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GOVERNMENT OF INDIA MINISTRY OF RAILWAYS

KAVACH Interoperability test format for various scenarios with approved vendors

Issued by

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



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Document Control

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Document History

#	Issue	Version	Reason for Amendment
1.	First	1.0	First issue as per RDSO/ SPN/196/2020 (Version 4.0)
2.	2 nd	1.1	Override interoperability testing added in clause 3.12.

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1 Introduction

- 1.1 This document describes the procedure to be followed to perform for testing interoperability of Stationary KAVACH & Onboard KAVACH of vendors under approval in IRISET or RDSO lab. The objective of this test procedure is to verify the following in sequence:
- 1.2 <u>Checksum details of Onboard Kavach Unit under test:</u> DMI Screen Info and Confirmation button shall be pressed for noting checksum value of modules as below.

Card/ Module	Checksum

1.3 Checksum details of Stationary KAVACH Unit under test: See in SM-OCIP

Card/ Module	Checksum

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1.4 Onboard KAVACH interoperability test

- (a) Verification of KMS key
- (b) Verification of Signal aspect linking and Signal naming, MA correspondence This ensures check of proper registration and radio communication of Onboard KAVACH unit under test with Stationary KAVACH of existing vendor.
- (c) Verification of PSR, TSR
- (d) Verification of SPAD prevention
- (e) Verification of collision scenarios
- (f) Verification of Manual SoS

1.5 Stationary KAVACH interoperability test

- (a) Verification of KMS key
- (b) Verification of SKAVACH-to-SKAVACH communication
- (c) Verification of NMS communication
- (d) Verification of TSRMS communication
- (e) Any one existing vendor of Onboard KAVACH shall be tested as per 1.4 (b) to (f).

2 Pre-requisites

The following are to be ensured prior to start of interoperability testing

- (a) Existing vendor Stationary KAVACH & Onboard KAVACH are working properly and having valid keys.
- (b) Adjacent Stationary KAVACH connectivity is established.
- (c) TSRMS connectivity is established.
- (d) NMS details are programmed and connected to the test Stationary KAVACH.
- (e) RFID tag simulators

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3 Onboard KAVACH interoperability test

Onboard KAVACH ID	Vendor name under interoperability test	
Vendor name of Stationary KAVACH		

3.1 Verification of KMS key:

SN	Stationary KAVACH ID	No of KMS Key available)	
1			

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3.2 MA related tests:

The Onboard Kavach movement shall be carried out with existing approved stationary KAVACH section in lab and verify the details as mentioned below tables. The results shall be tabulated below:

SN	ENTRY SIGNAL	EXIT SIGNAL	ENTRY SIGNAL ASPECT	EXIT SIGNAL ASPECT	ENTRY SIGNAL NAME on DMI	MA IN SECTIONS as per ToC	MA value received on DMI	Result (Ok/ Not Ok)
1								
2								
3								
4								
5								
6								

Signature with Date	Signature with Date	
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3.3 RFID Linking (To be tested in field)

SN	Stationar	ENTRY	EXIT SIGNAL	REF RFID	RFIDs in	Any tags	Any Invalid	Result
	y KAVACH ID	SIGNAL		(Signal Foot Tag)	the route	missing	tags found	(Ok/ Not Ok)
1								
2								

3.4 KAVACH TSR speed control test reports

SN	Stationary KAVACH ID	Route ID	Impos locatio TSRM	n by	Imposed Speed	Author	tion ized by Kavach	Imposed Speed by Onboard KAVACH	Result (Ok/ Not Ok)
			From	То					
1									
2									

3.5 KAVACH PSR speed control test reports:

SN	Stationary KAVACH ID	Route	Impos	ed	Imposed	Location A	Authorized	Imposed Speed	Result
		ID	location	n by	Speed	by Onboar	rd Kavach	by Onboard	
			PSR					KAVACH	(Ok/ Not
									Ok)
			From	To					

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1											
2											
۷											
				•	'			•			

3.6 KAVACH SPAD Prevention test reports

SN	Stationary KAVACH ID	Entry Signal	Exit Signal	Stopping Distance before Exit Signal	Result (Ok/ Not Ok)
1					
2					

3.7 KAVACH Rear End collision test reports-.

SN	Stationary KAVACH	Entry	Exit	Distance from which Rear end	Stopping	Result
	ID	Signal	Signal	collision message is displayed	Distance from Rear Loco	(Ok/Not Ok)
1						
2						

3.8 KAVACH Head ON collision test reports-

SN	Stationary KAVACH	Entry	Exit	Distance from which Head on	Stopping	Result
	ID	Signal	Signal	collision message is displayed	Distance from the Loco	(Ok/Not Ok)
1						

Signature with Date	Signature with Date	
Name and Designation (Firm	Name and Designation (RDSO	
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endors

3.9 KAVACH Unusual Stoppage in Block section test reports -

- This SoS will not be generated in the Station Section. For this purpose, the Station section shall be matching with the details prescribed in the Station Working Rules. The Tag data is to be checked for this.
- In case of diverging lines, the adjacent tag shall be placed suitably, to avoid stopping of trains where not required.

SN	Stationary KAVACH ID	Entry Signal	Exit Signal	Stopping Distance	Result
					(Ok/ Not Ok)
1					
2					

3.10 Manual SoS Generation from Stationary KAVACH test reports:

SN	Stationary KAVACH ID	Entry Signal	Exit Signal	Stopping Distance	Result
					(Ok/ Not Ok)
1					
2					

S	N SOS	generation after	Time duration between pressing	After cancelation,	Result
		ing SOS button in SMOCIP (Y/N)	the button and SOS generation	whether SoS stopped	(Ok/ Not Ok)

Signature with Date	Signature with Date	
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1									
2									

3.11 Manual SoS Generation from Onboard KAVACH test reports:

SN	Onboard KAVACH ID	Entry Signal	Exit Signal	Stopping Distance	Result (Ok/ Not Ok)
1					
2					

3.12 override from onboard KAVACH test report:

SN	On-board KAVACH ID	Entry Signal	Mode	Exit Signal	MA section	Tag linking	Result (Ok/ Not Ok)
1.		Home Signal					
2.		Starter					
3.		Adv Starter					
4.		Routing Home					
5.		Routing Starter					
6.		IB stop Signal					
7.		LC gate stop					
8.							

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Multiple override									
of Home, starter									
and adv Starter									

Note: After override of IB stop signal, no brake be applied in permissive signal.

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representative,	011101017	

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4 Stationary KAVACH interoperability test:

Stationary KAVACH ID	Vendor name under interoperability test	
Onboard KAVACH ID	Vendor name of Onboard KAVACH	

The following test shall be carried out in stationary KAVACH under test as mentioned below.

4.1 Verification of KMS key

SN	Stationary KAVACH ID	No of KMS Key available	
1			
2			

4.2 Connectivity with adjacent stationary KAVACH as per IP address scheme of Annexure-A3

SN	Stationary KAVACH ID	IP	Port	Adjacent Stationary KAVACH	IP	Port	Result
		address	No	ID	address	No	(Ok/Not Ok)
1							
2							

4.3 Proper handing over and taking over of border tag - SKAVACH ID.

SN	Boarder	EXIT	Border	EXIT	Border	MA IN SECTIONS as	MA value	Result
	ENTRY	SIGNAL	ENTRY	SIGNAL	ENTRY	per ToC	received on	
	SIGNAL		SIGNAL	ASPECT	SIGNAL		DMI	(Ok/Not Ok)
			ASPECT		NAME on			
					DMI			

Signature with Date	Signature with Date	
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Representative)	Official)	

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		T.						
1								
2								
4.		-		_	System- Check to be demonstrated	-	= =	d in NMS in
SN	Stationary	KAVACH ID	IP address	Port No	NMS ID	IP address	Port No	Result
								(Ok/ Not Ok)
1								
2	1				1			

4.5 Connectivity with TSRMS-

SN	Stationary KAVACH ID	IP address	Port No	TSRMS ID	IP address	Port No	Result
							(Ok/ Not Ok)
1							
2							

4.6 Onboard KAVACH -

The existing vendor onboard KAVACH movement shall be carried out for testing interoperability in the stationary Kavach being approved and verify the details as mentioned below tables:

Signature with Date	Signature with Date	
Name and Designation (Firm	Name and Designation (RDSO	
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4.6.1 MA related tests:

The Onboard Kavach movement shall be carried out with existing approved stationary KAVACH section in lab and verify the details as mentioned below tables. The results shall be tabulated below:

SN	ENTRY SIGNAL	EXIT SIGNAL	ENTRY SIGNAL ASPECT	EXIT SIGNAL ASPECT	ENTRY SIGNAL NAME on DMI	MA IN SECTIONS as per ToC	MA value received on DMI	Result (Ok/ Not Ok)
1								
2								
3								
4								
5								
6								

Signature with Date	Signature with Date	
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4.6.2 RFID Linking (To be tested in field)

SN	Stationar	ENTRY	EXIT SIGNAL	REF RFID	RFIDs in	Any tags	Any Invalid	Result
	y KAVACH ID	SIGNAL		(Signal Foot Tag)	the route	missing	tags found	(Ok/ Not Ok)
1								
2								

4.6.3 KAVACH TSR speed control test reports

SN	Stationary KAVACH ID	Route ID	Impos locatio TSRM	n by	Imposed Speed	Location Authorized by Onboard Kavach		Imposed Speed by Onboard KAVACH	Result (Ok/ Not Ok)
			From	То					
1									
2									

4.6.4 KAVACH PSR speed control test reports:

Sì	Stationary KAVACH ID	Route	Impose	ed	Imposed	Location A	Authorized	Imposed Speed	Result
		ID	location	by	Speed	by Onboar	rd Kavach	by Onboard	
			PSR					KAVACH	(Ok/ Not
									Ok)
			From	To					

Signature with Date	Signature with Date	
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4.	6.5 KAVA	CH SPAD E	revent	ion test	rep	orts			<u> </u>			
SN	Stationar	ry KAVACH	ID E	ntry Sig	nal	Exi Sign		Stopping I	Distance be Signal	fore Exit		Result k/ Not Ok)
4.	6.6 KAVA	CH Rear E	End col	lision t	test	report	.s					
N	Stationary	KAVACH	Entry	Exit				ich Rear end		_	Re	sult
	ID		Signal	Signal			ion me isplay	ssage is yed	Distance Rear Lo		(Ok/N	ot Ok)
4.	6.7 KAVA	CH Head O	ON coll	ision te	est r	eports			1			
1	Stationary	KAVACH	Entry	Exit				nich Head on	Stoppi	_	Re	sult
	ID		Signal	Signal			ion me isplay	ssage is yed	Distance the Lo		(Ok/N	ot Ok)

Signature with Date	Signature with Date	
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Representative)	official)	

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4.6.8 KAVACH Unusual Stoppage in Block section test reports -

- This SoS will not be generated in the Station Section. For this purpose, the Station section shall be matching with the details prescribed in the Station Working Rules. The Tag data is to be checked for this.
- In case of diverging lines, the adjacent tag shall be placed suitably, to avoid stopping of trains where not required.

SN	Stationary KAVACH ID	Entry Signal	Exit Signal	Stopping Distance	Result
					(Ok/ Not Ok)
1					
2					

4.6.9 Manual SoS Generation from Stationary KAVACH test reports:

SN	Stationary KAVACH ID	Entry Signal	Exit Signal	Stopping Distance	Result
					(Ok/ Not Ok)
1					
2					

SN	SOS generation after pressing SOS button in SMOCIP (Y/N)	Time duration between pressing the button and SOS generation	After cancelation, whether SoS stopped	Result (Ok/ Not Ok)
1				

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4.6.10 Manual SoS Generation from Onboard KAVACH test reports:

SN	Onboard KAVACH ID	Entry Signal	Exit Signal	Stopping Distance	Result (Ok/ Not Ok)
1					
2					

Signature with Date	Signature with Date	
Name and Designation (Firm	Name and Designation (RDSO	
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