भारत सरकार – रेल मंत्रालय
Government of India –
Ministry of Railways
अनुसंधान अभिकल्प और मानक संगठन
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No.: RDSO-SIG0KVCH(GEN)/2/2024 Dated: 28.01.2025

PCSTEs
Indian Railways
Address Overleaf

Sub.: Issue of Factory Acceptance Test (FAT) Procedure for Stationary KAVACH Application Logic as per RDSO/SPN/196/2020, Version 4.0.

Competent authority has approved the Factory Acceptance Test (FAT) Procedure for Stationary KAVACH Application Logic as per RDSO/SPN/196/2020, Version 4.0 for use in Indian Railway.

SNo.	Documents Description	Document No. & Version	Effective From
1.	Factory Acceptance Test (FAT) Procedure for Stationary KAVACH Application Logic	SIF 0515, Version 1.2	27.01.2025

Encl.: As above

Pavan Kumar
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(G. Pavan Kumar)
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GOVERNMENT OF INDIA
MINISTRY OF RAILWAYS

FACTORY ACCEPTANCE TEST SCHEME FOR STATIONARY KAVACH APPLICATION LOGIC

(SPECIFICATION: RDSO/SPN/196/2020, Version 4.0)

Issued by

S&T DIRECTORATE
RESEARCH, DESIGNS & STANDARDS ORGANISATION
MINISTRY OF RAILWAYS
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Revision History

Line #	Issue	Version	Reason of Amendment
1	First	0	First issue as per RDSO/ SPN/196/2012 (version 3.2)
2	2nd	1.0	Due to revision of Specification RDSO/ SPN/196/2020 (version 4.0)
3	3rd	1.1	Issue observed during FAT testing
4	4th	1.2	Added Layout and ToC Checking & modified FAT Certificate (Annexure-1).

Prepared by:	**Approved by:**
Sh. Manish Kumar Gupta SSE/S&T Sh. R. N. Singh ADE/S&T Sh. M. M. Srivastava Director/Sig-IV Sh. G. Pavan Kumar ED/Tele-II	Shri Suresh Kumar PED/S&T/RDSO

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Table of Contents:

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1 Introduction

1.1 Functional Description of KAVACH

(i) The **KAVACH (IRATP)** comprises of sub-systems namely Stationary KAVACH, Remote Interface Unit, TSR Management System (Future) and Onboard KAVACH. The Stationary KAVACH comprises of Stationary Electronic Unit, GPS Receiver, RFID Tags, Field Inputs, Radio Modem and Radio Antennae. Remote Interface Units are used to gather inputs at far away locations like IBS, LC Gate, Auto Signals and other cabins. TSR management system imposes Temporary speed restrictions (Future). Similarly, the Onboard KAVACH comprises of the Loco Electronic Unit, RFID Reader, GPS Receiver, DMI, Brake Interface Unit, Radio Modem and Radio Antennae. The GPS is used to provide time reference to Onboard and Stationary KAVACH systems to perform Radio Communication.

(ii) The Stationary KAVACH collects the current statuses of all the field inputs like points, signals and berthing tracks. Based on the status of these inputs, the Stationary KAVACH calculates the Movement Authority for the Loco(s) considering their absolute position with respect to reference RFID and the routes that are set for those traveling in the Station vicinity. It also derives the current signal aspect and next signal aspect considering the current status of all the inputs.

(iii) Also, when the route is set for the Loop line, the Stationary KAVACH processes the information pertaining to turn out speed, turn out distance and release distance. In addition to this, the Stationary KAVACH provides the necessary information required to compute the Train length by checking the sequence of states that the AT and BT track circuits has to follow to register a valid entry and exit of the train.

(iv) All this information is framed as a packet and communicated to the Onboard KAVACH using the Stationary Radio Modem through the Radio communication. This information can be received by all the trains equipped with functional Onboard KAVACH that are within vicinity of a station.

(v) The Onboard KAVACH reads the information contained in the RFID tags mounted over the track and then establishes its movement direction. The Onboard KAVACH receives the data transmitted by the Stationary KAVACH and travels in accordance with the received Movement Authority, Current Signal aspect and other information received from the station. The Onboard KAVACH frames the information containing its operating mode, absolute position, last RFID tag, movement direction, train length, track identification number as a single communication packet and send it to the Stationary KAVACH unit using the Radio modem through Radio antenna mounted above the Loco or Driving Coach.

1.2 Scope

This document provides the scope for testing the Station specific Application Data for Railway officials. Railway officials will perform the Factory Acceptance Test in co-ordination with firm representatives for ensuring the functionality and safety of the

Station specific Application Data as per the Approved KAVACH Table of Control.

1.3 Specification

The System has been designed to meet the RDSO Specification No: RDSO/SPN/196/2020 Version 4.0.

1.4 FAT Testing Requirements

To carry out the FAT Testing following are the requirements:

- Onboard KAVACH Simulator
- Onboard KAVACH Simulator along with RTS generator (To simulate the Onboard KAVACH) or Onboard KAVACH -2 units.
- RFID Tag Simulator
- Station Simulator/Field Simulator: To Simulate Field Inputs
- Relay Interface Simulator: To simulate status Relays
- Stationary KAVACH System – 1/2/3 units depending on the yard.
- Station Specific Application Data along with Approved KAVACH table of Control
- Station Specific RFID Tag Layout
- Station Specific Yard Layout for VDU Display
- TSR Management System or Simulator (Future)
- Local Network Monitoring system (NMS)

1.5 Conclusion

If FAT testing is completed successfully as per the KAVACH Table of control, Track Profile Table and FAT test procedure defined in this document, FAT certificate shall be generated as prescribed in the Annexure-1.

2 Test Setup Description

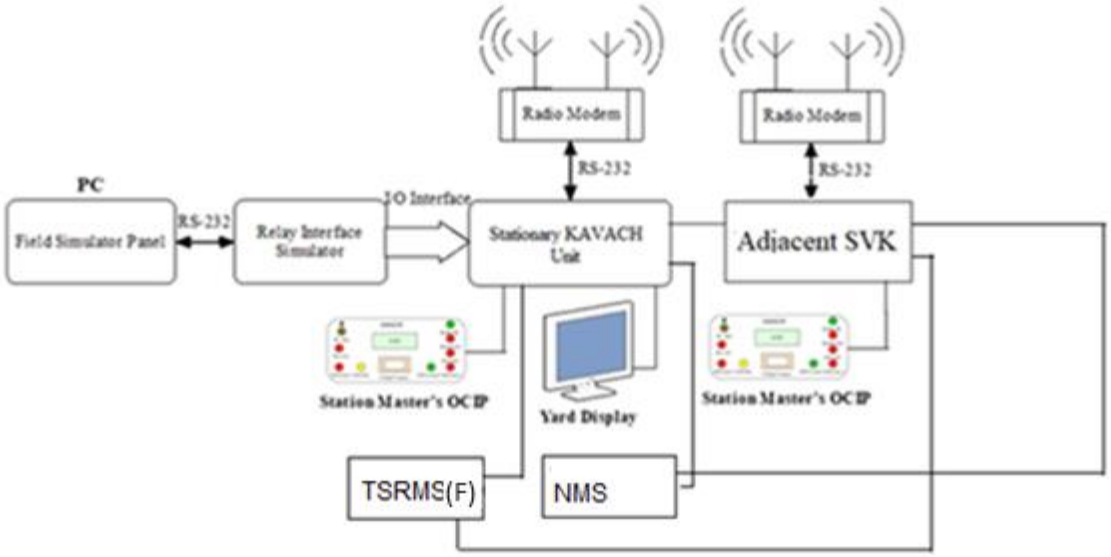

Figure 1 Typical FAT setup arrangement of Stationary KAVACH

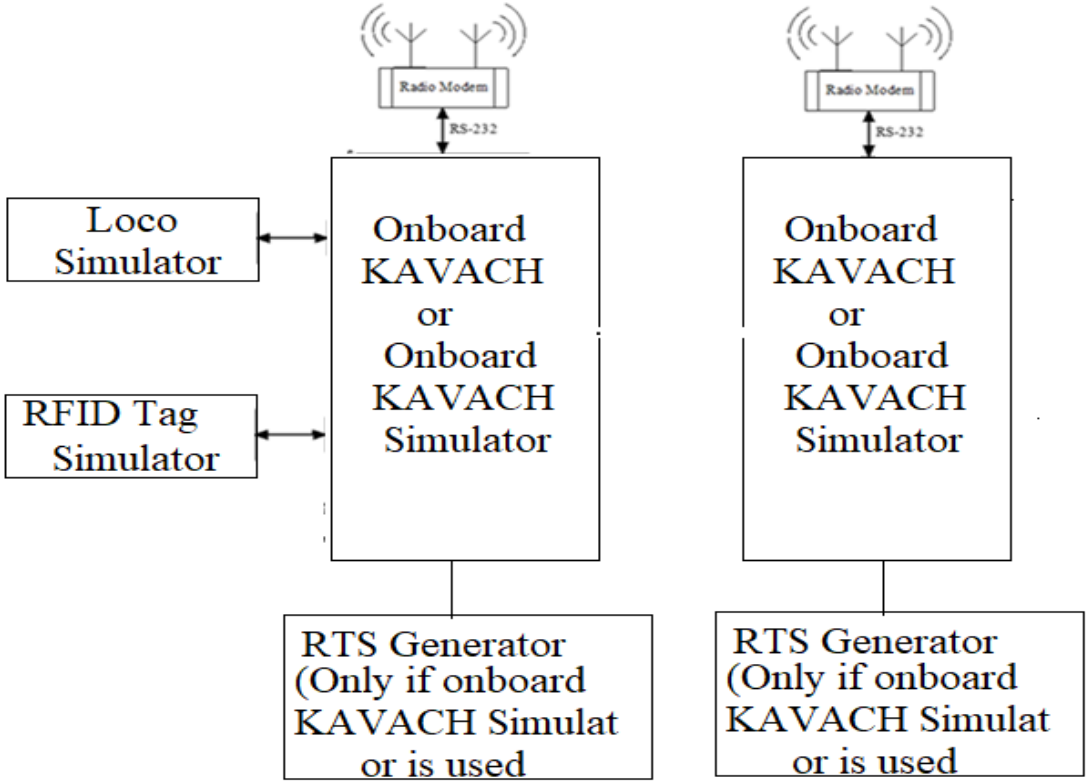

Figure 2 Typical FAT setup arrangement of Onboard KAVACH

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2.1 Onboard KAVACH Simulator

Onboard KAVACH Simulator is a PC Application, it simulates the Loco functionality. It simulates the speed of the loco, cab inputs, brake applications etc.,

2.2 Onboard KAVACH Simulator/Onboard KAVACH

Onboard KAVACH functionality is simulated with Loco ID, mode, Absolute Location, Train Direction, Speed, Length can be configured at start-up the application.

2.3 RTS generator

RTS generator is used to generate the RTS signal required for the Radio Modem, as Radio Modem is in RTS mode.

2.4 RFID Tag Simulator

Input for the application is RFID Tag data and Route information of the **Station** under test and Route information. RFID tag data is the data prepared to program the tags in the field. Route information is the simulating path of the Loco movement in the yard. Route information consists of RFID tag sequence between the signals as per the Station RFID tag Layout.

The Figure 3 shows the outline of Onboard KAVACH simulator application.

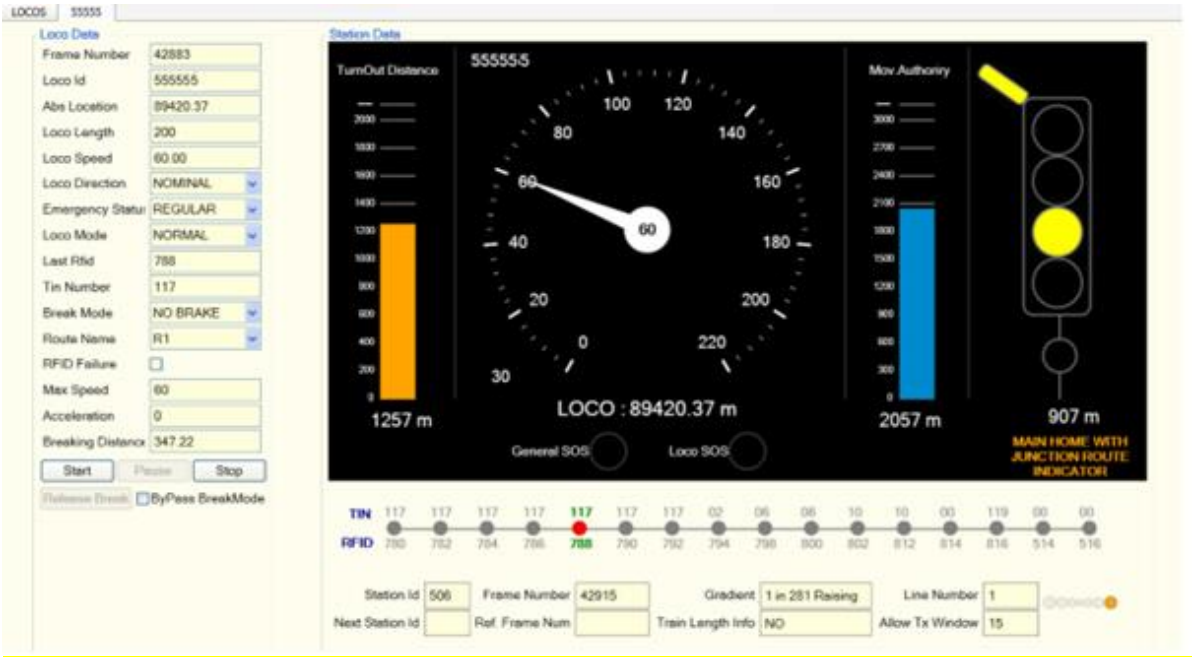

Figure 3 Outline of Onboard KAVACH Simulator application

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Options for Onboard KAVACH Mode, Direction, Brake Status & Radio packet type are given as below:

Sr. No	Function	Options
1	Mode	Standby Mode/ Staff Responsible Mode/ Limited Supervision Mode / Full Supervision Mode/ On-sight Mode/ Trip Mode/ Post Trip Mode/ Reverse Mode/ Shunt Mode Non Leading/ System Failure Mode/ Isolation Mode
2	Direction	Nominal/Reverse/Unidentified
3(i)	Radio Packet Type to be sent by Onboard KAVACH Simulator	Onboard to Station Regular packet Access Request packet
3(ii)	Radio Packet Type to be received by Onboard KAVACH Simulator/Onboard KAVACH	Station to Onboard Regular packet Access Authority packet Additional Emergency packet
4	Brake Status	No brake/Over speed/NB/FSB/EB

2.5 Field Simulator Panel (FSP)

(i) Field Simulator Panel is also a PC application, which shows the layout of the Station yard. This will be designed for each station, as yard is variable from station to station. The following image shows the model FSP.

(ii) The Figure 4 and Figure 5 shows, position of signal posts, points and track circuits in the station yard. FSP application can be operated by using mouse. When the user right clicks on functions like Signals, Points, Track Circuits corresponding menu with functional options will appear.

(iii) User can change the aspect of signal by using mouse click. Similarly point positions and track circuit status can be changed as per the test case requirement.

(iv) FSP application communicates with Relay Interface simulator through RS-232/Ethernet interface. It continuously updates the yard status to Relay Interface Simulator.

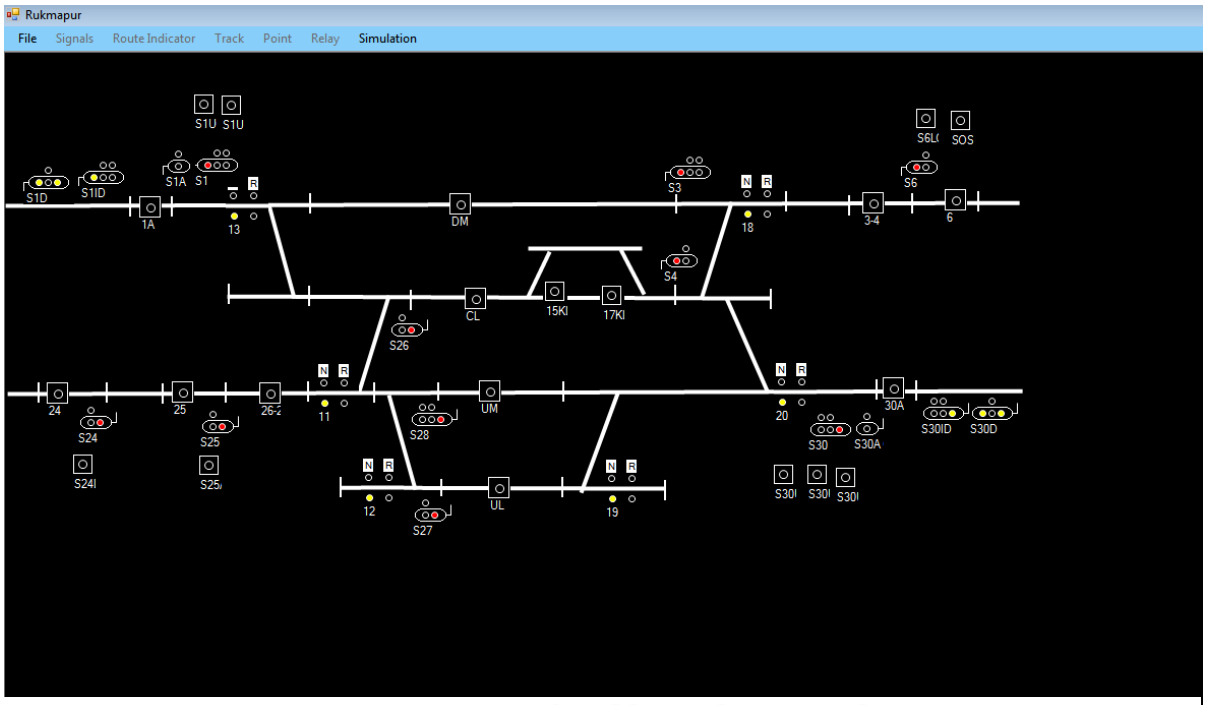

Figure 4 Typical Field Simulator Panel

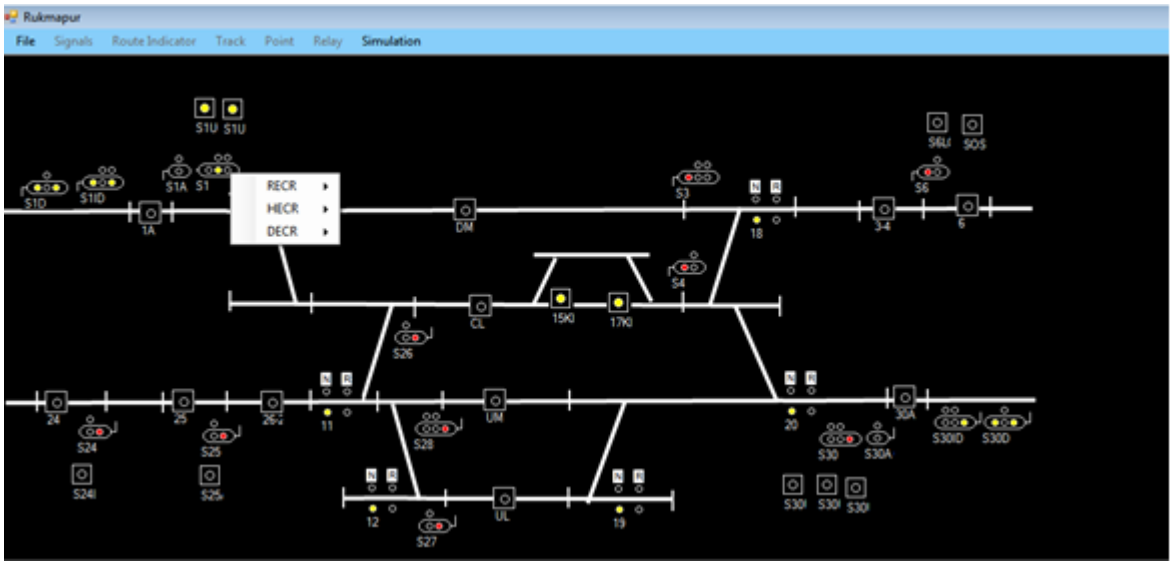

Figure 5 Field Simulator Panel

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Options to simulate field functions are given as per the below table.

Sr. No	Field Function	Options
1	Track Circuit	Free/ Occupied
2	Points	Normal/Reverse/No Field Input
3	Signal Aspects	RECR/HECR/HHECR/DECR-ON and OFF for each aspect
4	Route Indicator	UECR, UGRCL/UGRDL - ON and OFF for each aspect
5	Calling-on	HECR: ON or OFF
6	LCPR/VPR	ON and OFF

2.6 Relay Interface Simulator

Relay Interface Simulator is a Hardware unit, which simulates status of relays in the yard. At one end it will be interfaced with FSP application through serial/Ethernet interface on the other end it will be connected to Stationary KAVACH system through parallel/Ethernet interface. When the user changes the field functions in the yard by using FSP, Relay Interface simulator update the status of relays accordingly.

2.7 Stationary KAVACH System

Stationary KAVACH system is the system designed as per the RDSO specification. In this system, number of input cards are variable depending on the size of the yard. It gets the status of field functions from the relay interface simulator and perform it functions. Stationary KAVACH system software is common for any type of station. Application data shall be programmed for specific station. This application data is designed based on the RFID tag Layout, RFID Tag-Tin data and KAVACH Table of Control. Before starting the FAT testing, station specific application data shall be programmed in the Stationary KAVACH system.

2.8 Yard Display (Local NMS)

This display shows station specific yard layout. Current status of Signal aspects will be updated periodically. It also shows the TIN occupied status and Train position equipped with functional Onboard KAVACH in the yard.

2.9 Station Master's OCIP

Station Master's OCIP is designed as per the RDSO KAVACH specification. It shows the System health status and SOS indications.

2.10 Operation

(i) Onboard KAVACH Simulator application can be started after providing the RFID tag data and Route information. At start up, the application knows the current absolute location, mode and direction. It gets the RFID tag data from the Route information and starts the Onboard packet Radio communication.

(ii) Depending on the current speed, it will change its absolute location and the same will be conveyed to Stationary KAVACH system through Radio communication packet. RFID tag data contains absolute location of each RFID tag used in the yard. Whenever the Onboard KAVACH absolute location matches with the absolute location of RFID tag, it will update the RFID tag ID and its TIN in the Radio communication packet.

(iii) When the Stationary KAVACH gets the Radio communication packet from the Onboard KAVACH Simulator, it determines the approaching signal of the Onboard KAVACH and calculates the Movement Authority (MA). The current signal aspect, MA, approaching signal distance, etc will be transmitted to the Onboard KAVACH simulator/Onboard KAVACH. In the application all this information will be displayed.

(iv) Track Profile information comprises of Permanent Speed Restrictions (PSR), Temporary Speed Restrictions (TSR) (Future), Gradient profile, LC Gate profile and Track Conditions information. This information can be configured in the Stationary KAVACH Application data as per the site conditions.

(v) After performing the FAT testing as per approved KAVACH Table of Control, following information shall be verified by using NMS report generation tool. While performing FAT, Stationary KAVACH unit shall be connected to the Local NMS. i.e., Track Profile information comprises of Permanent Speed Restrictions (PSR), Temporary Speed Restrictions (TSR) (Future), Gradient profile, LC Gate profile and Track Conditions information. This information can be configured in the Stationary KAVACH Application data as per the site conditions.

3 Evaluation of Test Cases

The following test cases shall be performed for Table of Control Testing.

3.1 Pre-Requisites:

The following approved documents are required before the start of FAT.

1) Approved SIP.
2) Approved ToC.
3) Approved RFID Tag-TIN Layout – This shall refer to the document number in Approved SIP and shall be tallied.
4) Approved RFID Tag data– This shall refer to the document number specified in RFID Tag-TIN Layout and shall be tallied.
5) Approved KAVACH Table of Control and Track Profile Table– This shall refer the document no of Approved SIP, Approved ToC, Approved RFID Tag-TIN Layout and shall be tallied.

3.2 Test Cases:

Signal aspects can be changed by using FSP application. Change of signal aspect, extending the Movement Authority, loop line speed control, distance to the signal shall be verified for each signal in the yard. Sample test cases are given below for one signal.

S No	Test Procedure	Expected Result	Actual Result
1.	**Layout and ToC Checking:**		
1.1.	Number of routes in Station ToC and KAVACH ToC should be same.		
1.2.	Number of lines in SIP and RFID Tag TIN Layout should be same.		
1.3.	Number of interlocked points in SIP and RFID Tag TIN Layout should be same.		
1.4.	Number of signals in SIP and RFID Tag TIN Layout should be same.		

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S No	Test Procedure	Expected Result	Actual Result
1.5.	LC Gate in SIP and RFID Tag TIN Layout should be same.		
2.	**RFID Tag Data Checking:**		
2.1.	RFID Tag data shall be verified manually as per the approved layout	RFID tag data shall be as per the approved layout.	
2.2.	Reading of version "1" for Kavach Spec 4.0. Swipe the RFID Tag for version 4.0.	Check for RFID Tag Reading for version 4.0	
2.3.	Reading of Absolute Loc in meters as per Version 4.0. Programme the Tag in meter as **169440** meter and check in the DMI that it displays the same location and in log.	Check for the RFID Reader log count.	
3.	**Entry Signal correspondence test**		
3.1.	Change the Entry Signal aspect to various OFF states and set the point's position and track circuits to desired state as per the KAVACH Table of Control. Simulate the Loco position at rear of the signal post.	Current signal aspect shall be shown in the Onboard KAVACH Simulator/Onboard KAVACH DMI. Movement Authority shall be from the current position of the Loco to number of sections mentioned in the KAVACH Table of Control.	
3.2.	Change the Exit Signal aspect to various states and set the point's position and track circuits to desired state as per the KAVACH Table of Control. Simulate the Loco position at rear of the signal post.	Current signal aspect shall be shown in the Onboard KAVACH Simulator/Onboard KAVACH DMI. Movement Authority shall be from the current position of the Loco to number of sections mentioned in the KAVACH Table of Control.	
3.3.	**Next Signal Blank**: Change the signal aspect to OFF state and simulate next signal aspect as Blank. Simulate the Loco position at rear of the signal post (OFF State).	Most restrictive signal aspect shall be shown in the Onboard KAVACH Simulator for the approaching signal. Movement Authority shall be reduced up to foot of the approaching signal.	

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S No	Test Procedure	Expected Result	Actual Result
3.4.	Set the point's position to conflict state as per the KAVACH Table of Control. Simulate the Loco position at rear of the signal post.	Most restrictive signal aspect shall be shown in the Onboard KAVACH Simulator/ Onboard KAVACH DMI. Movement Authority shall be reduced.	a) Conflict State: b) Both State:
3.5.	Set the berthing/Auto track circuit status (as applicable) to conflict state as per the KAVACH Table of Control. Simulate the Loco position at rear of the signal post.	Most restrictive signal aspect shall be shown in the Onboard KAVACH Simulator/ Onboard KAVACH DMI. Movement Authority shall be reduced.	
3.6.	Set the line clear proving relay or/and BPAC VPR status (if applicable) to conflict state as per the KAVACH Table of Control. Simulate the Loco position at rear of the signal post.	Most restrictive signal aspect shall be shown in the Onboard KAVACH Simulator/ Onboard KAVACH DMI. Movement Authority shall be reduced.	
3.7.	**TIN Conflict Checking:** Set the TINs as occupied as mentioned in the conflict state as per the KAVACH Table of Control.	Movement Authority shall be reduced up to the foot of cleared signal foot.	
3.8.	Set the TINs as occupied in the conflict state which are not mentioned in the KAVACH Table of Control.	Movement Authority shall not be changed.	
4.	**Loop Line Speed Control (If Applicable):** Set the route for Loop line and simulate the position of Loco rear of the signal post.	Turnout speed, distance to the turnout, release distance shall be observed in the Onboard KAVACH Simulator/ Onboard KAVACH DMI as per the KAVACH Table of Control.	
5.	**Calling-On Signal Testing (If Applicable):** Take off the Calling-On signal and set the points position and track circuits to desired state as per the KAVACH Table of Control.	Movement Authority for the second Loco shall be up to safe distance from first Loco.	

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S No	Test Procedure	Expected Result	Actual Result
	Simulate a Loco position at berthing track. Simulate another Loco position at rear of the Calling-On signal post.	Signal aspect for second Loco shall be Calling-on with OFF aspect and speed restriction shall be 15 kmph.	
6.	**RFID Tag Sequence Checking**		
6.1.	**Normal working:** Change the Signal aspect to OFF state and simulate the Loco movement for the set route.	RFID tag sequence shall be as per the RFID Tag Layout. Last RFID tag passed can be observed in the Onboard KAVACH Simulator.	
6.2.	**Tag read in advance:** Simulate a tag is read before 50m of the linking distance	Onboard KAVACH will send message to NMS and Onboard KAVACH shall update odometry.	
6.3.	**Tag Missing:** Simulate a tag is read beyond 50m of the linking distance	Onboard KAVACH will send message to NMS and tag shall be treated as missed.	
6.4.	**Tag Missing:** Simulate any one RFID tag missing case for the set route.	Onboard KAVACH will send message to NMS.	
6.5.	**Main or Duplicate Tag Missing:** Simulate any one RFID tag missing case for the set route.	Onboard KAVACH will send message to NMS.	
6.6.	**Conflict:** Onboard KAVACH shall read RFID tag which is not available in the set route and within the location accuracy window from Onboard KAVACH Simulator.	Onboard specific SOS shall be generated from Stationary KAVACH system.	
6.7.	**Conflict:** Onboard KAVACH shall read RFID tag which is not available in the set route and beyond the location accuracy window.	Onboard KAVACH shall ignore this tag & report to NMS through GPRS.	
7.	**Stationary KAVACH Time Slot Checking:** The time slot shall be finalized based on time slots of adjacent stations radiating in the same frequency, number of		

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S No	Test Procedure	Expected Result	Actual Result
	simultaneous trains and Simultaneous MA extension for all the registered locos. Stationary KAVACH Unit shall send the Radio Communication packet in its designated Time Slot. The Same shall be verified with reference to GPS Time. *Station Time Slot Checking:* *As per the selected time slot the radio interface card in stationary KAVACH shall take the following input parameters (configurable) using an application on its communication port.* 1. *Number of locos registered with stationary Kavach* 2. *Number of possible simultaneous MA extensions.* 3. *Time slot (start and end) of adjacent stations (on either side)* 4. *Average number of parameters in sub packets e.g no. of tag linked, PSR count etc, (configurable)* *The radio interface card shall frame station regular packets as per the above input parameters* *A four channel CRO shall display the following markers.* *(i)PPS of GPS* *(ii)Time slots of current station and* *(iii) Time slot of adjacent station 1.*	1. Communication Time Slot shall be observed on CRO with reference to GPS time as per configured data in the station. 2. There shall not be any overlap between current station time slot with that of adjacent stations' time slot as seen on CRO 3. Onboard Tx window Time Slots allocated by Stationary KAVACH shall be as per the priority defined in the configured data. 4. Allocated window slot shall be observed on Onboard KAVACH Simulator/Onboard KAVACH log.	

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S No	Test Procedure	Expected Result	Actual Result
	(iv) Time slot of adjacent station 2 *Note: the adjacent stations are defined as stations within 10 kms radius with same frequency pairs.*		
8.	**Station SOS Generation from SM-OCIP:** Simulate SOS from SM-OCIP SOS indication shall be observed on SM-OCIP panel.	SOS indication LEDs should be lit on Station Master's OCIP panel.	
9.	**Train Length Packet checking (Only For LSS):** Simulate Train passing through AT and BT track circuits by using Field Simulator panel. (AT ↑ BT ↑; AT↓ BT ↑; AT ↓ BT ↓; AT ↑ BT ↓)	Stationary KAVACH should transmit Train length packet to Onboard KAVACH unit. Train length packet shall be observed on Onboard KAVACH Simulator.	
10.	**Station Entry & Exit Limits for Radio communication:** Simulate the Loco/train Position from the Station Entry point (Radio Communication Required from Loco) Simulate Loco movement from LSS to Block Section.	Stationary KAVACH shall start communicating with Loco from Entry Point. Stationary KAVACH should stop communicating with Loco at Exit Point (1.5 km from LSS for Absolute Block Section OR after crossing border RFID Tag for Automatic Block section)	
11.	**Station ID & Next Station ID Testing in Radio Communication:** Station ID & Next Station ID are configurable in the Stanton Application Data.	Station ID and Next Station ID observed in the Radio communication packet shall be as per configured data. Same shall be observed on the radio packet received in Onboard KAVACH Simulator.	

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S No	Test Procedure	Expected Result	Actual Result
12.	**Shunt Limits Testing:** Simulate Loco Movement beyond BSLB limit in shunt mode.	Station KAVACH should generate SOS message for the simulated Loco after crossing BSLB limit point.	
13.	**Permissive Signal Testing:** a) Change the Home Signal aspect to Green and simulate Distant Signal aspect as Double Yellow/ Blank. b) Change the Home Signal aspect to Green and simulate Inner Distant Signal aspect as Double Yellow/Yellow/Blank.	a) Double Yellow/Blank signal shall be shown in the Onboard KAVACH Simulator for the Distant Signal & MA shall be as TOC b) Double Yellow/Yellow/Blank signal shall be shown in the Onboard KAVACH Simulator for the Inner Distant Signal & MA shall be as per TOC	
14.	**Test procedure for TRACK Profile Data Verification in the Stationary KAVACH Application Data**		
14.1.	**Gradient Data Verification:** Simulate a Loco movement on UP & DN main lines. Before Distant Signal to After Advance Starter. Generate Track Profile Graphs by using NMS report generation tool.	Gradient information generated from the graphs shall be as per the Applicable Engineering Data. (Note: Raise/Fall of the gradient for each piece of track section to be verified as per the Gradient Table shown in the specification. Raise/Fall shall be considered based on the train movement)	

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S No	Test Procedure	Expected Result	Actual Result
14.2.	**PSR Data Verification:** Simulate a Loco movement on UP & DN main lines. Before Distant Signal to After Advance Starter. Generate Track Profile Graphs by using NMS report generation tool.	Section Speed & Permanent Speed Restrictions information generated from the graphs shall be as per the Applicable Working Time Table for the respective station section. (Note: PSR information provided in the working time table is with reference to pole numbers, whereas PSR programmed in KAVACH is with reference to Absolute Location)	
14.3.	**TSR Data Verification: (Future)** Simulate a Loco movement on UP & DN main lines. Before Distant Signal to After Advance Starter. Generate Track Profile Graphs by using NMS report generation tool.	Temporary Speed Restrictions information generated from the graphs shall be as per the Caution orders for the respective station section.	
14.4.	**LC Gate Data Verification:** Simulate a Loco movement on UP & DN main lines. Before Distant Signal to After Advance Starter. Generate Track Profile Graphs by using NMS report generation tool.	Location of LC Gate shall be as per Applicable Working Time Table for the respective station section. (Note: LC Gate location provided in the working time table is with reference to pole numbers, whereas Absolute location is programmed in KAVACH)	

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S No	Test Procedure	Expected Result	Actual Result
14.5.	**Track Conditions Verification:** Simulate a Loco movement on UP & DN main lines. Before Distant Signal to After Advance Starter. Generate Track Conditions by using NMS report generation tool.	Location of various track conditions as per approved KAVACH Table of Control shall be available.	
15.	**On-Sight Mode test scenarios**		
15.1.	**Override of Main Stop Signals other than LSS/IBS/Auto:** Simulate that the approaching signal is at danger, and press 'OVRD' and 'CNFM' buttons within 200m (configurable) at stand still.	Onboard KAVACH enters into OS mode on receiving On Sight Movement Authority along with Authorized speed from Stationary KAVACH based on KAVACH Table of Control.	
15.2.	**Override of LSS/IBS:** Simulate that the approaching signal is at danger, and press 'OVRD' and 'CNFM' buttons within 200m (configurable) on RUN.	Onboard KAVACH enters into OS mode on receiving On Sight Movement Authority along with Authorized speed from Stationary KAVACH based on KAVACH Table of Control.	
15.3.	**Override of Auto Signals:** Simulate that the approaching signal is at danger, and press 'OVRD' and 'CNFM' buttons within 200m (configurable) at stand still.	Onboard KAVACH enters into OS mode on receiving On Sight Movement Authority along with Authorized speed from Stationary KAVACH based on KAVACH Table of Control after the train stops for one minute (*Configurable*) by day and two minutes (*Configurable*) by night.	
15.4.	**Override of stop signal leading to multiple routes:** Simulate that the approaching signal is at danger, and press 'OVRD' and 'CNFM' buttons within 200m (configurable) at stand still.	• Stationary KAVACH shall transmit On Sight Movement Authority for override danger signal up to next nearest (where there are multiple routes) approaching stop signal with speed restriction as specified for each signal in KAVACH table of control.	

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S No	Test Procedure	Expected Result	Actual Result
		• Stationary KAVACH shall also convey 'Route not Known' information to the Onboard KAVACH. • While approaching next stop signal, based on signal aspect, On Sight Movement Authority shall be updated.	
16.	Collision Scenarios Few rear end and head on collision scenarios in the station to be tested		
17.	Braking commence distance testing for SPAD prevention at home signals: • Light Engine – WAP-5/WAP-7 • Formation 22 LHB coach -WAP 5/WAP-7		

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FACTORY ACCEPTANCE TEST CERTIFICATE

Date:

This is to certify that Factory Acceptance Test for Stationary KAVACH unit initial Data configuration has been performed for (Firm name) …… Stationary KAVACH unit of (Station name) ……... The FAT has been performed based on following documents.

#	Drawings/ Document name	Drawing/ Document no.	Alteration/ Version no.
1	Signalling Interlocking Plan		
2	Signalling Table of Control		
3	RFID Tag/ TIN layout		
4	KAVACH Table of Control		
5	KAVACH Track Profile Table		
6	KAVACH TSR Route Table (Future)		
7	i) Stationary KAVACH ID ii) Adjacent Stationary KAVACH ID		
8	IP Address	S-KAVACH ID	Primary / Secondary
	i) Stationary KAVACH IP Address		
	ii) Adjacent Stationary KAVACH IP address		
	iii) [Add any other item]		
9	Stationary KAVACH Frequency	Rx:	Tx: / F_0:
10	KAVACH Channel Slot	Loco Slots:	Station Slots:

EXECUTIVE SOFTWARE CHECK SUM

(1) Stationary KAVACH :

(2) Onboard KAVACH or Simulator :

APPLICATION DATA CHECKSUM[1]

(1) STATION LAYOUT FILE :

(2) FIELD LAYOUT FILE :

(3) CONTROL LAYOUT FILE :

(4) STATIONARY KAVACH CONFIGURATION FILE :

RAILWAY OFFICIAL (Name & Designation) : _____

FIRM REPRESENTATIVES (Name & Designation) : _____

Signature of Railway Official **Signature of Representative of Firm**

[1] Names of files can be modified based on the description followed by the firm