



सत्यमेव जयते

GOVERNMENT OF INDIA
MINISTRY OF RAILWAYS

Annexure - D

Kavach RFID Tag Data Format (Amendment-5)

Issued by

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



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Amendment History

<i>Amdt</i>	<i>Date of Issue</i>	<i>Reasons for change</i>
1	27.01.22	<p>Normal Tag:</p> <ul style="list-style-type: none"> Abs. location changed from 24 bits to 23 bits. Abs. location reset changed from 3 bits to 2 bits. Communication in nominal and reverse direction each one bit is added. <p>LC gate tag:</p> <ul style="list-style-type: none"> Version changed from 3 bit to 2 bit Abs. location changed from 24 bits to 23 bits
2	20-06-22	<p>TIN is changed from 7 bits to 8 bits. CRC changed from 32 bits to 30 bits Abs. location reset and Communication in nominal and reverse direction added in LC Gate tag.</p>
3	14-09-22	<p>Normal Tag:</p> <ul style="list-style-type: none"> Tag Placement: <ul style="list-style-type: none"> "110" – At Signal foot in both directions. "111" – Adjustment/Junction location <p>LC gate Tag:</p> <ul style="list-style-type: none"> Tag Placement: <ul style="list-style-type: none"> "110" – At Signal foot in both directions. "111" – Adjustment/Junction location
4	11.01.2023	<p>1. Normal Tag: Tag Placement: -</p> <ul style="list-style-type: none"> Bit Y30-Y27 - "111" Reserved. "1000" At Dead Stop in Nominal Direction "1001" At Dead Stop in Reverse Direction "1010-1111" Reserved Bit Y31-Y30 deleted for Absolute Location Reset Bit Y31 modified for Tag Duplication <p>2. LC Tag:-</p> <ul style="list-style-type: none"> Bit X62-X59 -"0111" Reserved. "1000" At Dead Stop in Nominal Direction "1001" At Dead Stop in Reverse Direction "1010-1111" Reserved Bit Y31-Y30 deleted for Absolute Location Reset Bit Y31 modified for Tag Duplication <p>3. Adjacent Line Tag:-</p> <ul style="list-style-type: none"> Bit Y31 added for Tag Duplication. Bit Y33-Y31 modified as Bit Y33-Y32 – 2 Bit in place of 3 bit

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		4. Adjustment/Junction Tag – New Tag is added.
5	17.07.2023	Clause No .D.1 “0111” – At KAVACH territory exit in both direction. Clause No D.2 “0111” – At KAVACH territory exit in both direction.
6	29.11.2023	CL. No D.4 Modified –Reserved bit Y22–Y21, 3 – 2-Reserved for future use.

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1. INTRODUCTION

This document describes the RFID tag data formats for all the possible RFID tags defined for KAVACH System.

D.1 Normal Tag

Field	Bit Positions	No of bits	Description
Type of Tag (1001: Normal Tag)	X3 - X0	4	This field denotes the type of Tag. The decimal value is 9
Version	X5-X4	2	0: KAVACH Spec 3.2 1: KAVACH Spec 4.0 2,3: Reserved for future use
Unique ID of RFID Tag Set	X15– X6	10	Unique ID of the RFID Tag. Value ranges from 1 to 1023
Absolute Loc in meters (1111111 11111111 11111111 : Not Applicable)	X38– X16	23	Geographical location of the RFID Tag in terms of meters as per Railway metrics or Location referred in the Signal Interlocking Plan of the respective stations. Value ranges from 0 to 83,88,607
TIN in Nominal Direction	X46 – X39	8	Track Identification number encountered while traversing in Nominal direction(Incremental direction of absolute location) Value ranges from 0 to 255 0: TIN value to be used at KAVACH territory exit in valid direction
TIN in Reverse Direction	X54– X47	8	Track Identification number encountered while traversing in Reverse direction (Decremental direction of absolute location). Value ranges from 0 to 255 0: TIN value to be used at KAVACH territory exit in valid direction
Station ID in Nominal direction	Y6-Y0 & X63- X55	16	Station ID corresponding to Tag placement, Note: 0 to be programmed if Tag is not mapped to any station
Station ID in Reverse direction	Y22– Y7	16	Station ID corresponding to Tag placement, Note: 0 to be programmed if Tag is not mapped to any station
Section type in Nominal direction	Y24 – Y23	2	Indicates whether the territory encountered by the Loco falls in Station vicinity or Block section in its direction of travel 00-Station Section 01-Absolute block 10-Automatic section 11-Virtual Block (01, 10 and 11 – to be used for collision detection)

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Field	Bit Positions	No of bits	Description
Section type in Reverse direction	Y26 – Y25	2	Indicates whether the territory encountered by the Loco falls in Station vicinity or Block section in its direction of travel 00-Station Section 01-Absolute block 10-Automatic section 11-Virtual Block (01, 10 and 11 – to be used for collision detection)
Tag placement	Y30 – Y27	4	Denotes the placement of the tag "0000" – In line section "0001" – At Signal foot in Nominal direction "0010" – At Signal foot in Reverse direction "0011" – At Turnout "0100" – At Kavach territory exit in Nominal direction "0101" – At Kavach territory exit in Reverse direction "0110" – At Signal foot in both directions "0111" – At Kavach territory exit in both direction "1000" – At Dead Stop in Nominal Direction "1001" – At Dead Stop in Reverse Direction "1010-1111" Reserved
Tag Duplication	Y31	1	0- Main Tag 1- Duplicate Tag
Communication in Nominal Direction	Y32	1	0- Required 1-Not required
Communication in Reverse Direction	Y33	1	0- Required 1-Not required
CRC	Y63-Y34	30	Compute CRC (Cyclic Redundancy Checksum) to check the data integrity. 30 Bit CCITT CRC
Total		128	

Note: The Normal tag shall cater the requirement of the Signal foot Tag, Turn Out Tag, Exit Tag, Adjustment/Junction Location Tag as per the placement of the tag.

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D.2 L C Tag

Field	Bit Positions	No of bits	Description
Type of Tag (1010 : LC Tag)	X3 - X0	4	This field denotes the type of Tag. The decimal value is 10
Version	X5-X4	2	0-TCAS Spec 3.2 1-TCAS (KAVACH) Spec 4.0 2,3 – Reserved for future use
Unique ID of RFID Tag Set	X15– X6	10	Unique ID of the RFID Tag. Value ranges from 1 to 1023
Absolute Loc in meters (1111111 11111111 11111111 : Not Applicable)	X38– X16	23	Geographical location of the RFID Tag in terms of meters as per Railway metrics or Location referred in the Signal Interlocking Plan of the respective stations. Value ranges from 0 to 83,88,607
TIN in Nominal Direction	X46 – X39	8	Track Identification number encountered while traversing in Nominal direction (Incremental direction of absolute location) Value ranges from 0 to 255 0: TIN value to be used in Non-KAVACH territory or at KAVACH territory exit in valid direction
TIN in Reverse Direction	X54 – X47	8	Track Identification number encountered while traversing in Reverse direction (Decremental direction of absolute location) Value ranges from 0 to 255 0: TIN value to be used in Non-KAVACH territory or at KAVACH territory exit in valid direction
Section type in Nominal direction	X56 – X55	2	Indicates whether the territory encountered by the Loco falls in Station vicinity or Block section in its direction of travel 00-Station Section 01-Absolute block 10-Automatic section 11-Virtual Block (01, 10 and 11 – to be used for collision detection)
Section type in Reverse direction	X58 – X57	2	Indicates whether the territory encountered by the Loco falls in Station vicinity or Block section in its direction of travel 00-Station Section 01-Absolute block 10-Automatic section 11-Virtual Block (01, 10 and 11 – to be used for collision detection)
Tag placement	X62 – X59	4	Denotes the placement of the tag (G-tag can to be used when approaching an LC gate instead of N-Tag) Denotes the placement of the tag

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Field	Bit Positions	No of bits	Description
			Denotes the placement of the tag "0000" – In line section "0001" – At Signal foot in Nominal direction "0010" – At Signal foot in Reverse direction "0011" – At Turnout "0100" – At KAVACH territory exit in Nominal direction "0101" – At KAVACH territory exit in Reverse direction "0110" At Signal foot in both directions "0111" At KAVACH territory exit in both directions "1000" At Dead Stop in Nominal Direction "1001" At Dead Stop in Reverse Direction "1010-1111" Reserved
LC Gate Approach tag in direction of applicability	Y0-X63	2	Denotes whether the Tag is placed in KAVACH or Non KAVACH territory. If placed in Non KAVACH territory, parameters for nominal direction only to be used 00: KAVACH 01: NON KAVACH First 10: NON KAVACH Second 11: Spare
Applicable Direction	Y1	1	Denotes the applicable direction of the LC gate (0=Nominal, 1=Reverse)
Gate ID	Y11-Y2 ,	10	Unique ID of the LC Gate as per Railway data. Value ranges from 1 to 1023
LC Gate ID (alpha)	Y14-Y12	3	Unique ID of the LC Gate as per Railway data. Value ranges from 1 to 1023 000 : None, 001: a, 010: b, 011: c, 100: d, 101: e, 110: Out of range (display xx on DMI) 111: Spare
Gate Type	Y15	1	Denotes the type of LC gate (0=manned,1=unmanned)
Distance to Gate	Y25-Y16	10	Denotes the distance from this tag to the approaching LC gate in terms of meters
Auto whistling	Y26	1	Denotes whether Auto whistling is required (0=No, 1= Yes)
Type of Auto whistling	Y27	1	Denotes type of Auto whistling required 0= Distance based Auto-whistling 1= Time based Auto Whistling
Fill Zeros	Y30-Y28	3	Zero padding to be done
Tag Duplication	Y31	1	0- Main Tag 1- Duplicate Tag

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Field	Bit Positions	No of bits	Description
Communication in Nominal Direction	Y32	1	0- Required 1-Not required
Communication in Reverse Direction	Y33	1	0-Required 1-Not required
CRC	Y63-Y34	30	Compute CRC (Cyclic Redundancy Checksum) to check the data integrity. 30Bit CCITT CRC
Total		128	

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D.3 Adjacent Line tag

Adjacent Line Tag			
Field	BIT POSITIONS	No of bits	Description
Type of Tag (1011: Adjacent Line Tag)	X3 – X0	4	This field denotes the type of Tag. The decimal value is 11
Version	X5 - X4	2	0: TCAS (KAVACH) Spec 3.2 1: TCAS (KAVACH) Spec 4.0 2,3: Reserved for future use
Unique ID of RFID Tag Set	X15 – X6	10	Unique ID of the RFID Tag. Value ranges from 1 to 1023
Absolute Loc in meters (1111111 1111111 1111111 : Not Applicable)	X38 – X16	23	Geographical location of the RFID Tag in terms of meters as per Railway metrics or Location re-ferred in the Signal Interlocking Plan of the respective stations. Value ranges from 0 to 83,88,608
TIN in Nominal Direction	X46 – X39	8	Track Identification number encountered while traversing in Nominal direction(Incremental direction of absolute location) Value ranges from 0 to 255
TIN in Reverse Direction	X54 – X47	8	Track Identification number encountered while traversing in Reverse direction (Decremental direction of absolute location) Value ranges from 0 to 255
Adjacent Line-1 TIN	X62 – X55	8	TIN number of adjacent lines Value range (1-255), 0=No adjacent Line TIN
Adjacent Line-2 TIN	Y6-Y0 & X63	8	TIN number of adjacent lines Value range (1-255), 0=No adjacent Line TIN
Adjacent Line-3 TIN	Y14-Y7	8	TIN number of adjacent lines Value range (1-255), 0=No adjacent Line TIN
Adjacent Line-4 TIN	Y22-Y15	8	TIN number of adjacent lines Value range (1-255), 0=No adjacent Line TIN
Adjacent Line-5 TIN	Y30-Y23	8	TIN number of adjacent lines Value range (1-255), 0=No adjacent Line TIN
Tag Duplication	Y31	1	0- Main Tag 1- Duplicate Tag
Fill Zeros	Y33- Y32	2	Zero padding to be done
CRC	Y63-Y34	30	Compute CRC (Cyclic Redundancy Checksum) to check the data integrity. 30 Bit CCITT CRC
Total		128	

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D.4 Adjustment/Junction Location Tag

Field	BIT POSITIONS	No of bits	Description
Type of Tag (1100: Junction Tag V2.0)	X3 - X0	4	This field denotes the type of Tag. The decimal value is 12
Version	X5-X4	2	0: TCAS Spec 3.2 1: TCAS Spec 4.0 2,3: Reserved for future use
Unique ID of RFID Tag Set	X15– X6	10	Unique ID of the RFID Tag. Value ranges from 1 to 1023
Absolute Location-1 (in meters (1111111 11111111 11111111 : Not Applicable)	X38– X16	23	Geographical location of the RFID Tag in terms of meters as per Railway metrics or Location referred in the Signal Interlocking Plan of the respective stations. Value ranges from 0 to 83,88,607
TIN -1	X46 – X39	8	Track Identification number associated towards Absolute location -1 Value ranges from 0 to 255 0: TIN value to be used at TCAS territory exit in valid direction
TIN -2	X54 – X47	8	Track Identification number associated towards Absolute location -2 Value ranges from 0 to 255 0: TIN value to be used at TCAS territory exit in valid direction
Absolute Location-2 in meters (1111111 11111111 11111111 : Not Applicable)	Y13-Y0 & X63- X55	23	Geographical location of the RFID Tag in terms of meters as per Railway metrics or Location referred in the Signal Interlocking Plan of the respective stations. Value ranges from 0 to 83,88,607
Direction Correction-1 (Absolute Location-1)	Y16- Y14	3	Direction Reset toward absolute location-1 000 – Reset Direction unknown. Derive direction from next tags 001 – Location Correction, Loco travel direction Nominal and Next tag is in Nominal direction 010 – Location Correction, Loco travel direction Nominal and Next tag is in Reverse direction 011 – Location Correction, Loco travel direction Reverse and Next tag is in Nominal direction 100 – Location Correction, Loco travel direction Reverse and Next tag is in Reverse direction 110 – 111: Reserved

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Direction Correction-2 (Absolute Location-2)	Y19- Y17	3	Direction Reset toward absolute location-2 000 – Reset Direction unknown. Derive direction from next tags 001 – Location Correction, Loco travel direction Nominal and Next tag is in Nominal direction 010 – Location Correction, Loco travel direction Nominal and Next tag is in Reverse direction 011 – Location Correction, Loco travel direction Reverse and Next tag is in Nominal direction 100 – Location Correction, Loco travel direction Reverse and Next tag is in Reverse direction 110 – 111: Reserved
Location Correction Type	Y20	1	0 – Adjustment in Absolute Location 1 – Reset in Absolute Location
Reserved	Y22 – Y21	3 2	Reserved for future use
Section type-1	Y24 – Y23	2	Section type toward absolute location-1 Indicates whether the territory encountered by the Loco falls in Station vicinity or Block section in its direction of travel 00-Station Section 01-Absolute block 10-Autoblock 11-Virtual Block (01, 10 and 11 – to be used for collision detection)
Section type -2	Y26 – Y25	2	Section type toward absolute location-2 Indicates whether the territory encountered by the Loco falls in Station vicinity or Block section in its direction of travel 00-Station Section 01-Absolute block 10-Autoblock 11-Virtual Block (01, 10 and 11 – to be used for collision detection)
Reserved	Y30-Y27	4	Reserved for Future use
Tag Type	Y31	1	0 – Main Tag 1– Duplicate tag
Communication in Nominal direction	Y32	1	0 – Required 1– Not Required
Communication in Reverse direction	Y33	1	0 – Required 1– Not Required
CRC	Y63-Y34	30	Compute CRC (Cyclic Redundancy Checksum) to check the data integrity. 30 Bit CRC /CDMA
Total		128	

Note: RFID tag data value shall be in decimal except CRC.

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D.5 CRC-30/CDMA

Polynomial: $x^{30} + x^{29} + x^{21} + x^{20} + x^{15} + x^{13} + x^{12} + x^{11} + x^8 + x^7 + x^6 + x^2 + x + 1$

Width: 30 bits

Truncated Polynomial: 0x2030B9C7

Initial Remainder: 0x3FFFFFFF

Final Xor Value: 0x3FFFFFFF

Sample Data:

0x31, 0x32, 0x33, 0x34, 0x35, 0x36, 0x37, 0x38, 0x39

CRC-30 Value: 0x04C34ABF

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NORMAL TAG

FIELD DESCRIPTION	Bit Position	No.of Bits	749R	749D	751R	751D	676N	676D
Type of Tag(9-Normal,10- LC, 11-Adjacent Line,Adjustment/Junction -12)	X3 - X0	4	9	9	9	9	9	9
Kavach Version(0-Kavach Spec 3.2, 1-Kavach Spec 4.0, 2,3: Reserved for future Use)	X5-X4	2	1	1	1	1	1	1
Unique ID of RFID Tag Set	X15– X6	10	749	749	751	751	676	676
Absolute Location in meters	X38– X16	23	117930	117926	117680	117676	118540	118544
TIN in Nominal Direction	X46 – X39	8	94	94	94	94	95	95
TIN in Reverse Direction	X54 – X47	8	94	94	94	94	95	95
Station ID in Nominal direction	Y6-Y0 & X63- X55	16	520	520	520	520	520	520
Station ID in Reverse direction	Y22 - Y7	16	520	520	520	520	503	503
Section type in Nominal direction (0-Station Section ,1-Absolute block, 2-Automatic section, 3-Virtual Block)	Y24 – Y23	2	1	1	1	1	1	1
Section type in Reverse direction (0-Station Section ,1-Absolute block, 2-Automatic section, 3-Virtual Block)	Y26 – Y25	2	1	1	1	1	1	1
Tag placement ("0" – In line section,"1" – At Signal foot in Nominal direction "2" – At Signal foot in Reverse direction,"3" – At Turnout "4" – At Kavach territory exit in Nominal direction, "5" – At Kavach territory exit in Reverse direction, "6" – At Signal foot in both directions,"7" – At Kavach territory exit in both directions, "8" – At Dead Stop in Nominal Direction,"9" – At Dead Stop in Reverse Direction)	Y30 – Y27	4	0	0	2	2	0	0
Tag Duplication (0 – Main Tag 1 – Duplicate Tag)	Y31	1	0	1	0	1	0	1
Communication in Nominal direction (0 – Required,1 – Not Required)	Y32	1	0	0	0	0	0	0
Communication in Reverse direction (0 – Required,1 – Not Required)	Y33	1	0	0	0	0	0	0
CRC	Y63-Y34	30	109D9C2A	22F82D57	512DDF2	318775AD	4A54207	3030EA58
PAGEX		64	042F2F01CCAABB59	042F2F01CCA6BB59	042F2F01CBB0BBD9	042F2F01CBACBBD9	042FAF81CF0CA919	042FAF81CF10A919
PAGEY		64	427670A802810401	8BE0B55C82810401	144B77C812810401	C61DD6B492810401	1295081C0280FB81	C0C3A9608280FB81

Total no'of RFID tags as per RFID Layout: 133									
Approving Authority			1	Modified During RDSO FAT Testing				26-09-2023	
			0	Submission to SCR for Approval				27-072023	
			REV.NO	REVISION				DATE	
			VIKARABAD JN (VKB) Secunderabad Division, SC Railway				REF:KAVACH_RFID_TAG_LAYOUT_VKB_2.0.1		
JE/SSE/RDSO/LKO	ADE/RDSO/LKO	DIRECTOR/RDSO/LKO	KAVACH RFID TAG DATA				TABLE NO: KAVACH_RFID_TAG_DATA_VKB_2.0.1 PAGE 39 OF 45		
Checked By									
				PREPARED BY	CHECKED BY				
			SIGN						
JE/SSE/HQ/SCR	ASTE/SSTE/P/ HQ/SCR	Dy.CSTE/ P/HQ/SCR	NAME						

LC GATE TAG

FIELD DESCRIPTION	Bit Position	No.of Bits	897R	897D	907R	907D	911R	911D
Type of Tag=10(LC Gate Tag)	X3 - X0	4	10	10	10	10	10	10
KAVACH Version (0=TCAS Spec 3.2 , 1=TCAS (KAVACH) Spec 4.0,2,3=Reserved for future use)	X5-X4	2	1	1	1	1	1	1
Unique ID of RFID Tag Set (Value ranges from 1 to 1023)	X15- X6	10	897	897	907	907	911	911
Tag Absolute Loc in meters	X38- X16	23	111030	111026	110020	110016	2170	2166
TIN in Nominal Direction (Incremental direction of absolute location Value ranges from 0 to 255, 0: TIN value to be used in NonKavach territory or at Kavach territory exit in valid direction)	X46 - X39	8	4	4	97	97	97	97
TIN in Reverse Direction (decremental direction of absolute location Value ranges from 0 to 255, 0: TIN value to be used in NonKavach territory or at Kavach territory exit in valid direction)	X54 - X47	8	4	4	97	97	97	97
Section type in Nominal direction (0=Station Section, 1=Absolute block, 2=Automatic section, 3=Virtual Block, 1, 2 and 3 - to be used for collision detection)	X56 - X55	2	0	0	1	1	1	1
Section type in Reverse direction (0=Station Section, 1=Absolute block, 2=Automatic section, 3=Virtual Block, 1, 2 and 3 - to be used for collision detection)	X58 - X57	2	0	0	1	1	1	1
Tag placement (0=In line section,1=At Signal foot in Nominal direction,2=At Signal foot in Reverse direction,3=At Turnout,4=At Kavach territory exit in Nominal direction,5=At Kavach territory exit in Reverse direction,6=At Signal foot in both directions,7=Reserved,8=At Dead Stop in Nominal Direction,9=At Dead Stop in Reverse Direction,10-15=Reserved)	X62 - X59	4	0	0	0	0	0	0
LC Gate Approach tag in direction of applicability (0=Kavach,1=NON Kavach First,2=NON Kavach Second,3=Spare)	Y0-X63	2	0	0	0	0	0	0
Applicable Direction (0=Nominal, 1=Reverse)	Y1	1	1	1	1	1	1	1
Gate ID (Value ranges from 1 to 1023)	Y11-Y2	10	2	2	3	3	2	2
LC Gate ID(alpha) (0=None,1=a,2=b,3=c,4=d,5=e,6=Out of range (display xx on DMI)7=Spare)	Y14-Y12	3	0	0	0	0	0	0
Gate Type (0=manned,1=unmanned)	Y15	1	0	0	0	0	0	0
Distance to Gate in meters	Y25-Y16	10	730	730	650	650	640	640
Auto whistling (0=No, 1=Yes)	Y26	1	1	1	1	1	1	1
Type of Auto whistling (0=Distance based, 1=Time based)	Y27	1	0	0	0	0	0	0
Fill Zeros	Y30-Y28	3	0	0	0	0	0	0
Tag Duplication (0=Main Tag, 1=Duplicate Tag)	Y31	1	0	1	0	1	0	1
Comm. With S-KAVACH in Nominal Direction (0=Required, 1=Not required)	Y32	1	0	0	0	0	0	0
Comm. With S-KAVACH in Reverse Direction (0=Required, 1=Not required)	Y33	1	0	0	0	0	0	0
CRC	y63-y34	30	39D48C83	8C9316F	5D4214B	34C99CA7	35A91EAD	7CCAFD0
PAGEX			00020201B1B6E05A	00020201B1B2E05A	02B0B081ADC4E2DA	02B0B081ADC0E2DA	02B0B080087AE3DA	02B0B0800876E3DA
PAGEY			E752320C06DA000A	2324C5BC86DA000A	1750852C068A000E	D326729C868A000E	D6A47AB40680000A	1F32BF408680000A

Total no'of RFID tags as per RFID Layout: 133									
Approving Authority			1	Modified During RDSO FAT Testing				26-09-2023	
			0	Submission to SCR for Approval				27-072023	
			REV.NO	REVISION				DATE	
			VIKARABAD JN (VKB) Secunderabad Division, SC Railway				REF:KAVACH_RFID_TAG_LAYOUT_VKB_2.0.1		
JE/SSE/RDSO/LKO	ADE/RDSO/LKO	DIRECTOR/RDSO/LKO	KAVACH RFID TAG DATA				TABLE NO: KAVACH_RFID_TAG_DATA_VKB_2.0.1 PAGE 41 OF 45		
Checked By									
				PREPARED BY	CHECKED BY				
			SIGN						
JE/SSE/HQ/SCR	ASTE/SSTE/P/ HQ/SCR	Dy.CSTE/ P/HQ/SCR	NAME						

ADJACENT LINE TAG								
FIELD DESCRIPTION	Bit Position	No.of Bits	738N	738D	521R	521D	901R	901D
Type of Tag(9-Normal,10- LC, 11-Adjacent Line,Adjustment/Junction -12)	X3 – X0	4	11	11	11	11	11	11
Kavach Version(0-Kavach Spec 3.2, 1-Kavach Spec 4.0, 2,3: Reserved for future Use)	X5 - X4	2	1	1	1	1	1	1
Unique ID of RFID Tag Set	X15 – X6	10	738	738	521	521	901	901
Tag Absolute Loc in meters	X38 – X16	23	112960	112964	110910	110906	110910	110906
TIN in Nominal Direction	X46 – X39	8	95	95	114	114	97	97
TIN in Reverse Direction	X54 – X47	8	95	95	114	114	97	97
Adjacent Line-1 TIN	X62 - X55	8	94	94	115	115	0	0
Adjacent Line-2 TIN	Y6-Y0 & X63	8	0	0	0	0	0	0
Adjacent Line-3 TIN	Y14-Y7	8	0	0	0	0	0	0
Adjacent Line-4 TIN	Y22-Y15	8	0	0	0	0	0	0
Adjacent Line-5 TIN	Y30-Y23	8	0	0	0	0	0	0
Tag Duplication (0 – Main Tag 1 – Duplicate Tag)	Y31	1	0	1	0	1	0	1
Fill Zeros	Y33- Y32	2	0	0	0	0	0	0
CRC	Y63-Y34	30	3C056697	D18DB7B	2BEEE8EB	1AF35507	252E74FF	1433C913
PAGEX		64	2F2FAF81B940B89B	2F2FAF81B944B89B	39B93901B13E825B	39B93901B13A825B	0030B081B13EE15B	0030B081B13AE15B
PAGEY		64	F0159A5C00000000	34636DEC80000000	AFBBA3AC00000000	6BCD541C80000000	94B9D3FC00000000	50CF244C80000000

Total no'of RFID tags as per RFID Layout: 133								
Approving Authority			1	Modified During RDSO FAT Testing			26-09-2023	
			0	Submission to SCR for Approval			27-072023	
			REV.NO	REVISION			DATE	
			VIKARABAD JN (VKB) Secunderabad Division, SC Railway			REF:KAVACH_RFID_TAG_LAYOUT_VKB_2.0.1		
JE/SSE/RDSO/LKO	ADE/RDSO/LKO	DIRECTOR/RDSO/LKO	KAVACH RFID TAG DATA			TABLE NO: KAVACH_RFID_TAG_DATA_VKB_2.0.1 PAGE 44 OF 45		
Checked By								
				PREPARED BY	CHECKED BY			
			SIGN					
JE/SSE/HQ/SCR	ASTE/SSTE/P/ HQ/SCR	Dy.CSTE/ P/HQ/SCR	NAME					

ADJUSTMENT/JUNCTION LOCATION TAG

FIELD DESCRIPTION	Bit Position	No.of Bits	908M	908D	674M	674D
Type of Tag(9-Normal,10- LC, 11-Adjacent Line,Adjustment/Junction -12)	X3 - X0	4	12	12	12	12
Kavach Version(0-Kavach Spec 3.2, 1-Kavach Spec 4.0,2,3: Reserved for future Use)	X5-X4	2	1	1	1	1
Unique ID of RFID Tag Set	X15- X6	10	908	908	674	674
Absolute Location-1 (in meters)	X38- X16	23	1920	1920	117840	117840
TIN -1	X46 - X39	8	97	97	95	95
TIN -2	X54 - X47	8	97	97	95	95
Absolute Location-2 in meters	Y13-Y0 & X63- X55	23	109910	109910	117900	117900
Direction Correcion-1 (Absolute Location-1) 000 – Reset Direction unknown. Derive direction from next tags ,001 – Location Correction, Loco travel direction Nominal and Next tag is in Nominal direction ,010 – Location Correction, Loco travel direction Nominal and Next tag is in Reverse direction ,011 – Location Correction, Loco travel direction Reverse and Next tag is in Nominal direction ,100 – Location Correction, Loco travel direction Reverse and Next tag is in Reverse direction , 110 – 111: Reserved);	Y16- Y14	3	3	3	4	4
Direction Correcion-2 (Absolute Location-2): 000 – Reset Direction unknown. Derive direction from next tags ,001 – Location Correction, Loco travel direction Nominal and Next tag is in Nominal direction ,010 – Location Correction, Loco travel direction Nominal and Next tag is in Reverse direction ,011 – Location Correction, Loco travel direction Reverse and Next tag is in Nominal direction ,100 – Location Correction, Loco travel direction Reverse and Next tag is in Reverse direction ,110 – 111: Reserved	Y19- Y17	3	3	3	1	1
Location Correction Type (0 – Adjustment in Absolute Location ,1 – Reset in Absolute Location)	Y20	1	1	1	0	0
Reserved	Y22 – Y21	2	0	0	0	0
Section type-1 (0-Station Section ,1-Absolute block, 2-Automatic section,3-Virtual Block)	Y24 – Y23	2	1	1	1	1
Section type-2 (0-Station Section ,1-Absolute block, 2-Automatic section,3-Virtual Block)	Y26 – Y25	2	1	1	1	1
Reserved	Y30-Y27	4	0	0	0	0
Tag Type (0 – Main Tag,1 – Duplicate Tag)	Y31	1	0	1	0	1
Communication in Nominal direction(0 – Required,1– Not Required)	Y32	1	0	0	0	0
Communication in Reverse direction(0 – Required,1– Not Required)	Y33	1	0	0	0	0
CRC	Y63-Y34	30	1AE4D3C2	1A5D3485	25C358C6	257ABF81
PAGEX		64	AB30B0800780E31C	AB30B0800780E31C	462FAF81CC50A89C	462FAF81CC50A89C
PAGEY		64	6B934F080296C0D6	6974D2148296C0D6	970D6318028300E6	95EAFE04828300E6

Total no'of RFID tags as per RFID Layout: 133						
Approving Authority			1	Modified During RDSO FAT Testing		26-09-2023
			0	Submission to SCR for Approval		27-072023
			REV.NO	REVISION		DATE
			VIKARABAD JN (VKB) Secunderabad Division, SC Railway		REF:KAVACH_RFID_TAG_LAYOUT_VKB_2.0.1	
JE/SSE/RDSO/LKO	ADE/RDSO/LKO	DIRECTOR/RDSO/LKO	KAVACH RFID TAG DATA		TABLE NO: KAVACH_RFID_TAG_DATA_VKB_2.0.1 PAGE 45 OF 45	
Checked By				PREPARED BY	CHECKED BY	
			SIGN			
JE/SSE/HQ/SCR	ASTE/SSTE/P/ HQ/SCR	Dy.CSTE/ P/HQ/SCR	NAME			