.7.	Handling of border tag by stationary KAVACH and Onboard KAVACH when: - i. STN-A to STN-B communication is not required. ii. Border Tag from STN-A to STN-B can be either STN-B entry point or between exit and entry limits. iii. Border Tag from STN-B to STN-A can be either STN-A entry point or between exit and entry limit. iv. Exit limit for STN-A is 1 - 1.5km after S6. Entry limit for STN-B is >3.5km before first stop signal of STN-B. v. Exit limit for STN-B is 1 - 1.5km after S5. Entry limit	1. Make sure loco is in FS/ OS mode. 2. Simulate the loco movement from A station to B station.	1. Check that onboard send access request packet with station "B" after reading Border Tag. 2. Check that loco get registered with station "B" without any mode transition.	

System Level TEST CASES (RDSO)				
Test ID	**Test Scenario**	**Input Specification**	**Expected Output/Values**	**Observed Output (Pass/Fail)**
	for STN-B is >3.5km before first stop signal of STN-A. vi. Communication is Mandatory between in block section when block section length is < 7km. vii. Both station ID shall be programmed in Tags based on movement direction between border Tags. viii. No Relays Status exchange is required between STN-A and STN-B. ix. TLM information exchange is not required.	1. Make sure loco is in FS/ OS mode. 2. Simulate the loco movement from B station to A station.	1. Check that onboard send access request packet with station "A" after reading Border Tag. 2. Check that loco gets registered with station "A" without any mode transition.	
				
20.8.	Handling of border tag by stationary KAVACH and onboard KAVACH when: - i. STN-A to STN-B communication is required. ii. Border Tag from STN-A to STN-B shall be entry signal of STN-B. iii. Border Tag from STN-B to STN-A shall be entry signal of STN-A. iv. Exit limit for STN-A is Border Tag (entry signal of STN-B). Entry limit for STN-B is Border Tag (entry signal of STN-B).	1. Make sure loco is in FS/ OS mode. 2. Simulate the loco movement from A station to B station.	1. Check that onboard send access request packet with station "B" after reading Border Tag. 2. Check that loco gets registered with station "B" without any mode transition.	
		1. Make sure loco is in	1. Check that onboard	

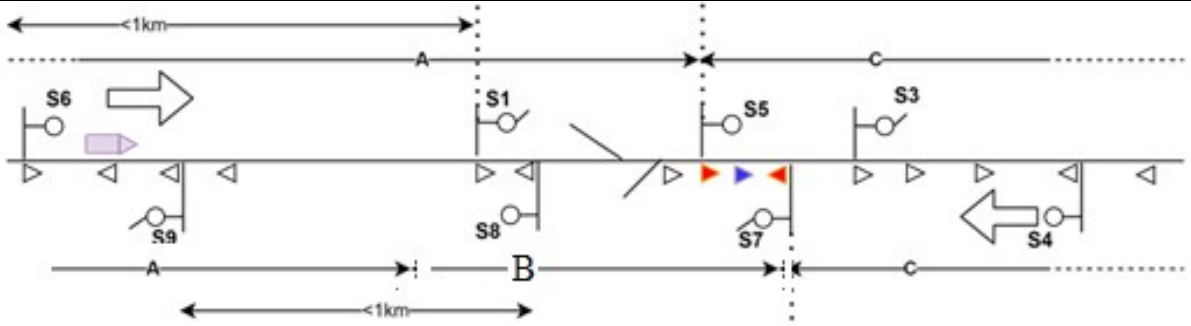
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System Level TEST CASES (RDSO)				
Test ID	**Test Scenario**	**Input Specification**	**Expected Output/Values**	**Observed Output (Pass/Fail)**
	v. Exit limit for STN-B is Border Tag (entry signal of STN-A). Entry limit for STN-A is Border Tag (entry signal of STN-A). vi. Communication is Mandatory in entire block section. vii. Both station ID shall be programmed in Tags based on movement direction between border Tags. viii. Relays Status exchange is required between STN-A and STN-B. ix. TLM information exchange is not required.	FS/OS mode. 2. Simulate the loco movement from B station to A station.	send access request packet with station "A" after reading Border Tag. 2. Check that loco gets registered with station "A" without any mode transition.	
				
20.9.	Handling of border tag by stationary KAVACH and onboard KAVACH when: - i. STN-A to STN-B communication is required. ii. Border Tag from STN-A to STN-B shall be entry signal of STN-B. iii. Border Tag from STN-B to STN-A shall be entry signal of STN-A. iv. Exit limit for STN-A is Border Tag (entry signal of STN-B). Entry limit for STN-B is Border Tag (entry	1. Make sure loco is in FS/OS mode. 2. Simulate the loco movement from A station to B station.	1. Check that onboard send access request packet with station "B" after reading Border Tag. 2. Check that loco get registered with station "B" without any mode transition.	

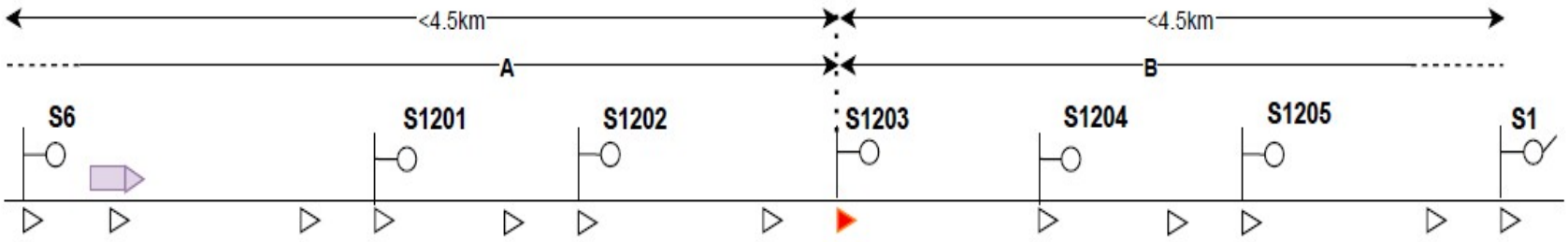
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System Level TEST CASES (RDSO)				
Test ID	**Test Scenario**	**Input Specification**	**Expected Output/Values**	**Observed Output (Pass/Fail)**
	signal of STN-B). v. Exit limit for STN-B is Border Tag (entry signal of STN-A). Entry limit for STN-A is Border Tag (entry signal of STN-A). vi. Communication is Mandatory in entire block section. vii. Both station ID shall be programmed in Tags based on movement direction between border Tags. viii. No Relays Status exchange is required between STN-A and STN-B. ix. TLM information exchange is not required.	1. Make sure loco is in FS/OS mode. 2. Simulate the loco movement from B station to A station.	1. Check that onboard send access request packet with station "A" after reading Border Tag. 2. Check that loco gets registered with station "A" without any mode transition.	
				
20.10.	Handling of border tag by stationary KAVACH and onboard KAVACH when: - i. STN-B is controlled by STN-A. All relays of STN-B shall be connected to STN-A through RIU. ii. STN-A to STN-C Communication is required if block section length (STN-B to STN-C) is < 5km. iii. Border Tag shall be at exit signal foot of STN-B from STN-A to STN-C direction. iv. Border Tag shall be at entry signal foot of STN-B from	1. Make sure loco is in FS/OS mode. 2. Simulate the loco movement from A station to C station.	1. Check that onboard send access request packet with station "C" after reading Border Tag (S-5 signal foot tag). 2. Check that loco gets registered with station "C" without	

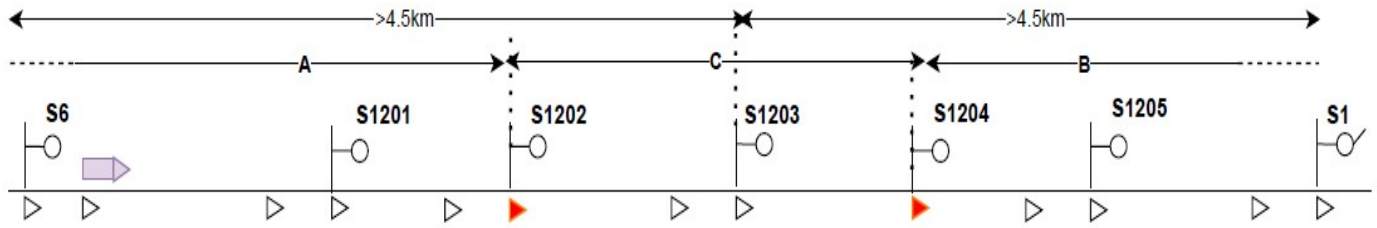
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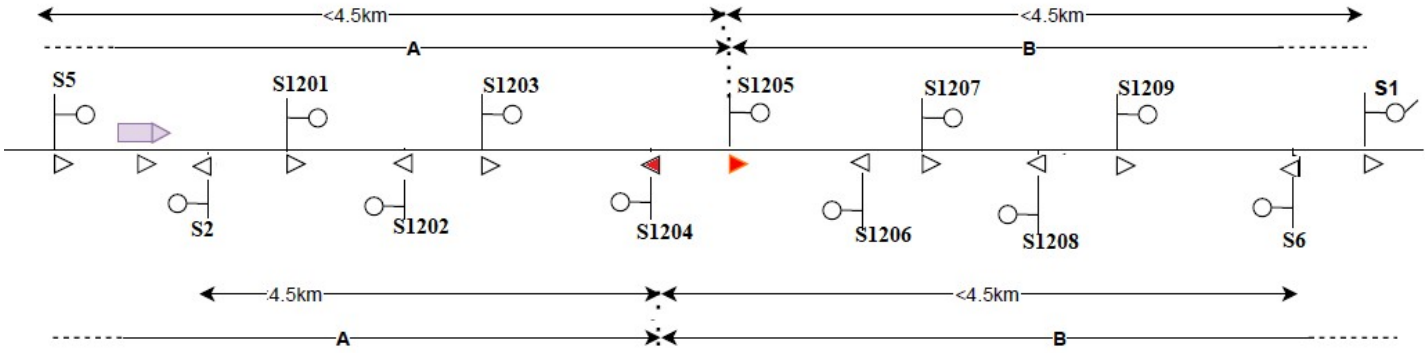
System Level TEST CASES (RDSO)				
Test ID	**Test Scenario**	**Input Specification**	**Expected Output/Values**	**Observed Output (Pass/Fail)**
	STN-C to STN-A direction. v. Exit limit for STN-A is Border Tag (Exit Signal of STN-B). vi. Entry limit for STN-A is Border Tag (Entry Signal of STN-B). vii. Communication is Mandatory in entire block section if length (STN-B to STN-C) is < 5km. viii. No Relays Status exchange is required between STN-A to STN-C. ix. TLM information exchange is not required.		any mode transition.	
		1. Make sure loco is in FS/OS mode. 2. Simulate the loco movement from C station to A station.	1. Check that onboard send access request packet with station "A" after reading Border Tag. 3. Check that loco gets registered with station "A" without any mode transition.	
				
20.11.	Handling of border tag by stationary KAVACH and onboard KAVACH in Auto section when: -	1. Make sure loco is in FS/ OS mode.	1. Check that onboard send access request	

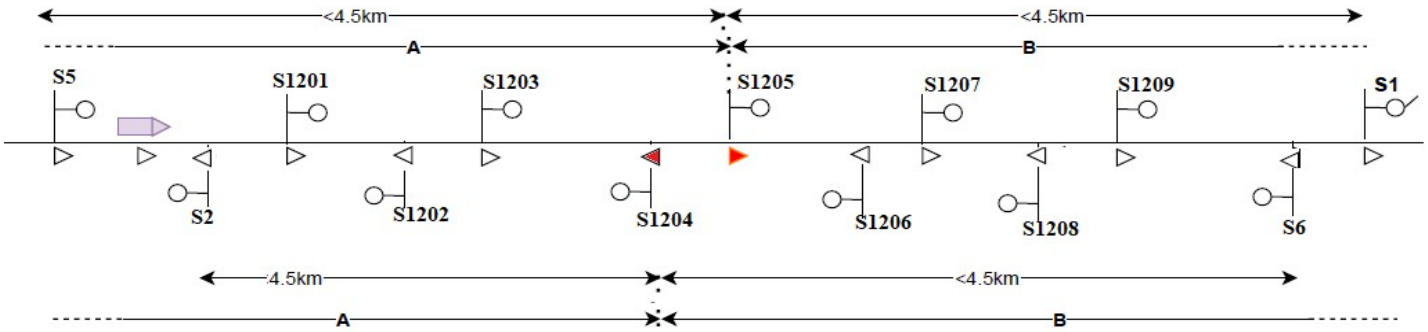
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System Level TEST CASES (RDSO)				
Test ID	**Test Scenario**	**Input Specification**	**Expected Output/Values**	**Observed Output (Pass/Fail)**
	i. STN-A to STN-B communication is required. ii. Border Tag from STN-A to STN-B shall be entry signal of STN-B (S-1203 auto signal). iii. Exit limit for STN-A is Border Tag (entry signal of STN-B- S1203 foot tag). Entry limit for STN-B is Border Tag (entry signal of STN-B). iv. Communication is Mandatory in entire block section. v. Both station ID shall be programmed in Tags based on movement direction between border Tags. vi. Relays Status exchange is required between STN-B and STN-A. vii. TLM information exchange is not required.	2. Simulate the loco movement from A station to B station.	packet with station "B" shall start after reading Border Tag (S-1203 signal foot tag). 2. On board shall deregistered with STN-A after registering with STN-B without any mode transition.	
				

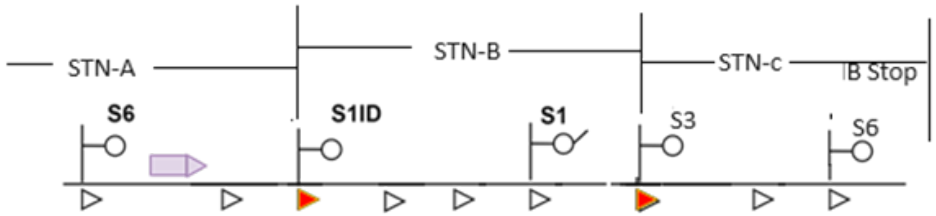
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System Level TEST CASES (RDSO)				
Test ID	**Test Scenario**	**Input Specification**	**Expected Output/Values**	**Observed Output (Pass/Fail)**
20.12.	Handling of border tag by stationary KAVACH and onboard KAVACH when: - (i) STN-A to STN-C communication is required. (ii) STN-C to STN-B communication is required. (iii) Border Tag between STN-A and STN-C can be STN-C entry point i.e (S-1202 signal foot Tag) or Communication point of the two towers. (iv) Border Tag between STN-C and STN-B can be STN-B entry point (i.e S-1204 Signal foot Tag) or Communication point of the two towers. (v) Relays Status exchange is required between STN-A and STN-C & STN-C and STN-B. (vi) TLM information exchange is not required.	1. Make sure loco is in FS/ OS mode. 2. Simulate the loco movement from A station to B station.	1. Check that onboard send access request packet with station "B" after reading Border Tag. 2. Check that loco gets registered with station "B" without any mode transition.	
				
20.13.	Handling of border tag by stationary KAVACH and onboard KAVACH in Single line Auto section when: - i. Distance between two station is less than 4.5 km from border tag signal to home signal. ii. STN-A to STN-B communication is required. iii. Communication is Mandatory in entire block section. iv. Border Tag from STN-A to STN-B shall be entry signal	1. Make sure loco is in FS/ OS mode. 2. Simulate the loco movement from A station to B station.	1. Check that onboard send access request packet with station "B" shall start after reading Border Tag (S-1205 signal foot tag).	

System Level TEST CASES (RDSO)				
Test ID	**Test Scenario**	**Input Specification**	**Expected Output/Values**	**Observed Output (Pass/Fail)**
	of STN-B (**S-1205** auto signal). v. Exit limit for STN-A is Border Tag (entry signal of STN-B- S1205 foot tag). Entry limit for STN-B is Border Tag (entry signal of STN-B). vi. Both station ID shall be programmed in Tags based on movement direction between border Tags. vii. Relays Status exchange is required between STN-B and STN-A. viii. TLM information exchange is not required.		2. On board shall deregistered with STN-A after registering with STN-B without any mode transition.	
				
20.14.	Handling of border tag by stationary KAVACH and onboard KAVACH in Single Line Auto section when: - i. Distance between two station is less than 4.5 km from border tag signal to home signal. ii. STN-A to STN-B communication is required. iii. Communication is Mandatory in entire block section. iv. Border Tag from STN-B to STN-A shall be entry signal	1. Make sure loco is in FS/ OS mode. 2. Simulate the loco movement from B station to A station.	1. Check that onboard send access request packet with station "A" shall start after reading Border Tag (S-1204 signal foot tag).	

System Level TEST CASES (RDSO)				
Test ID	**Test Scenario**	**Input Specification**	**Expected Output/Values**	**Observed Output (Pass/Fail)**
	of STN-B (**S-1205** auto signal). v. Exit limit for STN-B is Border Tag (entry signal of STN-A- S1204 foot tag). Entry limit for STN-B is Border Tag (entry signal of STN-B). vi. Both station ID shall be programmed in Tags based on movement direction between border Tags. vii. Relays Status exchange is required between STN-B and STN-A. viii. TLM information exchange is not required.		2. On board shall deregistered with STN-B after registering with STN-A without any mode transition.	
				
20.15.	Handling of border tag by stationary KAVACH and onboard KAVACH in absolute section when stations are very close: - i. Distance between stations is less than 3 km from border tag signal to home signal. ii. STN-A to STN-B & Station -C communication is required. iii. Communication is Mandatory in entire block section.	1. Make sure loco is in FS/ OS mode. 2. Simulate the loco movement from A station to B station. 3. Station-B shall fetch two section	1. Check that onboard KAVACH recieves the MA of 4 section along with track profile. 2. On board shall deregistered with	

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System Level TEST CASES (RDSO)				
Test ID	**Test Scenario**	**Input Specification**	**Expected Output/Values**	**Observed Output (Pass/Fail)**
	iv. Border Tag from STN-A to STN-B shall be entry signal of STN-B (**S-**1ID). v. Exit limit for STN-A is Border Tag (entry signal of STN-B- S1ID foot tag. Exit limit for STN-B is Border Tag of Signal S-3 (entry signal of STN-C). vi. Both station ID shall be programmed in Tags based on movement direction between border Tags. vii. Relays Status exchange is required between STN-B & STN-A and STN -C& STN-B. viii. TLM information exchange is required. ix. STN A shall request for 4 MA section data from STN - B.	data from station-C. 4. Station-B shall append the received data and send to Station -A.	STN-B after registering with STN-A without any mode transition and subsequently Station-C. 3. Check the proper TLM measurement in LP-OCIP after passing STN-A. 4. Check that the granted OSMA is withdrawn and extended based on signal aspect or track circuit status.	
			5. All signals green.	
			6. Make only IB Stop S6 Red.	
			7. Make only S3 Red.	
			8. Make only berthing track fail between S1 and S3	
			9. Make only point indication fail between S1 and S3	
			10. Make only S1 Red.	

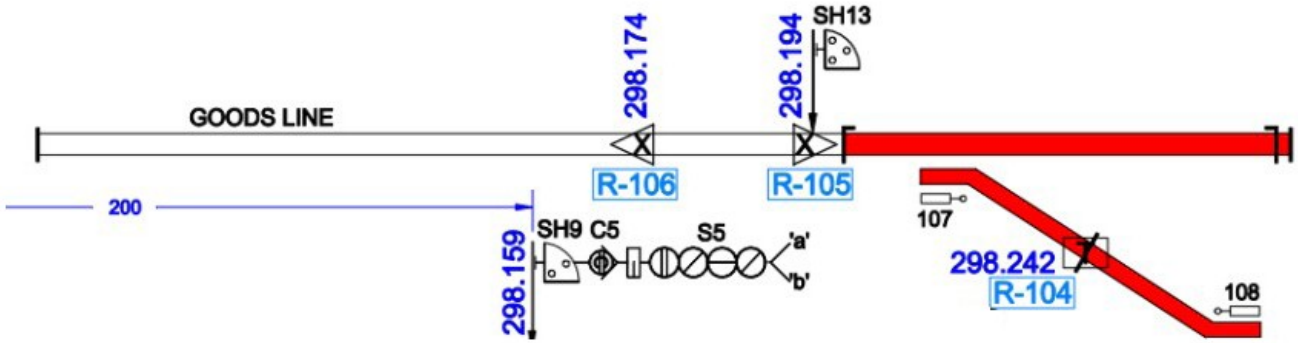
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System Level TEST CASES (RDSO)				
Test ID	**Test Scenario**	**Input Specification**	**Expected Output/Values**	**Observed Output (Pass/Fail)**
			11. Make S1ID blank (no affect should be on MA).	
20.16.	Handling of radio communication at border tag by stationary KAVACH and onboard KAVACH.	1. Make sure that loco is in FS/ OS mode. 2. Simulate the loco movement from station A to station B. 3. Loco KAVACH shall initiate transmission of Access Request packet on approach of border tag. 4. Station-B shall send access authority packet only when Loco KAVACH passes the border tag location. 5. Loco KAVACH shall transmit the Loco regular packet as per the new Session Key. 6. Station-B shall send Movement Authority packet when valid Loco regular packet is received. 7. Loco KAVACH shall accept the MA packet from Station-A until communication session is successfully established with Station-B i.e. valid MA packet is received from station-B. 8. Check there is no reduction in communication signal strength on DMI during handover.	1. Check that onboard KAVACH receives the MA along with track profile beyond border tag. 2. On board shall deregistered with Station-A after registering with STN-B without any mode transition. 3. Check there is no reduction in communication signal strength on DMI during handover.	

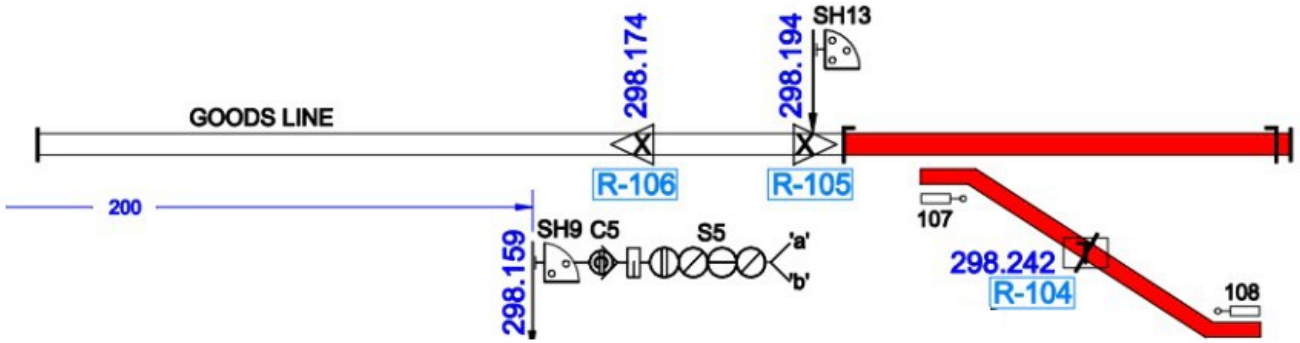
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System Level TEST CASES (RDSO)				
Test ID	**Test Scenario**	**Input Specification**	**Expected Output/Values**	**Observed Output (Pass/Fail)**
21.	**KAVACH_FRS_21: Exit Tag Handling- This test case to check that stationary KAVACH and Onboard KAVACH handling of Exit tag.**			
21.1.	Handling of exit tag by stationary KAVACH and onboard KAVACH when exit tag installed as per below figure. The movement from KAVACH to non KAVACH area.	1. Onboard is in OS/FS mode. 2. R-106 shall be programed for no communication in both directions and exit in reverse direction. 3. R-105 shall be programed for communication in nominal direction and no communication in reverse direction and exit in reverse direction. 4. Simulate the loco movement from R-104 to exit tag R-106 in reverse direction i.e KAVACH area to non KAVACH area.	1. Check that No mode changes till R-105 tag. 2. Brake shall not be applied. 3. Sufficient MA shall be given beyond the R-105. 4. Track profile shall not be monitored beyond R-105. 5. Onboard shall report the R-105 Tag to stationary KAVACH and transit to SR mode. 6. On-board KAVACH shall maintain communication with same TIN till its train length passes X-Tag. 7. Message "**Ack SR mode, KAVACH Territory Exit** "shall be displayed on LP-OCIP. 8. Prompt for SR mode acknowledgement.	FS OS

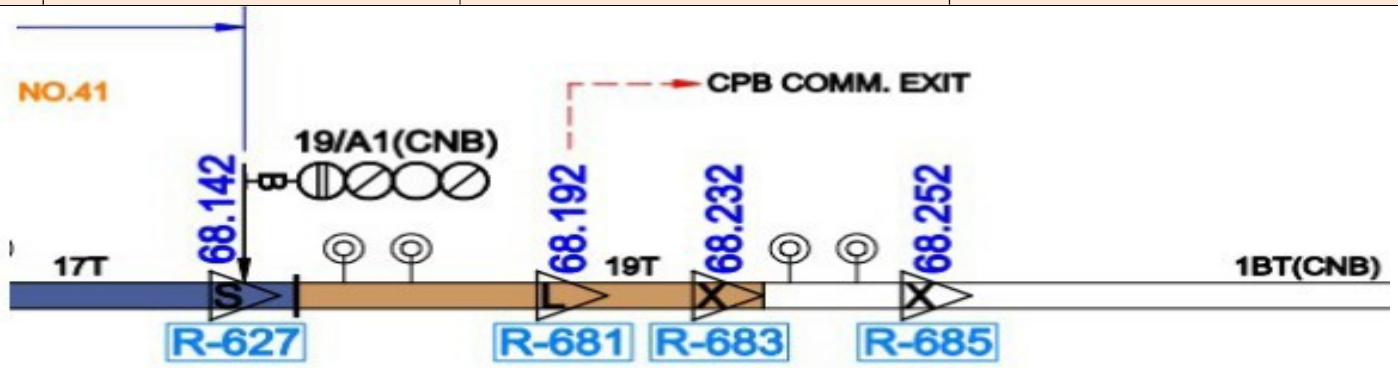
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System Level TEST CASES (RDSO)				
Test ID	**Test Scenario**	**Input Specification**	**Expected Output/Values**	**Observed Output (Pass/Fail)**
				
21.2.	Handling of exit tag by stationary KAVACH and onboard KAVACH when exit tag installed as per below figure. The movement from Non KAVACH area to KAVACH area.	1. Onboard is in SR mode. 2. R-106 shall be programed for no communication in both directions and exit in reverse. 3. R-105 shall be programed for communication in nominal direction and no communication in reverse direction and exit in reverse. 4. Simulate the loco movement from R-106 to tag R-104 in nominal direction i.e non KAVACH area to KAVACH area.	1. Check for "KAVACH TERRITORY ENTRY" message on LP-OCIP after R-105 is read by onboard. (SR Mode/SH Mode) 2. Direction shall be established after reading R-105 and communication shall be started with stationary KAVACH. (OS/SH) 3. Stationary KAVACH should send DIST_PKT_START as 0 with MA and Track Profile information from the reported entry X Tag R-105 with OSMA, authorized speed (MPS) and Track Profile information. (OS)	OS	

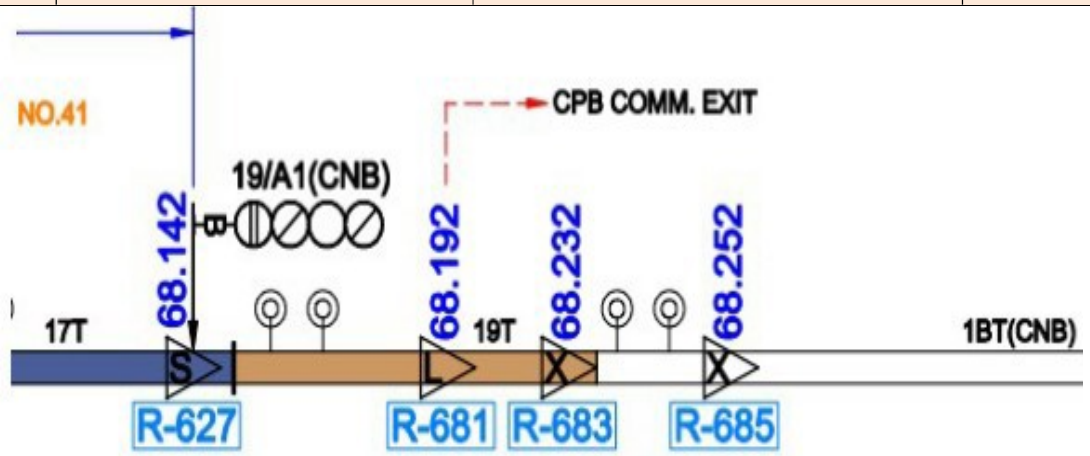
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System Level TEST CASES (RDSO)				
Test ID	**Test Scenario**	**Input Specification**	**Expected Output/Values**	**Observed Output (Pass/Fail)**
				
21.3.	Handling of exit tag by stationary KAVACH and onboard KAVACH when exit tag installed as per below figure. The movement from KAVACH to Non-KAVACH area.	1. Onboard is in FS/ OS mode. 2. R-685 shall be programed for no communication in both directions and exit in reverse. 3. R-683 shall be programed for communication in reverse direction and no communication in nominal direction and exit in nominal. 4. Simulate the loco movement from R-681 to exit tag R-685 in nominal direction i.e KAVACH area to non KAVACH area.	1. Check that No mode changes till R-683 tag. 2. Brake shall not be applied. 3. Sufficient MA shall be given beyond the R-683. 4. Track profile shall not be monitored beyond R-683. 5. Onboard shall report the R-683 Tag to stationary KAVACH and transit to SR mode. 6. On-board KAVACH shall maintain communication with same TIN till its train length passes X-Tag. 7. Message "**Ack SR mode, KAVACH Territory Exit"** shall be displayed on LP-OCIP. 8. Prompt for SR mode acknowledgement.	FS OS

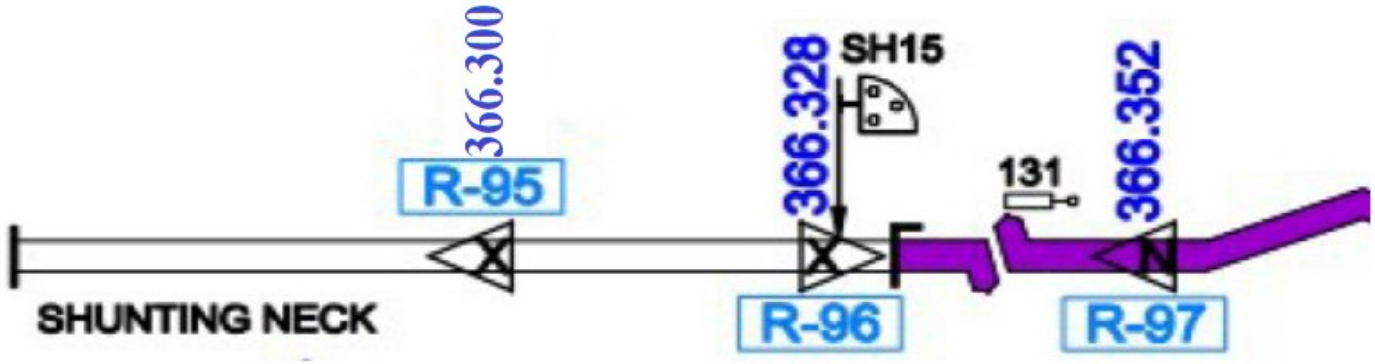
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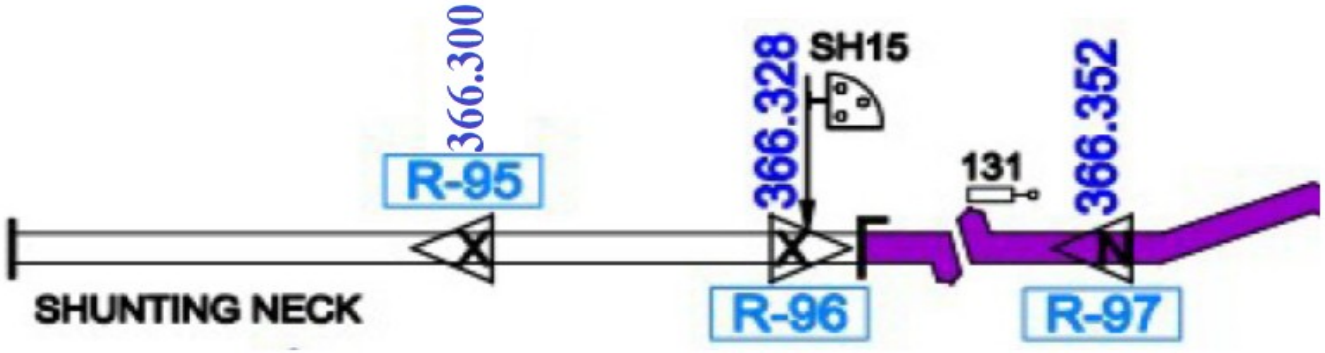
System Level TEST CASES (RDSO)				
Test ID	**Test Scenario**	**Input Specification**	**Expected Output/Values**	**Observed Output (Pass/Fail)**
				
21.4.	Handling of exit tag by stationary KAVACH and onboard KAVACH when exit tag installed as per below figure. The movement from NON KAVACH to KAVACH area.	1. Onboard is in SR mode. 2. R-685 shall be programed for no communication in both directions and exit in reverse. 3. R-683 shall be programed for communication in reverse direction and no communication in nominal direction and exit in nominal. 4. Simulate the loco movement from R-685 to exit tag R-683 in reverse direction i.e non KAVACH area to KAVACH area.	1. Check for "KAVACH TERRITORY ENTRY" message on LP-OCIP after R-683 is read by onboard. 2. Direction shall be established after reading R-683 and communication shall be started with stationary KAVACH. 3. Stationary KAVACH should send DIST_PKT_START as 0 with MA and Track Profile information from the reported entry (exit) Tag R-683 with OSMA, authorized speed (MPS) and Track Profile information.	

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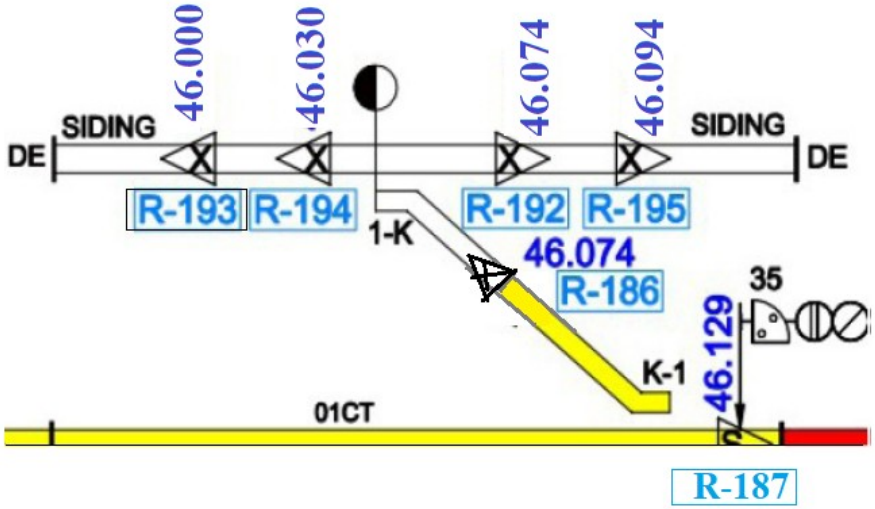
System Level TEST CASES (RDSO)				
Test ID	**Test Scenario**	**Input Specification**	**Expected Output/Values**	**Observed Output (Pass/Fail)**
				
21.5.	Handling of exit tag by stationary KAVACH and onboard KAVACH when exit tag installed as per below figure. The movement from KAVACH area to non KAVACH area.	1. Onboard is in OS/FS mode. 2. R-95 shall be programed for no communication in both directions. 3. R-96 shall be programed for communication in nominal direction and no communication in reverse direction. 4. R-95 & R-96 shall be programed for KAVACH territory Exit in reverse direction. 5. Simulate the loco movement from R-97 to exit tag R-95 in reverse. 6. direction i.e KAVACH area to non KAVACH area.	1. Check that No mode changes till R-96 tag. 2. Brake shall not be applied. 3. Sufficient MA shall be given beyond the R-96. 4. Track profile shall not be monitored beyond R-96. 5. Onboard shall report the R-96 Tag to stationary KAVACH and transit to SR mode. 6. On-board KAVACH shall maintain communication with same TIN till its train length passes X-Tag. 7. Message "**Ack SR mode, KAVACH Territory Exit"** shall be displayed on	FS OS

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System Level TEST CASES (RDSO)				
Test ID	**Test Scenario**	**Input Specification**	**Expected Output/Values**	**Observed Output (Pass/Fail)**
			LP-OCIP. 8. Prompt for SR mode acknowledgement	
				
21.6.	Handling of exit tag by stationary KAVACH and onboard KAVACH when exit tag installed as per below figure. The movement from NON KAVACH to KAVACH area.	1. Onboard is in SR mode. 2. R-95 shall be programed for no communication in both directions. 3. R-96 shall be programed for communication in nominal direction and no communication in reverse direction. 4. R-95 & R-96 shall be programed for KAVACH territory Exit in reverse direction. 5. Simulate the loco movement from R-95 to exit tag R-96 in nominal direction i.e non	1. Check for "KAVACH TERRITORY ENTRY" message on LP-OCIP after R-96 is read by onboard. 2. Direction shall be established after reading R-96 and communication shall be started with stationary KAVACH. 3. Stationary KAVACH should send DIST_PKT_START as 0 with MA and Track Profile information from the reported entry exit Tag R-96 with OSMA, authorized speed (MPS) and Track Profile information. 4. In case of R-95 is not read by	

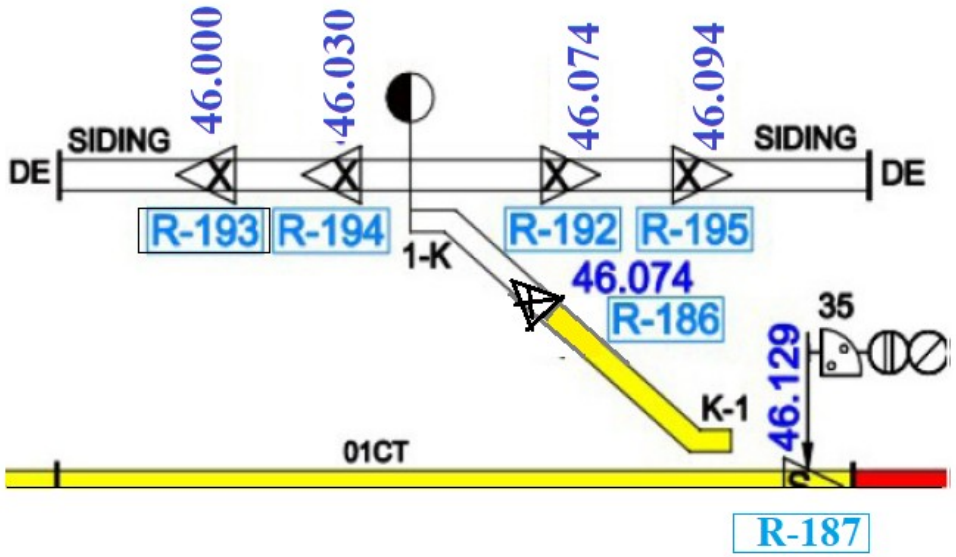
System Level TEST CASES (RDSO)				
Test ID	**Test Scenario**	**Input Specification**	**Expected Output/Values**	**Observed Output (Pass/Fail)**
		KAVACH area to KAVACH area.	onboard, the direction shall be established after reading R-97 and communication shall be started with stationary KAVACH	
				
21.7.	Handling of exit tag by stationary KAVACH and onboard KAVACH when exit tag installed as per below figure. The movement from KAVACH area to non KAVACH area.	1. Onboard is in SOS/FS mode. 2. R-192, R-193, R-194 & R-195 shall be programed for no communication in both directions. 3. R-192, R-193 & R-195 shall be programed for KAVACH territory Exit in both directions and R-194 & R-186 shall be programmed with KAVACH territory exit in reverse only. 4. R-186 shall be program for no	1. Check that No mode changes till R-186 tag. 2. Brake shall not be applied. 3. Sufficient MA shall be given beyond the R-186. 4. Track profile shall not be monitored beyond R-186. 5. Onboard shall report the R-186 Tag to stationary KAVACH and transit to SR mode. 6. On-board KAVACH shall maintain communication with same TIN till its	FS OS

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System Level TEST CASES (RDSO)				
Test ID	**Test Scenario**	**Input Specification**	**Expected Output/Values**	**Observed Output (Pass/Fail)**
		communication in reverse direction and communication in nominal direction. 5. R-186 shall be as "Kavach territory exit in Reverse direction". 6. Simulate the loco movement from KAVACH area i.e. R-186 to exit tag R-193 in reverse direction i.e to non KAVACH area.	train length passes X-Tag. 7. Message "**Ack SR mode, KAVACH Territory Exit"** shall be displayed on LP-OCIP. 8. Prompt for SR mode acknowledgement.	
				

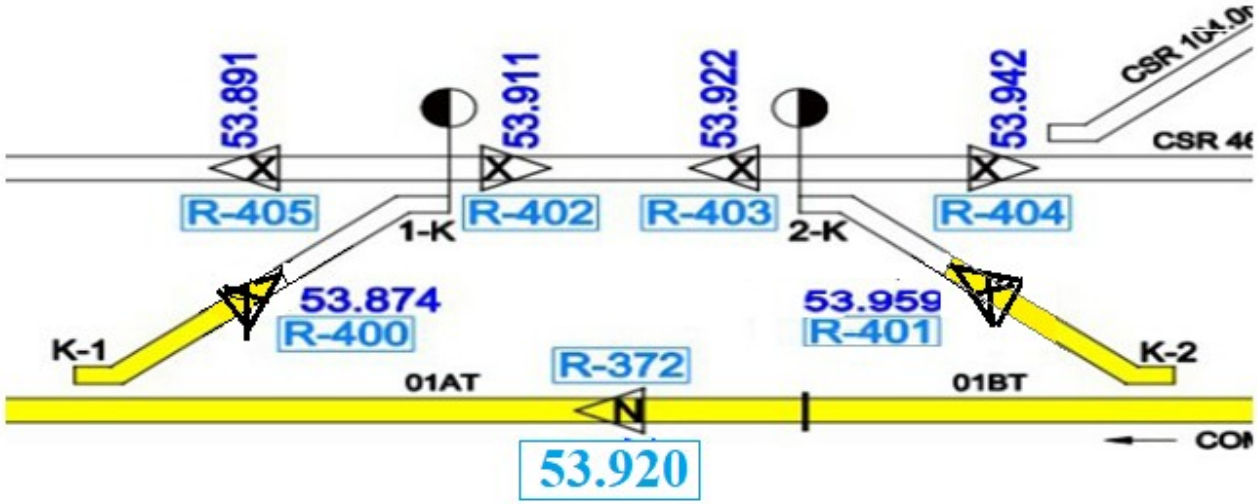
Representative of Firm	RDSO Inspecting Official

System Level TEST CASES (RDSO)				
Test ID	**Test Scenario**	**Input Specification**	**Expected Output/Values**	**Observed Output (Pass/Fail)**
21.8.	Handling of exit tag by stationary KAVACH and onboard KAVACH when exit tag installed as per below figure. The movement from non-KAVACH area to KAVACH area.	1. Onboard is in SR mode. 2. R-192, R-193, R-194 & R-195 shall be programed for no communication in both directions. 3. R-192, R-193 & R-195 shall be programed for Kavach territory Exit in both directions and R-194 & R-186 shall be programmed with Kavach territory exit in reverse only. 4. R-186 shall be program for no communication in reverse direction and communication is nominal direction. 5. Simulate the loco movement from non KAVACH area i.e. R-193 to tag R-186 in nominal direction i.e to KAVACH area.	1. Check for "KAVACH TERRITORY ENTRY" message on LP-OCIP after R-186 is read by onboard. 2. Direction shall be established after reading R-186 and communication shall be started with stationary KAVACH. 3. Stationary KAVACH should send DIST_PKT_START as 0 with MA and Track Profile information from the reported entry (exit) Tag R-186 with OSMA, authorized speed (MPS) and Track Profile information.	

System Level TEST CASES (RDSO)				
Test ID	**Test Scenario**	**Input Specification**	**Expected Output/Values**	**Observed Output (Pass/Fail)**
				
21.9.	Handling of exit tag by stationary KAVACH and onboard KAVACH when exit tag installed as per below figure. The movement from KAVACH area to non KAVACH area.	1. Onboard is in FS/OS mode. 2. R-402, R-403, R-404 & R-405 shall be programed for no communication in both directions. 3. R400 & R-402 shall be programmed with KAVACH territory exit in Nominal direction and R-401 & R-403 shall be programmed with KAVACH territory exit in reverse direction. 4. R-401 shall be program for no communication in reverse	1. Check that No mode changes till R-400 tag. 2. Brake shall not be applied. 3. Sufficient MA shall be given beyond the R-400. 4. Track profile shall not be monitored beyond R-400. 5. Onboard shall report the R-400 Tag to stationary KAVACH and transit to SR mode after reading R-400. 6. On-board KAVACH shall maintain communication with same TIN till its	FS OS

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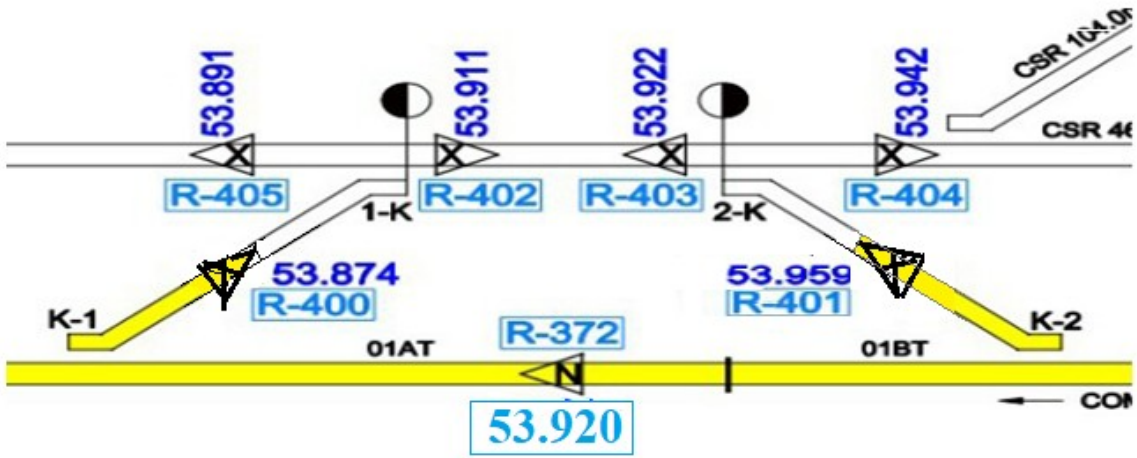
System Level TEST CASES (RDSO)				
Test ID	**Test Scenario**	**Input Specification**	**Expected Output/Values**	**Observed Output (Pass/Fail)**
		direction & R-400 for no communication in nominal direction and communication is nominal and reverse direction respectively. 5. Simulate the loco movement from KAVACH area i.e. R-400 to R-404 exit tag in nominal direction i. e. Non KAVACH area.	train length passes X-Tag . 7. Message "**Ack SR mode, KAVACH Territory Exit"** shall be displayed on LP-OCIP. 8. Prompt for SR mode acknowledgement.	



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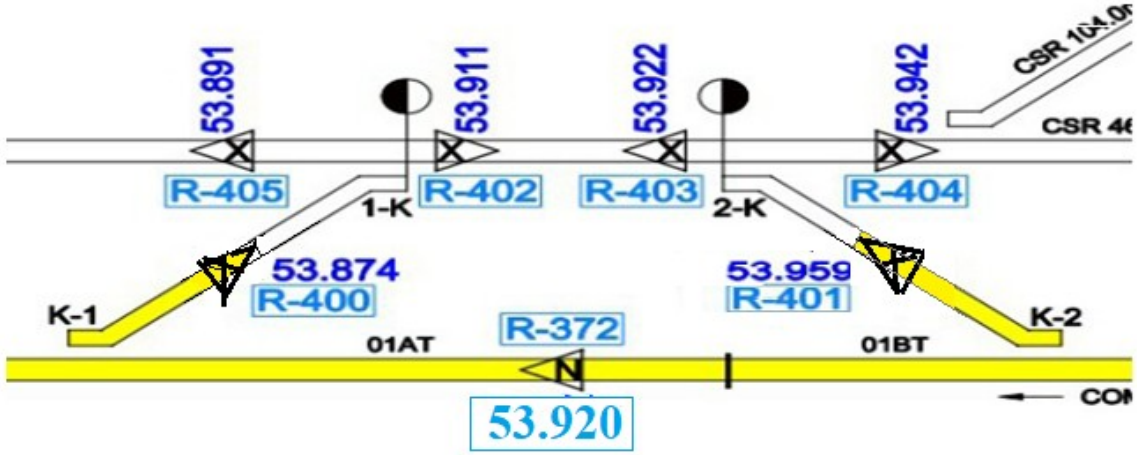
System Level TEST CASES (RDSO)				
Test ID	**Test Scenario**	**Input Specification**	**Expected Output/Values**	**Observed Output (Pass/Fail)**
21.10.	Handling of exit tag by stationary KAVACH and onboard KAVACH when exit tag installed as per below figure. The movement from KAVACH area to non KAVACH area.	1. Onboard is in FS/OS mode. 2. R-404 & R-405 shall be programed for no communication in both directions. 3. R-404 & R-405 shall be programmed for Kavach territory Exit in both directions and R400 & R-402 shall be programmed with KAVACH territory exit in Nominal direction and R-401 & R-403 shall be programmed with Kavach territory exit in reverse direction. 4. R-401 shall be program for no communication in reverse direction & R-400 for no communication in nominal direction and communication is nominal and reverse direction respectively. 5. Simulate the loco movement from KAVACH area i.e. R-401 to R-405 exit tag in reverse direction i. e. Non KAVACH area.	1. Check that No mode change till R-401 tag. 2. Brake shall not be applied. 3. Sufficient MA shall be given beyond the R-401. 4. Track profile shall not be monitored beyond R-401. 5. Onboard shall report the R-401 Tag to stationary KAVACH and transit to SR mode after reading R-401. 6. On-board KAVACH shall maintain communication with same TIN till its train length passes X-Tag R-401. 7. Message "**Ack SR mode, KAVACH Territory Exit"** shall be displayed on LP-OCIP. 8. Prompt for SR mode acknowledgement.	FS OS

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System Level TEST CASES (RDSO)				
Test ID	**Test Scenario**	**Input Specification**	**Expected Output/Values**	**Observed Output (Pass/Fail)**
				
21.11.	Handling of exit tag by stationary KAVACH and onboard KAVACH when exit tag installed as per below figure. The movement from Non KAVACH area to KAVACH area.	1. Onboard is in SR mode. 2. R-404 & R-405 shall be programed for no communication in both directions. 3. R-404 & R-405 shall be programmed for KAVACH territory Exit in both directions and R400 & R-402 shall be programmed with KAVACH territory exit in Nominal direction and R-401 & R-403 shall be programmed with KAVACH territory exit in reverse direction	1. Check for "KAVACH TERRITORY ENTRY" message on LP-OCIP after R-401 is read by onboard. 2. Direction shall be established after reading R-401 and communication shall be started with stationary KAVACH. 3. Stationary KAVACH should send DIST_PKT_START as 0 with MA and Track Profile information from the reported entry (exit) Tag R-401 with OSMA, authorized speed (MPS) and Track Profile information after ascertaining route.	

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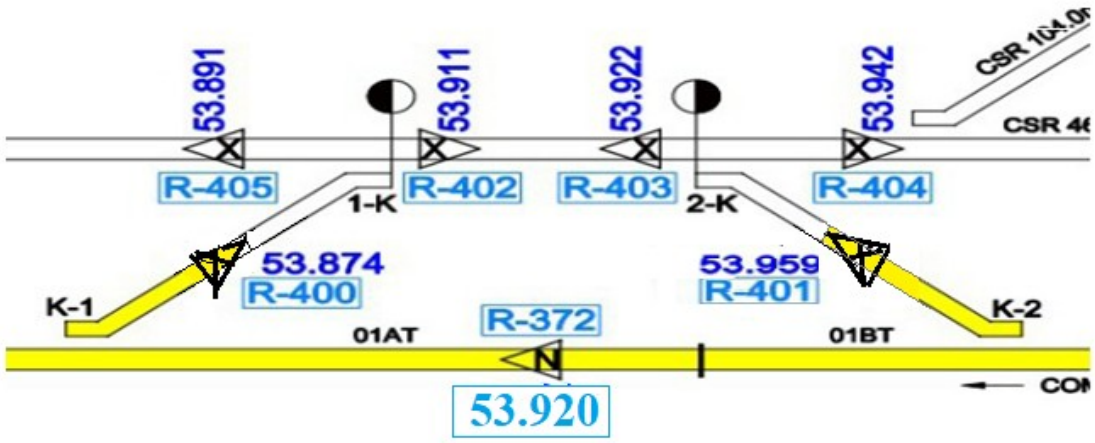
System Level TEST CASES (RDSO)				
Test ID	**Test Scenario**	**Input Specification**	**Expected Output/Values**	**Observed Output (Pass/Fail)**
		4. R-401 shall be program for no communication in reverse direction & R-400 for no communication in nominal direction and communication is nominal and reverse direction respectively 5. Simulate the loco movement from non KAVACH area i.e. R-405 to R-401 tag in nominal direction i. e. KAVACH area.		



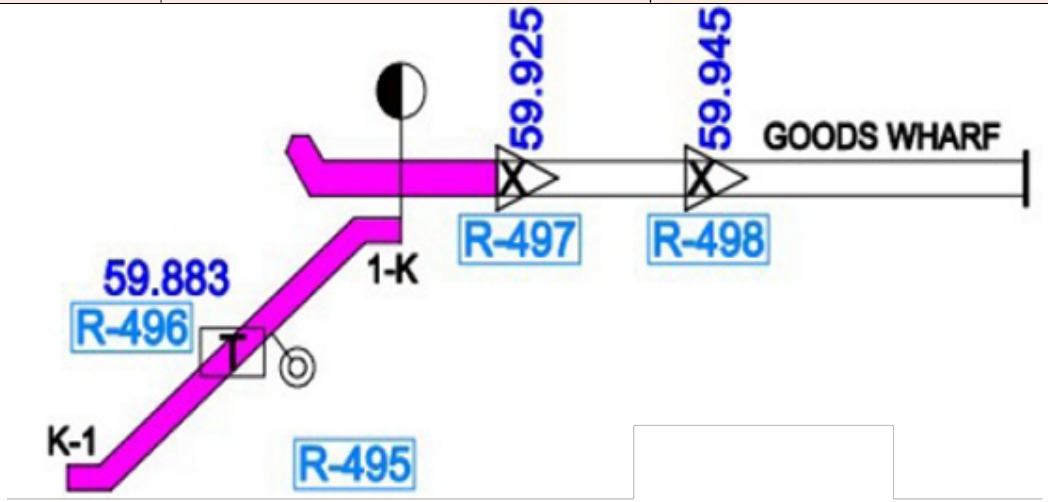
Representative of Firm	RDSO Inspecting Official

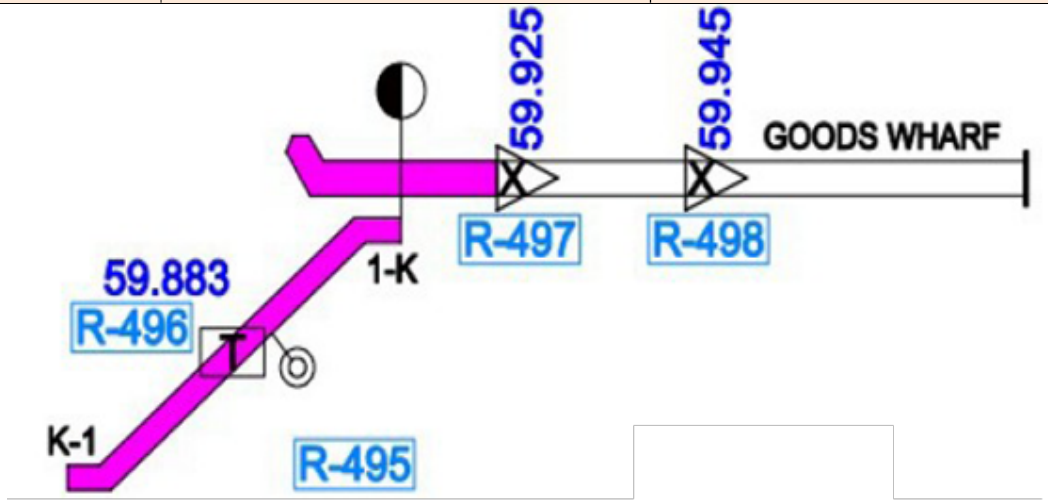
System Level TEST CASES (RDSO)				
Test ID	**Test Scenario**	**Input Specification**	**Expected Output/Values**	**Observed Output (Pass/Fail)**
21.12.	Handling of exit tag by stationary KAVACH and onboard KAVACH when exit tag installed as per below figure. The movement from Non KAVACH area to KAVACH area.	1. Onboard is in SR mode. 2. R-404 & R-405 shall be programed for no communication in both directions. 3. R-404 & R-405 shall be programmed for KAVACH territory Exit in both directions and R400 & R-402 shall be programmed with KAVACH territory exit in Nominal direction and R-401 & R-403 shall be programmed with KAVACH territory exit in reverse direction. 4. R-401 shall be program for no communication in reverse direction & R-400 for no communication in nominal direction and communication is nominal and reverse direction respectively 5. Simulate the loco movement from non KAVACH area i.e. R-404 to R-400 tag in reverse direction i. e. KAVACH area.	1. Check for "KAVACH TERRITORY ENTRY" message on LP-OCIP after R-400 is read by onboard. 2. Direction shall be established after reading R-400 and communication shall be started with stationary KAVACH. 3. Stationary KAVACH should send DIST_PKT_START as 0 with MA and Track Profile information from the reported entry (exit) Tag R-400 with OSMA, authorized speed (MPS) and Track Profile information after ascertaining route.	

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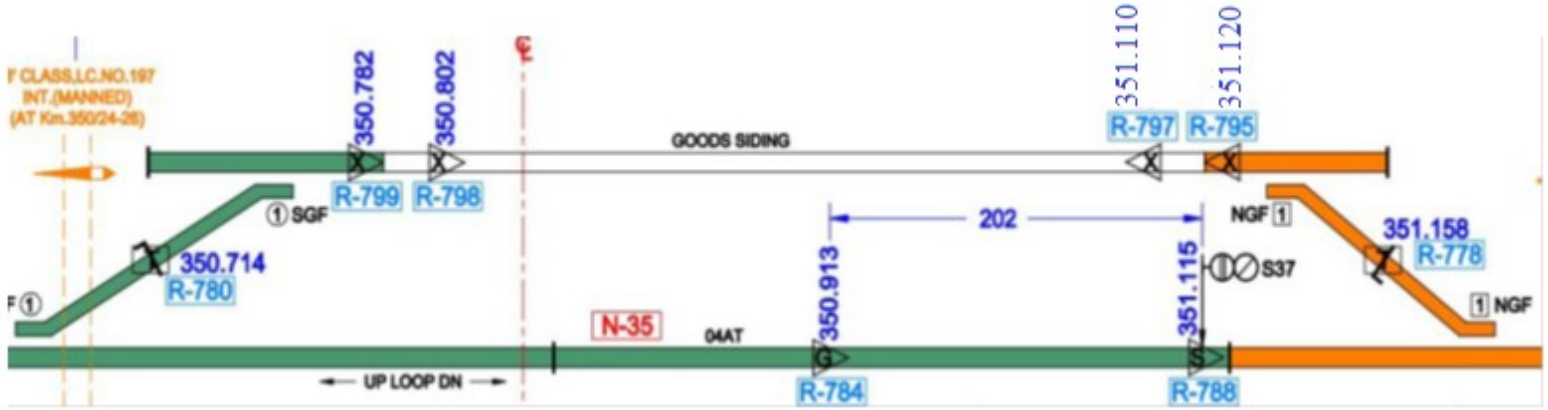
System Level TEST CASES (RDSO)				
Test ID	**Test Scenario**	**Input Specification**	**Expected Output/Values**	**Observed Output (Pass/Fail)**
				
21.13.	Handling of exit tag by stationary KAVACH and onboard KAVACH when exit tag installed as per below figure. The movement from KAVACH area to non KAVACH area.	1. Onboard is in FS/OS mode. 2. R-497 shall be programed for communication in reverse direction and R-498 as no communication in both directions. 3. R-497 & R-498 shall be programmed for KAVACH Territory exit in nominal direction. 4. Simulate the loco movement from KAVACH area i.e. R-496 to R-498 X tag in nominal direction i. e. Non KAVACH area.	1. Check that No mode change till R-497 X tag. 2. Brake shall not be applied. 3. Sufficient MA shall be given beyond the R-497. 4. Track profile shall not be monitored beyond R-497. 5. Onboard shall report the R-497 Tag to stationary KAVACH and transit to SR mode after reading R-497. 6. On-board KAVACH shall maintain communication with same TIN till its train length passes X-Tag R-497. 7. Message "**Ack SR mode, KAVACH Territory Exit"** shall be displayed on LP-OCIP. 8. Prompt for SR mode acknowledgement.	FS OS

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System Level TEST CASES (RDSO)				
Test ID	**Test Scenario**	**Input Specification**	**Expected Output/Values**	**Observed Output (Pass/Fail)**
				
21.14.	Handling of exit tag by stationary KAVACH and onboard KAVACH when exit tag installed as per below figure. The movement from Non KAVACH area to KAVACH area.	1. Onboard is in SR mode. 2. R-497 shall be programed for communication in reverse direction and R-498 as no communication in both directions. 3. R-497 & R-498 shall be programmed for KAVACH Territory exit in nominal direction. 4. Simulate the loco movement from KAVACH area i.e. R-498 to R-496 X tag in reverse direction i. e. KAVACH area.	1. Check for "KAVACH TERRITORY ENTRY" message on LP-OCIP after R-497 is read by onboard. 2. Direction shall be established after reading R-497 and communication shall be started with stationary KAVACH. 3. Stationary KAVACH should send DIST_PKT_START as 0 with MA and Track Profile information from the reported entry (exit) Tag R-497 with OSMA, authorized speed (MPS) and Track Profile information after ascertaining route.	

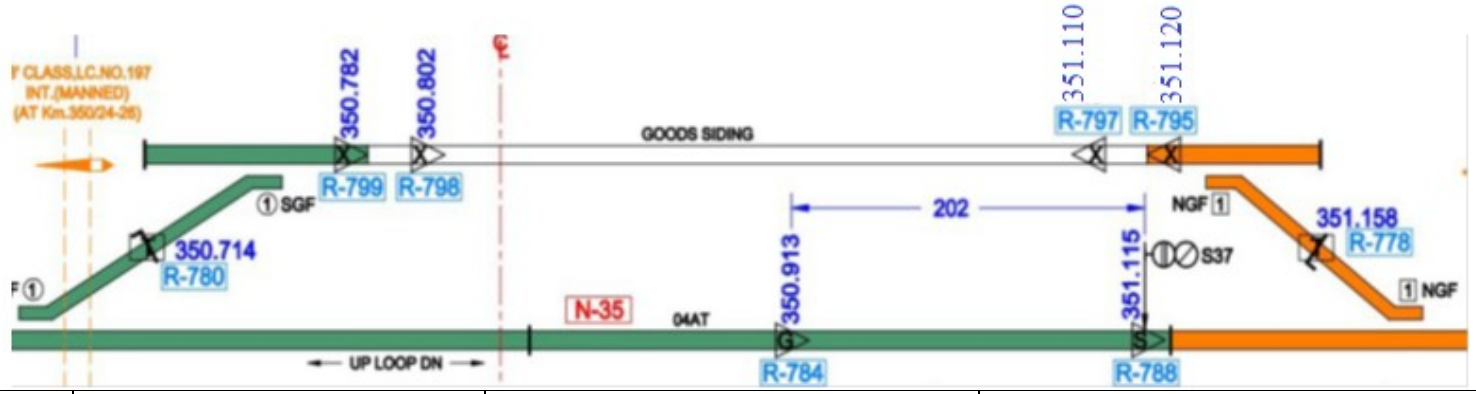
System Level TEST CASES (RDSO)				
Test ID	**Test Scenario**	**Input Specification**	**Expected Output/Values**	**Observed Output (Pass/Fail)**
				
21.15.	Handling of exit tag by stationary KAVACH and onboard KAVACH when exit tag installed as per below figure. The movement from KAVACH area to non KAVACH area.	1. Onboard is in FS/OS mode. 2. R-799 shall be programed for communication in reverse direction and R-798 as no communication in both directions. 3. R-799 & R-798 shall be programmed for KAVACH territory exit in Nominal direction and R-797 & R-795 as KAVACH territory exit in Reverse direction. 4. Similarly, R-795 shall be	1. Check that No mode changes till R-799 X tag. 2. Brake shall not be applied. 3. Sufficient MA shall be given beyond the R-799. 4. Track profile shall not be monitored beyond R-799. 5. Onboard shall report the R-799 Tag to stationary KAVACH and transit to SR mode after reading R-799. 6. On-board KAVACH shall maintain communication with same TIN till its train length passes X-Tag R-799.	FS OS

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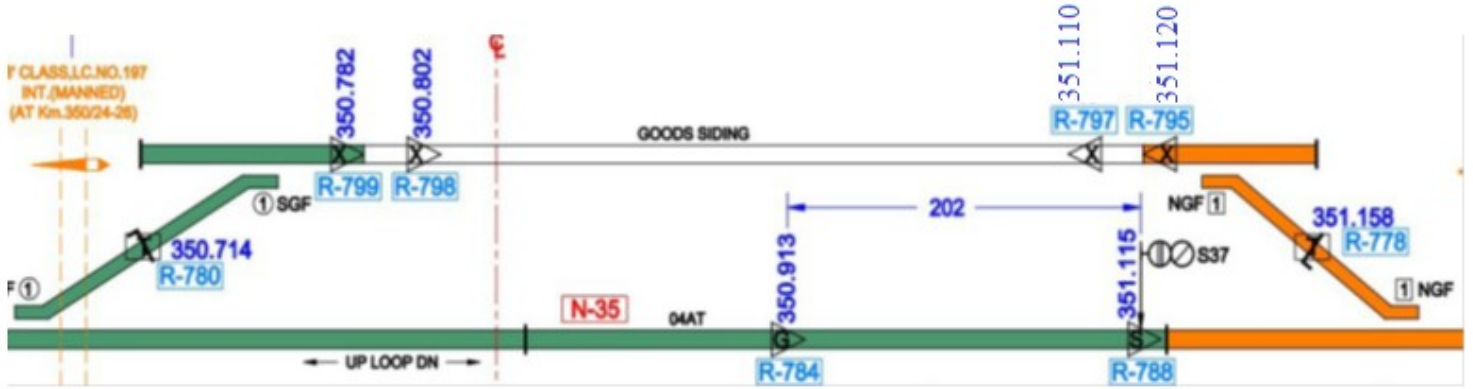
System Level TEST CASES (RDSO)				
Test ID	**Test Scenario**	**Input Specification**	**Expected Output/Values**	**Observed Output (Pass/Fail)**
		programed for communication in nominal direction and R-797 as no communication in both directions. 5. Simulate the loco movement from KAVACH area i.e. R-780 to R-798 X tag in nominal direction i. e. Non KAVACH area.	7. Message "**Ack SR mode, KAVACH Territory Exit"** shall be displayed on LP-OCIP. 8. Prompt for SR mode acknowledgement. 9. No direction shall be established after reading R-798 and R-797 Tags.	
				
21.16.	Handling of exit tag by stationary KAVACH and onboard KAVACH when exit tag installed as per below figure.	1. Onboard is in FS/OS mode. 2. R-799 shall be programed for communication in reverse direction and R-798 as no communication in both	1. Check that No mode change till R-795 X tag. 2. Brake shall not be applied. 3. Sufficient MA shall be given beyond the R-795.	FS OS

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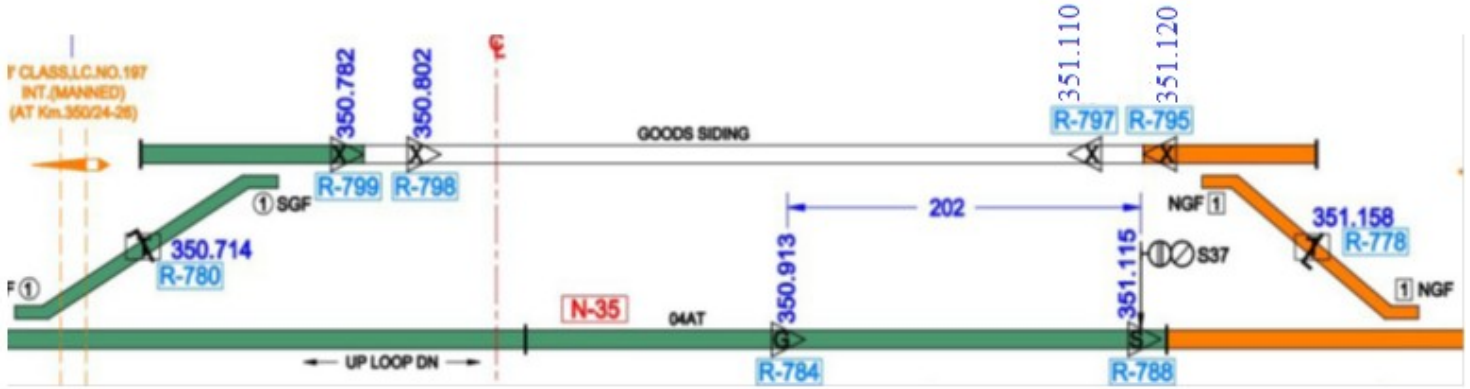
System Level TEST CASES (RDSO)				
Test ID	**Test Scenario**	**Input Specification**	**Expected Output/Values**	**Observed Output (Pass/Fail)**
	The movement from KAVACH area to non KAVACH area.	directions. 3. R-799 & R-798 shall be programmed for KAVACH territory exit in Nominal direction and R-797 & R-795 as KAVACH territory exit in Reverse direction. 4. Similarly, R-795 shall be programed for communication in nominal direction and R-797 as no communication in both directions. 5. Simulate the loco movement from KAVACH area i.e. R-778 to R-797 X tag in reverse direction i. e. Non KAVACH area.	4. Track profile shall not be monitored beyond R-795. 5. Onboard shall report the R-795 Tag to stationary KAVACH and transit to SR mode after reading R-795. 6. On-board KAVACH shall maintain communication with same TIN till its train length passes X-Tag R-795. 7. Message "**Ack SR mode, KAVACH Territory Exit"** shall be displayed on LP-OCIP. 8. Prompt for SR mode acknowledgement. 9. No direction shall be established after reading R-797 and R-798 Tags.	

System Level TEST CASES (RDSO)				
Test ID	**Test Scenario**	**Input Specification**	**Expected Output/Values**	**Observed Output (Pass/Fail)**
				
21.17.	Handling of exit tag by stationary KAVACH and onboard KAVACH when exit tag installed as per below figure. The movement from Non KAVACH area to KAVACH area.	1. Onboard is in SR mode. 2. R-799 shall be programed for communication in reverse direction and R-798 as no communication in both directions. 3. R-799 & R-798 shall be programmed for KAVACH territory exit in Nominal direction and R-797 & R-795 as KAVACH territory exit in Reverse direction. 4. Similarly, R-795 shall be programed for communication in nominal direction and R-797 as no communication in both directions.	1. Check for "KAVACH TERRITORY ENTRY" message on LP-OCIP after R-799 is read by onboard. 2. Direction shall be established after reading R-799 and communication shall be started with stationary KAVACH. 3. Stationary KAVACH should send DIST_PKT_START as 0 with MA and Track Profile information from the reported entry (exit) Tag R-799 with OSMA, authorized speed (MPS) and Track Profile information after ascertaining route.	

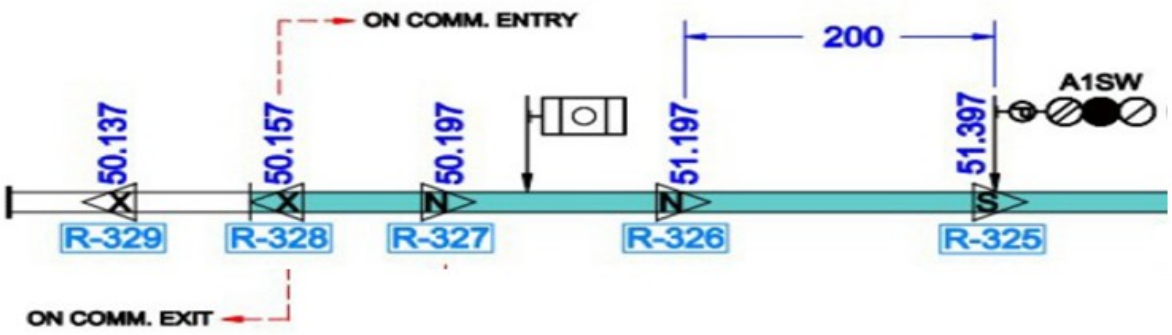
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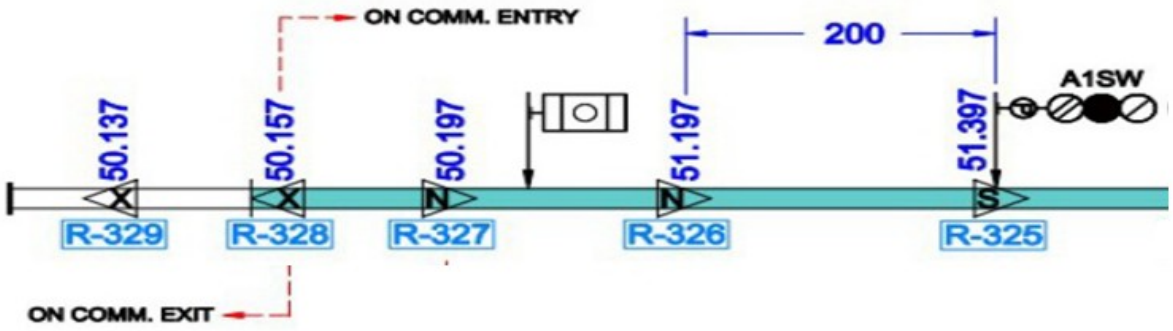
System Level TEST CASES (RDSO)				
Test ID	**Test Scenario**	**Input Specification**	**Expected Output/Values**	**Observed Output (Pass/Fail)**
		5. Simulate the loco movement from non KAVACH area i.e. R-798 to R-780 X tag in reverse direction i. e. KAVACH area.		
				
21.18.	Handling of exit tag by stationary KAVACH and onboard KAVACH when exit tag installed as per below figure. The movement from Non KAVACH area to KAVACH area.	1. Onboard is in SR mode. 2. R-799 shall be programed for communication in reverse direction and R-798 as no communication in both directions. 3. R-799 & R-798 shall be programmed for KAVACH territory exit in Nominal direction and R-797 & R-795 as KAVACH territory exit in Reverse direction.	1. Check for "KAVACH TERRITORY ENTRY" message on LP-OCIP after R-795 is read by onboard. 2. Direction shall be established after reading R-795 and communication shall be started with stationary KAVACH. 3. Stationary KAVACH should send DIST_PKT_START as 0 with MA and Track Profile information from	

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System Level TEST CASES (RDSO)				
Test ID	**Test Scenario**	**Input Specification**	**Expected Output/Values**	**Observed Output (Pass/Fail)**
		4. Similarly, R-795 shall be programed for communication in nominal direction and R-797 as no communication in both directions. 5. Simulate the loco movement from non KAVACH area i.e. R-797 to R-778 X tag in nominal direction i. e. KAVACH area.	the reported entry (exit) Tag R-795 with OSMA, authorized speed (MPS) and Track Profile information after ascertaining route.	
				
21.19.	Handling of exit tag by stationary KAVACH and onboard KAVACH when exit tag installed as per below figure.	1. Onboard is in FS/OS mode. 2. R-328 shall be programed for communication in reverse direction & communication in nominal direction and R-329 as	1. Check that No mode changes till R-328 X tag. 2. Brake shall not be applied. 3. Sufficient MA shall be given beyond the R-328.	FS OS

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System Level TEST CASES (RDSO)				
Test ID	**Test Scenario**	**Input Specification**	**Expected Output/Values**	**Observed Output (Pass/Fail)**
	The movement from KAVACH area to Non KAVACH area.	no communication in both directions. 3. R-328 & R-329 shall be programmed for KAVACH territory exit in Reverse direction. 4. Simulate the loco movement from KAVACH area i.e. R-327 to R-329 X tag in reverse direction through goods siding and train length.	4. Track profile shall not be monitored beyond R-328. 5. Onboard shall report the R-328 Tag to stationary KAVACH and transit to SR mode after reading R-328. 6. On-board KAVACH shall maintain communication with same TIN till its train length passes X-Tag R-328. 7. Message "**Ack SR mode, KAVACH Territory Exit"** shall be displayed on LP-OCIP. 8. Prompt for SR mode acknowledgement.	
				
21.20.	Handling of exit tag by stationary KAVACH and onboard KAVACH when exit tag installed as per below	1. Onboard is in SR mode. 2. R-328 shall be programed for communication in nominal direction & no communication in	1. Check for "KAVACH TERRITORY ENTRY" message on LP-OCIP after R-328 is read by onboard. 2. Direction shall be established after	

System Level TEST CASES (RDSO)				
Test ID	**Test Scenario**	**Input Specification**	**Expected Output/Values**	**Observed Output (Pass/Fail)**
	figure. The movement from Non KAVACH area to KAVACH area.	reverse direction and R-329 as no communication in both directions. 3. R-328 & R-329 shall be programmed for KAVACH territory exit in Reverse direction. 4. Simulate the loco movement from non KAVACH area i.e. R-329 to R-328 X tag in nominal direction i. e. KAVACH area.	reading R-328 and communication shall be started with stationary KAVACH. 3. Stationary KAVACH should send DIST_PKT_START as 0 with MA and Track Profile information from the reported entry (exit) Tag R-328 with OSMA, authorized speed (MPS) and Track Profile information after ascertaining route.	
				

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<table>
<tr><th colspan="5">System LEVEL TEST CASES (RDSO)</th></tr>
<tr><th>Test ID</th><th>Test Scenario</th><th>Input Specification</th><th>Expected Output/Values</th><th>Observed Output (Pass/Fail)</th></tr>
<tr><td>22.</td><td colspan="4">KAVACH_FRS_22: SOS Handling- This test case checks for SOS and MA handling by stationary KAVACH</td></tr>
<tr><td></td><td colspan="4">(i) The states of MA upon reception of SoS can be as follows
<table>
<tr><td>M1</td><td>No Change</td></tr>
<tr><td>M2</td><td>Rear End Collision SoS and Reduce MA up to Rear End Collision Margin</td></tr>
<tr><td>M3</td><td>Zero (0) for L2</td></tr>
<tr><td>M4</td><td>Head On Collision SoS and MA Zero (0) for both locos</td></tr>
<tr><td>M5</td><td>Rear End Collision SoS when MA not available</td></tr>
<tr><td>M6</td><td>Head On Collision SoS for both locos when MA not available.</td></tr>
</table>
(ii) The States of Status of signal display can be as follows
<table>
<tr><td>S1</td><td>As at Site</td></tr>
<tr><td>S2</td><td>Blank</td></tr>
<tr><td>S3</td><td>Red</td></tr>
</table>
(iii) The States of brakes can be
<table>
<tr><td>B1</td><td>No Brake</td></tr>
<tr><td>B2</td><td>Brake</td></tr>
</table>
</td></tr>
</table>

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System LEVEL TEST CASES (RDSO)				
Test ID	**Test Scenario**	**Input Specification**	**Expected Output/Values**	**Observed Output (Pass/Fail)**
	(iv) The various conditions that an Onboard KAVACH can based on Communication zone and availability are as follows			

C1	Zone-Mandatory and Available with station
C2	Zone-Mandatory and Unavailable with station
C3	Zone-non Mandatory

(v) The various conditions that an Onboard KAVACH can based on Signal Foot Tag read can be as follows

R1	Read
R2	Missed and passed 30m

(vi) The various conditions that an Onboard KAVACH can based on Position Report can be as follows

P1	Available
P2	Not Available

(vii) The type of section occupied by Onboard KAVACH can be as follows

A1	Station Section
A2	Absolute Block Section
A3	Automatic Block Section
A4	Virtual Block

(viii) The result of IXL validations to be done by Stationary KAVACH can result in two states

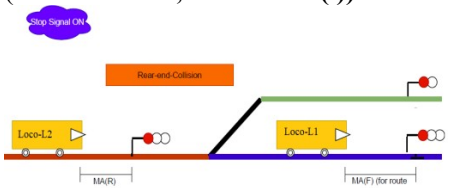
I1	Ok
I2	Not Ok

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System LEVEL TEST CASES (RDSO)				
Test ID	**Test Scenario**	**Input Specification**	**Expected Output/Values**	**Observed Output (Pass/Fail)**
	(ix) The result of TIN validations to be done by Stationary KAVACH can result following states			

T1	Same TIN, Onboard KAVACH separated by Signal at ON
T2	Same TIN, Onboard KAVACH separated by Signal at OFF & state I2
T3	Different in the Route, Onboard KAVACH separated by Signal at ON, Route not known & state I1
T4	Different in the Route, Onboard KAVACH separated by Signal at ON, Route Ascertained due to enroute Tags & state I1
T5	Different in the Route, Onboard KAVACH separated by Signal at OFF, Route not known & State I2
T6	Different in the Route, Onboard KAVACH separated by Signal at OFF, Route Ascertained due to enroute Tags & state I2
T7	Same TIN, No signal in between two trains

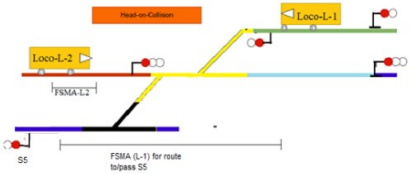
System LEVEL TEST CASES (RDSO)

Test ID	Test Scenario	Input Specification	Expected Output/Values	Observed Output (Pass/Fail)
22.1.	To check for rear end collision SOS from station when Stop Signal at ON is between two trains with valid position report station section. As shown in Fig-1. **(FRS cl. 31.5.1, A1.8.13.1 a(i))**  **Figure 1**	1) Make sure that no faults are present and tests are repeated for FS+OV, OS+OV & PT+OV. 2) L-1 & L-2 is available as shown in figure-1. 3) In communication mandatory area and with valid communication. 4) TIN validation: different. 5) Approaching stop signal at ON. 6) Interlocking functional. 7) Press OV and CNFM button in L-2.	1. L-2 Onboard shall receive OSMA up to shortest possible MA as defined in KAVACH table of control. 2. Subsequently on reading the Tag, MA is extended based on the route. 3. It is ascertained that approaching route, TIN is occupied & onboard L1 is stationary or moving in same direction, then rear end collision message shall be generated. 4. See table for expected output. 5. Approaching signal shall be blank for L-2.	L-2 / Pass/ Fail FS+OV OS+OV PT+OV

	Section: Station (A1)	Communication: Zone-Mandatory and Available with station (C1)							
	Tin Validation: Different in the Route, Onboard KAVACH separated by Signal at ON, Route not known & state I1 (T3)								
L2↓ L1→	SR P1)	LS (C2)	OS	FS	OS+OV	FS+OV	TR	PT	PT+OV
SR(P1)	☒	☒	☒	☒	☒	☒	☒	☒	☒
LS(C2)	☒	☒	☒	☒	☒	☒	☒	☒	☒
OS	☒	☒	M2 @T4	M2 @T4	M2 @T4	M2 @T4	M2 @T4	M2 @T4	@T4
FS	NA	NA	NA	NA	NA	NA	NA	NA	NA
OS+OV	☒	☒	M2 @T4	M2 @T4	M2 @T4	M2 @T4	M2 @T4	M2 @T4	M2@T4
FSOV	☒	☒	M2 @T4	M2 @T4	M2 @T4	M2 @T4	M2 @T4	M2 @T4	M2@T4
TR	NA	NA	M5@T4	M5@T4	M5@T4	M5@T4	M5@T4	M5@T4	NA
PT	NA	NA	M5@T4	M5@T4	M5@T4	M5@T4	M5@T4	M5@T4	NA
PT+OV	☒	☒	M2 @T4	M2 @T4	M2 @T4	M2 @T4	M2 @T4	M2 @T4	M2@T4

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System LEVEL TEST CASES (RDSO)

Test ID	Test Scenario	Input Specification	Expected Output/Values	Observed Output (Pass/Fail)
22.2.	To verify the rear end collision prevention when Stop Signal at ON in between two trains with valid position report in station section. As shown in Fig-1. **(SRS A1.8.13.1 a (i)**	1) Power on the system. 2) Make sure that no faults are present 3) In communication mandatory area and with valid communication. 4) Make Onboard L-2 move such that it crosses signal at ON by selecting Override button & confirm and MA is< 200meters. 5) After crossing stop signal L-2 make the onboard standstill. 6) Now simulate the movement of L1 in REV mode and SH mode and verify the output.	1. No SoS from stationary KAVACH.	L-1 / Pass/Fail REV SH
22.3.	To verify the Head on collision prevention in station region when Stop Signal at ON in between two trains with valid position report in station section and Onboard L-2 selected with Override **SRS A1.8.13.1 (ii)**  **Figure 2**	1) Simulate the condition as specified in the below table.	1. See table for expected output. 2. In case of SR/LS, the Head on collision message shall be generated in approach of same TIN. 3. No SOS from stationary KAVACH.	L-2 / Pass/Fail FS+OV OS+OV PT+OV SR LS PT **L1** / Pass/Fail REV SH

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System LEVEL TEST CASES (RDSO)

Test ID	Test Scenario	Input Specification	Expected Output/Values	Observed Output (Pass/Fail)

Head On Collision as at — Section: Station (A1) — Communication: Zone-Mandatory and Available with station (C1)

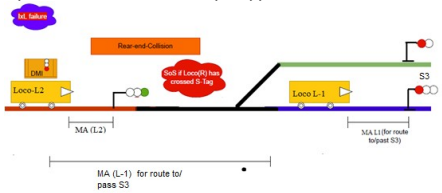
Tin Validation: Different in the Route, Onboard KAVACH separated by Signal at ON, Route not known & state I1 (T3)

L2↓ L1→	SR (P1)	LS (C2)	OS	FS	OS+OV	FS+OV	TR	PT	P+OV
SR(P1)	☒	☒	☒	☒	☒	☒	☒	☒	☒
LS(C2)	☒	☒	☒	☒	☒	☒	☒	☒	☒
OS	☒	☒	M4@T4	M4@T4	M4@T4	M4@T4	M4@T4	M4@T4	M4T4
FS	NA	NA	NA	NA	NA	NA	NA	NA	NA
OS+OV	☒	☒	M4@T4	M4@T4	M4@T4	M4@T4	M4@T4	M4@T4	M4@T4
FS+OV	☒	☒	M4@T4	M4@T4	M4@T4	M4@T4	M4@T4	M4@T4	M4@T4
TR	NA	NA	M5@TR	M5@TR	M5@TR	M5@TR	M5@TR	M5@TR	NA
PT	NA	NA	M5@TR	M5@TR	M5@TR	M5@TR	M5@TR	M5@TR	NA
PT+OV	☒	☒	M4@T4	M4@T4	M4@T4	M4@T4	M4@T4	M4@T4	M4@T4

22.4.	Check for Rear end collision SOS from station when Stop Signal at OFF (IxL fail) is between two trains with valid position report as shown in figure-3. TIN Occupation: TIN occupied by L-1and L-2 Onboard are different	1) Power on the system. 2) Onboard L1 should be in FS/OS mode and berthing track is dropped. 3) Point indication (NWKR ↑ and RWKR ↓). 4) In communication mandatory area	(i) See table for expected output. (ii) Rear end collision SoS to be supervised when PT+OV is pressed and OSMA received after route is ascertained.	L-2 / Pass/Fail FS+OV OS+OV PT+OV

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System LEVEL TEST CASES (RDSO)

Test ID	Test Scenario	Input Specification	Expected Output/Values	Observed Output (Pass/Fail)
	(SRS –A1.8.13.1 (b-i))  **Figure 3**	and with valid communication.	(iii) In Trip mode, Signal aspect RED to be shown.	L-2 Pass/ Fail TR

Rear End Collision as at	Section: Station (A1)	Communication: Zone-Mandatory and Available with station (C1)							
	Tin Validation: Different in the Route, Onboard KAVACH separated by Signal at ON, Route not known & state I2 (T5)								
L2↓	L1→ SR (P1)	LS (C2)	OS	FS	OS+OV	FS+OV	TR	PT	PT+OV
SR(P1)	☒	☒	☒	☒	☒	☒	☒	☒	☒
LS(C2)	☒	☒	☒	☒	☒	☒	☒	☒	☒
OS	☒	☒	S3@T5, S2@R1/R2,M2@T6	S3@T5, S2@R1/R2, M2@T6	S3@T5, S2@R1/R2, M2@T6	S3@T5, S2@R1/R2, M2@T6	S3@T5, S2@R1/R2, M2@T6	S3@T5, S2@R1/R2, M2@T6	S3@T5, S2@R1/R2, M2@T6
FS	S3	S3	S3	S3	S3	S3	S3	S3	S3
TR	S3/M5	S3/M5	S3/M5	S3/M5	S3/M5	S3/M5	S3/M5	S3/M5	S3/M5
PT	S2@R1/R2, S2/M5	S2@R1/R2, S2/M5	S2@R1/R2, S2/M5	S2@R1/R2, S2/M5	S2@R1/R2, S2/M5	S2@R1/R2, S2/M5	S2@R1/R2, S2/M5	S2@R1/R2, S2/M5	S2@R1/R2, S2/M5
OS+OV/ FS+OV	☒	☒	S2@R1/R2 M2@T6	S2@R1/R2, M2@T6	S2@R1/R2, M2@T6	S2@R1/R2, M2@T6	S2@R1/R2, M2@T6	S2@R1/R2, M2@T6	S2@R1/R2, M2@T6
PT+OV	☒	☒	S2@R1/R2, M2@T6	S2@R1/R2, M2@T6	S2@R1/R2, M2@T6	S2@R1/R2, M2@T6	S2@R1/R2, M2@T6	S2@R1/R2, M2@T6	S2@R1/R2, M2@T6

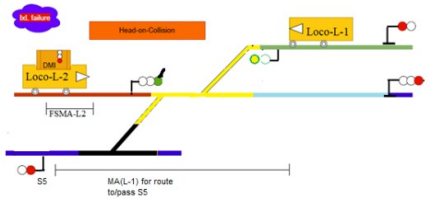
22.5.	Check for SOS from station when Stop Signal at OFF (IxL fail) is between two trains with valid position report as shown **in figure-3**. TIN Occupation: TIN occupied by L-1and L-2 Onboard are different (**SRS –A1.8.13.1 (b-i)**	1) Power on the system. 2) Onboard L1 should be in FS/OS mode. 3) Point indication is (RWKR↑ & NWKR↓). 4) In communication mandatory area and with valid	(i) L-2 MA shall be up to approaching Home signal. (ii) Signal displayed on LP-OCIP shall be as RED. (iii) Rear end collision SOS shall not be generated.	FS OS

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System LEVEL TEST CASES (RDSO)				
Test ID	**Test Scenario**	**Input Specification**	**Expected Output/Values**	**Observed Output (Pass/Fail)**
		communication.		
22.6.	Check for SOS from station when Stop Signal at OFF (IxL fail) is between two trains with valid position report as **shown in figure-3**. TIN Occupation: TIN occupied by L-1and L-2 Onboard are different (**SRS –A1.8.13.1 (b-i)**	1) Power on the system. 2) Onboard L1 should be in FS/OS mode. 3) Point indication is (RWKR↑ & NWKR↑). 4) In communication mandatory area and with valid communication.	(i) L-2 MA shall be up to approaching Home signal. (ii) Signal displayed on LP-OCIP shall be as RED. (iii) Rear end collision SOS shall not be generated.	FS OS
22.7.	Check for SOS from station when Stop Signal at OFF (IxL fail) is between two trains with valid position report as **shown in figure-3**. TIN Occupation: TIN occupied by L-1and L-2 Onboard are different (**FRS cl. 31.5.1, SRS –A1.8.13.1 (b-i)**	1) Power on the system. 2) Onboard L1 should be in FS/OS mode. 3) Point indication is (RWKR↓ & NWKR↓). 4) In communication mandatory area and with valid communication	(i) L-2 MA shall be up to approaching Home signal. (ii) Signal displayed on LP-OCIP shall be as RED. (iii) Rear end collision SOS shall not be generated.	FS OS
22.8.	Check for SOS from station when Stop Signal at OFF (IxL fail) is between two trains with valid position report as **shown in figure-3.** TIN Occupation: TIN occupied by L-1and L-2 Onboard are different **SRS –A1.8.13.1 (b-i)**	1) Power on the system. 2) Onboard L1 should be in FS/OS mode. 3) Point set in field is in reverse. 4) Point indication is (RWKR↓ & NWKR↑). 5) In communication mandatory area and with valid communication.	(i) L-2 MA shall be up to approaching Home signal. (ii) Signal displayed on LP-OCIP shall be as RED. (iii) Rear end collision SOS shall not be generated.	FS OS
22.9.	To verify the Head on collision	1) Power on the system.	1) Head ON collision SoS shall be	FS+OV

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System LEVEL TEST CASES (RDSO)

Test ID	Test Scenario	Input Specification	Expected Output/Values	Observed Output (Pass/Fail)
	prevention in station region when Stop Signal at OFF (IxL fail) is between two trains with valid position report. TIN Occupation: TIN occupied by L-1and L-2 Onboard are different (**FRS cl. 31.4.1, (SRS –A8.4.1 (b-iii))**  Figure 4	2) In communication mandatory area and with valid communication. 3) Make Onboard movement such that it crosses signal at OFF (IxL fail) by selection of Override button and MA is< 200meters train is at standstill. 4) Simulate the condition as specified in the below table.	generated when Stationary KAVACH detects that any of the Occupied TIN falls in the path of the two trains. 2) See table for expected output.	OS+OV TR PT+OV

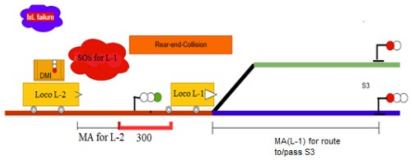
Head On Collision as		Section: Station (A1)		Communication: Zone-Mandatory and Available with station (C1)						
		Tin Validation: Different in the Route, Onboard KAVACH separated by Signal at ON, Route not known & state I2 (T5)								
L2↓	L1→	SR (P1)	LS (C2)	OS	FS	OS+OV	FS+V	TR	PT	PT+OV
SR(P1)		☒	☒	☒	☒	☒	☒	☒	☒	☒
LS(C2)		☒	☒	☒	☒	☒	☒	☒	☒	☒
OS		☒	☒	S3@T5 S2@R1/R2	S3@T5 S2@R1/R2	S3@T5 S2@R1/R2	S3@T5 S2@R1/R2	S3@T5 S2@R1/R2	S3@T5 S2@R1/R2	S3@T5 S2@R1/R2

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System LEVEL TEST CASES (RDSO)

Test ID	Test Scenario	Input Specification	Expected Output/Values	Observed Output (Pass/Fail)

			M4@T6	M4@T6	M4@T6	M4@T6	M4@T6	M4@T6	M4@T6
FS	S3	S3	S3	S3	S3	S3	S3	S3	S3
TR	S3@M6	S3@M6	S3@M6	S3@M6	S3@M6	S3@M6	S3@M6	S3@M6	S3@M6
PT	S2@M6	S2@M6	S2@M6	S2@M6	S2@M6	S2@M6	S2@M6	S2@M6	S2@M6
OS+OV/ FS+OV	☒	☒	S3@T5 S2@R1/R2 M4@T6	S3@T5 S2@R1/R2 M4@T6	S3@T5 S2@R1/R2 M4@T6	S3@T5 S2@R1/R2 M4@T6	S3@T5 S2@R1/R2 M4@T6	S3@T5 S2@R1/R2 M4@T6	S3@T5 S2@R1/R2 M4@T6
PT+OV	☒	☒	S3@T5 S2@R1/R2 M4@T6	S3@T5 S2@R1/R2 M4@T6	S3@T5 S2@R1/R2 M4@T6	S3@T5 S2@R1/R2 M4@T6	S3@T5 S2@R1/R2 M4@T6	S3@T5 S2@R1/R2 M4@T6	S3@T5 S2@R1/R2 M4@T6

22.10.	Check for Rear end collision SOS from station when Stop signal is at OFF (IxL fail) is between two trains with valid position report TIN Occupation: TIN occupied by L- 1 Onboard is same as L-2 in absolute block section (FRS cl. **31.5.1, (SRS – A8.5.1 (C-i))**  **Figure 5**	1) In communication mandatory area and with valid communication. 2) TIN is same. 3) MA margin is <300 meter. 4) Simulate the condition as specified in the below table.	1) Signal Aspect danger on DMI of L-2. 2) See table for expected output. 3) Rear end collision shall be generated in SR & LS mode.	FS+OV OS+OV PT+OV TR PT SR LS

	Rear End Collision as at	Section: Station (A1)	Communication: Zone-Mandatory and Available with station (C1)	

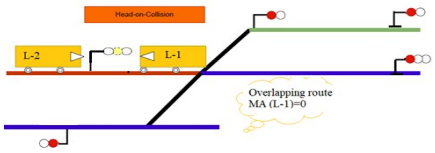
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System LEVEL TEST CASES (RDSO)

Test ID	Test Scenario	Input Specification	Expected Output/Values	Observed Output (Pass/Fail)

Tin Validation: Same TIN, Onboard KAVACH separated by Signal at OFF & state I2 (T2)

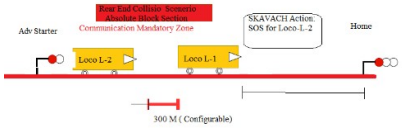
L2↓ / L1→	SR (P1)	LS (C2)	OS	FS	OS+OV	F+OV	TR	PT	PT+OV
SR(P1)	M5	M5	M5	M5	M5	M5	M5	M5	M5
LS(C2)	M5	M5	M5	M5	M5	M5	M5	M5	M5
FS/OS	M2, S2	M2, S2	M2, S2	M2, S2	M2, S2	M2, S2	M2, S2	M2, S2	M2, S2
FS+OV OS+OV	M2, S2	M2, S2	M2, S2	M2, S2	M2, S2	M2, S2	M2, S2	M2, S2	M2, S2
TR	M3,S3	M3,S3	M3,S3	M3,S3	M3,S3	M3,S3	M3,S3	M3,S3	M3,S3
PT	M3, S2	M3, S2	M3, S2	M3, S2	M3, S2	M3, S2	M3, S2	M3, S2	M3, S2
PT+OV	M2, S2	M2, S2	M2, S2	M2, S2	M2, S2	M2, S2	M2, S2	M2, S2	M2, S2

22.11.	To verify the Head on collision prevention in block section when Stop Signal at OFF (IxL fail) is between two trains with valid position report. TIN Occupation: TIN occupied by L-1and L-2 Onboard are same (**FRS cl. 31.5.1, (SRS –A8.4.1 (C-iii))**  Fig-6	1) In communication mandatory area and with valid communication. 2) Both Onboard shall be in same TIN. 3) Make the approaching stop signal of L-2 as OFF aspect. (IxL fail) 4) Simulate the condition as specified in the below table. 5) L1 will be in SR mode in double line. 6) L-1 can be any mode in single line.	See table for expected output.	SR LS FS+OV OS+OV TR PT PT+OV

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System LEVEL TEST CASES (RDSO)											
Test ID	**Test Scenario**	**Input Specification**				**Expected Output/Values**					**Observed Output (Pass/Fail)**
		Head On Collision as at		Section: Station (A1)		Communication: Zone-Mandatory and Available with station (C1)					
				Tin Validation: Same TIN, Onboard KAVACH separated by Signal at OFF & state I2 (T2)							
		L2↓	L1→	SR (P1)	LS (C2)	OS	FS	OS+OV	FS+OV	TR	PT	PT+OV	
		SR(P1)		M6, S2	M6, S2	M6, S2	M6 S2	M6, S2	M6, S2	M6, S2	M6, S2	M6, S2	
		LS(C2)		M6, S2	M6, S2	M6, S2	M6, S2	M6, S2	M6, S2	M6, S2	M6, S2	M6, S2	
		FS/OS		M6, S2	M6, S2	M6, S2	M6, S2	M6, S2	M6, S2	M6, S2	M6, S2	M6, S2	
		OS+OV		M6, S2	M6, S2	M6, S2	M6, S2	M6, S2	M6, S2	M6, S2	M6, S2	M6, S2	
		FS+OV		M6, S2	M6, S2	M6, S2	M6, S2	M6, S2	M6, S2	M6, S2	M6, S2	M6, S2	
		TR/PT		M6, S2	M6, S2	M6, S2	M6, S2	M6, S2	M6, S2	M6, S2	M6, S2	M6, S2	
		PT+OV		M6, S2	M6, S2	M6, S2	M6, S2	M6, S2	M6, S2	M6, S2	M6, S2	M6, S2	

System LEVEL TEST CASES (RDSO)

Test ID	Test Scenario	Input Specification	Expected Output/Values	Observed Output (Pass/Fail)
22.12.	Check for Rear end collision SOS from station in absolute block section when No Stop Signal between trains with valid position report (Communication mandatory zone and communication available with station). (FRS cl. 31.5.1, (SRS **–A1.8.14 (a-i))**  Figure-9	1) Power on the system. 2) In communication mandatory area and with valid communication. 3) TIN occupied by front Onboard is same as rear Onboard TIN in the signal route. 4) In LS mode, signal display will not be available. 5) Position report is available in SR mode.	(i) Brake shall be applied in rear end Loco if it is within collision margin. (ii) MA for front Onboard will be as per Stationary KAVACH Table of Control inputs. (iii) See table for expected output.	SR LS FS+OV OS+OV TR PT PT+OV

Rear End Collision as at	Section: Absolute Block (A2)	Communication: Zone-Mandatory and Available with station (C1)							
	Tin Validation: Same TIN and no Stop signal in between two trains (T2T7), IXL working.								
L2↓ L1→	SR (P1)	LS (C2)	OS	FS	OS+OV	FS+OV	TR	PT	PT+OV
SR(P1)	M5	M5	M5	M5	M5	M5	M5	M5	M5
LS(C2)	M5	M5	M5	M5	M5	M5	M5	M5	M5
OS	S2, M2	S2, M2	S2, M2	S2, M2	S2, M2	S2, M2	S2, M2	S2, M2	S2, M2
FS	NA	NA	NA	NA	NA	NA	NA	NA	NA
FS+OV OS+OV	S2, M2	S2, M2	S2, M2	S2, M2	S2, M2	S2, M2	S2, M2	S2, M2	S2, M2
TR/PT	NA	NA	NA	NA	NA	NA	NA	NA	NA
PT+OV	S2, M2	S2, M2	S2, M2	S2, M2	S2, M2	S2, M2	S2, M2	S2, M2	S2, M2

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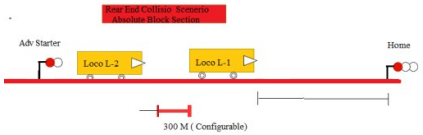
System LEVEL TEST CASES (RDSO)

Test ID	Test Scenario	Input Specification	Expected Output/Values	Observed Output (Pass/Fail)
22.13.	To verify the Head on collision SOS n when in absolute block section when No Stop Signal between trains with valid position report (Communication mandatory zone). (**FRS cl. 31.5.2, SRS–A1.8.14 (a-ii)**)  Figure-10	1) Power on the system. 2) In communication mandatory area and with valid communication. 3) Both loco is occupying same TIN. 4) Position report is available in SR &LS mode. 5) No Stop Signal between both onboard.	. 1) Signal shall not be displayed in both loco L-1 & L-2. 2) Brake shall be applied in both the loco. 3) See table for expected output.	SR LS FS+OV OS+OV TR PT PT+OV

Head On Collision as at		Section: Absolute Block (A2)		Communication: Zone-Mandatory and Available with station (C1), IXL working						
		Tin Validation: Same TIN and no Stop signal in between two trains (T~~2~~T7)								
L2↓	L1→	SR (P1)	LS (C2)	OS	FS	OS+OV	FS+OV	TR	PT	PT+OV
SR(P1)		M6	M6	M6	M6	M6	M6	M6	M6	M6
LS(C2)		M6	M6	M6	M6	M6	M6	M6	M6	M6
OS		S2, M4	S2, M4	S2, M4	S2, M4	S2, M4	S2, M4	S2, M4	S2, M4	S2, M4
FS		NA	NA	NA	NA	NA	NA	NA	NA	NA
OS+OV		S2, M4	S2, M4	S2, M4	S2, M4	S2, M4	S2, M4	S2, M4	S2, M4	S2, M4
FS+OV		S2, M4	S2, M4	S2, M4	S2, M4	S2, M4	S2, M4	S2, M4	S2, M4	S2, M4
TR		NA	NA	NA	NA	NA	NA	NA	NA	NA
PT		NA	NA	NA	NA	NA	NA	NA	NA	NA

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System LEVEL TEST CASES (RDSO)

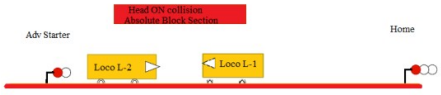
Test ID	Test Scenario	Input Specification	Expected Output/Values	Observed Output (Pass/Fail)
	PT+OV S2, M4 S2, M4 S2, M4 S2, M4 S2, M4 S2, M4 S2, M4 S2, M4 S2, M4			
22.14.	Check for Rear end collision SOS from station in absolute block section when No Stop Signal between trains with valid position report (Communication mandatory zone FRS cl. 31.5.1, (SRS **–A1.8.14 (b-i))**  Figure-11	1) Power on the system. 2) In communication mandatory area 3) communication not available with stationary KAVACH. 4) TIN occupied by front Onboard is same as rear Onboard TIN in the signal route. 5) In LS mode, signal display will not be available. 6) Position report is available in SR mode.	(i) Brake shall be applied in rear end Loco if it is within collision margin. (ii) MA for front Onboard will be as per Stationary KAVACH Table of Control inputs. (iii) See table for expected output.	SR LS FS+OV OS+OV PT+OV TR PT
	Rear End Collision as at	Section: Absolute Block (A2) Communication: Zone-Mandatory and Available with station (C2) Tin Validation: Same TIN and no Stop signal in between two trains (T7)		

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System LEVEL TEST CASES (RDSO)

Test ID	Test Scenario	Input Specification	Expected Output/Values	Observed Output (Pass/Fail)

L2↓ / L1→	SR (P1)	LS (C2)	OS	FS	OS+OV	FS+OV	TR	PT	PT+OV
SR(P1)	M5	M5	M5	M5	M5	M5	M5	M5	M5
LS(C2)	M5	M5	M5	M5	M5	M5	M5	M5	M5
OS	S2, M2	S2, M2	S2, M2	S2, M2	S2, M2	S2, M2	S2, M2	S2, M2	S2, M2
FS	NA	NA	NA	NA	NA	NA	NA	NA	NA
OS+OV	S2, M2	S2, M2	S2, M2	S2, M2	S2, M2	S2, M2	S2, M2	S2, M2	S2, M2
FS+OV	S2, M2	S2, M2	S2, M2	S2, M2	S2, M2	S2, M2	S2, M2	S2, M2	S2, M2
TR/PT	NA	NA	NA	NA	NA	NA	NA	NA	NA
PT+OV	S2, M2	S2, M2	S2, M2	S2, M2	S2, M2	S2, M2	S2, M2	S2, M2	S2, M2

22.15.	To verify the Head on collision prevention when in absolute block section when No Stop Signal between trains with valid position report (Non Communication mandatory zone). **(SRS–A1.8.14 (b-ii)**  Figure-12	1) Power on the system. 2) In Non communication mandatory zone. 3) Both loco is occupying same TIN. 4) Position report is available in SR & LS mode. 5) No Stop Signal between both onboard.	1) Brake shall be applied in both the loco and train shall have brought to standstill. 2) Overlap distance shall be made zero. 3) See table for expected output.	SR	
				LS	
				OS	
				FS	
				OS+OV	
				FS+OV	
				TR	
				PT	
				PT+OV	

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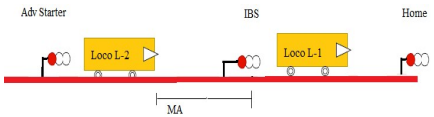
System LEVEL TEST CASES (RDSO)

Test ID	Test Scenario	Input Specification	Expected Output/Values	Observed Output (Pass/Fail)

Rear End Collision as at — Section: Absolute Block (A2) — Communication: Non-Mandatory zone and Available with station (C 3)

Tin Validation: Same TIN and no Stop signal in between two trains (T7), IXL working

L2 ↓ / L1 →	SR (P1)	LS (C2)	OS	FS	OS+OV	FS+OV	TR	PT	PT+OV
SR(P1)	M6	M6	M6	M6	M6	M6	M6	M6	M6
LS(C2)	M6	M6	M6	M6	M6	M6	M6	M6	M6
OS	S2, M4	S2, M4	S2, M4	S2, M4	S2, M4	S2, M4	S2, M4	S2, M4	S2, M4
FS	S2, M4	S2, M4	S2, M4	S2, M4	S2, M4	S2, M4	S2, M4	S2, M4	S2, M4
OS+OV	S2, M4	S2, M4	S2, M4	S2, M4	S2, M4	S2, M4	S2, M4	S2, M4	S2, M4
FS+OV	S2, M4	S2, M4	S2, M4	S2, M4	S2, M4	S2, M4	S2, M4	S2, M4	S2, M4
TR	S2, M4	S2, M4	S2, M4	S2, M4	S2, M4	S2, M4	S2, M4	S2, M4	S2, M4
PT	S2, M4	S2, M4	S2, M4	S2, M4	S2, M4	S2, M4	S2, M4	S2, M4	S2, M4
PT+OV	S2, M4	S2, M4	S2, M4	S2, M4	S2, M4	S2, M4	S2, M4	S2, M4	S2, M4

22.16.	Check for rear end collision SOS from stationary KAVACH in absolute block section with IBS when Stop Signal at ON is between two trains with valid position report **(SRS –A1.8.15 (a-i))**  Figure-13	1) Power on the system. 2) In communication mandatory zone. 3) Both loco is occupying same TIN. 4) Position report is available in SR & LS mode.	See table for expected output.	SR LS OS FS OS+OV FS+OV TR PT	

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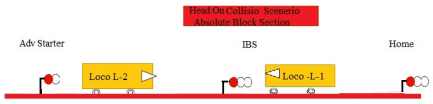
System LEVEL TEST CASES (RDSO)

Test ID	Test Scenario	Input Specification	Expected Output/Values	Observed Output (Pass/Fail)

Rear End Collision as at — Section: Absolute Block (A2) — Communication: Zone-Mandatory and Available with station (C2)

Tin Validation: Same TIN and Stop signal at ON in between two trains (T1)

L2↓ / L1 →	SR (P1)	LS (C2)	OS	FS	OS+OV	FS+OV	TR	PT	PT+OV
SR(P1)	M5	M5	M5	M5	M5	M5	M5	M5	M5
LS(C2)	M5	M5	M5	M5	M5	M5	M5	M5	M5
OS	M2	M2	M2	M2	M2	M2	M2	M2	M2
FS	M2	M2	M2	M2	M2	M2	M2	M2	M2
OS+OV	M2	M2	M2	M2	M2	M2	M2	M2	M2
FS+OV	M2	M2	M2	M2	M2	M2	M2	M2	M2
TR	S3, M2	S3, M2	S3, M2	S3, M2	S3, M2	S3, M2	S3, M2	S3, M2	S3, M2
PT	S2, M2	S2, M2	S2, M2	S2, M2	S2, M2	S2, M2	S2, M2	S2, M2	S2, M2
PT+OV	M2	M2	M2	M2	M2	M2	M2	M2	M2

22.17.	To verify the Head on collision prevention when in absolute block section with IBS when Stop Signal at ON is between two trains with valid position report and same TIN. **(SRS –A1.8.15 (a-ii)**  Figure-14	1) Power on the system. 2) In communication mandatory area and with valid communication. 3) Position report is available in SR & LS mode. 4) Keep both the L-2 onboard between advance starter & IBS and L-1 onboard IBS & home of next station.	. 1) Brake shall be applied in both the loco and train shall have brought to standstill. 2) Overlap distance shall be made zero. 3) See table for expected output.	SR LS OS FS OS+OV FS+OV TR PT	

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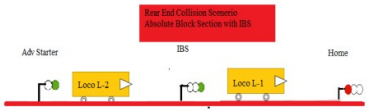
System LEVEL TEST CASES (RDSO)

Test ID	Test Scenario	Input Specification	Expected Output/Values	Observed Output (Pass/Fail)

Head On Collision as at — Section: Absolute Block (A2) — Communication: Zone-Mandatory and Available with station (C2)

Tin Validation: Same TIN and Stop signal at ON in between two trains (T1)

L2 ↓ / L1 →	SR (P1)	LS (C2)	OS	FS	OS+OV	FS+OV	TR	PT	PT+ OV
SR(P1)	M6	M6	M6	M6	M6	M6	M6	M6	M6
LS(C2)	M6	M6	M6	M6	M6	M6	M6	M6	M6
OS	M4	M4	M4	M4	M4	M4	M4	M4	M4
FS	M4	M4	M4	M4	M4	M4	M4	M4	M4
OS+OV	M4	M4	M4	M4	M4	M4	M4	M4	M4
FS+OV	M4	M4	M4	M4	M4	M4	M4	M4	M4
TR	S3, M4	S3, M4	S3, M4	S3, M4	S3, M4	S3, M4	S3, M4	S3, M4	S3, M4
PT	S2, M4	S2, M4	S2, M4	S2, M4	S2, M4	S2, M4	S2, M4	S2, M4	S2, M4
PT+OV	M4	M4	M4	M4	M4	M4	M4	M4	M4

22.18.	Check for rear ends collision SOS from stationary KAVACH in absolute block section with IBS when Stop signal is at OFF (IxL fail) is between two trains with valid position report. TIN Occupation: TIN occupied by L1 & L2 Onboard is same TIN in the signal route **(SRS –A1.8.15 (b-i)**  Figure-15	1) Power on the system. 2) In communication mandatory area and with valid communication. 3) TIN occupied by L1 & L2 Onboard is same TIN in the signal route. 4) Position report is available in SR & LS mode.	1) Signal shall be displayed if it is beyond rear end collision margin. 2) Overlap distance shall be made Zero. 3) See table for expected output.	SR LS OS FS OS+OV FS+OV TR PT	

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System LEVEL TEST CASES (RDSO)

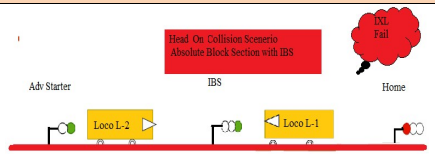
Test ID	Test Scenario	Input Specification	Expected Output/Values	Observed Output (Pass/Fail)	

Rear End Collision as at		Section: Absolute Block (A2)		Communication: Zone-Mandatory and Available with station (C2)						
		Tin Validation: Same TIN and Stop signal at OFF in between two trains & State I2 (T2)								
L2 ↓	L1 →	SR (P1)	LS (C2)	OS	FS	OS+OV	FS+OV	TR	PT	PT+OV
SR(P1)		M5	M5	M5	M5	M5	M5	M5	M5	M5
LS(C2)		M5	M5	M5	M5	M5	M5	M5	M5	M5
OS		S3, M2	S3, M2	S3, M2	S3, M2	S3, M2	S3, M2	S3, M2	S3, M2	S3, M2
FS		S3, M2	S3, M2	S3, M2	S3, M2	S3, M2	S3, M2	S3, M2	S3, M2	S3, M2
OS+OV		S2, M2	S2, M2	S2, M2	S2, M2	S2, M2	S2, M2	S2, M2	S2, M2	S2, M2
FS+OV		S2, M2	S2, M2	S2, M2	S2, M2	S2, M2	S2, M2	S2, M2	S2, M2	S2, M2
TR		S3, M3	S3, M3	S3, M3	S3, M3	S3, M3	S3, M3	S3, M3	S3, M3	S3, M3
PT		S2, M3	S2, M3	S2, M3	S2, M3	S2, M3	S2, M3	S2, M3	S2, M3	S2, M3
PT+OV		S2, M2	S2, M2	S2, M2	S2, M2	S2, M2	S2, M2	S2, M2	S2, M2	S2, M2

22.19.	To verify the Head on collision prevention when in absolute block section with IBS when Stop Signal at OFF is between two trains with valid position report **(SRS –A1.8.15 (b-ii)**	1) Power on the system. 2) In communication mandatory area and with valid communication. 3) Position report is available in SR &LS mode. 4) Keep both the L-2 onboard between advance starter & IBS	1) Brake shall be applied in both the loco and train shall have brought to standstill. 1) Overlap distance shall be made zero. 2) See table for expected output.	SR LS OS FS OS+OV FS+OV TR	

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System LEVEL TEST CASES (RDSO)

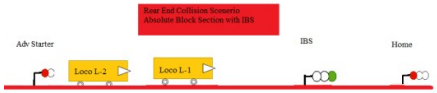
Test ID	Test Scenario	Input Specification	Expected Output/Values	Observed Output (Pass/Fail)	
	 Figure-16	and L-1 onboard IBS & home of next station.		PT	

Head On Collision as at	Section: Absolute Block (A2)	Communication: Zone-Mandatory and Available with station (C2)							
	Tin Validation: Same TIN and Stop signal at OFF in between two trains & State I2 (T2)								
L2↓ L1→	SR (P1)	LS (C2)	OS	FS	OS+OV	FS+OV	TR	PT	PT+OV
SR(P1)	M6	M6	M6	M6	M6	M6	M6	M6	M6
LS(C2)	M6	M6	M6	M6	M6	M6	M6	M6	M6
OS	S3, M4	S3, M4	S3, M4	S3, M4	S3, M4	S3, M4	S3, M4	S3, M4	S3, M4
FS	S3, M4	S3, M4	S3, M4	S3, M4	S3, M4	S3, M4	S3, M4	S3, M4	S3, M4
OS+OV	S2, M4	S2, M4	S2, M4	S2, M4	S2, M4	S2, M4	S2, M4	S2, M4	S2, M4
FS+OV	S2, M4	S2, M4	S2, M4	S2, M4	S2, M4	S2, M4	S2, M4	S2, M4	S2, M4
TR	S3, M4	S3, M4	S3, M4	S3, M4	S3, M4	S3, M4	S3, M4	S3, M4	S3, M4
PT	S2, M4	S2, M4	S2, M4	S2, M4	S2, M4	S2, M4	S2, M4	S2, M4	S2, M4
PT+OV	S2, M4	S2, M4	S2, M4	S2, M4	S2, M4	S2, M4	S2, M4	S2, M4	S2, M4

22.20.	Check for rear end collision SOS from	1) Power on the system.	.	SR	

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System LEVEL TEST CASES (RDSO)

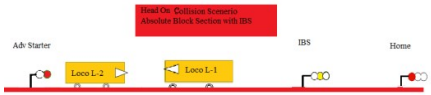
Test ID	Test Scenario	Input Specification	Expected Output/Values	Observed Output (Pass/Fail)	
	station in absolute block section with IBS when No Stop Signal between two trains with valid position report. TIN Occupation: Two trains are on the same TIN. **(SRS –A1.8.15 (C-i)** 	2) In communication mandatory area and communication available with stationary KAVACH. 3) In communication mandatory area and with valid communication. 4) Position report is available in SR &LS mode. 5) TIN occupied by L1 & L2 Onboard is same TIN in the signal route.	1) See table for expected output.	LS OS FS OS+OV FS+OV TR PT	

Rear End Collision as at		Section: Absolute Block (A2)	Communication: Zone-Mandatory and Available with station (C2)							
		Tin Validation: Same TIN and Stop signal at ON in between two trains (T1)								
L2↓	L1 →	SR (P1)	LS (C2)	OS	FS	OS+OV	FS+OV	TR	PT	PT+OV
SR(P1)		M5	M5	M5	M5	M5	M5	M5	M5	M5
LS(C2)		M5	M5	M5	M5	M5	M5	M5	M5	M5
OS		M2	M2	M2	M2	M2	M2	M2	M2	M2
FS		M2	M2	M2	M2	M2	M2	M2	M2	M2
OS+OV		M2	M2	M2	M2	M2	M2	M2	M2	M2
FS+OV		M2	M2	M2	M2	M2	M2	M2	M2	M2
TR		S3, M2	S3, M2	S3, M2	S3, M2	S3, M2	S3, M2	S3, M2	S3, M2	S3, M2
PT		S2, M2	S2, M2	S2, M2	S2, M2	S2, M2	S2, M2	S2, M2	S2, M2	S2, M2
PT+OV		M2	M2	M2	M2	M2	M2	M2	M2	M2

22.21.	To verify the Head on collision prevention when in absolute block	1) Power on the system. 2) Make sure that no faults are	1) Brake shall be applied in both the loco and train shall have brought to	SR LS	

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System LEVEL TEST CASES (RDSO)

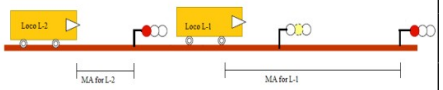
Test ID	Test Scenario	Input Specification	Expected Output/Values	Observed Output (Pass/Fail)	
	section with IBS when there is no Stop Signal between two trains with valid position report. **(SRS –A1.8.15 (C-ii)** 	present. 3) In communication mandatory area and with valid communication. 4) Position report is available in SR & LS mode.	standstill. 2) Overlap distance shall be made zero. 3) See table for expected output.	OS FS OS+OV FS+OV TR PT	

Head On Collision as at	Section: Absolute Block (A2)	Communication: Zone-Mandatory and Available with station (C2)							
	Tin Validation: Same TIN and Stop signal at ON in between two trains (T1)								
L2 ↓ / L1 →	SR (P1)	LS (C2)	OS	FS	OS+OV	FS+OV	TR	PT	PT+ OV
SR(P1)	M6	M6	M6	M6	M6	M6	M6	M6	M6
LS(C2)	M6	M6	M6	M6	M6	M6	M6	M6	M6
OS	M4	M4	M4	M4	M4	M4	M4	M4	M4
FS	M4	M4	M4	M4	M4	M4	M4	M4	M4
OS+OV	M4	M4	M4	M4	M4	M4	M4	M4	M4
FS+OV	M4	M4	M4	M4	M4	M4	M4	M4	M4
TR	S3, M4	S3, M4	S3, M4	S3, M4	S3, M4	S3, M4	S3, M4	S3, M4	S3, M4
PT	S2, M4	S2, M4	S2, M4	S2, M4	S2, M4	S2, M4	S2, M4	S2, M4	S2, M4
PT+OV	M4	M4	M4	M4	M4	M4	M4	M4	M4

22.22.	To verify the rear end collision prevention in automatic block	1) Power on the system. 2) Make sure that no faults are	1) MA for L-2 Onboard is generated up to an EoA location which is at rear	SR LS	

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System LEVEL TEST CASES (RDSO)

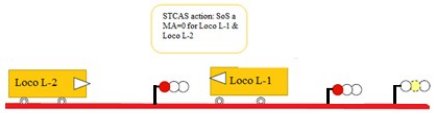
Test ID	Test Scenario	Input Specification	Expected Output/Values	Observed Output (Pass/Fail)	
	section when stop Signal between two trains with valid position report. TIN Occupation: Two trains are in same route & on the same TIN. **(SRS –A1.8.16 (a-i)**  **Figure-17**	present. 3) In communication mandatory area and with valid communication. 4) Both onboard are on the same route & on the same TIN. 5) Position report is available in SR &LS mode. 6) Move the L-2 onboard to pass the stop by selection of OVRD button.	end of the L-1 Onboard with additional safety margin of 300m (Configurable) distance. 2) MA for front Onboard will be as per Stationary KAVACH Table of Control inputs. 3) See table for expected output.	OS FS OS+OV FS+OV TR PT	

Rear End Collision as at		Section: Automatic Block (A3)		Communication: Zone-Mandatory and Available with station (C2)						
		Tin Validation: Same TIN and Stop signal at ON in between two trains (T1)								
L2 ↓	L1 →	SR (P1)	LS (C2)	OS	FS	OS+OV	FS+OV	TR	PT	PT+OV
SR(P1)		M5	M5	M5	M5	M5	M5	M5	M5	M5
LS(C2)		M5	M5	M5	M5	M5	M5	M5	M5	M5
OS		M2	M2	M2	M2	M2	M2	M2	M2	M2
FS		M2	M2	M2	M2	M2	M2	M2	M2	M2
OS+OV		M2	M2	M2	M2	M2	M2	M2	M2	M2
FS+OV		M2	M2	M2	M2	M2	M2	M2	M2	M2
TR		S3, M2	S3, M2	S3,M2	S3, M2	S3, M2	S3, M2	S3, M2	S3, M2	S3, M2
PT		S2, M2	S2, M2	S2, M2	S2, M2	S2, M2	S2, M2	S2, M2	S2, M2	S2, M2
PT+OV		M2	M2	M2	M2	M2	M2	M2	M2	M2

22.23.	To verify the Head on collision prevention when Stop Signal	1) Power on the system. 2) Make sure that no faults are	1) See table for expected output.	SR LS	

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System LEVEL TEST CASES (RDSO)

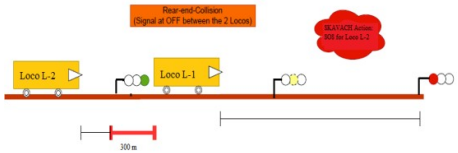
Test ID	Test Scenario	Input Specification	Expected Output/Values	Observed Output (Pass/Fail)	
	between two trains with valid position report. TIN Occupation: Two trains are in the same route & on the same TIN. **(SRS –A1.8.16 (a-ii)**  **Figure-18**	present. 3) In communication mandatory area and with valid communication. 4) Position report is available in SR &LS mode. 5) Both onboard are in same route & on the same TIN.		OS	
				FS	
				OS+OV	
				FS+OV	
				TR	
				PT	

Head On Collision as at		Section: Automatic Block (A3)		Communication: Zone-Mandatory and Available with station (C2)						
		Tin Validation: Same TIN and Stop signal at ON in between two trains (T1)								
L2 ↓	L1 →	SR (P1)	LS (C2)	OS	FS	OS+OV	FS+OV	TR	PT	PT+OV
SR(P1)		M6	M6	M6	M6	M6	M6	M6	M6	M6
LS(C2)		M6	M6	M6	M6	M6	M6	M6	M6	M6
OS		M4	M4	M4	M4	M4	M4	M4	M4	M4
FS		M4	M4	M4	M4	M4	M4	4	M4	M4
OS+OV		M4	M4	M4	M4	M4	M4	M4	M4	M4
FS+OV		M4	M4	M4	M4	M4	M4	M4	M4	M4
TR		S3, M4	S2, M4	S2, M4	S2, M4	S2, M4	S2, M4	S2, M4	S2, M4	S2, M4
PT		S2, M4	S2, M4	S2, M4	S2, M4	S2, M4	S2, M4	S2, M4	S2, M4	S2, M4
PT+OV		M4	M4	M4	M4	M4	M4	M4	M4	M4

22.24.	To verify the rear end collision prevention in Automatic block section	1) Power on the system. 2) Make sure that no faults are	1) On the request of LP OSMA for L-2 Onboard is generated up to an EoA	SR	
				LS	

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System LEVEL TEST CASES (RDSO)

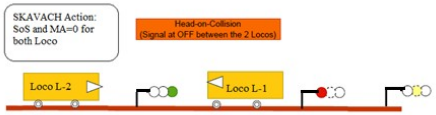
Test ID	Test Scenario	Input Specification	Expected Output/Values	Observed Output (Pass/Fail)	
	when Stop signal is at OFF (IxL fail) is between two trains with valid position report. TIN Occupation: TIN occupied by L1 & L2 Onboard is same TIN in the signal route **(SRS –A1.8.16 (b-i)**  **Figure-19**	present. 3) In communication mandatory area and with valid communication. 4) Position report is available in SR &LS mode.	location which is at rear end of the L-1 Onboard with additional safety margin of 300m (Configurable) distance. 2) MA for L-1 Onboard will be as per Stationary KAVACH Table of Control. 3) See table for expected output.	OS FS OS+OV FS+OV TR PT PT+OV	

Rear End Collision as at	Section: Automatic Block (A3)	Communication: Zone-Mandatory and Available with station (C2)							
	Tin Validation: Same TIN and Stop signal at OFF in between two trains & State I2 (T2)								
L2↓ / L1 →	SR (P1)	LS (C2)	OS	FS	OS+OV	FS+OV	TR	PT	PT+OV
SR(P1)	M5	M5	M5	M5	M5	M5	M5	M5	M5
LS(C2)	M5	M5	M5	M5	M5	M5	M5	M5	M5
OS	S3, M2	S3, M2	S3, M2	S3, M2	S3, M2	S3, M2	S3, M2	S3, M2	S3, M2
FS	S3, M2	S3, M2	S3, M2	S3, M2	S3, M2	S3, M2	S3, M2	S3, M2	S3, M2
OS+OV	S3, M2	S3, M2	S3, M2	S3, M2	S3, M2	S3, M2	S3, M2	S3, M2	S3, M2
FS+OV	S3, M2	S3, M2	S3, M2	S3, M2	S3, M2	S3, M2	S3, M2	S3, M2	S3, M2
TR	S3, M3	S3, M3	S3, M3	S3, M3	S3, M3	S3, M3	S3, M3	S3, M3	S3, M3
PT	S2, M3	S2, M3	S2, M3	S2, M3	S2, M3	S2, M3	S2, M3	S2, M3	S2, M3
PT+OV	S3, M2	S3, M2	S3, M2	S3, M2	S3, M2	S3, M2	S3, M2	S3, M2	S3, M2

22.25.	To verify the Head on collision prevention when in Automatic block	1) Power on the system. 2) Make sure that no faults are	1) See table for expected output.	SR LS	

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System LEVEL TEST CASES (RDSO)

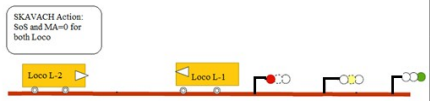
Test ID	Test Scenario	Input Specification	Expected Output/Values	Observed Output (Pass/Fail)	
	section when Stop signal is at OFF (IxL fail) is between two trains with valid position report. TIN Occupation: TIN occupied by L1 & L2 Onboard is same TIN in the signal route **(SRS –A1.8.16 (b-ii)**  **Figure-20**	present. 3) In communication mandatory area and with valid communication. 4) Position report is available in SR mode.		OS	
				FS	
				OS+OV	
				FS+OV	
				TR	
				PT	
				PT+OV	

Head On Collision as at	Section: Automatic Block (A3)	Communication: Zone-Mandatory and Available with station (C2)							
	Tin Validation: Same TIN and Stop signal at OFF in between two trains & State I2 (T2)								
L2↓ L1→	SR (P1)	LS (C2)	OS	FS	OS+OV	FS+OV	TR	PT	PT+OV
SR(P1)	M6	M6	M6	M6	M6	M6	M6	M6	M6
LS(C2)	M6	M6	M6	M6	M6	M6	M6	M6	M6
OS	S3, M4	S3, M4	S3, M4	S3, M4	S3, M4	S3, M4	S3, M4	S3, M4	S3, M4
FS	S3, M4	S3, M4	S3, M4	S3, M4	S3, M4	S3, M4	S3, M4	S3, M4	S3, M4
OS+OV	S2, M4	S2, M4	S2, M4	S2, M4	S2, M4	S2, M4	S2, M4	S2, M4	S2, M4
FS+OV	S2, M4	S2, M4	S2, M4	S2, M4	S2, M4	S2, M4	S2, M4	S2, M4	S2, M4
TR	S3, M4	S3, M4	S3, M4	S3, M4	S3, M4	S3, M4	S3, M4	S3, M4	S3, M4
PT	S2, M4	S2, M4	S2, M4	S2, M4	S2, M4	S2, M4	S2, M4	S2, M4	S2, M4
PT+OV	S2, M4	S2, M4	S2, M4	S2, M4	S2, M4	S2, M4	S2, M4	S2, M4	S2, M4

22.26.	Check for SOS from station in automatic block section with No Stop	1) Power on the system. 2) Make sure that no faults are	1) Both On-boards shall receive MA = 0.	SR	
				LS	

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System LEVEL TEST CASES (RDSO)

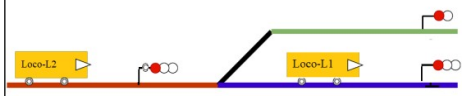
Test ID	Test Scenario	Input Specification	Expected Output/Values	Observed Output (Pass/Fail)	
	Signal between two trains with valid position report: TIN Occupation: Two trains are on the same TIN. **(SRS –A1.8.16 (c)** 	present. 3) In communication mandatory area and with valid communication. 4) Position report is available in SR mode.	2) Head ON collision SoS shall be generated by stationary KAVACH. 3) Brake shall be applied in both the loco and train shall have brought to standstill. 4) Overlap distance shall be made zero. 5) See table **for automatic block section case** for expected output.	OS FS OS+OV FS+OV TR PT PT+OV	

Head On Collision	Section: Absolute Block (A2)	Communication: Zone-Mandatory and Available with station (C2)							
	Tin Validation: Same TIN and Stop signal at ON in between two trains (T1)								
L2↓ L1→	SR (P1)	LS (C2)	OS	FS	OS+OV	FS+OV	TR	PT	PT+OV
SR(P1)	M6	M6	M6	M6	M6	M6	M6	M6	M6
LS(C2)	M6	M6	M6	M6	M6	M6	M6	M6	M6
OS	M4	M4	M4	M4	M4	M4	M4	M4	M4
FS	M4	M4	M4	M4	M4	M4	M4	M4	M4
OS+OV	M4	M4	M4	M4	M4	M4	M4	M4	M4
FS+OV	M4	M4	M4	M4	M4	M4	M4	M4	M4
TR	S3, M4	S3, M4	S3, M4	S3, M4	S3, M4	S3, M4	S3, M4	S3, M4	S3, M4
PT	S2, M4	S2, M4	S2, M4	S2, M4	S2, M4	S2, M4	S2, M4	S2, M4	S2, M4
PT+OV	M4	M4	M4	M4	M4	M4	M4	M4	M4

22.27.	To verify the rear end collision prevention in in automatic/ absolute block section with calling	1) Power on the system. 2) Make sure that no faults are present.	1) MA for L-1 Onboard will be as per Stationary KAVACH Table of Control.	OS	

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System LEVEL TEST CASES (RDSO)

Test ID	Test Scenario	Input Specification	Expected Output/Values	Observed Output (Pass/Fail)	
	ON signal. **(SRS –A1.8.17 (a-i)**  **Figure-21**	3) In communication mandatory area and with valid communication.	2) See table for expected output.		

Rear End Collision as at		Section: Station (A1)		Communication: Zone-Mandatory and Available with station (C1)						
		Tin Validation: Different in the Route, Onboard KAVACH separated by Signal at ON, Route known & state I1 (T4)								
L2	L1 →	SR (P1)	LS (C2)	OS	FS	OS+OV	FS+OV	TR	PT	PT+OV
SR(P1)		☒	☒	☒	☒	☒	☒	☒	☒	☒
LS(C2)		☒	☒	☒	☒	☒	☒	☒	☒	☒
OS		☒	☒	M2	M2	M2	M2	M2	M2	M2
FS		NA	NA	NA	NA	NA	NA	NA	NA	NA
OS+OV		☒	☒	M2	M2	M2	M2	M2	M2	M2
FS+OV		☒	☒	M2	M2	M2	M2	M2	M2	M2
TR		NA	NA	NA	NA	NA	NA	NA	NA	NA
PT		NA	NA	NA	NA	NA	NA	NA	NA	NA
PT+OV		☒	☒	M2	M2	M2	M2	M2	M2	M2

22.28.	To verify the Head on collision prevention in automatic/absolute block section with calling ON signal. **(SRS –A1.8.17 (a-ii)**  	1) Power on the system. 2) Make sure that no faults are present. 3) In communication mandatory area and with valid communication.	1) See table for expected output.	OS	
				FS	
				OS+OV	
				FS+OV	
				TR	
				PT	

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System LEVEL TEST CASES (RDSO)

Test ID	Test Scenario	Input Specification	Expected Output/Values	Observed Output (Pass/Fail)
			PT+OV	

Figure-22

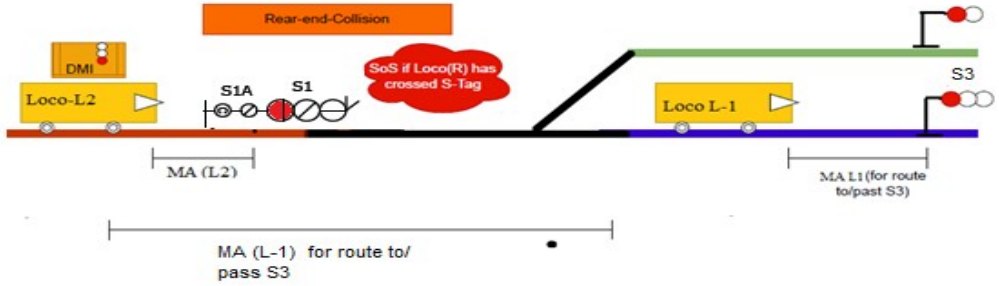
Head On Collision as at	Section: Station (A1)	Communication: Zone-Mandatory and Available with station (C1)							
	Tin Validation: Different in the Route, Onboard KAVACH separated by Signal at ON, Route known & state I1 (T4)								
L2↓ L1→	SR (P1)	LS (C2)	OS	FS	OS+OV	FS+OV	TR	PT	PT+OV
SR(P1)	☒	☒	☒	☒	☒	☒	☒	☒	☒
LS(C2)	☒	☒	☒	☒	☒	☒	☒	☒	☒
OS	☒	☒	S3, M4	S3, M4	S3, M4	S3, M4	S3, M4	S3, M4	S3, M4
FS	S3, M4	S3, M4	S3, M4	S3, M4	S3, M4	S3, M4	S3, M4	S3, M4	S3, M4
OS+OV	☒	☒	S2, M4	S2, M4	S2, M4	S2, M4	S2, M4	S2, M4	S2, M4
FS+OV	☒	☒	S2, M4	S2, M4	S2, M4	S2, M4	S2, M4	S2, M4	S2, M4
TR	S3, M4	S3, M4	S3, M4	S3, M4	S3, M4	S3, M4	S3, M4	S3, M4	S3, M4
PT	S2, M4	S2, M4	S2, M4	S2, M4	S2, M4	S2, M4	S2, M4	S2, M4	S2, M4
PT+OV	☒	☒	S2, M4	S2, M4	S2, M4	S2, M4	S2, M4	S2, M4	S2, M4

22.29.	Check for SOS from station in Automatic/Absolute block station (Home to Adv. Starter): TIN occupation: Two trains on different TIN at mission start up in the same route **(SRS –A1.8.18)**	1) Power on the system. 2) Make sure that no faults are present. 3) In communication mandatory area and with valid communication. 4) No stop signal between two trains with valid position	SoS shall be generated when route is same. SoS shall not be generated when route is different.	

System LEVEL TEST CASES (RDSO)				
Test ID	**Test Scenario**	**Input Specification**	**Expected Output/Values**	**Observed Output (Pass/Fail)**
		Report		
22.30.	Check for withdrawal of calling on signal when Stop Signal at OFF is between two trains with valid position report as shown in figure-3. TIN Occupation: TIN occupied by L-1and L-2 Onboard are different.	1) Power on the system. 2) Onboard L1 should be in FS/OS mode and berthing track is dropped. 3) Point indication (NWKR ↑ and RWKR ↓). 4) Ensure that calling ON is taken OFF. 5) In communication mandatory area and with valid communication.	(i) L-2 MA shall be up to approaching home signal. (ii) Calling ON Signal displayed on LP-OCIP. (iii)OSMA shall be extended up to 300m before the rear end of L-1. (iv)Rear end collision SOS shall be generated. (v) Subsequently overlap shall be made as Zero (0) meter by onboard KAVACH.	
		6) Now make NWKR ↓	(vi)NWKR is made dropped, the OSMA shall be withdrawn and restricted up to the approaching signal foot.	

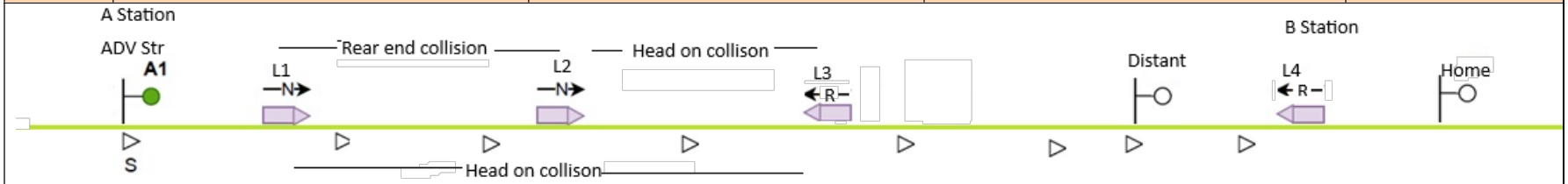
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System LEVEL TEST CASES (RDSO)

Test ID	Test Scenario	Input Specification	Expected Output/Values	Observed Output (Pass/Fail)
				
22.31.	To check that there are four locos in same block as below figure and having collision scenario with each other in the following pattern L1-L2-L3-L4 L1-L2-REAR END COLLISION L2-L3-HEAD ON COLLISION L4-L3- REAR END COLLISION. L1-L3- HEADON COLLISION.	1) Power on the system. 2) Onboard L2 in FS/OS mode. 3) Onboard L-1 is in OS mode. 4) Onboard L-3 is in SR mode with position report. 5) L4 is in SR mode with position report. 6) L1 is communication mandatory area of A- station. 7) L-4 is communication mandatory area of B- station.	1. Check that L1 & L2 and L3 & L4 shall apply the brake after detection of Head ON collision. 2. Prompt for "Head ON Collision with Loco XXXXX in YYYY m" and "Rear End Collision with Loco XXXXX in YYYY m alternate message shall be displayed on LP-OCIP of L1 & L-2 and L3 & L4 with the loco which is nearest.	

Loco	SoS	Result
L1-L3	HOC	
L1-L4	HOC	
L1-L2	REC	
L2-L3	HOC	
L2-L4	HOC	
L4-L3	REC	

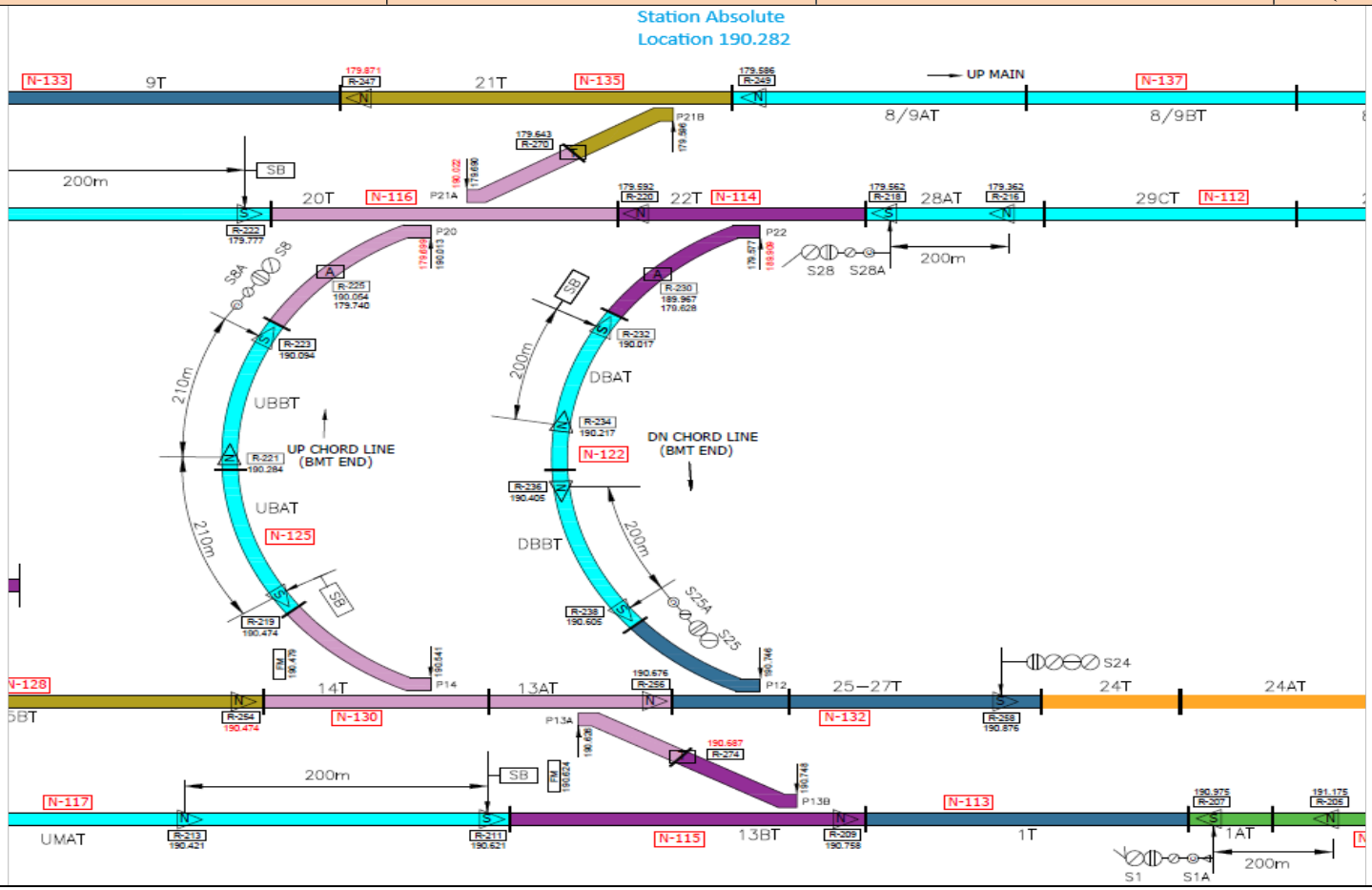
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System LEVEL TEST CASES (RDSO)				
Test ID	**Test Scenario**	**Input Specification**	**Expected Output/Values**	**Observed Output (Pass/Fail)**
				
22.32.	Check for detection of rear end collision SoS when both trains L1 and L2 are moving in the same direction.	1. Simulate front loco L-1 and rear loco L-2 are moving in the same direction on the same TIN. 2. L-2 received Rear end collision SoS. 3. Press Acknowledge button on DMI.	Rear end collision SoS shall not be cancelled.	
22.33.	Check for detection of Head on collision SoS when both trains L1 and L2 are moving in the opposite direction.	1. Simulate front loco L-1 and rear loco L-2 are moving in the opposite direction on the same TIN. 2. Both locos received Head On collision SoS. 3. Press Acknowledge button on DMI.	Head On Collision SoS shall not be cancelled.	
22.34.	On receipt of rear end collision SoS when the braking distance is less than the target distance.	1. Simulate front loco L-1 and rear loco L-2 are moving in the same direction on the same TIN. 2. L-2 received Rear end collision SoS.	1. Rear end collision SoS shall be displayed in DMI of L-2 loco. 2. Brake should not be applied if braking distance is less than the target distance of rear end collision.	

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System LEVEL TEST CASES (RDSO)				
Test ID	**Test Scenario**	**Input Specification**	**Expected Output/Values**	**Observed Output (Pass/Fail)**
22.35.	Generation of Manual SoS from SMOCIP when aboslute location adjustment is in within manual SoS range i.e. 3 kilometer.	1. Place 04 onboard at TIN-112, 137, 125 & 113. 2. Onboard is on FS/OS/SR mode with postion report. 3. Generate the SoS from SM-OCIP and check that SOS received by onboard in Stationary KAVACH to Loco regular packet and emergency packet. 4. Stationary KAVACH shall radiate the SoS message in slot P55, P56, P67 and P68 alternatively with different aboslute location as 190.282, 179.682 etc randomly in every slot cycle.	Check that all onboard receive the SoS packet and brake applied.	
		Similarly check for station having five different adjustment location. Generate the SoS from SM-OCIP and check that SOS received by onboard in Stationary KAVACH to Loco regular packet and emergency packet.	Check that all onboard receive the SoS packet and brake applied.	

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System LEVEL TEST CASES (RDSO)				
Test ID	**Test Scenario**	**Input Specification**	**Expected Output/Values**	**Observed Output (Pass/Fail)**
				

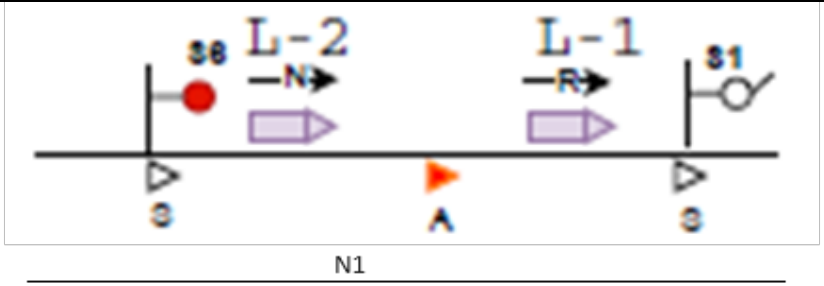
Representative of Firm	RDSO Inspecting Official

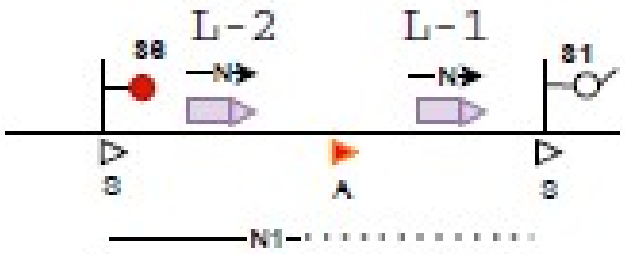
<table>
<tr><th colspan="6">System Level TEST CASES (RDSO)</th></tr>
<tr><th>Test ID</th><th>Test Scenario</th><th>Input Specification</th><th>Expected Output/Values</th><th colspan="2">Observed Output (Pass/Fail)</th></tr>
<tr><td>23.</td><td colspan="5">KAVACH_FRS_23 – SOS handling when encounter with adjustment Tag- This test case checks for SOS and MA handling by Stationary KAVACH/ Onboard KAVACH in block section when encountered with adjustment Tag.</td></tr>
<tr><td rowspan="3">23.1.</td><td rowspan="2">Check for detection of rear end collision when both trains L1 and L2 (OS/FS) are moving in the same direction on the same TIN in Absolute Block Section and are separated by adjustment tag, where only location changes.

(NON-COMMUNICATION MANDATORY AREA)</td><td rowspan="2">1. Simulate L1 is having position and is in either of SR-PR (Position report available)/LS/OS/FS mode and is ahead of L2 and moving in same direction.
2. Simulate L2 is in OS/FS mode.
3. Simulate such that L1 and L2 are separated by adjustment tag programmed with same TIN, and direction and, only change in location is available.
4. Simulate such that L1 and L2 are in non-communication mandatory area.
5. They are not separated by stop signal.</td><td>• Rear end collision shall be detected in L2 and MA shall be curtailed to Rear end collision margin.</td><td colspan="2"><table><tr><th>L1 mode</th><th>L2 in OS +OV</th><th>L2 in FS+ OV</th></tr><tr><td>SR-PR</td><td></td><td></td></tr><tr><td>LS</td><td></td><td></td></tr><tr><td>OS</td><td></td><td></td></tr><tr><td>FS</td><td></td><td></td></tr></table></td></tr>
<tr><td>• L2 shall make overlap margin zero in the braking logic upon detecting the collision margin. This shall be checked in the log.</td><td colspan="2"></td></tr>
<tr><td> 
</td><td>• As L1 moves further, the MA of L2 shall also be enhanced up to rear end collision margin.
• Prompt for “Rear End Collision with Loco XXXXX in YYYY m” and message shall be displayed on LP-OCIP of L-2.</td><td colspan="2"></td></tr>
</table>

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System Level TEST CASES (RDSO)

Test ID	Test Scenario	Input Specification	Expected Output/Values	Observed Output (Pass/Fail)
23.2.	Check for detection of rear end collision when both trains L1 and L2 (OS/FS) are moving in the same direction on the same TIN in Absolute Block Section and are separated by adjustment tag, where location and direction changes. (NON-COMMUNICATION MANDATORY AREA)	1. Simulate L1 is having position and is in either of SR-PR (Position report available)/LS/OS/FS mode and is ahead of L2 and moving in same direction. 2. Simulate L2 is in OS/FS mode. 3. Simulate such that L1 and L2 are separated by adjustment tag programmed with same TIN, and there is change in direction and location. 4. Simulate such that L1 and L2 are in non-communication mandatory area. 5. They are not separated by stop signal.	• Rear end collision shall be detected in L2 and MA shall be curtailed to Rear end collision margin.	**L1 mode** / **L2 in OS +OV** / **L2 in FS+ OV** SR-PR LS OS FS
			• L2 shall make overlap margin zero in the braking logic upon detecting the collision margin. This shall be checked in the log. • As L1 moves further, the MA of L2 shall also be enhanced up to rear end collision margin. • Prompt for "Rear End Collision with Loco XXXXX in YYYY m" and message shall be displayed on LP-OCIP of L-2.	
23.3.	Check for detection of rear end collision when both trains L1 and L2 (OS/FS) are moving in the same direction	1. Simulate L1 is having position and is in either of SR-PR (Position report available)/LS/OS/FS mode and is ahead of L2 and moving in	• Rear end collision shall be detected in L2 and MA shall be curtailed to Rear end collision margin.	**L1 mode** / **L2 in OS** / **L2 in FS**

System Level TEST CASES (RDSO)				
Test ID	**Test Scenario**	**Input Specification**	**Expected Output/Values**	**Observed Output (Pass/Fail)**
	on the same TIN in Absolute Block Section and are separated by adjustment tag, where only location changes. (L2 IN COMMUNICATION MANDATORY AREA AND OVERRIDE NOT SELECTED & L1 IN NON-COMMUNICATION MANDATORY AREA)	same direction. 2. Simulate L2 is in OS/FS mode. 3. Simulate such that L1 and L2 are separated by adjustment tag programmed with same TIN, and direction and, only change in location is available. 4. Simulate such that L2 is in communication mandatory area, override not selected and OS MA not extended. 5. Simulate such that L1 is in non-communication mandatory area. 6. They are not separated by stop signal.		SR-PR LS OS FS
			• L2 shall make overlap margin zero in the braking logic upon detecting the collision margin. This shall be checked in the log.	
			• As L1 moves further, the MA of L2 shall also be enhanced up to rear end collision margin. • Prompt for "Rear End Collision with Loco XXXXX in YYYY m" and message shall be displayed on LP-OCIP of L-2.	

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System Level TEST CASES (RDSO)

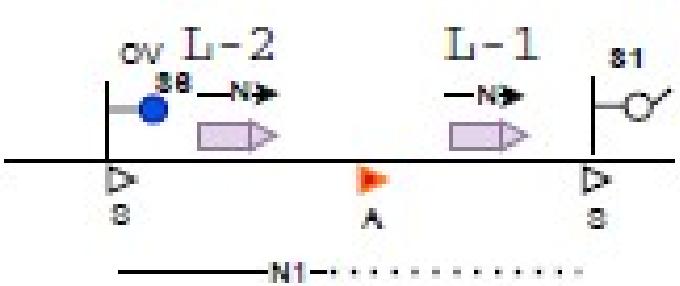
Test ID	Test Scenario	Input Specification	Expected Output/Values	Observed Output (Pass/Fail)
23.4.	Check for detection of rear end collision when both trains L1 and L2 (OS/FS) are moving in the same direction on the same TIN in Absolute Block Section and are separated by adjustment tag, where location and direction changes. (L2 IN COMMUNICATION MANDATORY AREA AND OVERRIDE NOT SELECTED & L1 IN NON-COMMUNICATION MANDATORY AREA)	1. Simulate L1 is having position and is in either of SR-PR (Position report available)/LS/OS/FS mode and is ahead of L2 and moving in same direction. 2. Simulate L2 is in OS/FS mode. 3. Simulate such that L1 and L2 are separated by adjustment tag programmed with same TIN, and there is change in direction and location. 4. Simulate such that L2 is in communication mandatory area, override not selected and OS MA not extended. 5. Simulate such that L1 is in non-communication mandatory area. 6. They are not separated by stop signal	• Rear end collision shall be detected in L2 and MA shall be curtailed to Rear end collision margin.	L1 mode / L2 in OS / L2 in FS SR-PR LS OS FS
			• Prompt for "Rear End Collision with Loco XXXXX in YYYY m" and message shall be displayed on LP-OCIP of L-2.	
			• L2 shall make overlap margin zero in the braking logic upon detecting the collision margin. This shall be checked in the log.	

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<table>
<tr><th colspan="6">System Level TEST CASES (RDSO)</th></tr>
<tr><th>Test ID</th><th>Test Scenario</th><th>Input Specification</th><th>Expected Output/Values</th><th colspan="3">Observed Output (Pass/Fail)</th></tr>
<tr><td></td><td></td><td></td><td>• As L1 moves further, the MA of L2 shall also be enhanced up to rear end collision margin.</td><td colspan="3"></td></tr>
<tr><td rowspan="2">23.5.</td><td rowspan="2">Check for detection of rear end collision when both trains L1 and L2 (OS/FS) are moving in the same direction on the same TIN in Absolute Block Section and are separated by adjustment tag, where only location changes.

(L2 IN COMMUNICATION MANDATORY AREA AND OVERRIDE SELECTED & L1 IN NON-COMMUNICATION MANDATORY AREA)</td><td rowspan="2">1. Simulate L1 is having position and is in either of SR-PR (Position report available)/LS/OS/FS mode and is ahead of L2 and moving in same direction.
2. Simulate L2 is in OS/FS mode.
3. Simulate such that L1 and L2 are separated by adjustment tag programmed with same TIN, and direction and, only change in location is available.
4. Simulate such that L2 is in communication mandatory area, override selected and OS MA extended.
5. Simulate such that L1 is in non-communication mandatory area.
6. They are not separated by stop signal.</td><td>• Rear end collision shall be detected in L2 and MA shall be curtailed to Rear end collision margin.</td><td colspan="3"><table><tr><td>L1 mode</td><td>L2 in OS + OV</td><td>L2 in FS + OV</td></tr><tr><td>SR-PR</td><td></td><td></td></tr><tr><td>LS</td><td></td><td></td></tr><tr><td>OS</td><td></td><td></td></tr><tr><td>FS</td><td></td><td></td></tr></table></td></tr>
<tr><td>• L2 shall make overlap margin zero in the braking logic upon detecting the collision margin. This shall be checked in the log.</td><td colspan="3"></td></tr>
</table>

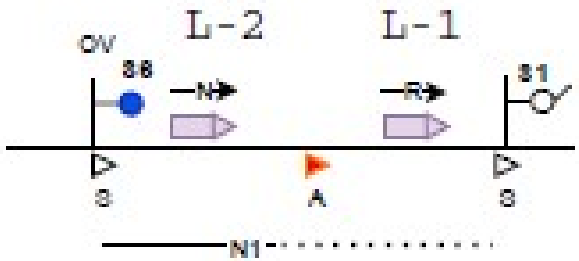
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<table>
<tr><th colspan="5">System Level TEST CASES (RDSO)</th></tr>
<tr><th>Test ID</th><th>Test Scenario</th><th>Input Specification</th><th>Expected Output/Values</th><th>Observed Output (Pass/Fail)</th></tr>
<tr><td></td><td> 
</td><td></td><td>• As L1 moves further, the MA of L2 shall also be enhanced up to rear end collision margin.
• Prompt for “Rear End Collision with Loco XXXXX in YYYY m” and message shall be displayed on LP-OCIP of L-2.</td><td></td></tr>
<tr><td>23.6.</td><td>Check for detection of rear end collision when both trains L1 and L2 (OS/FS) are moving in the same direction on the same TIN in Absolute Block Section and are separated by adjustment tag, where location and direction changes.

(L2 IN COMMUNICATION MANDATORY AREA AND OVERRIDE SELECTED & L1 IN NON-COMMUNICATION MANDATORY AREA)</td><td>1. Simulate L1 is having position and is in either of SR-PR (Position report available)/LS/OS/FS mode and is ahead of L2 and moving in same direction.
2. Simulate L2 is in OS/FS mode.
3. Simulate such that L1 and L2 are separated by adjustment tag programmed with same TIN, and there is change in direction and location.
4. Simulate such that L2 is in communication mandatory area, override selected and OS MA extended.
5. Simulate such that L1 is in non-communication mandatory area.
6. They are not separated by stop signal.</td><td>• Rear end collision shall be detected in L2 and MA shall be curtailed to Rear end collision margin.

• L2 shall make overlap margin zero in the braking logic upon detecting the collision margin. This shall be checked in the log.</td><td><table><tr><td>L1 mode</td><td>L2 in OS + OV</td><td>L2 in FS + OV</td></tr><tr><td>SR-PR</td><td></td><td></td></tr><tr><td>LS</td><td></td><td></td></tr><tr><td>OS</td><td></td><td></td></tr><tr><td>FS</td><td></td><td></td></tr></table></td></tr>
</table>

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<table>
<tr><th colspan="6">System Level TEST CASES (RDSO)</th></tr>
<tr><th>Test ID</th><th>Test Scenario</th><th>Input Specification</th><th>Expected Output/Values</th><th colspan="3">Observed Output (Pass/Fail)</th></tr>
<tr><td></td><td> 
</td><td></td><td>As L1 moves further, the MA of L2 shall also be enhanced up to rear end collision margin.
Prompt for “Rear End Collision with Loco XXXXX in YYYY m” and message shall be displayed on LP-OCIP of L-2.</td><td colspan="3"></td></tr>
<tr><td rowspan="3">23.7.</td><td rowspan="3">Check for detection of rear end collision when both trains L1 and L2 (OS/FS) are moving in the same direction and are separated by adjustment tag, where only location changes.

L2 is in communication mandatory area and override not selected & L1 is in communication mandatory area.

L2 is in Station section. L1 is in Absolute block section. Radio communication is healthy.</td><td rowspan="3">1. Simulate L1 is having position and is in either of SR-PR (Position report available)/LS/OS/FS mode and is ahead of L2 and moving in same direction.
2. Simulate L2 is in OS/FS mode.
3. Simulate such that L1 and L2 are separated by adjustment tag programmed with same TIN, and only change in location is available.
4. Simulate such that L2 in station section, in different TIN communication mandatory area and radio communication is healthy.
5. Simulate such that L1 in communication mandatory area in Absolute Block section.
6. They are separated by stop signal OFF condition.</td><td>• Rear end collision SoS shall be detected for L2 and MA shall be curtailed to Rear end collision margin by stationary KAVACH.</td><td>L1 mode</td><td>L2 in OS mode</td><td>L2 in FS mode</td></tr>
<tr><td></td><td></td><td></td></tr>
<tr><td></td><td></td><td></td></tr>
<tr><td></td><td>• L2 shall make overlap margin zero in the braking logic upon detecting the collision margin. This shall be checked in the log.</td><td colspan="3"></td></tr>
<tr><td></td><td>• As L1 moves further, the MA of L2 shall also be enhanced up to rear end collision margin.
• Prompt for “Rear End Collision from station (XXXXX)”</td><td colspan="3"></td></tr>
</table>

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System Level TEST CASES (RDSO)				
Test ID	**Test Scenario**	**Input Specification**	**Expected Output/Values**	**Observed Output (Pass/Fail)**
			message shall be displayed on LP-OCIP of L-2.	
23.8.	Check for detection of rear end collision when both trains L1 and L2 (OS/FS) are moving in the same direction and are separated by adjustment tag, where location and direction changes. L2 is in communication mandatory area and override not selected & L1 is in communication mandatory area. L2 is in Station section. L1 is in Absolute block section. Radio communication is healthy.	4. Simulate L1 is having position and is in either of SR-PR (Position report available)/LS/OS/FS mode and is ahead of L2 and moving in same direction. 5. Simulate L2 is in OS/FS mode. 6. Simulate such that L1 and L2 are separated by adjustment tag programmed with same TIN, and change in direction and location are available. 7. Simulate such that L2 in station section, in different TIN communication mandatory area and radio communication is healthy. 8. Simulate such that L1 in communication mandatory area in Absolute Block section. 9. They are separated by stop signal OFF condition.	• Rear end collision SoS shall be detected for L2 and MA shall be curtailed to Rear end collision margin by stationary KAVACH. • L2 shall make overlap margin zero in the braking logic upon detecting the collision margin. This shall be checked in the log.	L1 mode / L2 in OS mode / L2 in FS mode OS FS

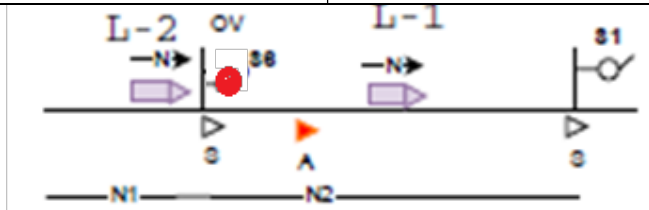
Representative of Firm	RDSO Inspecting Official

<table>
<tr><th colspan="5">System Level TEST CASES (RDSO)</th></tr>
<tr><th>Test ID</th><th>Test Scenario</th><th>Input Specification</th><th>Expected Output/Values</th><th>Observed Output (Pass/Fail)</th></tr>
<tr><td></td><td> 
</td><td></td><td></td><td></td></tr>
<tr><td></td><td></td><td></td><td>• As L1 moves further, the MA of L2 shall also be enhanced up to rear end collision margin.
• Prompt for “Rear End Collision from station (xxxxx)” and message shall be displayed on LP-OCIP of L-2.</td><td></td></tr>
<tr><td>23.9.</td><td>Check for detection of rear end collision when both trains L1 and L2 (OS/FS) are moving in the same direction in Absolute Block Section and are separated by adjustment tag, where only location changes.

(L2 IN COMMUNICATION MANDATORY AREA AND OVERRIDE SELECTED & L1 IN NON-COMMUNICATION MANDATORY AREA)

L2 is in Station section. L1 is in Absolute block section. Radio communication is healthy.</td><td>1. Simulate L1 is having position and is in either of SR-PR (Position report available)/LS/OS/FS mode and is ahead of L2 and moving in same direction.
2. Simulate such that L2 is in communication mandatory area, override selected and OS MA is extended.
3. Simulate such that L1 and L2 are separated by adjustment tag programmed with same TIN, and direction and, only change in location is available.
4. Simulate such that L2 in station section, in different TIN communication mandatory area and radio communication is healthy.
5. Simulate such that L1 in non-communication mandatory area in</td><td>• Stationary KAVACH shall extend OS MA as per ToC after receipt of SIG_OV input.
• Rear end collision SoS shall be detected for L2 and MA shall be curtailed to Rear end collision margin by Onboard KAVACH when TIN occupied is same as Loco L2.</td><td><table><tr><th>L1 mode</th><th>L2 in OS + OV</th><th>L2 in FS + OV</th></tr><tr><td>SR-PR</td><td></td><td></td></tr><tr><td>LS</td><td></td><td></td></tr><tr><td>OS</td><td></td><td></td></tr><tr><td>FS</td><td></td><td></td></tr></table></td></tr>
<tr><td></td><td></td><td></td><td>• L2 shall make overlap margin zero in the braking logic upon detecting the collision margin. This shall be checked in the log.</td><td></td></tr>
<tr><td></td><td></td><td></td><td>• As L1 moves further, the MA of L2 shall also be enhanced up to rear end collision margin.</td><td></td></tr>
</table>

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System Level TEST CASES (RDSO)				
Test ID	**Test Scenario**	**Input Specification**	**Expected Output/Values**	**Observed Output (Pass/Fail)**
		Absolute Block section. 6. They are separated by stop signal.	• Prompt for "Rear End Collision from onboard (XXXXX)" and message shall be displayed on LP-OCIP of L-2.	
				
23.10	Check for detection of rear end collision when both trains L1 and L2 (OS/FS) are moving in the same direction in Absolute Block Section and are separated by adjustment tag, **where location and direction changes.** (L2 IN COMMUNICATION MANDATORY AREA AND OVERRIDE SELECTED & L1 IN NON-COMMUNICATION MANDATORY AREA) L2 is in Station section. L1 is	• Simulate L1 is having position and is in either of SR-PR (Position report available)/LS/OS/FS mode and is ahead of L2 and moving in same direction. • Simulate such that L2 is in communication mandatory area, override selected and OS MA is extended. • Simulate such that L1 and L2 are separated by adjustment tag programmed with same TIN, and change in direction and location are available. • Simulate such that L2 in station section, in different TIN communication mandatory area and radio communication is healthy.	• Stationary KAVACH shall extend OS MA as per ToC after receipt of SIG_OV input. • Rear end collision SoS shall be detected for L2 and MA shall be curtailed to Rear end collision margin by Onboard KAVACH when TIN occupied is same as Loco L2. • L2 shall make overlap margin zero in the braking logic upon detecting the collision margin. This shall be checked in the log. • As L1 moves further, the MA of L2 shall also be enhanced up to rear end collision margin.	L1 mode / L2 in OS + OV / L2 in FS + OV SR-PR LS OS FS

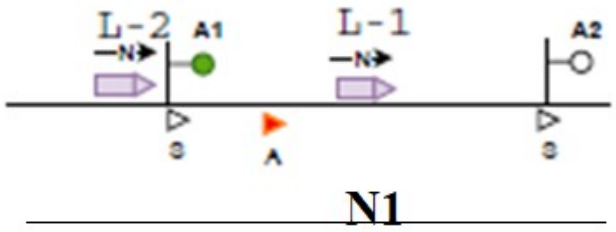
Representative of Firm	RDSO Inspecting Official

<table>
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<tr><th>Test ID</th><th>Test Scenario</th><th>Input Specification</th><th>Expected Output/Values</th><th>Observed Output (Pass/Fail)</th></tr>
<tr><td></td><td>in Absolute block section. Radio communication is healthy.</td><td>• Simulate such that L1 in non-communication mandatory area in Absolute Block section.
• They are separated by stop signal.</td><td>• Prompt for “Rear End Collision from onboard (XXXXX)” and message shall be displayed on LP-OCIP of L-2.</td><td></td></tr>
<tr><td></td><td> 
</td><td></td><td></td><td></td></tr>
<tr><td>23.11</td><td>Check for detection of rear end collision when both trains L1 and L2 (OS/FS) are moving in the same direction and are separated by adjustment tag, where only location changes.

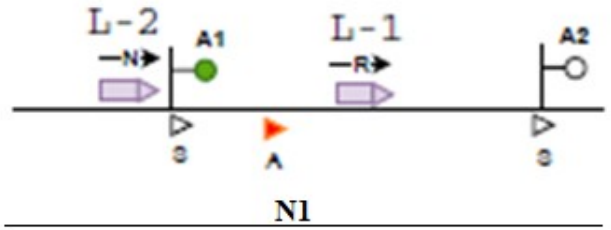
L2 & L1 are in communication mandatory area.</td><td>1. Simulate L1 is having position and is in either of SR-PR (Position report available)/LS/OS/FS mode and is ahead of L2 and moving in same direction.
2. Simulate L2 is in OS/FS mode.
3. Simulate such that L1 and L2 are separated by adjustment tag programmed with same TIN, and change in location is only available.
4. Simulate such that L1 and L2 are in Automatic Block Section</td><td>• Rear end collision SoS shall be detected for L2 and MA shall be curtailed to Rear end collision margin by stationary KAVACH.

• L2 shall make overlap margin zero in the braking logic upon detecting the collision margin.</td><td><table><tr><th>L1 mode</th><th>L2 in OS mode</th><th>L2 in FS mode</th></tr><tr><td>SR-PR</td><td></td><td></td></tr><tr><td>OS</td><td></td><td></td></tr><tr><td>FS</td><td></td><td></td></tr></table></td></tr>
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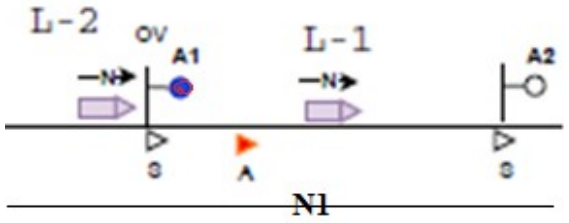
System Level TEST CASES (RDSO)				
Test ID	**Test Scenario**	**Input Specification**	**Expected Output/Values**	**Observed Output (Pass/Fail)**
	L2 and L1 are in Automatic block section. Radio communication is healthy.	communication mandatory area and radio communication is healthy. 5. They are separated by stop signal OFF condition.	This shall be checked in the log.	
			• As L1 moves further, the MA of L2 shall also be enhanced up to rear end collision margin. • Prompt for "Rear End Collision from Station (XXXXX)" and message shall be displayed on LP-OCIP of L-2.	
23.12	Check for detection of rear end collision when both trains L1 and L2 (OS/FS) are moving in the same direction and are separated by adjustment tag, where there is change in direction and location. L2 & L1 are in communication mandatory area. L2 and L1 are in Automatic block section. Radio communication is healthy.	1. Simulate L1 is having position and is in either of SR-PR (Position report available)/LS/OS/FS mode and is ahead of L2 and moving in same direction. 2. Simulate L2 is in OS/FS mode. 3. Simulate such that L1 and L2 are separated by adjustment tag programmed with same TIN, and change in direction and location are available. 4. Simulate such that L1 and L2 are in Automatic Block Section communication mandatory area and radio communication is healthy. 5. They are separated by stop signal	• Rear end collision SoS shall be detected for L2 and MA shall be curtailed to Rear end collision margin by stationary KAVACH. • L2 shall make overlap margin zero in the braking logic upon detecting the collision margin. This shall be checked in the log.	L1 mode / L2 in OS mode / L2 in FS mode SR-PR OS FS

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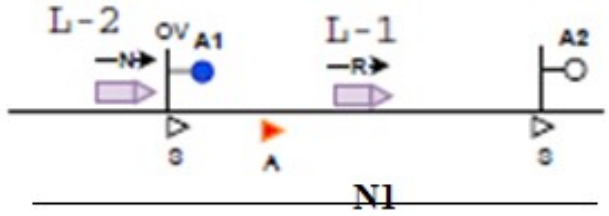
System Level TEST CASES (RDSO)				
Test ID	**Test Scenario**	**Input Specification**	**Expected Output/Values**	**Observed Output (Pass/Fail)**
		OFF condition.		
			• As L1 moves further, the MA of L2 shall also be enhanced up to rear end collision margin. • Prompt for "Rear End Collision from Station (XXXXX)" and message shall be displayed on LP-OCIP of L-2.	
23.13	Check for detection of rear end collision when both trains L1 and L2 (OS/FS) are moving in the same direction and are separated by adjustment tag, where there is change in only location. L2 & L1 are in communication mandatory area. L2 is in Station section and override is selected and L1 is in Automatic block section. Radio communication is	1. Simulate L1 is having position and is in either of SR-PR (Position report available)/LS/OS/FS mode and is ahead of L2 and moving in same direction. 2. Simulate such that L2 is in communication mandatory area, override selected and OS MA is extended. 3. Simulate such that L1 and L2 are separated by adjustment tag programmed with same TIN, and change location is only available. 4. Simulate such that L2 in Station section and L1 are in Automatic Block Section communication	• Rear end collision SoS shall be detected for L2 and MA shall be curtailed to Rear end collision margin by Stationary KAVACH. • L2 shall make overlap margin zero in the braking logic upon detecting the collision margin. This shall be checked in the log. • As L1 moves further, the MA of L2 shall also be enhanced up to rear end collision margin.	L1 mode / L2 in OS + OV / L2 in FS + OV SR-PR OS FS

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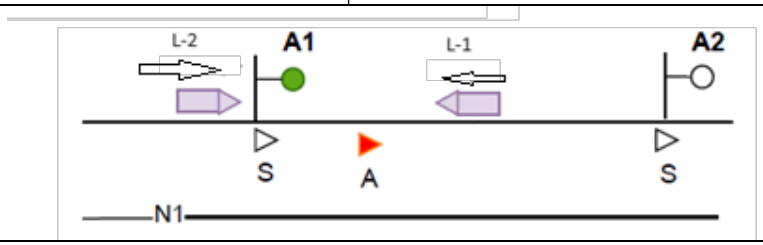
System Level TEST CASES (RDSO)

Test ID	Test Scenario	Input Specification	Expected Output/Values	Observed Output (Pass/Fail)
	healthy.	mandatory area and radio communication is healthy. 5. They are separated by stop signal ON condition.	• Prompt for "Rear End Collision from Station (XXXXX)" and message shall be displayed on LP-OCIP of L-2.	
				
23.14	Check for detection of rear end collision when both trains L1 and L2 (OS/FS) are moving in the same direction and are separated by adjustment tag, where there is change in direction and location. L2 & L1 are in communication mandatory area. L2 is in Station section and override is selected and L1 is in Automatic block section. Radio communication is	1. Simulate L1 is having position and is in either of SR-PR (Position report available)/LS/OS/FS mode and is ahead of L2 and moving in same direction. 2. Simulate such that L2 is in communication mandatory area, override selected and OS MA is extended. 3. Simulate such that L1 and L2 are separated by adjustment tag programmed with same TIN, and change in direction and location are available. 4. Simulate such that L1 in Station section and L2 are in Automatic Block Section communication	• Rear end collision SoS shall be detected for L2 and MA shall be curtailed to Rear end collision margin by stationary KAVACH. • L2 shall make overlap margin zero in the braking logic upon detecting the collision margin. This shall be checked in the log. • As L1 moves further, the MA	L1 mode / L2 in OS + OV / L2 in FS + OV SR-PR OS FS

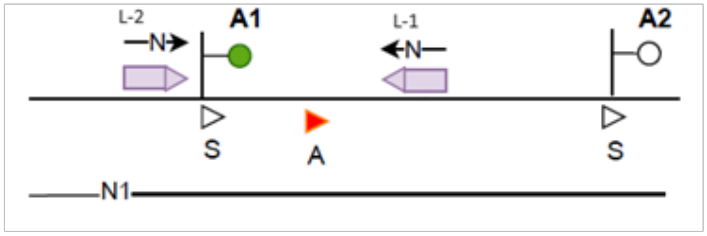
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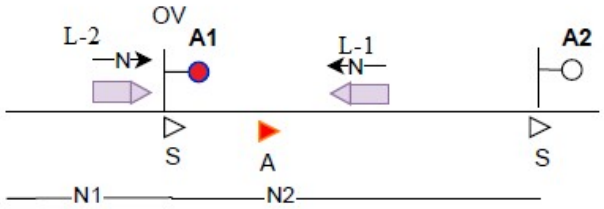
System Level TEST CASES (RDSO)				
Test ID	**Test Scenario**	**Input Specification**	**Expected Output/Values**	**Observed Output (Pass/Fail)**
	healthy.	mandatory area and radio communication is healthy. 5. They are separated by stop signal in ON Aspect.	of L2 shall also be enhanced up to rear end collision margin. • Prompt for "Rear End Collision from Station (XXXXX)" and message shall be displayed on LP-OCIP of L-2.	
				
23.15	Check for detection of Head ON collision when both trains L1 and L2 (OS/FS) are moving in the opposite direction and are separated by adjustment tag, **where only location changes.** L2 & L1 are in communication mandatory area. L2 and L1 are in Automatic block section. Radio communication is healthy.	1. Simulate L1 is having position and is in either of SR-PR (Position report available)/LS/OS/FS mode and is ahead of L2 and moving in opposite direction. 2. Simulate L2 is in OS/FS mode. 3. Simulate such that L1 and L2 are separated by adjustment tag programmed with different TIN, and change in location is only available. 4. Simulate such that L1 and L2 are in Automatic Block Section communication mandatory area and radio communication is healthy. 5. They are separated by stop signal in	• Head ON collision SoS shall be detected for L1 & L2 and MA shall be "0" and both the Onboard shall stop with application of brakes. • Prompt for "Head ON Collision from station (XXXXX)" and message shall be displayed on LP-OCIP of L-1 and L-2.	L2 mode / L1 in SR SR-PR OS FS

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System Level TEST CASES (RDSO)				
Test ID	**Test Scenario**	**Input Specification**	**Expected Output/Values**	**Observed Output (Pass/Fail)**
		OFF condition.		
				

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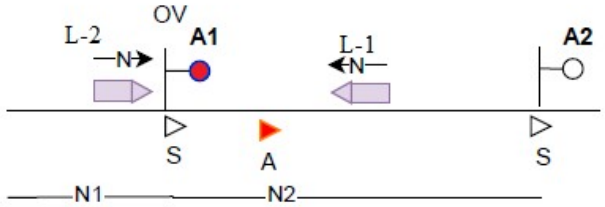
System Level TEST CASES (RDSO)				
Test ID	**Test Scenario**	**Input Specification**	**Expected Output/Values**	**Observed Output (Pass/Fail)**
23.16	Check for detection of Head ON Collision when both trains L1 and L2 (OS/FS) are moving in the opposite direction and are separated by adjustment tag, **where there is change in direction and location.** L2 & L1 are in communication mandatory area. L2 and L1 are in Automatic block section. Radio communication is healthy.	1. Simulate L1 is having position and is in either of SR-PR (Position report available)/LS/OS/FS mode and is ahead of L2 and moving in opposite direction. 2. Simulate L2 is in OS/FS mode. 3. Simulate such that L1 and L2 are separated by adjustment tag programmed with same TIN, and change in direction and location are available. 4. Simulate such that L1 and L2 are in Automatic Block Section communication mandatory area and radio communication is healthy. 5. They are separated by stop signal in OFF condition.	• Head ON collision SoS shall be detected for L1 & L2 and MA shall be made "0" • Both the Onboard shall stop with application of brakes. • Prompt for "Head On Collision from station (XXXXX)" and message shall be displayed on LP-OCIP of L-1 and L-2.	L2 mode: L1 in SR SR-PR: OS: FS:
				
23.17	Check for detection of Head ON collision when both trains L1 and L2 (OS/FS) are moving in the opposite	1. Simulate L1 is having position and is in either of SR-PR (Position report available)/ /OS/FS mode and is ahead of L2 and moving in	• Head ON collision SoS shall be detected for L1 & L2 and MA shall be made "0"	L2 mode: L1 in SR SR-PR: OS+O:

System Level TEST CASES (RDSO)				
Test ID	**Test Scenario**	**Input Specification**	**Expected Output/Values**	**Observed Output (Pass/Fail)**
	direction and are separated by adjustment tag, **where there is change in only location.** L2 & L1 are in communication mandatory area. L2 is in Station section and override is selected and L1 is in Automatic block section. Radio communication is healthy.	opposite direction. 2. Simulate L2 is in OS/FS mode. 3. Simulate such that L1 and L2 are separated by adjustment tag programmed with same TIN, and change location is only available. 4. Simulate such that L2 in Station section and L1 are in Automatic Block Section communication mandatory area and radio communication is healthy. 5. They are separated by stop signal at ON and override is selected in L2.	• Both the Onboard shall stop with application of brakes. • Prompt for "Head ON Collision from station (XXXXX)" and message shall be displayed on LP-OCIP of L-1 and L-2.	V FS+O V
				

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System Level TEST CASES (RDSO)

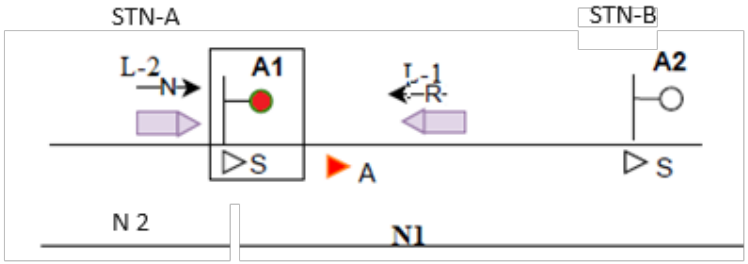
Test ID	Test Scenario	Input Specification	Expected Output/Values	Observed Output (Pass/Fail)
23.18	Check for detection of Head ON collision when both trains L1 and L2 (OS/FS) are moving in the opposite direction and are separated by adjustment tag, **where there is change in direction and location.** L2 & L1 are in communication mandatory area. L2 is in Station section and override is selected and L1 is in Automatic block section. Radio communication is healthy.	1. Simulate L1 is having position and is in either of SR-PR (Position report available)/ /OS/FS mode and is ahead of L2 and moving in opposite direction. 2. Simulate L2 is in OS/FS mode. 3. Simulate such that L1 and L2 are separated by adjustment tag programmed with same TIN, and change in direction and location are available. 4. Simulate such that L2 in Station section and L1 are in Automatic Block Section communication mandatory area and radio communication is healthy. 5. They are separated by stop signal at ON and override is selected in L2.	• Head ON collision SoS shall be detected for L1 & L2 and MA shall be made "0" • Both the Onboard shall stop with application of brakes. • Prompt for "Head ON Collision from station (XXXXX)" and message shall be displayed on LP-OCIP of L-1 and L-2.	L2 mode: L1 in SR SR-PR: OS+OV: FS+OV:



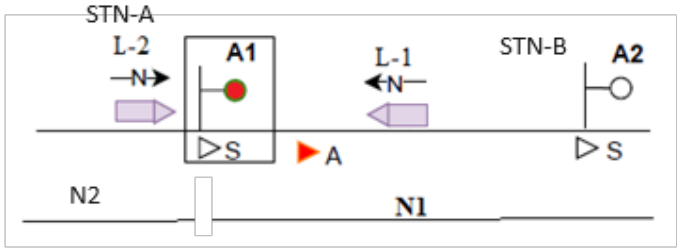
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System Level TEST CASES (RDSO)				
Test ID	**Test Scenario**	**Input Specification**	**Expected Output/Values**	**Observed Output (Pass/Fail)**
23.19	Check for detection of Head ON collision when both trains L1 and L2 (OS/FS) are moving in the opposite direction and are separated by adjustment tag, **where there is change in only location.** L2 & L1 are in communication mandatory area. L2 is in Station section and override is selected and L1 is in Automatic block section of adjacent stationary Kavach. Radio communication is healthy. (S-Kavach to S-Kavach interface is functional)	1. Simulate L1 is having position and is in either of SR-PR (Position report available)/ /OS/FS mode & L2 moving in opposite direction. 2. Simulate L2 is in OS/FS mode. 3. Simulate such that L1 and L2 are separated by adjustment tag programmed with same TIN, and change location is only available. 4. Simulate such that L2 in Station section and L1 are in Automatic Block Section of adjacent stationary Kavach, communication mandatory area and radio communication is healthy.	• Head ON collision SoS shall be detected for L1 & L2 and MA shall be made "0" • Both the Onboard shall stop with application of brakes. • Prompt for "Head ON Collision from station (XXXXX)" and message shall be displayed on LP-OCIP of L-1 and L-2.	L2 mode / L1 in SR SR-PR OS+OV FS+OV

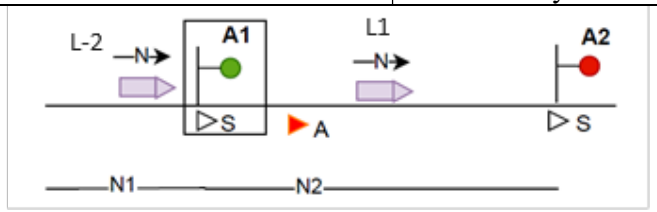
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System Level TEST CASES (RDSO)				
Test ID	**Test Scenario**	**Input Specification**	**Expected Output/Values**	**Observed Output (Pass/Fail)**
				
23.20	Check for detection of Head ON collision when both trains L1 and L2 (OS/FS) are moving in the opposite direction and are separated by adjustment tag, **where there is change in direction and location.** L2 & L1 are in - communication mandatory area. L2 is in Station section and override is selected and L1 is in Automatic block section of adjacent stationary Kavach. Radio communication is healthy. (S-Kavach to S-Kavach interface is	1. Simulate L1 is having position and is in either of SR-PR (Position report available)/LS/OS/FS mode and L2 moving in opposite direction. 2. Simulate L2 is in OS/FS mode. 3. Simulate such that L1 and L2 are separated by adjustment tag programmed with Same TIN, and change in direction and location are available. 4. Simulate such that L2 in Station section and L1 is in Automatic Block Section communication mandatory area of adjacent stationary Kavach and radio communication is healthy. 5. They are separated by stop signal at ON and override is selected in L2	1. Head ON collision SoS shall be detected for L1 & L2 and MA shall be made "0" in OS & FS mode by stationary KAVACH. 2. Both the Onboard shall stop with application of brakes. 3. Prompt for "Head ON Collision from station (XXXXX)" and message shall be displayed on LP-OCIP of L-1 and L-2.	L2 mode / L1 in SR SR-PR OS+OV FS+OV

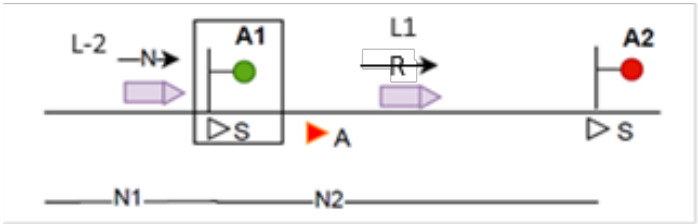
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System Level TEST CASES (RDSO)				
Test ID	**Test Scenario**	**Input Specification**	**Expected Output/Values**	**Observed Output (Pass/Fail)**
	functional)			
				
23.21	Check for detection of rear end collision when both trains L1 and L2 (OS/FS) are moving in the same direction and are separated by adjustment tag, **where there is change in only location.** L2 & L1 are in communication mandatory area. L2 is in Station section and override is selected and L1 is in Automatic block section of adjacent stationary Kavach. Radio communication is healthy. (S-	1. Simulate L1 is having position and is in either of SR-PR (Position report available) /OS/FS mode & L2 moving in same direction. 2. Simulate L2 is in OS/FS mode. 3. Simulate such that L1 and L2 are separated by adjustment tag after border tag programmed with same TIN, and change location is only available. 4. Simulate such that L2 in Station section and L1 are in Automatic Block Section of	• Rear end collision SoS shall be detected for L2 and MA shall be curtailed to Rear end collision margin by Stationary KAVACH. • L2 shall make overlap margin zero in the braking logic upon detecting the collision margin. This shall be checked in the log. • As L1 moves further, the MA of L2 shall also be enhanced up to rear end collision margin. • Prompt for "Rear End Collision	L2 mode / L1 in SR/OS/FS SR-PR OS+OV FS+OV

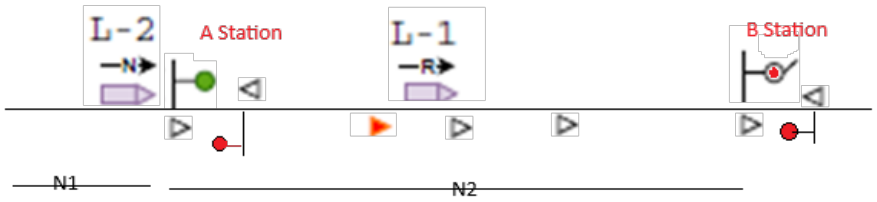
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System Level TEST CASES (RDSO)				
Test ID	**Test Scenario**	**Input Specification**	**Expected Output/Values**	**Observed Output (Pass/Fail)**
	Kavach to S-Kavach interface is functional)	adjacent stationary Kavach, communication mandatory area and radio communication is healthy.	from Station (XXXXX)" and message shall be displayed on LP-OCIP of L-2.	
				
23.22	Check for detection of rear end collision when both trains L1 and L2 (OS/FS) are moving in the same direction and are separated by adjustment tag, **where there is change in location and direction.** L2 & L1 are in communication mandatory area. L2 is in Station section and override is selected and L1 is in Automatic block section of adjacent stationary Kavach. Radio communication is healthy. (S-Kavach to S-Kavach interface is functional)	1. Simulate L1 is having position and is in either of SR-PR (Position report available)/ /OS/FS mode & L2 moving in same direction. 2. Simulate L2 is in OS/FS mode. 3. Simulate such that L1 and L2 are separated by adjustment tag after border tag programmed with same TIN, and change location and direction. 4. Simulate such that L2 in Station section and L1 are in Automatic Block Section of adjacent stationary Kavach, communication mandatory area and radio communication	• Rear end collision SoS shall be detected for L2 and MA shall be curtailed to Rear end collision margin by Stationary KAVACH. • L2 shall make overlap margin zero in the braking logic upon detecting the collision margin. This shall be checked in the log. • As L1 moves further, the MA of L2 shall also be enhanced up to rear end collision margin. • Prompt for "Rear End Collision from Station (XXXXX)" and message shall be displayed on LP-OCIP of L-2.	L2 mode / L1 in SR/OS/ FS SR-PR OS+OV FS+OV

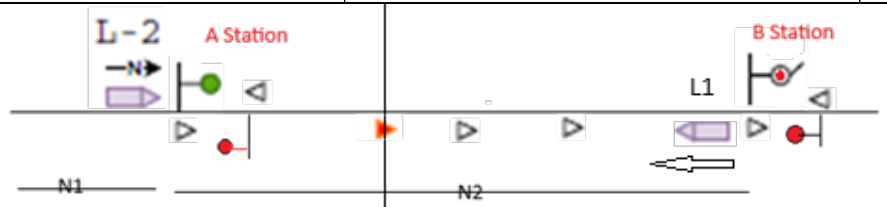
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System Level TEST CASES (RDSO)				
Test ID	**Test Scenario**	**Input Specification**	**Expected Output/Values**	**Observed Output (Pass/Fail)**
		is healthy.		
				
23.23	Check for detection of rear end collision when both trains L1 and L2 (OS/FS) are moving in the same direction and are separated by adjustment tag, where location and direction changes. (Single Line Section) L2 is in communication mandatory area and override not selected & L1 is in communication mandatory area. L2 is in Station section. L1 is in Absolute block section. Radio communication is healthy.	1. Simulate L1 is having position and is in either of SR-PR (Position report available)/LS/OS/FS mode and is ahead of L2 and moving in same direction. 2. Simulate L2 is in OS/FS mode. 3. Simulate such that L1 and L2 are separated by adjustment tag programmed with same TIN, and change in direction and location are available. 4. Simulate such that L2 in station section, in different TIN communication mandatory area and radio communication is healthy. 5. Simulate such that L1 in communication mandatory area in Absolute Block section. 6. They are separated by stop signal OFF condition.	• Rear end collision SoS shall be detected for L2 and MA shall be curtailed to Rear end collision margin by stationary KAVACH. • L2 shall make overlap margin zero in the braking logic upon detecting the collision margin. This shall be checked in the log.	L1 mode / L2 in OS mode / L2 in FS mode SR-PR LS OS FS

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System Level TEST CASES (RDSO)				
Test ID	**Test Scenario**	**Input Specification**	**Expected Output/Values**	**Observed Output (Pass/Fail)**
				
		• As L1 moves further, the MA of L2 shall also be enhanced up to rear end collision margin. • Prompt for "Rear End Collision from station (xxxxx)" and message shall be displayed on LP-OCIP of L-2.		
23.24	Check for detection of Head ON Collision when both trains L1 and L2 are moving in the opposite direction and are separated by adjustment tag, where location and direction changes. (Single Line Section) L2 is in communication mandatory area and override selected & L1 is in communication mandatory area.	1. Simulate L1 is having position and is in either of SR-PR (Position report available)/LS/OS/FS mode and is ahead of L2 and moving in opposite direction. 2. Simulate L2 is in OS mode after override.. 3. Simulate such that L1 and L2 are separated by adjustment tag programmed with same TIN, and change in direction and location are available. 4. Simulate such that L2 in station section, in different TIN	• Head ON collision SoS shall be detected for L2 , L1 and MA shall be curtailed to "0". • Make overlap margin zero in the braking logic upon detecting the collision margin. This shall be checked in the log.	L1/L2 | FS+OV | OS+OV | SR-PR | LS SR-PR LS OS FS

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System Level TEST CASES (RDSO)				
Test ID	**Test Scenario**	**Input Specification**	**Expected Output/Values**	**Observed Output (Pass/Fail)**
	L2 is in Station section. L1 is in Absolute block section. Radio communication is healthy.	communication mandatory area and radio communication is healthy. 5. Simulate such that L1 in communication mandatory area in Absolute Block section. 6. They are separated by stop signal OFF condition.		
				

System Level TEST CASES (RDSO)				
Test ID	**Test Scenario**	**Input Specification**	**Expected output/values**	**Observed Output (Pass/Fail)**
24.	**KAVACH_SYS_24- Test cases for Radio Communication Security- This test case checks for Radio communication security by Stationary / Onboard KAVACH.**			
24.1.	Communication technique based on AES 128 Security coding shall be used for communication between KAVACH Entities. ***(SRS-4.7.8.14)***	Stationary KAVACH ID with Even no		
		Onboard KAVACH ID with Even no		
		Stationary KAVACH ID with Odd no		
		Onboard KAVACH ID with Odd no		
		TSRMS ID with Even no		
		TSRMS ID with Odd no		

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System Level TEST CASES (RDSO)				
Test ID	**Test Scenario**	**Input Specification**	**Expected output/values**	**Observed Output (Pass/Fail)**
24.2.	When the Stationary KAVACH unit communicating the safety related data with Onboard KAVACH, it shall verify that communication is established with ***an authorized Onboard KAVACH unit.*** ***(SRS- 4.1, 4.2, 4.3)***	1. Ensure Keys are not available with Onboard KAVACH unit & keys are available with Stationary KAVACH unit. 2. Simulate an Onboard KAVACH movement in the Stationary KAVACH unit vicinity.	Communication should not be established and Onboard KAVACH should continue to SR mode.	
24.3.	Check that Stationary /Onboard KAVACH shall have the following registered URL (configuration). …… ***(SRS 4.7.7.2)***	1. Configure the IP address of KMS server in Stationary KAVACH unit. 2. Configure the IP address of KMS server in Onboard KAVACH unit. 3. Observe the Log of KMS server for the above configured KAVACH units.	Log should be observed in the KMS server for the newly configured KAVACH units.	
24.4.	To Check that previous OTP SMS not stored in SIM before sending request.	1. Manually remove the SIM. 2. Insert in Mobile set.	Check that except for current, no other SMS are available in SIM.	
24.5.	**Check for receipt of KMS Key in Stationary KAVACH.** If the first request is not successful, it shall send request for every 5 minutes until it receives information from Key Management System. ***(SRS 4.7.6.8 (a))***	1. Manually remove the KMS key in stationary KAVACH. 2. Remove the GSM antennae to simulate a fault (to make unsuccessful the keys transaction). 3. Stationary KAVACH should send the request to KMS for every 5 minutes.	Check the log that request is sent for every 5 minutes.	

System Level TEST CASES (RDSO)				
Test ID	**Test Scenario**	**Input Specification**	**Expected output/values**	**Observed Output (Pass/Fail)**
24.6.	**Check for receipt of KMS Key in stationary KAVACH** If the first request is not successful, it shall send request for every 5 minutes until it receives information from Key Management System. ***(SRS 4.7.6.8 (a))***	1. Manually remove the KMS key in stationary KAVACH. 2. Insert the SIM-1 and check that no fault is available. 3. Stationary KAVACH should send the request to KMS.	1. Check that key set has been received from KMS. 2. After receipt of Key set, stationary KAVACH shall stop sending request message. 3. KAVACH Log to be verified.	
24.7.	**Check for receipt of KMS Key in stationary KAVACH** If the first request is not successful, it shall send request for every 5 minutes until it receives information from Key Management System. ***(SRS 4.7.6.8 (a))***	1. Manually remove the KMS key in stationary KAVACH. 2. Insert the SIM-2 and check that no fault is available. 3. Stationary KAVACH should send the request to KMS.	1. Check that key set has been received from KMS. 2. After receipt of Key set, stationary KAVACH shall stop sending request message. 3. KAVACH Log to be verified.	
24.8.	**Check for receipt of KMS Key in stationary KAVACH** If the first request is not successful, it shall send request for every 5 minutes until it receives information from Key Management System. ***(SRS 4.7.6.8 (a))***	1. Manually remove the KMS key in stationary KAVACH. 2. Insert the both SIM-1 & SIM-2 and check that no fault is available. 3. Stationary KAVACH should send the request to KMS.	1. Check that key set has been received from KMS. 2. After receipt of Key set, stationary KAVACH shall stop sending request message. 3. KAVACH Log to be verified.	

System Level TEST CASES (RDSO)				
Test ID	**Test Scenario**	**Input Specification**	**Expected output/values**	**Observed Output (Pass/Fail)**
24.9.	**Check for receipt of KMS Key in Onboard KAVACH** If the first request is not successful, it shall send request for every 5 minutes until it receives information from Key Management System. ***(SRS 4.7.6.8 (a))***	1. Manually remove the KMS key in Onboard KAVACH. 2. Remove the GSM antennae to simulate a fault (to make unsuccessful the keys transaction). 3. Onboard KAVACH should send the request to KMS for every 5 minutes.	Check the log that request is sent for every 5 minutes.	
24.10.	**Check for receipt of KMS Key in Onboard KAVACH** If the first request is not successful, it shall send request for every 5 minutes until it receives information from Key Management System. ***(SRS 4.7.6.8 (a))***	1. Manually remove the KMS key in Onboard KAVACH. 2. Insert the SIM-1 and check that no fault is available. 3. Onboard KAVACH should send the request to KMS.	1. Check that key set has been received from KMS. 2. After receipt of Key set, Onboard KAVACH shall stop sending request message. 3. Log to be verified.	
24.11.	**Check for receipt of KMS Key in Onboard KAVACH** If the first request is not successful, it shall send request for every 5 minutes until it receives information from Key Management System. ***(SRS 4.7.6.8 (a))***	1. Manually remove the KMS key in Onboard KAVACH. 2. Insert the SIM-2 and check that no fault is available. 3. Onboard KAVACH should send the request to KMS.	1. Check that key set has been received from KMS. 2. After receipt of Key set, Onboard KAVACH shall stop sending request message. 3. Log to be verified.	

System Level TEST CASES (RDSO)				
Test ID	**Test Scenario**	**Input Specification**	**Expected output/values**	**Observed Output (Pass/Fail)**
24.12.	**Check for receipt of KMS Key in Onboard KAVACH** If the first request is not successful, it shall send request for every 5 minutes until it receives information from Key Management System. ***(SRS 4.7.6.8 (a))***	1. Manually remove the KMS key in stationary KAVACH. 2. Insert the both SIM-1 & SIM-2 and check that no fault is available. 3. Onboard KAVACH should send the request to KMS.	1. Check that key set has been received from KMS. 2. After receipt of Key set, Onboard KAVACH shall stop sending request message. 3. Log to be verified.	
24.13.	**Check for receipt of KMS Key in TSRMS-** If the first request is not successful, it shall send request for every 5 minutes until it receives information from Key Management System. (**Future**) ***(SRS 4.7.6.8 (a))***	1. Manually remove the KMS key in TSRMS. 2. Remove the GSM antennae to simulate a fault (to make unsuccessful the keys transaction). 3. TSRMS should send the request to KMS for every 5 minutes.	Check the log that request is sent for every 5 minutes.	
24.14.	**Check for receipt of KMS Key in TSRMS-** If the first request is not successful, it shall send request for every 5 minutes until it receives information from Key Management System**. (Future)** ***(SRS 4.7.6.8 (a))***	1. Manually remove the KMS key in TSRMS. 2. Insert the SIM-1 and check that no fault is available. 3. TSRMS should send the request to KMS.	1. Check that key set has been received from KMS. 2. After receipt of Key set, stationary KAVACH shall stop sending request message. 3. Log to be verified.	

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System Level TEST CASES (RDSO)				
Test ID	**Test Scenario**	**Input Specification**	**Expected output/values**	**Observed Output (Pass/Fail)**
24.15.	**Check for receipt of KMS Key in TSRMS-** If the first request is not successful, it shall send request for every 5 minutes until it receives information from Key Management System. (**Future**) ***(SRS 4.7.6.8 (a))***	1. Manually remove the KMS key in TSRMS. 2. Insert the SIM-2 and check that no fault is available. 3. TSRMS should send the request to KMS.	1. Check that key set has been received from KMS. 2. After receipt of Key set, stationary KAVACH shall stop sending request message. 3. Log to be verified.	
24.16.	**Check for receipt of KMS Key in TSRMS-** If the first request is not successful, it shall send request for every 5 minutes until it receives information from Key Management System. (**Future)** ***(SRS 4.7.6.8 (a))***	1. Manually remove the KMS key in TSRMS. 2. Insert the both SIM-1 & SIM-2 and check that no fault is available. 3. TSRMS should send the request to KMS.	1. Check that key set has been received from KMS. 2. After receipt of Key set, stationary KAVACH shall stop sending request message. 3. Log to be verified.	
24.17.	Noting down the current running key (16 bytes).	1. Ensure valid keys are available from KMS with Stationary KAVACH. 2. Ensure valid keys are available from KMS with Onboard KAVACH. 3. The current running key shall be same in both the units.	Running key in Stationary KAVACH: Set1: _____ Set2: _____ Running key in Onboard KAVACH: Set1: _____ Set2: _____	

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System Level TEST CASES (RDSO)				
Test ID	**Test Scenario**	**Input Specification**	**Expected output/values**	**Observed Output (Pass/Fail)**
24.18.	Noting down the details of Access Request Packet with even number Stationary KAVACH ID and even number Onboard KAVACH ID. ***(SRS-4.7.8.10)***	1. On entering the communication mandatory area, Onboard KAVACH shall send the Access Request Packet to Stationary KAVACH. 2. The details of the data received from the Stationary KAVACH shall be noted from the event log of the Stationary KAVACH.	Onboard KAVACH ID: _____ Stationary KAVACH ID: _____ Last Reference RFID: _____ TIN: _____ Loco Random Number: _____	
24.19.	Verification of behavior of Stationary KAVACH, if the Stationary KAVACH ID received through is not tallied. ***(SRS-4.7.8.11)***	1. Simulate such that Access Request Packet is received with another stationary KAVACH.	1. No action shall be taken by the Stationary KAVACH. 2. Stationary KAVACH shall log the packet received and send it to NMS.	
24.20.	Verification of behavior of Stationary KAVACH, if the Last Reference RFID received through is not available in the list of its tags. ***(SRS-4.7.8.11)***	1. Simulate such that Access Request Packet is received with RFID not available in the list of its tags.	1. No action shall be taken by the Stationary KAVACH. 2. Stationary KAVACH shall log the packet received and send it to NMS.	
24.21.	Verification of behavior of Stationary KAVACH, if the TIN received through is not available in the list of its tags. ***(SRS-4.7.8.11)***	1. Simulate such that Access Request Packet (ARP) is received with TIN not available in the list of its TINs.	1. No action shall be taken by the Stationary KAVACH. 2. Stationary KAVACH shall log the packet received and send it to NMS.	

System Level TEST CASES (RDSO)				
Test ID	**Test Scenario**	**Input Specification**	**Expected output/values**	**Observed Output (Pass/Fail)**
24.22.	On reception of Access Request Packet from Onboard KAVACH Unit, Stationary KAVACH unit generates its own Random Number (RS) and computes the session key KS and transmits the Access Authority message with CBC-MAC code. Access Authority message contains frequency pair and Random Number RS. ***(SRS- 4.7.8.15(b))***	1. Simulate an Onboard movement in the Stationary KAVACH unit vicinity. 2. Onboard should send Access request message. 3. Station should send Access Authority packet.	1. Access Authority packet should contain Random Number (RS) and MAC code. 2. Same shall be observed in Onboard Radio Log.	

System Level TEST CASES (RDSO)				
Test ID	**Test Scenario**	**Input Specification**	**Expected output/values**	**Observed Output (Pass/Fail)**
24.23.	Verification of Access Authority Packet received in Onboard KAVACH from Stationary KAVACH on loco random number received after verifying the Stationary KAVACH ID. (SRS-4.7.3, 4.7.8.11 & 4.7.8.12)	1. Observe the received Access Authority Packet (AAP) from the log of Onboard KAVACH. 2. Note down the following and enter the data in the respective fields of AAP Java script of RDSO. a) Enter Authentication key Set1 in Javascript for even numbered Stationary KAVACH and Onboard KAVACH. b) Loco Random number: _____ c) Source stationary KAVACH ID: _____ d) Onboard KAVACH ID: _____ e) Channel number of Uplink frequency: _____ f) Channel number of downlink frequency: _____ g) Allotted TDMA Slot: ____ h) Station Random Number: _____ (Hex value) i) Station TDMA Slot to Capture RSSI: _____ j) Session Key……	1. The MAC Code generated in Javascript should match with that of the AAP received. 2. The CRC 32 generated in javascript should match with that of the received by Onboard Kavach.	

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System Level TEST CASES (RDSO)				
Test ID	**Test Scenario**	**Input Specification**	**Expected output/values**	**Observed Output (Pass/Fail)**
24.24.	After the above i.e., authenticity and integrity of any information exchanged between Onboard KAVACH and Stationary KAVACH unit shall also be verified.	1. Ensure Keys are available with both Onboard KAVACH unit & Stationary KAVACH unit. 2. Simulate an Onboard KAVACH movement in the Stationary KAVACH unit vicinity.	3. Communication should be established between the KAVACH units, and Onboard KAVACH should transit from SR to OS mode. 4. Same shall be observed on the DMI.	
24.25.	After the above procedure shall take place each time the Onboard KAVACH in SR Mode and Stationary KAVACH unit effectively start a new communication session between them. ***(SRS 4.4)***	1. Establish communication between Stationary KAVACH unit and Onboard KAVACH units. 2. Simulate a communication failure and ensure Onboard KAVACH is in SR mode. 3. Recover the fault and check the communication between the two KAVACH units.	1. After recovery, Onboard KAVACH should send the Access request packet and Stationary KAVACH unit should respond with Access Authority message. 2. Further Onboard and Station should communicate with regular packets. 3. Above messages shall be observed in the Onboard & Station Logs.	
24.26.	Noting down the details of Access Request Packet with ***even number Stationary KAVACH ID and odd number Onboard KAVACH ID.*** ***(SRS 4.7.8.10)***	1. On entering the communication mandatory area, Onboard KAVACH shall send the Access Request Packet to Stationary KAVACH. 2. The details of the data received from the Stationary KAVACH shall be noted from the event log of the Stationary KAVACH.	Onboard KAVACH ID: _____ Stationary KAVACH ID: _____ Last Reference RFID: _____ TIN: _____ Loco Random Number: _____	

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System Level TEST CASES (RDSO)				
Test ID	**Test Scenario**	**Input Specification**	**Expected output/values**	**Observed Output (Pass/Fail)**
24.27.	Verification of Access Authority Packet received in Onboard KAVACH from Stationary KAVACH on loco random number received after verifying the Stationary KAVACH ID. ***(SRS-4.7.3, 4.7.8.11 & 4.7.8.12)***	1. Observe the received Access Authority Packet (AAP) from the log of Onboard KAVACH. 2. Note down the following and enter the data in the respective fields of AAP Java script of RDSO. a) Enter ***Authentication key Set2*** in Javascript for odd No numbered Stationary KAVACH and Onboard KAVACH b) Frame number: _____ c) Source stationary KAVACH ID: _____ d) Onboard KAVACH ID: _____ e) Channel number of Uplink frequency: _____ f) Channel number of downlink frequency: _____ g) Allotted TDMA Slot: ____ h) Station Random Number: _____ (Hex value) i) Station TDMA Slot to Capture RSSI: _____	1. The MAC Code generated in Javascript should match with that of the AAP received. 2. The CRC 32 generated in javascript should match with that of the received by Onboard Kavach.	

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System Level TEST CASES (RDSO)				
Test ID	**Test Scenario**	**Input Specification**	**Expected output/values**	**Observed Output (Pass/Fail)**
24.28.	After the above i.e., authenticity and integrity of any information exchanged between Onboard KAVACH and Stationary KAVACH unit shall also be verified. ***(SRS 4.4)***	1. Ensure Keys are available with both Onboard KAVACH unit & Stationary KAVACH unit. 2. Simulate an Onboard KAVACH movement in the Stationary KAVACH unit vicinity.	1. Communication should be established between the KAVACH units, and Onboard KAVACH should transit from SR to OS mode. 2. Same shall be observed on the DMI.	
24.29.	After the above procedure shall take place each time the Onboard KAVACH in LS Mode and Stationary KAVACH unit effectively start a new communication session between them. ***(SRS 4.4)***	1. Establish communication between Stationary KAVACH unit and Onboard KAVACH units. 2. Simulate a communication failure and ensure Onboard KAVACH is in LS mode. 3. Recover the fault and check the communication between the two KAVACH units.	1. After recovery, Onboard KAVACH should send the Access request message and Stationary KAVACH unit should respond with Access Authority message. 2. Further Onboard and Station should communicate with regular packets. 3. Above messages shall be observed in the Onboard & Station Logs.	
24.30.	After each successful Identification &Authentication dialogue, the data shall be protected using a Message Authentication Code. ***(SRS 4.5)***	1. Ensure Keys are available with both Onboard KAVACH unit & Stationary KAVACH unit. 2. Simulate an Onboard movement in the Stationary KAVACH unit vicinity. 3. Check the MAC code in the Radio log of both Stationary KAVACH & Onboard KAVACH units.	MAC code shall be observed in the Radio log of both Stationary KAVACH & Onboard KAVACH units.	

<table>
<tr><th colspan="5">System Level TEST CASES (RDSO)</th></tr>
<tr><th>Test ID</th><th>Test Scenario</th><th>Input Specification</th><th>Expected output/values</th><th>Observed Output (Pass/Fail)</th></tr>
<tr><td>24.31.</td><td>Manual SoS Condition
All messages in timeslots reserved for emergency communication and Onboard-to-Onboard direct communication, are not subjected I&A dialogue due to nature of the information conveyed by such messages.
(SRS 4.6)</td><td>1. Ensure Keys are not available in both Onboard KAVACH unit & Stationary KAVACH units.
2. Simulate an Onboard movement in the Stationary KAVACH vicinity.
3. Generate SOS from Stationary KAVACH unit.
4. The SoS shall be generated in different time slot in every cycle.</td><td>SOS message shall be received in the Onboard KAVACH unit and same shall be observed on the DMI.
<table><tr><th>Cycle</th><th>Timeslot of SoS</th></tr><tr><td>1</td><td></td></tr><tr><td>2</td><td></td></tr><tr><td>3</td><td></td></tr></table></td><td></td></tr>
<tr><td>24.32.</td><td>Rear End Collision Condition

All messages in timeslots reserved for emergency communication and Onboard-to-Onboard direct communication, are not subjected I&A dialogue due to nature of the information conveyed by such messages.
(SRS 4.6)</td><td>1. Ensure Keys are not available in two Onboard KAVACH units and are in block section.
2. Position report is available in both the onboard Kavach units.
3. Simulate them so as to receive Rear End collision SoS.
4. The SoS shall be generated in different time slot in every cycle.</td><td>Rear End collision SOS message shall be received in the Onboard KAVACH unit and same shall be observed on the DMI.
<table><tr><th>Cycle</th><th>Timeslot of SoS</th></tr><tr><td>1</td><td></td></tr><tr><td>2</td><td></td></tr><tr><td>3</td><td></td></tr></table></td><td></td></tr>
</table>

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<table>
<tr><th colspan="5">System Level TEST CASES (RDSO)</th></tr>
<tr><th>Test ID</th><th>Test Scenario</th><th>Input Specification</th><th>Expected output/values</th><th>Observed Output (Pass/Fail)</th></tr>
<tr><td>24.33.</td><td>Head on Collision Condition
All messages in timeslots reserved for emergency communication and Onboard-to-Onboard direct communication, are not subjected I&A dialogue due to nature of the information conveyed by such messages.
(SRS 4.6)</td><td>1. Ensure Keys are not available in two Onboard KAVACH units and are in block section.
2. Position report is available in both the onboard Kavach units.
3. Simulate them so as to receive Head on collision SoS.
4. The SoS shall be generated in different time slot in every cycle.</td><td>Head on collision SOS message shall be received in the Onboard KAVACH unit and same shall be observed on the DMI.
<table>
<tr><th>Cycle</th><th>Time slot of SoS of OVK1</th><th>Time slot of SoS of OVK1</th></tr>
<tr><td>1</td><td></td><td></td></tr>
<tr><td>2</td><td></td><td></td></tr>
<tr><td>3</td><td></td><td></td></tr>
</table></td><td></td></tr>
<tr><td>24.34.</td><td>Stationary KAVACH unit shall send the Authentication query message to KMS every 6 hours.
(SRS 4.7.6.6)</td><td>1. Ensure Keys are available with both Stationary KAVACH unit.
2. Stationary KAVACH should send a query message to KMS for every 6 hours.</td><td>Query messages of Stationary KAVACH shall be observed in KMS server log.</td><td></td></tr>
<tr><td>24.35.</td><td>If KAVACH sub-systems find that new set of Authentication keys are available at KMS, it shall send request to Key Management System at</td><td>1. Update the Key sets in KMS server.
2. Stationary KAVACH (ID: 503) should send first key request at 23 minutes after getting updated keys status from KMS server.</td><td>Keys status shall be updated in Stationary KAVACH unit within 24 minutes.</td><td></td></tr>
</table>

System Level TEST CASES (RDSO)				
Test ID	**Test Scenario**	**Input Specification**	**Expected output/values**	**Observed Output (Pass/Fail)**
	randomized time over next 2 hours. Randomized request shall be as follows: Request time in a day minutes = (Onboard ID or Station ID) mod (2Hr * 60 min). ***(SRS 4.7.6.7, 4.7.6.8)***	1. Ensure KMS keys are available in S-KAVACH. 2. Remove the stationary KAVACH ID from the KMS. 3. Kavach Entity shall request for new key by sending identification message after 24 minutes. 4. Ensure keys are not updated in Kavach Entity after 25 minutes. 5. Check that Kavach Entity sends identification message at interval of 5 minute to KMS for request of new key.	1. Check in log of KMS that the OTP has been not issued by KMS. 2. Check the log of Kavach Entity that request identification message are being sent at interval of every 5 minute.	
24.36.	Onboard KAVACH unit shall send the Authentication query message to KMS every 6 hours. ***(SRS 4.7.6.6)***	1. Ensure Keys are available with both Onboard KAVACH unit. 2. Onboard KAVACH should send a query message to KMS for every 6 hours.	Query messages of Onboard KAVACH shall be observed in KMS server log.	
24.37.	If KAVACH sub-systems find that new set of Authentication keys are available at KMS, it shall send request to Key Management System at	1. Update the Key sets in KMS server. 2. Onboard KAVACH (ID: 27854) should send first key request at 94 minutes after getting updated keys status from KMS server.	Keys status shall be updated in Onboard KAVACH unit within 95 minutes.	

System Level TEST CASES (RDSO)				
Test ID	**Test Scenario**	**Input Specification**	**Expected output/values**	**Observed Output (Pass/Fail)**
	randomized time over next 2 hours. Randomized request shall be as follows: Request time in a day minutes = (Onboard ID or Station ID) mod (2Hr * 60 min). ***(SRS 4.7.6.7, 4.7.6.8)***	1. Ensure KMS keys are available in Onboard KAVACH. 2. Remove the Onboard KAVACH ID from the KMS. 3. Kavach Entity shall request for new key by sending identification message after 94 minutes. 4. Ensure keys are not updated in Kavach Entity after 95 minutes. 5. Check that Kavach Entity sends identification message at interval of 5 minute to KMS for request of new key.	1. Check in log of KMS that the OTP has been not issued by KMS. 2. Check the log of Kavach Entity that request identification message are being sent at interval of every 5 minute.	
24.38.	TSRMS shall send the Authentication query message to KMS every 6 hours (**Future).** ***(SRS 4.7.6.6)***	1. Ensure Keys are available with both Onboard KAVACH unit. 2. TSRMS should send a query message to KMS for every 6 hours.	Query messages of TSRMS shall be observed in KMS server log.	
24.39.	If KAVACH sub-systems find that new set of Authentication keys are available at KMS, it shall send request to Key	1. Update the Key sets in KMS server. 2. TSRMS ID (30667) should send first key request at 67 minutes after getting updated keys status from KMS server.	Keys status shall be updated in TSRMS within 68 minutes.	

System Level TEST CASES (RDSO)				
Test ID	**Test Scenario**	**Input Specification**	**Expected output/values**	**Observed Output (Pass/Fail)**
	Management System at randomized time over next 2 hours. Randomized request shall be as follows: Request time in a day minute = (Onboard ID or Station ID) mod (2Hr * 60 min). (**Future**) ***(SRS 4.7.6.7, 4.7.6.8)***	1. Ensure KMS keys are available in TSRMS. 2. Remove the TSRMS ID from the KMS. 3. KAVACH Entity shall request for new key by sending identification message after 67 minutes. 4. Ensure keys are not updated in Kavach Entity after 68 minutes. 5. Check that Kavach Entity sends identification message at interval of 5 minute to KMS for request of new key.	1. Check in log of KMS that the OTP has been not issued by KMS. 2. Check the log of Kavach Entity that request identification message are being sent at interval of every 5 minute.	
24.40.	Stationary KAVACH shall send the Identification message to KMS when new set of Keys are to be delivered. ***(SRS-4.7.6.4)***	1. Update the keys at KMS server. 2. Stationary KAVACH should send the identification message to get the updated keys.	Stationary KAVACH identification message shall be observed in the KMS log.	
24.41.	Onboard KAVACH shall send the Identification message to KMS when new set of Keys are to be delivered. ***(SRS-4.7.6.4)***	1. Update the keys at KMS server. 2. Onboard KAVACH should send the identification message to get the updated keys.	Onboard KAVACH identification message shall be observed in the KMS log.	
24.42.	TSRMS shall send the Identification message to KMS when new set of Keys are to be delivered. (**Future**) ***(SRS-4.7.6.4)***	1. Update the keys at KMS server. 2. TSRMS should send the identification message to get the updated keys.	TSRMS identification message shall be observed in the KMS log.	
24.43.	Stationary KAVACH system shall store the authentication	1. Ensure latest key sets are available in Stationary KAVACH.	Keys shall be available in Kavach Entity before Power OFF.	

System Level TEST CASES (RDSO)				
Test ID	**Test Scenario**	**Input Specification**	**Expected output/values**	**Observed Output (Pass/Fail)**
	key in non- volatile memory. Power off and check for the same. ***(SRS-4.7.7.9)***	2. Switch OFF the Power for KAVACH Entity. 3. Switch ON the Power for Onboard Entity.	Keys shall not be available in Kavach Entity after Power ON.	
			Note down the GPRS boot up time after Power ON: _____	
			Keys shall be available in Kavach Entity within two minutes of Power ON.	
24.44.	Onboard KAVACH system shall store the authentication key in non- volatile memory. Power off and check for the same. ***(SRS-4.7.7.9)***	1. Ensure latest key sets are available in Onboard KAVACH. 2. Switch OFF the Power for KAVACH Entity. 3. Switch ON the Power for Onboard Entity.	Keys shall be available in Kavach Entity before Power OFF.	
			Keys shall not be available in Kavach Entity after Power ON.	
			Note down the GPRS boot up time after Power ON: _____	
			Keys shall be available in Kavach Entity within two minutes of Power ON.	
24.45.	TSRMS system shall store the authentication key in non-volatile memory. Power off and check for the same (Future). ***(SRS-4.7.7.9)***	1. Ensure latest key sets are available in TSRMS. 2. Switch OFF the Power for KAVACH Entity. 3. Switch ON the Power for Onboard Entity.	Keys shall be available in Kavach Entity before Power OFF.	
			Keys shall not be available in Kavach Entity after Power ON.	
			Note down the GPRS boot up time after Power ON: _____	
			Keys shall be available in Kavach Entity within two minutes of Power ON.	

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System Level TEST CASES (RDSO)				
Test ID	**Test Scenario**	**Input Specification**	**Expected output/values**	**Observed Output (Pass/Fail)**
24.46.	Cipher block chaining message authentication code (CBC-MAC) Application. ***(SRS.4.7.8.13, 4.7.8.15(c))*** On-board KAVACH or Stationary KAVACH radio packets will be in multiple of bytes.	Simulate an Onboard movement in the Stationary KAVACH unit vicinity (Keys available in both Onboard KAVACH unit & Stationary KAVACH unit).	Communication should be established, Onboard KAVACH should switch from SR to OS mode.	
24.47.	On entering into "Communication mandatory Zone" in vicinity of Stationary KAVACH territory, Onboard KAVACH unit sends the Access Request packet to Stationary KAVACH system in "f0" frequency. ***(SRS- 4.7.8.15(a))***	1. Set the 'f0' frequency as different in Onboard KAVACH and Stationary KAVACH. Simulate an Onboard movement in the Stationary KAVACH unit vicinity.	1. Communication should not be established and Onboard should continue to SR mode.	
		2. Set the 'f0' frequency as same in Onboard KAVACH and Stationary KAVACH. Simulate an Onboard movement in the Stationary KAVACH unit vicinity.	2. Communication should be established, Onboard KAVACH should switch from SR to OS mode.	

System Level TEST CASES (RDSO)				
Test ID	**Test Scenario**	**Input Specification**	**Expected output/values**	**Observed Output (Pass/Fail)**
24.48.	Onboard KAVACH unit receives the Access Authority message packet and compute the session key KS. The CBC-MAC will be computed for the Access Authority message packet and verify with received CBC-MAC. If CBC-MAC is successful, Onboard starts communicating the regular packet and stops sending the Access Request Packet. ***(SRS- 4.7.8.15(c))***	1. Simulate an Onboard movement in the Stationary KAVACH unit vicinity. 2. Onboard should send Access request message. 3. Station should send Access Authority packet. 4. Onboard should respond with Regular packet.	Communication should be established, Onboard KAVACH should switch from SR to OS mode.	
24.49.	Further, Stationary KAVACH and Onboard KAVACH units verify the CBC-MAC code for every message before processing. ***(SRS-4.7.8.13)***	1. Simulate an Onboard movement in the Stationary KAVACH unit vicinity (Keys are not available with Onboard KAVACH unit & keys are available with Stationary KAVACH unit). 2. Simulate an Onboard movement in the Stationary KAVACH unit vicinity ((Keys available in both Onboard KAVACH unit & Stationary KAVACH unit).	1. Communication should not be established and Onboard should continue to SR mode. 2. Communication should be established, Onboard KAVACH should switch from SR to OS mode.	

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<table>
<tr><th colspan="5">System Level TEST CASES (RDSO)</th></tr>
<tr><th>Test ID</th><th>Test Scenario</th><th>Input Specification</th><th>Expected output/values</th><th>Observed Output (Pass/Fail)</th></tr>
<tr>
<td>24.50.</td>
<td>Check for validity for the keyset.

(SRS - 4.7.6.3)</td>
<td>1. Note down the beginning and end time of current key and next key.

<table>
<tr><td></td><td></td><td>Beginning time</td><td>End time</td></tr>
<tr><td rowspan="2">Onboard KAVACH</td><td>Current key</td><td></td><td></td></tr>
<tr><td>Next key</td><td></td><td></td></tr>
<tr><td rowspan="2">Stationary KAVACH</td><td>Current key</td><td></td><td></td></tr>
<tr><td>Next key</td><td></td><td></td></tr>
</table>
2. The beginning and end time shall be same in onboard KAVACH and Stationary KAVACH.</td>
<td>To be verified in the log for the following:

a. Key using Before end time:
b. Key using at end time:
c. Key using after end time of first key:</td>
<td></td>
</tr>
<tr>
<td>24.51.</td>
<td>Check for transmission of identification message from stationary KAVACH to KMS when no key id available.

(SRS 4.7.7.6)</td>
<td>1. Manually remove the KMS key in S-KAVACH.
2. Remove the stationary KAVACH ID from the KMS.
3. S-KAVACH shall request for new key by sending identification message.
4. Check that stationary KAVACH sends identification message at interval of 5 minute to KMS for request of new key.</td>
<td>3. Check in log of KMS that the OTP has been not issued by KMS.
4. Check the log of stationary KAVACH that request identification message are being sent at interval of every 5 minute.</td>
<td></td>
</tr>
</table>

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System Level TEST CASES (RDSO)				
Test ID	**Test Scenario**	**Input Specification**	**Expected output/values**	**Observed Output (Pass/Fail)**
24.52.	Check for transmission of identification message from Onboard KAVACH to KMS when no key id available. ***(SRS 4.7.7.6)***	1. Manually remove the KMS key in Onboard KAVACH. 2. Remove the Onboard KAVACH ID from the KMS. 3. Onboard KAVACH shall request for new key by sending identification message. 4. Check that Onboard KAVACH sends identification message at interval of 5 minute to KMS for request of new key.	1. Check in log of KMS that the OTP has been not issued by KMS. 2. Check the log of Onboard KAVACH that request identification message are being sent at interval of every 5 minute.	
24.53.	Check for transmission of identification message from TSRMS to KMS when no key id available. **(Future)** ***(SRS 4.7.7.6)***	1. Manually remove the KMS key in TSRMS. 2. Remove the TSRMS ID from the KMS 3. TSRMS shall request for new key by sending identification message. 4. Check that TSRMS sends identification message at interval of 5 minute to KMS for request of new key.	1. Check in log of KMS that the OTP has been not issued by KMS. 2. Check the log of TSRMS that request identification message are being sent at interval of every 5 minute.	

System Level TEST CASES (RDSO)				
Test ID	**Test Scenario**	**Input Specification**	**Expected output/values**	**Observed Output (Pass/Fail)**
24.54.	**Check for receipt of OTP from KMS in Stationary KAVACH** and authentication of OTP in key request message. ***(SRS 4.7.7.3)***	1. Manually remove the KMS key in stationary KAVACH. 2. Request for new key for sending identification message.	1. Check in log that Stationary KAVACH shall receive the identification message from KMS with 4-character Alpha numeric code. 2. Check in log that KMS has received the authentication message from S-KAVACH with 4-character Alpha numeric code.	
24.55.	**Check for receipt of OTP from KMS in Onboard KAVACH** and authentication of OTP in key request message. ***(SRS 4.7.7.3)***	1. Manually remove the KMS key in onboard KAVACH. 2. Request for new key for sending identification message.	1. Check in log that Onboard KAVACH shall receive the identification message from KMS with 4-character Alpha numeric code. 2. Check in log that KMS has received the authentication message from O-KAVACH with 4-character Alpha numeric code.	
24.56.	**Check for receipt of OTP from KMS in TSRMS KAVACH** and authentication of OTP in key request message. **(Future)** ***(SRS 4.7.7.3)***	1. Manually remove the KMS key in TSRMS KAVACH. 2. Request for new key for sending identification message.	1. Check in log that TSRMS KAVACH shall receive the identification message from KMS with 4-character Alpha numeric code. 2. Check in log that KMS has received the authentication message from S-KAVACH with 4-character Alpha numeric code.	

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System Level TEST CASES (RDSO)				
Test ID	**Test Scenario**	**Input Specification**	**Expected output/values**	**Observed Output (Pass/Fail)**
24.57.	Check for Stationary KAVACH- Stationary KAVACH communication authentication. ***(SRS 4.7.8.16 (a) to (e))***	1. Note down the Random number generated by S-KAVACH (A): _____. 2. Note down the Random number generated by S-KAVACH (B): _____. 3. Authentication key to be selected: _____.	1. Authentication key selected shall be key set 1 in case of both random numbers are even.	
			2. Authentication key selected shall be key set 2 in case of one random number is even and other is odd.	
24.58.	Check for Stationary KAVACH- TSRMS communication authentication. **(Future)** ***(SRS 4.7.8.16 (a) to (e))***	1. Note down the Random number generated by S-KAVACH (A): _____. 2. Note down the Random number generated by TSRMS: _____. 3. Authentication key to be selected: _____.	1. Authentication key selected shall be key set 1 in case of both random numbers are even.	
			2. Authentication key selected shall be key set 2 in case of one random number is even and other is odd.	
24.59.	Check for Stationary KAVACH - Stationary KAVACH communication authentication **when no authentication key is available with one of the KAVACH entities** ***(SRS 4.1)***	1. Make Stationary KAVACH (A) as primary partner. 2. Ensure Keys are not available in S-KAVACH (A). 3. Note down the Random number generated by S-KAVACH (A): _____.	1. No MAC Code is to be generated by S-KAVACH (B). 2. No communication session shall be established between the S-KAVACH Entities.	

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System Level TEST CASES (RDSO)				
Test ID	**Test Scenario**	**Input Specification**	**Expected output/values**	**Observed Output (Pass/Fail)**
24.60.	Check for Stationary KAVACH - TSRMS communication authentication **when no authentication key is available with one of the KAVACH entities. (Future)** ***(SRS 4.1)***	1. Make TSRMS as primary partner. 2. Ensure Keys are not available in TSRMS. 3. Note down the Random number generated by TSRMS: _____.	1. No MAC Code is to be generated by S-KAVACH. 2. No communication session shall be established between the S-KAVACH Entities.	
24.61.	Check for Stationary KAVACH - TSRMS communication authentication **when no authentication key is available with one of the KAVACH entities. (Future)** ***(SRS 4.1)***	1. Make S-KAVACH as primary partner. 2. Ensure Keys are not available in S-KAVACH. 3. Note down the Random number generated by S-KAVACH: _____.	1. No MAC Code is to be generated by TSRMS. 2. No communication session shall be established between the S-KAVACH and TSRMS Entity.	
24.62.	Check for Stationary KAVACH-Stationary KAVACH communication authentication **when authentication key is updated by KMS and no onboard is in handing over process.**	1. Note down the Random number generated by S-KAVACH (A): _____. 2. Note down the Random number generated by S-KAVACH (B): _____. 3. KMS shall generate Authentication Key	1. Note down the change in Random numbers of Stationary KAVACH (A) and Stationary KAVACH (B). 2. New Random number of S-KAVACH (A): _____ 3. New Random number of S-KAVACH (B): _____	

System Level TEST CASES (RDSO)				
Test ID	**Test Scenario**	**Input Specification**	**Expected output/values**	**Observed Output (Pass/Fail)**
	(SRS 4.7.8.16 (f))	Message.	1. Authentication key selected shall be key set 1 in case of both random numbers are even. 2. Authentication key selected shall be key set 2 in case of one random number is even and other is odd.	
24.63.	Check for Stationary KAVACH- TSRMS communication authentication **when authentication key is updated by KMS. (Future)** ***(SRS 4.7.8.16 (f))***	1. Note down the Random number generated by S-KAVACH (A): _____. 2. Note down the Random number generated by TSRMS: _____. 3. KMS shall generate Authentication Key Message.	1. Note down the change in Random numbers of Stationary KAVACH (A) and TSRMS. 2. New Random number of S-KAVACH (A): _____ 3. New Random number of TSRMS: _____	
			1. Authentication key selected shall be key set 1 in case of both random numbers are even. 2. Authentication key selected shall be key set 2 in case of one random number is even and other is odd.	
24.64.	Check for Stationary KAVACH- Stationary KAVACH communication authentication **when time validity of authentication key is expired and no onboard is in handing**	1. Note down the Random number generated by S-KAVACH (A): _____. 2. Note down the Random number generated by S-KAVACH (B): _____.	1. Note down the change in Random numbers of Stationary KAVACH (A) and Stationary KAVACH (B). 2. New Random number of S-KAVACH (A): _____ 3. New Random number of S-	

System Level TEST CASES (RDSO)				
Test ID	**Test Scenario**	**Input Specification**	**Expected output/values**	**Observed Output (Pass/Fail)**
	over process. ***(SRS 4.7.8.16 (i))***	3. Ensure that the validity of authentication key is expired.	KAVACH (B): _____	
			4. Authentication key selected shall be key set 1 in case of both random numbers are even. 5. Authentication key selected shall be key set 2 in case of one random number is even and other is odd.	
24.65.	Check for Stationary KAVACH- TSRMS communication authentication **when time validity of authentication key is expired. (Future)** ***(SRS 4.7.8.16 (i))***	1. Note down the Random number generated by S-KAVACH (A): _____. 2. Note down the Random number generated by TSRMS: _____. 3. Ensure that the validity of authentication key is expired.	1. Note down the change in Random numbers of Stationary KAVACH (A) and d. 2. New Random number of S-KAVACH (A): _____ 3. New Random number of TSRMS: _____	
			4. Authentication key selected shall be key set 1 in case of both random numbers are even. 5. Authentication key selected shall be key set 2 in case of one random number is even and other is odd.	
24.66.	Check for Stationary KAVACH Stationary KAVACH communication authentication **when authentication key is updated by KMS and onboard is in handing over process.**	1. Note down the Random number generated by S-KAVACH (A): _____. 2. Note down the Random number generated by S-KAVACH (B): _____. 3. KMS shall generate Authentication Key	1. Note down that no change in Random numbers of Stationary KAVACH (A) and Stationary KAVACH (B) when onboard is in handing over process. 2. New Random number of S-KAVACH (A):	

System Level TEST CASES (RDSO)				
Test ID	**Test Scenario**	**Input Specification**	**Expected output/values**	**Observed Output (Pass/Fail)**
	(SRS 4.7.8.16 (f)) (Use Cases)	Message.	_____ 3. New Random number of S-KAVACH (B): _____	
			4. Authentication key selected shall be key set 1 in case of both random numbers are even. 5. Authentication key selected shall be key set 2 in case of one random number is even and other is odd.	
24.67.	Check for Stationary KAVACH Stationary KAVACH communication authentication **when time validity of authentication key is expired and onboard is in handing over process.** **(SRS 4.7.8.16 (i))** (Use Cases)	1. Note down the Random number generated by S-KAVACH (A): _____. 2. Note down the Random number generated by S-KAVACH (B): _____. 3. Ensure that the validity of authentication key is expired.	1. Note down the no change in Random numbers of Stationary KAVACH (A) and Stationary KAVACH (B) when onboard is in handing over process. 2. New Random number of S-KAVACH (A): _____ 3. New Random number of S-KAVACH (B): _____	
			4. Authentication key selected shall be key set 1 in case of both random numbers are even. 5. 5. Authentication key selected shall be key set 2 in case of one random number is even and other is odd.	

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System Level TEST CASES (RDSO)				
Test ID	**Test Scenario**	**Input Specification**	**Expected output/values**	**Observed Output (Pass/Fail)**
25.	**KAVACH_SYS_25- Test cases for flickering of signals, points, Berthing Tracks, and Cab Inputs**			
25.1.	When approaching signal is flickering (continuously up & down) for every 250ms – R,Y,YY,G.	1. Keep the train around 1.5Km away from signal. 2. Ensure Onboard KAVACH in OS/ FS mode.	1. There shall not be any withdrawal of MA for 6sec.	
			2. There shall not be any flickering of signal aspect on DMI for 6sec.	
			3. After 6sec the MA shall be withdrawn and signal aspect shall be made as RED.	
25.2.	When approaching signal is flickering (continuously up & down) for every 250ms – R,Y,YY,G.	1. Keep the train around 1.0 Km away from signal. 2. Ensure Onboard KAVACH in OS/ FS mode.	1. There shall not be any withdrawal of MA for 6sec.	
			2. There shall not be any flickering of signal aspect on DMI for 6sec.	
			3. After 6sec the MA shall be withdrawn and signal aspect shall be made as RED.	
25.3.	When approaching signal is flickering (continuously up & down) for every 250ms – R,Y,YY,G after reading signal approach TAG.	1. Keep the train around 250maway from signal. 2. Ensure Onboard KAVACH in OS/ FS mode.	1. There shall not be any withdrawal of MA for 6sec.	
			2. There shall not be any flickering of signal aspect on DMI for 6sec.	
			3. After 6sec the MA shall be withdrawn and signal aspect shall be made as RED.	
25.4.	When approaching signal is flickering (continuously up	1. Keep the train around 250m away from signal.	1. There shall not be any withdrawal of MA for 6sec.	

System Level TEST CASES (RDSO)				
Test ID	**Test Scenario**	**Input Specification**	**Expected output/values**	**Observed Output (Pass/Fail)**
	& down) for every 250ms – R,Y,YY,G after missing signal approach TAG.	2. Ensure Onboard KAVACH in OS/ FS mode.	2. There shall not be any flickering of signal aspect on DMI for 6sec.	
			3. After 6sec the MA shall be withdrawn and signal aspect shall be made as RED.	
25.5.	When approaching signal is flickering (continuously up & down) for every 250ms – R,Y,YY,G after missing signal approach TAG.	1. Keep the train around 30m away from signal. 2. Ensure Onboard KAVACH in OS/ FS mode.	1. There shall not be any withdrawal of MA for 6sec.	
			2. There shall not be any flickering of signal aspect on DMI for 6sec.	
			3. After 6sec the MA shall be withdrawn and signal aspect shall be made as RED.	
25.6.	When approaching signal is flickering (continuously up & down) for every 250ms – R,Y,YY,G after missing of signal foot TAG.	1. Keep the train around 5m after the signal. 2. Ensure Onboard KAVACH in OS/ FS mode.	1. There shall not be any withdrawal of MA for 6sec.	
			2. There shall not be any flickering of signal aspect on DMI for 6sec.	
			3. After 6sec the MA shall be withdrawn and signal aspect shall be made as blank.	
25.7.	When approaching signal is flickering (continuously up & down) for every 250ms – R,Y,YY,G after missing signal foot TAG.	1. Keep the train around 30m after the signal. 2. Ensure Onboard KAVACH in OS/ FS mode.	1. There shall not be any withdrawal of MA for 6sec.	
			2. There shall not be any flickering of signal aspect on DMI for 6sec.	
			3. After 6sec the MA shall be withdrawn and signal aspect shall be made as Blank.	

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System Level TEST CASES (RDSO)				
Test ID	**Test Scenario**	**Input Specification**	**Expected output/values**	**Observed Output (Pass/Fail)**
25.8.	When the point indication is flickering from normal to No Indication for every 250ms.	1. Keep the train around 1.5Km away from signal. 2. Ensure Onboard KAVACH in OS/ FS mode.	1. There shall not be any withdrawal of MA for 6sec.	
			2. There shall not be any flickering of signal aspect on DMI for 6sec.	
			3. After 6sec the MA shall be withdrawn and signal aspect shall be made as RED.	
25.9.	When the point indication is flickering from normal to No Indication for every 250ms.	1. Keep the train around 1.0 Km away from signal. 2. Ensure Onboard KAVACH in OS/ FS mode.	1. There shall not be any withdrawal of MA for 6sec.	
			2. There shall not be any flickering of signal aspect on DMI for 6sec.	
			3. After 6sec the MA shall be withdrawn and signal aspect shall be made as RED.	
25.10.	When the point indication is flickering from normal to No Indication for every 250ms.	1. Keep the train around 250m away from signal. 2. Ensure Onboard KAVACH in OS/ FS mode.	1. There shall not be any withdrawal of MA for 6sec.	
			2. There shall not be any flickering of signal aspect on DMI for 6sec.	
			3. After 6sec the MA shall be withdrawn and signal aspect shall be made as RED.	
25.11.	When the point indication is flickering from normal to No Indication for every 250ms.	1. Keep the train around 30m away from signal. 2. Ensure Onboard KAVACH in OS/ FS mode.	1. There shall not be any withdrawal of MA for 6sec.	
			2. There shall not be any flickering of signal aspect on DMI for 6sec.	

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System Level TEST CASES (RDSO)				
Test ID	**Test Scenario**	**Input Specification**	**Expected output/values**	**Observed Output (Pass/Fail)**
			3. After 6sec the MA shall be withdrawn and signal aspect shall be made as RED.	
25.12.	When the point indication is flickering from normal to No Indication for every 250ms.	1. Keep the train around 5m after the signal. 2. Ensure Onboard KAVACH in OS/ FS mode.	1. There shall not be any withdrawal of MA for 6sec.	
			2. There shall not be any flickering of signal aspect on DMI for 6sec.	
			3. After 6sec the MA shall be withdrawn and signal aspect shall be made as Blank.	
25.13.	When the point indication is flickering from normal to No Indication for every 250ms.	1. Keep the train around 50m after the signal and before the point. 2. Ensure Onboard KAVACH in OS/ FS mode.	1. There shall not be any withdrawal of MA for 6sec.	
			2. There shall not be any flickering of signal aspect on DMI for 6sec.	
			3. After 6sec the MA shall be withdrawn and signal aspect shall be made as Blank.	
25.14.	When the point indication is flickering from normal to No Indication for every 250ms.	1. Keep the train on the point. 2. Ensure Onboard KAVACH in OS/ FS mode.	There shall not be withdrawal of MA and Next signal aspect shall be linked as per site conditions.	
25.15.	When the point indication is flickering from normal to No Indication for every 250ms.	1. Keep the train after the point. 2. Ensure Onboard KAVACH in OS/ FS mode.	1. There shall not be any withdrawal of MA.	
			2. There shall not be any flickering of signal aspect on DMI.	

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System Level TEST CASES (RDSO)				
Test ID	**Test Scenario**	**Input Specification**	**Expected output/values**	**Observed Output (Pass/Fail)**
25.16.	When the berthing track circuit indication is flickering from up to down for every 250ms.	1. Keep the train around 1.5Km away from approach signal. 2. Ensure Onboard KAVACH in OS/FS mode.	1. There shall not be any withdrawal of MA for 6sec. 2. There shall not be any flickering of signal aspect on DMI for 6sec. 3. After 6sec the MA shall be withdrawn and signal aspect shall be made as RED.	
25.17.	When the berthing track circuit indication is flickering from up to down for every 250ms.	1. Keep the train around 1.0 Km away from signal. 2. Ensure Onboard KAVACH in OS/ FS mode.	1. There shall not be any withdrawal of MA for 6sec. 2. There shall not be any flickering of signal aspect on DMI for 6sec. 3. After 6sec the MA shall be withdrawn and signal aspect shall be made as RED.	
25.18.	When the berthing track circuit indication is flickering from up to down for every 250ms.	1. Keep the train around 250m away from approaching signal. 2. Ensure Onboard KAVACH in OS/ FS mode.	1. There shall not be any withdrawal of MA for 6sec. 2. There shall not be any flickering of signal aspect on DMI for 6sec. 3. After 6sec the MA shall be withdrawn and signal aspect shall be made as RED.	
25.19.	When the berthing track circuit indication is flickering from up to down for every 250ms.	1. Keep the train around 30m away from approaching signal. 2. Ensure Onboard KAVACH in OS/ FS mode.	1. There shall not be any withdrawal of MA for 6sec. 2. There shall not be any flickering of signal aspect on DMI for 6sec. 3. After 6sec the MA shall be withdrawn and signal aspect shall be made as RED.	

System Level TEST CASES (RDSO)				
Test ID	**Test Scenario**	**Input Specification**	**Expected output/values**	**Observed Output (Pass/Fail)**
25.20.	When the berthing track circuit indication is flickering from up to down for every 250ms.	1. Keep the train around 5m after the signal and before the berthing track circuit. 2. Ensure Onboard KAVACH in OS/ FS mode.	1. There shall not be any withdrawal of MA for 6sec. 2. There shall not be any flickering of signal aspect on DMI for 6sec. 3. After 6sec the MA shall be withdrawn and signal aspect shall be made as Blank.	
25.21.	When the berthing track circuit indication is flickering from up to down for every 250ms.	1. Keep the train around 50m after the signal and before the berthing track circuit. 2. Ensure Onboard KAVACH in OS/ FS mode.	1. There shall not be any withdrawal of MA for 6sec. 2. There shall not be any flickering of signal aspect on DMI for 6sec. 3. After 6sec the MA shall be withdrawn and signal aspect shall be made as Blank.	
25.22.	When the berthing track circuit indication is flickering from up to down for every 250ms.	1. Keep the train on the berthing track circuit. 2. Ensure Onboard KAVACH in OS/ FS mode.	1. There shall not be any withdrawal of MA for 6sec. 2. There shall not be any flickering of signal aspect on DMI for 6sec.	
25.23.	When the berthing track circuit indication is flickering from up to down for every 250ms.	1. Keep the train after the berthing track circuit. 2. Ensure Onboard KAVACH in OS/ FS mode.	1. There shall not be any withdrawal of MA. 2. There shall not be any flickering of signal aspect on DMI.	
25.24.	When the point indication has Failed for more than 2 Sec.	1. Keep the train 1 Km before the signal Controlled by the point. 2. Ensure Onboard KAVACH in OS/ FS mode.	There shall be withdrawal of MA and signal aspect shall be made as RED.	

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System Level TEST CASES (RDSO)				
Test ID	**Test Scenario**	**Input Specification**	**Expected output/values**	**Observed Output (Pass/Fail)**
25.25.	When the point indication has Failed for more than 2 Sec.	1. Keep the train250m before the signal Controlled by the point. 2. Ensure Onboard KAVACH in OS/ FS mode.	There shall be withdrawal of MA and signal aspect shall be made as RED.	
25.26.	When the point indication has Failed for more than 2 Sec.	1. Keep the train5m before the signal Controlled by the point. 2. Ensure Onboard KAVACH in OS/ FS mode.	There shall be withdrawal of MA and signal aspect shall be made as RED.	
25.27.	When the point indication has Failed for more than 2 Sec.	1. Keep the train 5m after the signal Controlled by the point. 2. Ensure Onboard KAVACH in OS/ FS mode.	There shall be withdrawal of MA and Next signal aspect shall be made as Blank.	
25.28.	When the point indication has Failed for more than 2 Sec.	1. Keep the train 50m before the point. 2. Ensure Onboard KAVACH in OS/FS mode.	There shall be withdrawal of MA and signal aspect shall be made as Blank.	
25.29.	When the point indication has Failed for more than 2 Sec.	1. Keep the train on the point. 2. Ensure Onboard KAVACH in OS/ FS mode.	1. There shall not be withdrawal of MA and Next signal aspect shall be linked as per site conditions.	
25.30.	When the point indication has Failed for more than 2 Sec.	1. Keep the train after the point. 2. Ensure Onboard KAVACH in OS/ FS mode.	There shall not be withdrawal of MA and Next signal aspect shall be linked as per site conditions.	

System Level TEST CASES (RDSO)				
Test ID	**Test Scenario**	**Input Specification**	**Expected output/values**	**Observed Output (Pass/Fail)**
25.31.	When the Berthing track indication has Failed for more than 2 Sec.	1. Keep the train 1 Km before the signal Controlled by the Berthing track. 2. Ensure Onboard KAVACH in OS/ FS mode.	There shall be withdrawal of MA and signal aspect shall be made as RED.	
25.32.	When the Berthing track indication has Failed for more than 2 Sec.	1. Keep the train 250m before the signal Controlled by the Berthing track. 2. Ensure Onboard KAVACH in OS/ FS mode.	There shall be withdrawal of MA and signal aspect shall be made as RED.	
25.33.	When the Berthing track indication has Failed for more than 2 Sec.	1. Keep the train 5m before the signal Controlled by the Berthing track. 2. Ensure Onboard KAVACH in OS/ FS mode.	There shall be withdrawal of MA and signal aspect shall be made as RED.	
25.34.	When the Berthing track indication has Failed for more than 2 Sec.	1. Keep the train 5m after the signal Controlled by the Berthing track. 2. Ensure Onboard KAVACH in OS/ FS mode.	There shall be withdrawal of MA and Next signal aspect shall be made as blank.	
25.35.	When the Berthing track indication has Failed for more than 2 Sec.	1. Keep the train 50m before the Berthing track. 2. Ensure Onboard KAVACH in OS/ FS mode.	There shall be withdrawal of MA and Next signal aspect shall be made as blank.	
25.36.	When the Berthing track indication has Failed for more than 2 Sec.	1. Keep the train on the Berthing track. 2. Ensure Onboard KAVACH in OS/ FS mode.	There shall not be withdrawal of MA and Next signal aspect shall be linked as per site conditions.	

System Level TEST CASES (RDSO)				
Test ID	**Test Scenario**	**Input Specification**	**Expected output/values**	**Observed Output (Pass/Fail)**
25.37.	When the Berthing track indication has Failed for more than 2 Sec.	1. Keep the train after the Berthing track. 2. Ensure Onboard KAVACH in OS/ FS mode.	There shall not be withdrawal of MA and Next signal aspect shall be linked as per site conditions.	
25.38.	When the Cab Input 1 indication is flickering for every 250 ms.	1. Ensure Cab 1 is Active. 2. Ensure Onboard KAVACH in OS/ FS mode.	There shall not be any application of Brakes. The event shall get logged in event logger.	
25.39.	When the Cab Input 2 indication is flickering for every 250 ms.	1. Ensure Cab 2 is Active. 2. Ensure Onboard KAVACH in OS/ FS mode.	There shall not be any application of Brakes. The event shall get logged in event logger.	
25.40.	When the Non-Leading Input in Cab 1 indication is flickering for every 250 ms.	1. Ensure Cab 1 is Active. 2. Ensure Onboard KAVACH in OS /FS mode.	There shall not be any application of Brakes. The event shall get logged in event logger.	
25.41.	When the Non-Leading Input in Cab 2 indication is flickering for every 250 ms.	1. Ensure Cab 2 is Active. 2. Ensure Onboard KAVACH in OS/ FS mode.	There shall not be any application of Brakes. The event shall get logged in event logger.	
25.42.	When the Isolation Input indication is flickering for every 250 ms.	1. Ensure Cab 1 is Active. 2. Ensure Onboard KAVACH in OS/ FS mode.	There shall not be any application of Brakes. The event shall get logged in event logger.	
25.43.	When the Isolation Input indication is flickering for every 250 ms.	1. Ensure Cab 2 is Active. 2. Ensure Onboard KAVACH in OS/ FS mode.	There shall not be any application of Brakes. The event shall get logged in event logger.	

System Level TEST CASES (RDSO)				
Test ID	**Test Scenario**	**Input Specification**	**Expected output/values**	**Observed Output (Pass/Fail)**
25.44.	When the EB Feedback Valve indication is flickering for every 250 ms.	1. Ensure Cab 1 is Active. 2. Ensure Onboard KAVACH in OS/ FS mode.	There shall not be any application of Brakes. The event shall get logged in event logger.	
25.45.	When the EB Feedback Valve indication is flickering for every 250 ms.	1. Ensure Cab 2 is Active. 2. Ensure Onboard KAVACH in OS/ FS mode.	There shall not be any application of Brakes. The event shall get logged in event logger.	
25.46.	When the BP/MR/BC-1/BC-2 indication is flickering for every 250 ms.	1. Ensure Cab 1 is Active. 2. Ensure Onboard KAVACH in OS/FS mode. 3. Simulate that the reading is fluctuating from zero to maximum and zero.	There shall not be any application of Brakes. The event shall get logged in event logger.	BP MR BC-1 BC-2
25.47.	When the BP/MR/BC-1/BC-2 indication is flickering for every 250 ms.	1. Ensure Cab 2 is Active. 2. Ensure Onboard KAVACH in OS/ FS mode. 3. Simulate that the reading is fluctuating from zero to maximum and zero.	There shall not be any application of Brakes. The event shall get logged in event logger.	BP MR BC-1 BC-2

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System Level TEST CASES (RDSO)				
Test ID	**Test Scenario**	**Input Specification**	**Expected Output/Values**	**Observed Output (Pass/Fail)**
26.	**KAVACH_FRS_26- Remote Interface Unit related test cases (Signal and track shall be connected with Remote interface unit)**			
26.1.	Check for computation of Movement Authority (MA) for five sections.	1. Configure and generate the Stationary KAVACH Application Data for Movement Authority (MA) derivation. 2. Program the generated application data into stationary KAVACH. 3. Simulate a Loco movement in Automatic Block section. 4. Set 6th, 5th ,4th ,3rd, and 2nd Automatic Signal as RED from the loco in route direction the Automatic Signal in Automatic Block Section. 5. Movement of loco in the direction of the route.	1. Stationary KAVACH should send Movement Authority (MA) based on successive OFF aspects of ahead Automatic Signals. 2. Respective Movement Authority (MA) shall be shown on LP-OCIP.	
26.2.	Check repeated override mode function. (If the next signal is at ON, the loco pilot shall press OV and confirm button to override RED aspect Auto signal).	1. Simulate a Loco movement in Automatic Block section and ensure that Loco KAVACH is in FS mode. 2. Set two consecutive automatic signals are in ON state (Red) and simulate a Loco movement towards those signals. 3. Loco KAVACH should stop before the first automatic signal and Override (OV) & confirm button to be selected to pass the Danger Signal (Red). 4. Wait for 02 minute in night and 1 minute in day for receipt of OSMA.	1. Loco KAVACH should transit to OS mode after receipt of OSMA. 2. Loco KAVACH should pass the second automatic signal in ON SIGHT (OS) mode after receipt of OSMA.	

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System Level TEST CASES (RDSO)				
Test ID	**Test Scenario**	**Input Specification**	**Expected Output/Values**	**Observed Output (Pass/Fail)**
26.3.	Check for On Sight (OS) mode to Full Supervision (FS) mode transition. (If the signal is at OFF and linked, loco shall transit to FS mode after passing stop signal.	1. Simulate a Loco movement in Automatic Block section and ensure that Loco KAVACH is in mode. 2. Set an automatic signal in RED state and simulate a Loco movement towards the signal 3. Loco KAVACH should stop before the signal and Override (OV) selected. 4. Loco should transit to On Sight (OS) mode after receipt of OSMA. 5. Ensure next Automatic signal is in OFF state.	1. In OS mode, Loco KAVACH should not display Signal aspect and same may be linked within 200 meters from next signal if no onboard is available. 2. Loco KAVACH should transit to FS mode after passing automatic signal.	
26.4.	Check for On Sight (OS) to Full Supervision (FS) mode transition in the absence of Signal foot tag.	1. Simulate a Loco movement in Automatic Block section and ensure that Loco KAVACH is in OS mode. 2. Set an automatic signal in OFF state and simulate a Loco movement towards the signal. 3. Simulate the onboard movement and make sure that signal foot tag is not read by onboard (signal foot tag is Missed).	1. In OS mode, Loco KAVACH shall linked the signal within 200 meters. 2. Loco KAVACH should transit to FS mode after passing the signal Location +30 meter.	

System Level TEST CASES (RDSO)				
Test ID	**Test Scenario**	**Input Specification**	**Expected Output/Values**	**Observed Output (Pass/Fail)**
26.5.	Check for extending MA, when one Loco is ahead of other Loco.	1. Simulate a Loco movement in Automatic Block Section and ensure that Loco is in FS mode. 2. Simulate a second Loco movement in rear of first Loco. 3. Second Loco should stop Rear stop signal of first Loco, Override (OV) mode to be selected to enter first Loco occupied section. 4. Ensure first Loco is before 10m from the automatic signal and signal is in OFF state 5. Simulate second Loco movement towards first Loco. 6. Clear an Automatic signal/ Semi-Automatic Signal for first Loco. 7. Clear an Automatic signal/Semi-Automatic Signal for second Loco, after passing the first Loco.	1. Second Loco should enter into On Sight (OS) mode after receipt of OSMA. 2. Rear end collision message shall be displayed on second Loco LP-OCIP. 3. Brakes shall be applied and it should stop before 300m from the first Loco. 4. Signal Aspect should not be shown in LP-OCIP (2nd loco). 5. Stationary KAVACH extend MA for First Loco and shall not extend MA for second Loco. 6. Stationary KAVACH shall extend MA for Second Loco, after movement of first loco.	
			7. Signal Aspect shall be linked within 200 meters from the signal if the 1st onboard crossed the signal.	

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System Level TEST CASES (RDSO)				
Test ID	**Test Scenario**	**Input Specification**	**Expected Output/Values**	**Observed Output (Pass/Fail)**
26.6.	Check KAVACH functionality for Semiautomatic Signal with Calling-On.	1. Simulate a Loco movement in Automatic Block section and ensure that Loco is in FS mode. 2. Stop the loco before Semi-automatic signal with A marker not lit. 3. Set a semi-automatic signal at ON and its calling-on signal at OFF. 4. Simulate Loco movement towards the signal. 5. Section Speed is less than the Calling on Signal speed restriction (Section speed is 10kmph, Calling-on speed restriction is 15kmph).	1. Loco Speed should be monitored against section speed. 2. Brakes shall be applied, when Loco speed is more than the section speed. i.e 10 + NB speed margin configured kmph. (After 15 kmph brake shall be applied).	
26.7.	To check the single line working, KAVACH shall extend Movement Authority after ensuring the establishment of direction of traffic and all stop signals (if available) against the established direction shall be at ON.	1. Simulate a loco movement in Automatic block section with Single line working. 2. Stop the loco before Semi-Automatic Signal. 3. Direction of traffic to be set by selecting Line clear input or any other input for direction selection to set the direction. 4. Semi-automatic signal shall be taken OFF and opposite direction signal shall be ON aspect. 5. Set all the semi-Automatic Signals in the train route as Green.	1. Stationary KAVACH shall send MA after direction of traffic is established. 2. Check the Movement Authority (MA) on LP-OCIP.	

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System Level TEST CASES (RDSO)				
Test ID	**Test Scenario**	**Input Specification**	**Expected Output/Values**	**Observed Output (Pass/Fail)**
26.8.	To check the single line working, KAVACH shall extend Movement Authority after ensuring the establishment of direction of traffic and both advance starter and Home signals are at OFF aspect (Green).	1. Simulate a loco movement in Automatic block section with Single line working. 2. Stop the loco before Semi-Automatic Signal. 3. Direction of traffic is set by selecting Line clear input or any other input for traffic direction to be set. 4. Semi-automatic signal shall be taken OFF and opposite direction signal shall be also kept in OFF aspect (Green). 5. Set all the semi-Automatic Signals in the train route as Green.	1. Stationary KAVACH shall not send MA until the conflicting signal are in ON aspect. 2. Respective Movement Authority (MA) shall be shown on LP-OCIP.	
26.9.	To check the single line working, KAVACH shall extend Movement Authority after ensuring the establishment of direction of traffic and both advance starter OFF and Home signals are at ON aspect.	1. Simulate a loco movement in Automatic block section with Single line working. 2. Stop the loco before Semi-Automatic Signal. 3. Direction of traffic to be set by selecting Line clear input or any other input for direction selection to set the direction. 4. Semi-automatic (advance starter) signal shall be taken OFF and opposite direction home signal shall be in ON aspect. 5. Set all the semi-Automatic Signals in the train route as Green.	1. Stationary KAVACH shall send MA based on signal aspect Respective. 2. Movement Authority (MA) shall be shown on LP-OCIP.	

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System Level TEST CASES (RDSO)				
Test ID	**Test Scenario**	**Input Specification**	**Expected Output/Values**	**Observed Output (Pass/Fail)**
26.10.	To check the modified automatic signal working as per General Rules in single line working.	1. Simulate a loco movement in Automatic block section with Single line working. 2. Stop the loco before Semi-Automatic Signal. 3. Modified automatic block working input to be activated IB sort working, the all auto signals foot tag of opposite signal shall be ignored. 4. Semi-automatic Signal foot tag shall be considered/ ignored and signal shall be taken OFF and all opposite direction signal shall be ON aspect. 5. Configure and generate the Stationary KAVACH Application Data for MA such as gradually increasing/ decreasing based on the approaching signal aspect/ track circuit status.	1. When loco is before Adv. Str: 2. MA shall not extend beyond Adv. Str., if there is another train in between Adv. Starter and Modified Automatic Signal. 3. MA shall extend beyond Adv. Starter, based on approaching signal aspect. Track circuit status, if there is no train in between Adv. Starter and Modified Automatic Signal. 4. All signal aspect is to be followed. 5. Respective Movement Authority (MA) shall be shown on LP-OCIP.	
26.11.	To check the modified automatic signal working as per General Rules in single line working.	1. Simulate a loco movement in Automatic block section with Single line working. 2. Stop the loco before Semi-Automatic Signal. 3. Modified automatic block working input to be activated IB sort working, the all auto signal foot tag shall be ignored 4. Semi-automatic Signal foot tag shall be considered/ignored, and signal shall be taken OFF and opposite direction any signal or all signals shall be OFF aspect 5. Configure and generate the Stationary KAVACH Application Data for MA.	1. Stationary KAVACH shall not extend Movement Authority (MA) beyond Adv. Starter. 2. Respective Movement Authority (MA) shall be shown on LP-OCIP.	

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System Level TEST CASES (RDSO)				
Test ID	**Test Scenario**	**Input Specification**	**Expected Output/Values**	**Observed Output (Pass/Fail)**
26.12.	To check the modified automatic signal working as per General Rules in single line.	1. Simulate a loco movement in Automatic block section with Single line working. 2. Stop the loco before Modified Automatic Signal. 3. Modified automatic block working input shall be activated IB sort working; the all auto signal foot tag of opposite signal shall be ignored. 4. Semi-automatic Signal foot tag shall be ignored, and signal shall be taken OFF and opposite direction signal shall be ON aspect. 5. Configure and generate the Stationary KAVACH Application Data for MA such as gradually increasing/ decreasing based on the approaching signal aspect/ track circuit status.	1. When loco is in between Adv. Starter and Modified Automatic Signal: 2. MA shall not extend beyond Modified Automatic Signal, if there is another train in between Modified Automatic signal and Next Home Signal 3. MA shall extend beyond Modified Automatic Signal based on approaching signal aspect/track circuit status, if there is no train in between Modified Automatic Signal and next Home. 4. All auto signal aspect shall be followed.	

System Level TEST CASES (RDSO)				
Test ID	**Test Scenario**	**Input Specification**	**Expected Output/Values**	**Observed Output (Pass/Fail)**
26.13.	To check the modified automatic signal working as per General Rules in single line.	1. Simulate a loco movement in Automatic block section with Single line working. 2. Stop the loco before Modified Automatic Signal. 3. Modified automatic block working input shall be activated IB sort working; the all auto signal foot tag of all opposite signal shall be ignored. 4. Semi-automatic Signal foot tag shall be ignored, and signal shall be taken OFF and opposite direction signal shall be OFF aspect. 5. Configure and generate the Stationary KAVACH Application Data for MA.	1. Stationary KAVACH shall not extend Movement Authority (MA) beyond modified automatic signal. 2. Respective Movement Authority (MA) shall be shown on LP-OCIP.	

<table>
<tr><th colspan="4">System Level TEST CASES (RDSO)</th></tr>
<tr><th>Test ID</th><th>Test Scenario</th><th>Input Specification</th><th>Expected Output/Values</th><th>Observed Output (Pass/Fail)</th></tr>
<tr>
<td>26.14.</td>
<td>To check the modified automatic signal working as per General Rules in single line working.</td>
<td>1. Simulate a loco movement in Automatic block section with Single line working.
2. Stop the loco before Semi-Automatic Signal (advance starter).
3. Modified automatic block working input to be activated for IB sort working, the all-auto signal foot tag of opposite signal shall be ignored.
4. Semi-automatic signal shall be taken OFF and opposite direction signal shall be ON aspect.
5. Movement of loco into Modified Automatic block section in between Handing Over/ Taking over signals.
6. Configure and generate the Stationary KAVACH Application Data for MA based on taking over signal aspects.</td>
<td>Movement authority shall be according to the aspect of Taking over signal aspect i.e.
<table>
<tr><th>Aspect of approaching signal</th><th>Movement Authority</th></tr>
<tr><td>Green</td><td>MA up to modified auto signal or up to 4sections/ 3sections/ 2sections (configurable).</td></tr>
<tr><td>Double Yellow</td><td>Movement Authority up to next one section beyond exit signal.</td></tr>
<tr><td>Yellow</td><td>Movement Authority up to exit signal.</td></tr>
<tr><td>Red</td><td>MA up to Signal foot.</td></tr>
</table>
</td>
<td></td>
</tr>
</table>

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System Level TEST CASES (RDSO)				
Test ID	**Test Scenario**	**Input Specification**	**Expected Output/Values**	**Observed Output (Pass/Fail)**
26.15.	To check the modified automatic signal working as per General Rules in double line working.	1. Simulate a loco movement in Automatic block section with Single line working. 2. Stop the loco before Semi-Automatic Signal. 3. Modified automatic block working input to be activated IB sort working. 4. Semi-automatic signal foot tag shall be considered/ignored, signal shall be taken OFF. 5. Configure and generate the Stationary KAVACH Application Data for MA such as gradually increasing/ decreasing based on approaching signal aspect/ track circuit status.	1. When loco is before Adv. Str: 2. MA shall not extend beyond Adv. Str., if there is another train in between Adv. Starter and Modified Automatic Signal. 3. MA shall extend beyond Adv. Starter, based on approaching signal aspect /track circuit status if there is no train in between Adv. Starter and Modified Automatic Signal. 4. Respective Movement Authority (MA) shall be shown on LP-OCIP.	

System Level TEST CASES (RDSO)				
Test ID	**Test Scenario**	**Input Specification**	**Expected Output/Values**	**Observed Output (Pass/Fail)**
26.16.	To check the modified automatic signal working as per General Rules in double line working.	1. Simulate a loco movement in Automatic block section with Single line working. 2. Stop the loco before Modified Automatic Signal. 3. Modified automatic block working input to be activated IB sort working, the all auto signal foot tag shall be ignored. 4. Semi-automatic signal foot tag shall be considered/ignored, signal shall be taken OFF. 5. Configure and generate the Stationary KAVACH Application Data for MA such as gradually increasing/decreasing derived from status of track/ signal.	1. When loco is in between Adv. Starter and Modified Automatic Signal: 2. MA shall not extend beyond Modified Automatic Signal, if there is another train in between Modified Automatic signal and Next Home Signal. 3. MA shall extend beyond Modified Automatic Signal based on approaching signal aspect/track circuit status, if there is no train in between Modified Automatic Signal and next Home. 4. All aspect of auto signal shall be followed. 5. Respective Movement Authority (MA) shall be shown on LP-OCIP.	

<table>
<tr><th colspan="5">System Level TEST CASES (RDSO)</th></tr>
<tr><th>Test ID</th><th>Test Scenario</th><th>Input Specification</th><th>Expected Output/Values</th><th>Observed Output (Pass/Fail)</th></tr>
<tr><td>26.17.</td><td>To check the modified automatic Signal working as per General Rules in double line working.</td><td>1. Simulate a loco movement in Automatic block section with double line working.
2. Stop the loco before Semi-Automatic Signal.
3. Modified automatic block working input to be activated for IB sort working.
4. Semi-automatic signal shall be taken OFF.
5. Movement of loco into Modified Automatic block section in between Handing Over/Taking over signals.
6. Configure and generate the Stationary KAVACH Application Data for MA derivation based on taking over signals aspects.</td><td>1. Movement authority shall be accordingly the aspect of Taking over signal aspect. i.e.
<table><tr><td>Green</td><td>MA upto next Home or upto 4sections/ 3sections/ 2sections (configurable)</td></tr><tr><td>Double Yellow</td><td>MA upto 01 section beyond exit signal</td></tr><tr><td>Yellow</td><td>MA upto exit signal</td></tr><tr><td>Red</td><td>MA up to Signal foot</td></tr></table>2. Respective Movement Authority (MA) shall be shown on LP-OCIP.</td><td></td></tr>
<tr><td>26.18.</td><td>Check for provision of Six RIUs in a Stationary KAVACH Unit from one port.</td><td>1. Stationary KAVACH and Six RIUs shall be interconnected as shown in figure below.
2. Stationary KAVACH & RIU inputs shall be simulated with the help of PC simulator.
3. Stationary KAVACH shall be connected to NMS to check the live status of inputs.
4. Change the status of inputs at each RIU and observe the respective inputs status at NMS.</td><td>Current Status of RIU inputs and Stationary KAVACH inputs shall be shown in NMS.</td><td></td></tr>
</table>

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System Level TEST CASES (RDSO)				
Test ID	**Test Scenario**	**Input Specification**	**Expected Output/Values**	**Observed Output (Pass/Fail)**
26.19.	To Check the Power Failure of one of Six RIU in Stationary KAVACH Unit Connected from one port.	1. Stationary KAVACH and Six RIUs shall be interconnected as shown in figure below. 2. One of RIU is failed due to some failure. 3. The loco shall move approaching the automatic Signal connected to the failed RIU.	1. Signal Aspect shall be displayed as RED for the Signal connected to failed RIU. 2. The Movement Authority (MA) for failed signal shall be upto Signal Foot only. 3. The Movement Authority shall be displayed as LP-OCIP.	
26.20.	To Check the Power Failure of one of Six RIU in Stationary KAVACH Unit Connected from one port.	1. Stationary KAVACH and Six RIUs shall be interconnected as shown in figure below. 2. One of RIU is failed due to some failure. 3. Loco Pilot press OV and confirm button to pass RED aspect. 4. The loco shall cross the automatic Signal connected to the failed RIU after receipt of OSMA.	1. Signal Aspect shall be blank. 2. The movement Authority shall be displayed as LP-OCIP.	
26.21.	Check for provision of Six RIUs in 06 direction with a Stationary KAVACH Unit from one port.	1. Stationary KAVACH and Six RIUs shall be interconnected as shown in figure below. 2. Stationary KAVACH & RIU inputs shall be simulated with the help of PC simulator. 3. Stationary KAVACH shall be connected to NMS to check the live status of inputs. 4. Change the status of inputs at each RIU and observe the respective inputs status at NMS.	Current Status of RIU inputs and Stationary KAVACH inputs shall be shown in NMS.	

System Level TEST CASES (RDSO)				
Test ID	**Test Scenario**	**Input Specification**	**Expected Output/Values**	**Observed Output (Pass/Fail)**
26.22.	Check for OFC redundancy Failure of primary or secondary communication links shall be logged in KAVACH NMS and also communicated through SMS.	1. Stationary KAVACH and Six RIUs shall be interconnected as shown in below. 2. Remove OFC Cable between RIU-1 and RIU-3. 3. Change the status of RIU-1 and RIU-3 inputs and observe the respective inputs status in NMS. 4. Restore the OFC link.	1. Current Status of RIU inputs shall be shown in NMS. 2. RIU-3: Primary OFC link fail message shall be observed in NMS. 3. RIU-1: Secondary OFC link fail message shall be observed in NMS. 4. SMS Alert shall be sent from NMS for OFC link fail. 5. RIU-3: Primary OFC link recovered shall be observed in NMS. 6. RIU-1: Secondary OFC link recovered shall be observed in NMS.	
26.23.	Check for provision of Six RIUs in 06 direction with a Stationary KAVACH Unit from one port.	1. Stationary KAVACH and Six RIUs shall be interconnected as shown in figure below. 2. Stationary KAVACH & RIU inputs shall be simulated with the help of PC simulator. 3. Stationary KAVACH shall be connected to NMS to check the live status of inputs. 4. Change the status of inputs at each RIU and observe the respective inputs status at NMS.	Current Status of RIU inputs and Stationery KAVACH inputs shall be shown in NMS.	

System Level TEST CASES (RDSO)				
Test ID	**Test Scenario**	**Input Specification**	**Expected Output/Values**	**Observed Output (Pass/Fail)**
26.24.	Check for OFC redundancy Failure of primary or secondary communication links shall be logged in KAVACH NMS and also communicated through SMS.	1. Stationary KAVACH and Six RIUs shall be interconnected as shown in below figure. (Stationary KAVACH to RIU interface, one RIU from each Port). 2. Remove OFC Cable between RIU-1 and RIU-3. 3. Change the status of RIU-1 and RIU-3 inputs and observe the respective inputs status in NMS. 4. Restore the OFC link.	1. Current Status of RIU inputs shall be shown in NMS. 2. RIU-3: Primary OFC link fail message shall be observed in NMS. 3. RIU-1: Secondary OFC link fail message shall be observed in NMS. 4. SMS Alert shall be sent from NMS for OFC link fail. 5. RIU-3: Primary OFC link recovered shall be observed in NMS. 6. RIU-1: Secondary OFC link recovered shall be observed in NMS.	
26.25.	Check for Battery charger-1 AC input fail fault generation.	1. Remove AC input power for Battery Charger-1. 2. Restore the AC input power.	1. Prompt shall be displayed in NMS as "Station ID- "RIU-X Battery Charger-1 AC input fail" and SMS shall be generated. 2. Prompt shall be displayed in NMS as "Station ID- "RIU-X Battery Charger-1 AC input recovered".	

System Level TEST CASES (RDSO)				
Test ID	**Test Scenario**	**Input Specification**	**Expected Output/Values**	**Observed Output (Pass/Fail)**
26.26.	Check for Battery charger-2 AC input fail fault generation.	1. Remove AC input power for Battery Charger-2. 2. Restore the AC input power.	1. Prompt shall be displayed in NMS as "Station ID- "RIU-X Battery Charger-2 AC input fail" and SMS shall be generated. 2. Prompt shall be displayed in NMS as "Station ID- "RIU-X Battery Charger-2 AC input recovered".	
26.27.	Check for Battery charger-1 output fail fault generation.	1. Simulate output fail fault for Battery Charger – 1. 2. Restore output fail fault.	1. Prompt shall be displayed in NMS as "Station ID- "RIU-X Battery Charger-1 O/P fail" and SMS shall be generated. 2. Prompt shall be displayed in NMS as "Station ID- "RIU-X Battery Charger-1 output recovered".	

System Level TEST CASES (RDSO)				
Test ID	**Test Scenario**	**Input Specification**	**Expected Output/Values**	**Observed Output (Pass/Fail)**
26.28.	Check for Battery charger-2 output fail fault generation.	1. Simulate output fail fault for Battery Charger - 2 2. Restore output fail fault.	1. Prompt shall be displayed in NMS as "Station ID- "RIU-X Battery Charger-2 O/P fail" and SMS shall be generated. 2. Prompt shall be displayed in NMS as "Station ID- "RIU-X Low Battery" and SMS shall be generated. 3. Prompt shall be displayed in NMS as "Station ID- "RIU-X Battery Charger-2 output recovered.	
26.29.	Check for Low Battery fault generation.	1. Simulate Low Battery fault. 2. Restore Low Battery fault.	1. Prompt shall be displayed in NMS as "Station ID- "RIU-X Low Battery" and SMS shall be generated. 2. Prompt shall be displayed in NMS as "Station ID- "RIU-X Battery recovered".	
26.30.	To check Loco KAVACH slot arrangement.	1. Two Stationary KAVACH units shall be made available. 2. LP-OCIP slot shall be prepared for automatic Signal. For A & B station. 3. Simulate a Loco movement from Station A to Station B.	1. check that loco deregister from station A and register in station B after handing over and taking over. 2. Verify Loco log.	

System Level TEST CASES (RDSO)				
Test ID	**Test Scenario**	**Input Specification**	**Expected Output/Values**	**Observed Output (Pass/Fail)**
26.31.	To check the Movement Authority (MA) Handing over and taking over.	1. Configure and generate the Stationary KAVACH Application Data for MA derivation as Three sections. 2. Simulate a Loco movement in Automatic from Station A to B with last signal of Handing over. 3. Set all the Automatic Signals in such a fashion that the handing over Signal shall be Yellow (last automatic signal of the dispatching Station is Yellow) and taking over Signal shall be Red (Receiving Station First signal shall be Red). 4. First signal of Receiving shall be taken OFF.	1. Stationary KAVACH should send MA up to three sections beyond exit of last automatic signal of station A when taking over signal set to line clear. 2. Respective MA shall be shown on LP-OCIP and no change in MA during the taking over station. 3. After controlled by taking over station new aspect of signal received shall be shown on LP-OCIP. 4. After First Automatic Signal of receiving station taken OFF, MA shall be updated.	

System Level TEST CASES (RDSO)				
Test ID	**Test Scenario**	**Input Specification**	**Expected Output/Values**	**Observed Output (Pass/Fail)**
26.32.	Check the signal Aspect holding on LP-OCIP upto 06 second during handing over from station A to B.	1. Simulate a Loco movement in Automatic Block Section and ensure that Loco is in FS mode from A to B for last signal of station A. 2. Configure and generate the Stationary KAVACH Application Data for MA derivation as Three sections. 3. Keep the radio of both station ON. 4. Set all the Automatic Signals in the train route as Green. 5. After handing over taken place, fail the RF communication of Loco.	1. Signal aspect controlled by handing over station aspect is shown of LP-OCIP. 2. During transition from handing over to taking over station signal aspect is to be retained on LP-OCIP at least for 06 second while RF communication of Loco is fail/ OFF. 3. After controlled by taking over station new aspect of signal received shall be shown on LP-OCIP.	
26.33.	Check that adjustment of absolute location in auto section with adjustment of variation in actual distance.	1. Configure the tag with adjustment of max 20 meter. 2. Simulate a Loco movement in Automatic Block Section and ensure that Loco is in FS mode.	Check that loco moves in FS mode without any issue and MA shall not be changed.	
26.34.	Check that adjustment of absolute location in auto section with adjustment of variation in actual distance more than 20 meters.	1. Configure the tag with adjustment of max 30 meters, 40 meters & 50 meters. 2. Simulate a Loco movement in Automatic Block Section and ensure that Loco is in FS mode.	Check that loco moves in FS mode without any issue and MA shall not be changed.	

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System Level TEST CASES (RDSO)				
Test ID	**Test Scenario**	**Input Specification**	**Expected Output/Values**	**Observed Output (Pass/Fail)**
26.35.	To check the working of KAVACH system in non-communication zone by passing the loco over the adjustment tag.	1. Configure the tag with adjustment of more than 100 meter. 2. Introduce the placement of adjustment tag in non-communication and other existing tag are in communication mandatory zone. 3. Simulate a Loco movement in Automatic Block Section and ensure that Loco is in FS mode.	1. Check that loco simulate in FS mode and MA shall not be changed. 2. Adjusted location shall be displayed in the LP-OCIP.	
26.36.	Check for computation of Movement Authority (MA) based on Track circuit occupation for 03 sections.	1. Configure and generate the Stationary KAVACH Application Data for Movement Authority (MA) derivation based on track section status & No derivation of signal aspect. 2. Program the generated application data into stationary KAVACH. 3. Simulate a Loco movement in Automatic Block section. 4. Set all the track circuits free by simulation panel of track circuit. Set four section track is free.	1. Stationary KAVACH should send Movement Authority (MA) up to three sections beyond the exit automatic signal. 2. Respective Movement authority (MA) shall be shown on LP-OCIP and Signal aspects shall not be shown on LP-OCIP.	

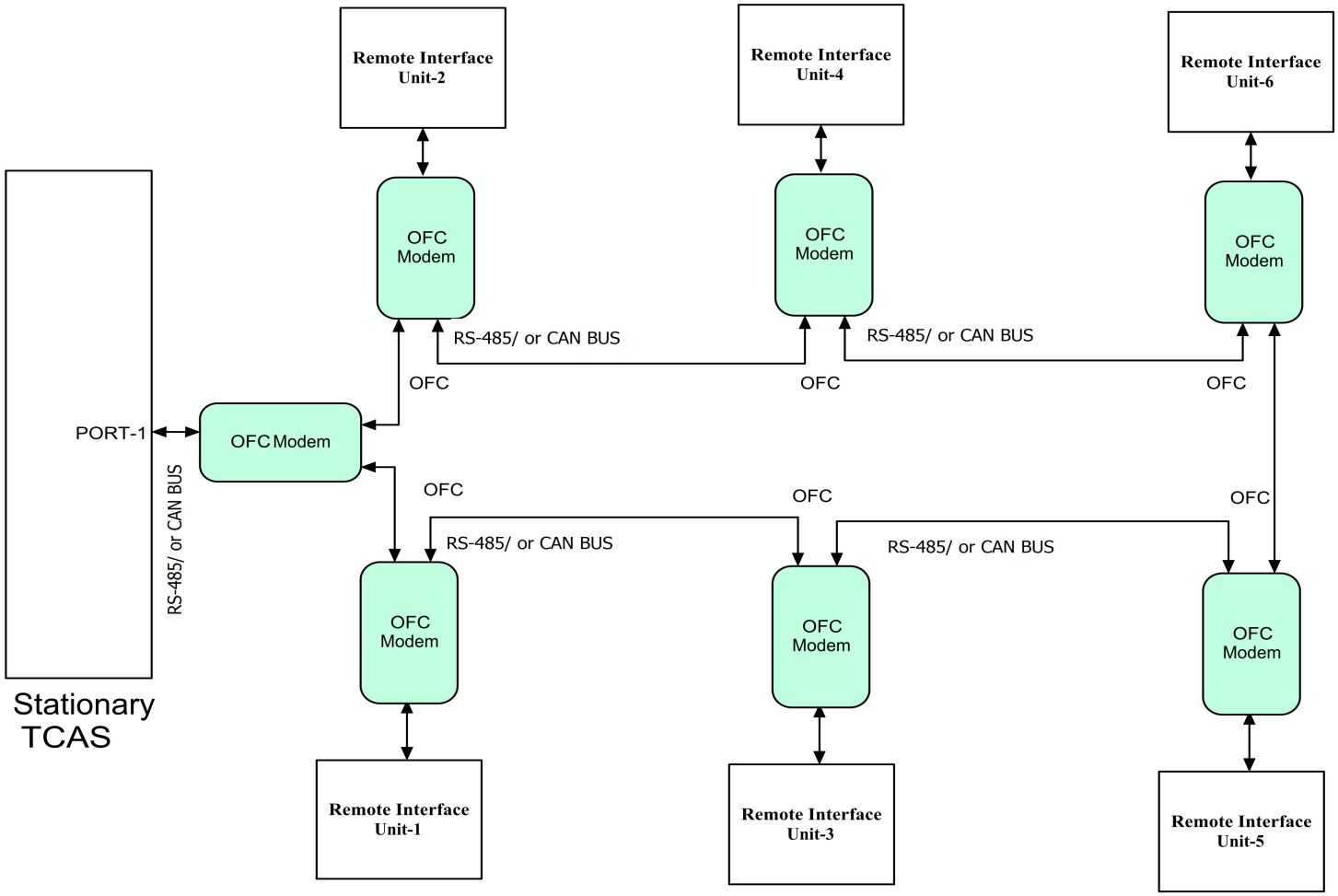
System Level TEST CASES (RDSO)				
Test ID	**Test Scenario**	**Input Specification**	**Expected Output/Values**	**Observed Output (Pass/Fail)**
26.37.	Check for computation of Movement Authority (MA) based on Track circuit occupation for 02 sections.	1. Configure and generate the Stationary KAVACH Application Data for Movement Authority (MA) derivation based on track section status & No derivation of signal aspect. 2. Program the generated application data into stationary KAVACH. 3. Simulate a Loco movement in Automatic Block section. 4. Set all the track circuits free by simulation panel of track circuit. Set 03 section track is free.	1. Stationary KAVACH should send Movement Authority (MA) up to 02 sections beyond the exit automatic signal. 2. Signal aspects shall not be shown on LP-OCIP.	
26.38.	Check for computation of Movement Authority (MA) based on Track circuit occupation for 01 section.	1. Configure and generate the Stationary KAVACH Application Data for Movement Authority (MA) derivation based on track section status & No derivation of signal aspect. 2. Program the generated application data into stationary KAVACH. 3. Simulate a Loco movement in Automatic Block section. 4. Set all the track circuits free by simulation panel of track circuit. Set 02 section track is free.	1. Stationary KAVACH should send Movement Authority (MA) up to 01 section beyond the exit automatic signal. 2. Signal aspects shall not be shown on LP-OCIP.	

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System Level TEST CASES (RDSO)				
Test ID	**Test Scenario**	**Input Specification**	**Expected Output/Values**	**Observed Output (Pass/Fail)**
26.39.	Check for computation of Movement Authority (MA) based on Track circuit occupation for 03 sections.	1. Configure and generate the Stationary KAVACH Application Data for Movement Authority (MA) derivation based on track circuit status and derivation of signal aspects. 2. Program the generated application data into stationary KAVACH. 3. Simulate a Loco movement in Automatic Block section. 4. Set all the track circuits free by simulation panel of track circuit. Set four section track is free.	1. Stationary KAVACH should send Movement Authority (MA) up to three sections beyond the exit automatic signal. 2. Derived signal aspects shall be shown on LP-OCIP	
26.40.	Check for computation of Movement Authority (MA) based on Track circuit occupation for 02 sections.	1. Configure and generate the Stationary KAVACH Application Data for Movement Authority (MA) based on track circuit status and derivation of signal aspects. 2. Program the generated application data into stationary KAVACH. 3. Simulate a Loco movement in Automatic Block section. 4. Set all the track circuits free by simulation panel of track circuit. Set 03 section track is free.	1. Stationary KAVACH should send Movement Authority (MA) up to 02 sections beyond the exit automatic signal. 2. Derived signal aspects shall be shown on DMI.	

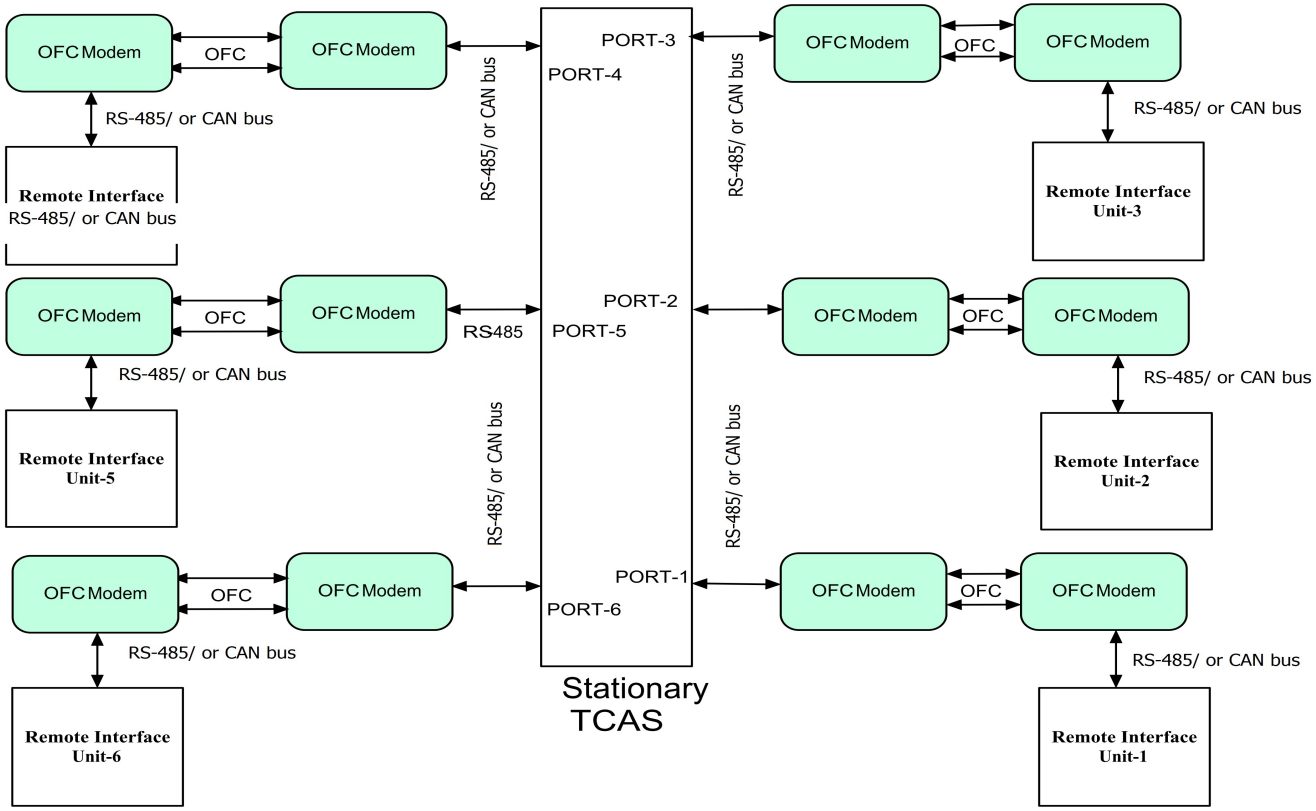
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System Level TEST CASES (RDSO)				
Test ID	**Test Scenario**	**Input Specification**	**Expected Output/Values**	**Observed Output (Pass/Fail)**
26.41.	Check for computation of Movement Authority (MA) based on Track circuit occupation for 01 section.	1. Configure and generate the Stationary KAVACH Application Data for Movement Authority (MA) derivation based on track circuit status and derivation of signal aspects. 2. Program the generated application data into stationary KAVACH. 3. Simulate a Loco movement in Automatic Block section. 4. Set all the track circuits free by simulation panel of track circuit. Set 02 section track is free.	1. Stationary KAVACH should send Movement Authority (MA) up to 01 section beyond the exit automatic signal. 2. Derived signal aspects shall be shown on DMI.	



Stationary KAVACH to RIU Interface, Six RIUs from one Port

Representative of Firm	RDSO Inspecting Official



Stationary KAVACH to RIU interface, one RIU from each Port

Representative of Firm	RDSO Inspecting Official