

ISO 9001: 2015	Effective from 14.11.2023	RDSO/SPN/196/2020	Version 4.0 Amdt-4.0
<b>Document Title :</b> Specification of Kavach (The Indian Railway ATP)- RFID Tag-TIN Layout Guidelines <b>Annexure – H</b>			



सत्यमेव जयते

GOVERNMENT OF INDIA  
MINISTRY OF RAILWAYS

**Annexure – H**  
**KAVACH**  
**RFID Tag-TIN Layout Guidelines**  
**(Amdt-4)**

**Issued by**


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



MANISH KUMAR GUPTA 2023.11.14 12:05:45 +05'30'	RAVINDRA NATH SINGH Digitally signed by RAVINDRA NATH SINGH Date: 2023.11.15 20:42:18 +05'30'		Page 1 of 11
Manish Kumar Gupta SSE/Insp./S&T/SC	R. N. Singh AIE/QA/S&T/SC	G. Pavan Kumar ED/Tele-II	


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Amdt	Date of issue	Amendment
1.d	29.12.2022	<p>Cl. H2.1-New clause added for version control.</p> <p>Cl.H2.6 – Signal foot Tag to be provided at the Ends of berthing track (may be with shunt signal sometimes).</p> <p>Cl. H2.7- Deleted.</p> <p>Cl. H2.8- The clause modified as “Normal tag shall be provided at distance of 150-250 meter (Preferably 200 meter)”.</p> <p>Cl. H2.9 –Deleted.</p> <p>Cl.H2.11-The clause modified as “To demarcate TIN sections, TIN discrimination Turnout tags”.</p> <p>Cl. H2.13 – The clause is modified as- “Location adjustment or Junction requirement are to be provided with Normal Tag where require”.</p> <p>Cl. H2.14- The following text is added in clause “Minimum 2 sets of Tags shall be provided as exit tag. The 1<sup>st</sup> Exit RFID shall be programmed with Communication in Direction of entry &amp; no communication in direction of exit and 2<sup>nd</sup> exit Tag shall be programmed with no communication required in both directions”.</p> <p>Cl. H2.16- The clause is modified as “The duplicate RFID tag shall be installed minimum distance of 3 meter to 5 meter except turn out RFID tag. The turn out RFID tag shall be in same absolute location”.</p> <p>Cl. H2.17 - New clause regarding border RFID Tag is added.</p> <p>Cl. H2.22 – The clause is modified to indicate notation for different types of Tag as per placement.</p> <p>Cl. H2.23, H2.25 and H2.26 are Deleted.</p> <p>Cl. H2.27:- clause modified to accommodate TIN range upto - 255.</p> <p>Cl. H2.31- Absolute location of Stop Board and BSLB to be mentioned in RFID Tag layout.</p> <p>Template for RFID layout is added after correction.</p>

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2	14.02.2023	<p>Cl.H2.8- modified as correction as “Normal or LC Gate tag shall be provided between 150-250 meters in approach to all Main Signals (Preferably 200 meter).</p> <p>Cl. H2.10 – Deleted.</p> <p>Cl. H2.13 –Deleted.</p> <p>Cl. H2.14- Modified with addition of “Exit Tag may be provided at a distance of 20m”.</p> <p>Cl. H2.15-modified as “The minimum distance between Tag set (Main &amp; Duplicate) to Tag set (Main &amp; Duplicate) shall be greater than 10 m.</p> <p>Cl. H2.13- New clause added with new numbering.</p> <p>Cl. H2.14- New clause added- Tag legend in RFID TIN Layout with new numbering.</p> <p>Cl. H2.17- modified with addition of definition.</p>
3	08.08.2023	<p><b>Cl. H2.7 -Exception:</b> The minimum distance can be less than 150 reckoned for Advanced Starter or Intermediate Starter.</p> <p><b>CL. H2.15- Exception:</b> If two stations are having overlap of signal, then border tag is defined.</p>
4	14.11.2023	<p>Cl. H2.5- The clause modified with addition of <b>consecutive. The following is further added “All the tags are to be linked and Stationary Kavach shall communicate to Onboard Kavach.”</b></p> <p>Cl. H2.8- modified as follows: “To demarcate TIN sections, TIN discrimination Turnout tags i.e. TIN demarcation <b>type Normal Tag, Inline section type Normal tag, Signal Foot type Normal Tag and Gate tag</b> shall be placed as per the feasibility.</p> <p>Cl. H2.10- Exit Tag may be provided at a distance of not less than <b>10m.</b></p> <p>Cl. H2.11- modified The TIN discrimination/turn out and adjustment/Junction RFID Tag shall be in same absolute location.</p>

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## H1 Introduction

H1.1 This document presents the guidelines for preparation of RFID Tag-TIN layouts for the purpose of KAVACH system.

## H2 Guidelines

Following guidelines shall be followed while preparing RFID Tag-TIN layouts for Station/IB/LC or block sections.

H2.1 **Version Control:** - The version control for all documents submitted for approving authority shall have X.Y.Z format in which:-

(i) X means KAVACH Version Control.

(ii) Y means SIP version control.

(iii) Z means Guidelines change or review comments control.

H2.2 Reference SIP drawing numbers shall be mentioned on the layout. The stationary KAVACH ID is also to be written below the station name in the layout. The ID shall be unique and shall be allotted by planning section the Railway.

H2.3 RFID tag-TIN layout shall be prepared with Signal Interlocking Plan (SIP) as reference. However, the actual site considerations shall be taken into account prior to its preparation. A site survey shall be conducted to mark the locations where tags need to be placed.

H2.4 The center of Station Master's panel shall be taken as station's Centre Line for reference purpose.

H2.5 Normal tags shall be provided in the block section as well as in station section. The maximum distance between the two consecutive Normal tags shall not be more than 1000m. All the tags are to be linked and Stationary Kavach shall communicate to Onboard Kavach.

H2.6 Every Main signal, Subsidiary signal, Stop board, Ends of berthing track (may be with shunt signal sometimes) and BSLB shall be provided with Signal foot tag.

H2.7 Normal (Signal Approach Tag) shall be provided between 150-250 meters in approach to all Main Signals (Preferably 200 meter). The distance of Signal Approach Tag from corresponding Signal Foot (S) Tag should be exact multiple of 1m. This should be invariably ensured during installation and verification at site.

Exception: The minimum distance can be less than 150 m for Advanced

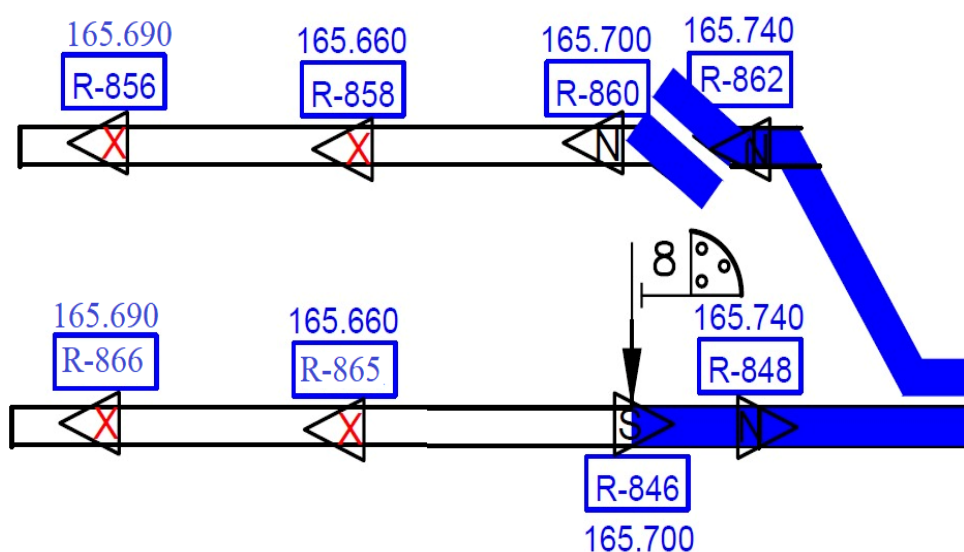
MANISH KUMAR GUPTA 2023.11.14 12:05:45 +05'30'	RAVINDRA NATH SINGH Digitally signed by RAVINDRA NATH SINGH Date: 2023.11.15 20:42:18 +05'30'		Page 4 of 11
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Starter or Intermediate Starter.

- H2.8 To demarcate TIN sections, TIN discrimination Turnout tags i.e. TIN demarcation **type Normal Tag**, **Inline section type Normal tag**, Signal Foot **type Normal Tag** and **Gate tag** shall be placed as per the feasibility.
- H2.9 Gate tags shall be placed at such a distance that Auto whistling for approaching LC gate can commence from at least 600m or W/L board on approach of LC gate.
- H2.10 While moving from KAVACH to non KAVACH territory, Exit tags shall be provided at the exit boundary of Stationary KAVACH in KAVACH territory. Minimum 2 sets of Tags shall be provided as exit tag.
- The 1<sup>st</sup> Exit RFID shall be programmed with Communication in Direction of entry & no communication in direction of exit and 2<sup>nd</sup> exit Tag shall be programmed with no communication required in both directions.
  - Exit Tag may be provided at a distance of not less than ~~20~~ 10m.

Example



- H2.11 The duplicate RFID tag shall be installed minimum distance of 3 meter to 5 meter except TIN discrimination/Turn out and **adjustment/Junction** RFID tag. The TIN discrimination/turn out **and adjustment/Junction** RFID Tag shall be in same absolute location.
- H2.12 The minimum distance between Tag set (Main & Duplicate) to Tag set (Main & Duplicate) shall not be less than 10m.

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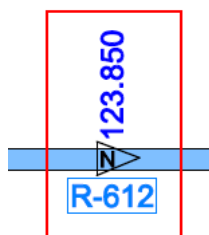
H2.13 Repeated Tag ID is not allowed within area of 25 Kilometer radius.

## H2.14 Tag legend in RFID TIN Layout

- Legend in rectangle to be used when Main Tag and Duplicate Tags contain same location.
- Legend in triangular to be used when Main Tag and Duplicate Tags contain different location. The duplicate tag shall be placed ahead of main tag in the direction of Tip of the Triangle.

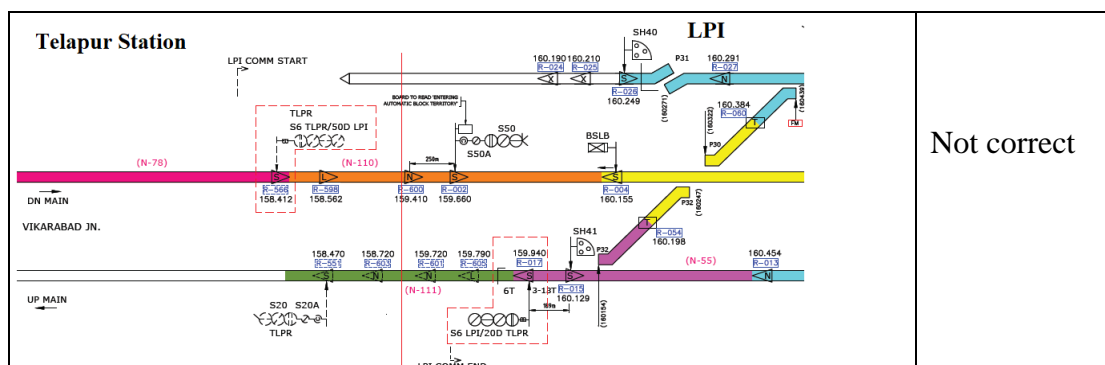
H2.15 Border RFID tag shall be indicated in RFID Tag layout with absolute location of station border line. Border RFID tag indicates the maximum distance from where the departed Loco will communicate with previous station SKAVACH. After crossing Border RFID tag, the loco shall communicate only from next stationary SKAVACH.

In RFID Layout, the border RFID tag shall be shown as below. -

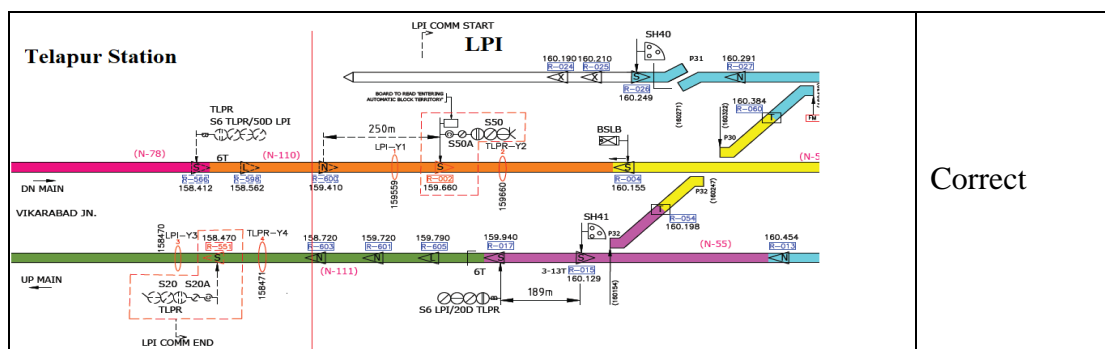


H2.15.1 Border Tag in absolute block section :

**Exception:** If two station are having overlap of signal, then the border tag shall be as per below example to avoid the issue of unsatisfactory working for display of signal.



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- H2.16 A single TIN section shall be represented using a single color. The TIN,s in vicinity shall be represented in different colors.
- H2.17 Non-KAVACH territory shall be represented through white color.
- H2.18 The TIN layouts thus prepared, shall permit all the train movements allowed in a section as per Table of Control / Selection Table. For facilitating common loop reception when loco is standing between shunt signal and advance starter, TIN shall be bifurcated
- H2.19 At all places, where the train is likely to move outside KAVACH territory or remain stabilized for long duration for e.g., sidings, Exit tags shall be provided.
- H2.20 Following notations shall be used to denote different types of tags as per placement :

Type of Tag	Notation as per placement
Normal Tag	N
Signal Foot Tag	S
TIN Discrimination/Turn out Tag	T
Gate Tag	G
Exit Tag	X
Adjacent Line tag	L
Adjustment/Junction Tag	A

- H2.21 Block Section TIN should be extended up to BSLB on unidirectional lines (such as Double Line) and up to opposite direction Advanced Starter on Single Line. S-tag shall be provided at the Yard Exit Points not protected by Signals like BSLB etc.,
- H2.22 Tag numbers (values in the range of 1 – 1023) and TIN numbers (values in the range of 1-255) shall be allotted by the user Railways. Sufficient spares for future needs shall be taken into consideration while allotting the num-

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bers. The allotted numbers shall also be mentioned on the RFID tag-TIN layout.

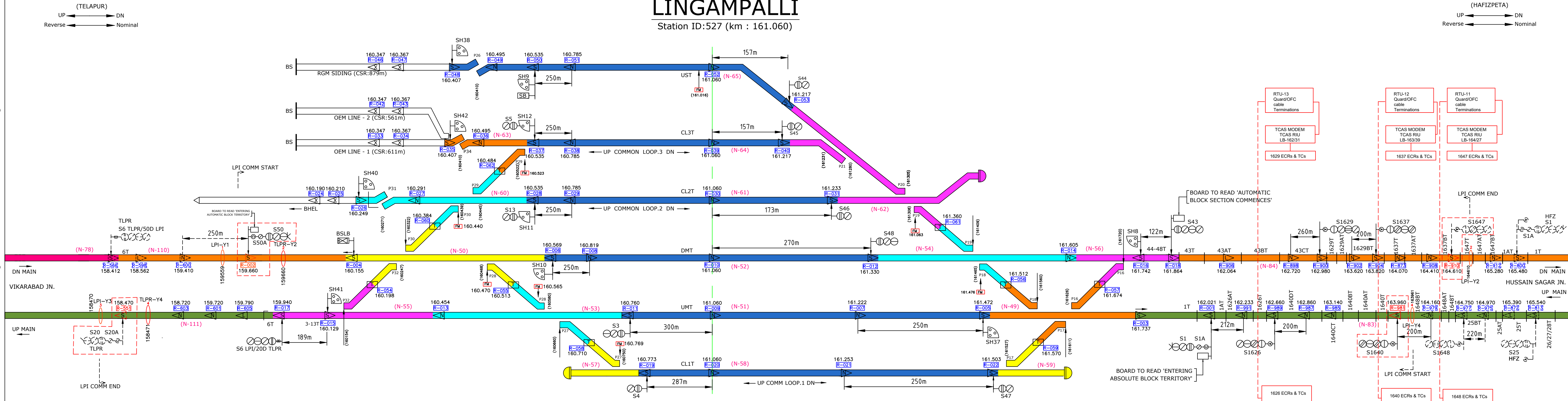
- H2.23 Signature Block and revision history blocks shall be prepared as per the practices of User Railways.
- H2.24 Legends mentioning the notation used for the purpose of preparation of layout shall be specifically mentioned on the layout.
- H2.25 RFID tag-TIN layout need not be up to scale. If the layout is not per scale, the same shall be mentioned on the layout.
- H2.26 Absolute locations of tags, LC gates, signals and turnout switches, BSLB, Stop board shall be mentioned on the RFID layout.
- H2.27 Absolute location of Station center line shall be mentioned on the layout.
- H2.28 A typical RFID tag-TIN layout for Indian Railways is shown below for reference purpose.

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# LINGAMPALLI

Station ID:527 (km : 161.060)



LINGAMPALLI (LPI)		REF.SIP: IPU.1005B Alt-1
Secunderabad Division, SC Railway		TOC : TC.1005B
KAVACH RFID TAG / TIN LAYOUT		LPI-SC Section:U.0043
NOT DRAWN TO SCALE		KAVACH_RFID_TAG_LAYOUT_LPI.2.0.2
Prepared By	Checked By	Checked By
SIGN. G ARCHANA	CH MASTANNAH	V VARUN KUMAR
NAME.		

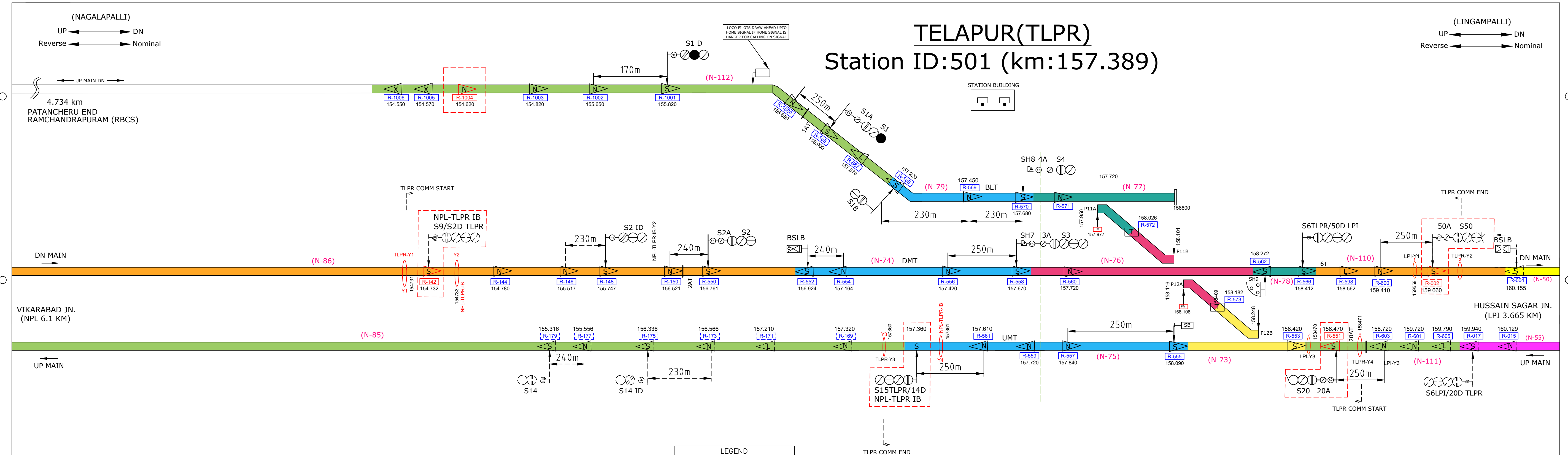
REV. NO	REVISION HISTORY	DATE
0	Initial Version	04.10.2022
1	1. Fouling mark information is added and Tag outer line is shown with Triangular representation 2. Adjacent Line Information tag's R-598 & R-605 are newly added in the TLPR and LPI block Section.	06.03.2023
2	For the Purpose of S To S communication, Border Tags are shifted from R-977, R-017 to R-981, R-551 on UP Main Line & R-566, R-904 to R-002, R-910 on Down Main Line Respectively.	20.06.2023


LEGEND
▷ NORMAL TAG
▷ SIGNAL FOOT TAG
T TIN DISCRIMINATION /TURNOUT TAG
▷ EXIT TAG
▷ GATE TAG
▷ ADJUSTMENT TAG
▷ ADJACENT LINE TAG

	LPI	UP	DN	OTHER
STATION ID	527	501	528	-
RFID ALLOTMENT	2-18 & 981,985-991 1-17	601-605 & 551	898-910 & 873	19-22,24-31, 33-40, 42-43,46-62
TIN ALLOTMENT	49 - 76	49 - 55	50 - 56	57 - 65
AUTO SECTION RFID	897-992 & 872&873	975-991 (Except-983)	898-912	-
AUTO SECTION TIN	83-84	83	84	-
BOUNDARY TAG'S	-	981,551	002,910	-
TOTAL NO. OF TAGS are 72				








APPROVED BY		
EXE./ DIRECTOR TELE-II		
SSE/PROJ/HQ/SCR	ASTE/PROJ/HQ/SCR	Dy.CSTE/P/HQ/SCR
JE/SSE/RDSO/LKO	ADE/RDSO/LKO	DIRECTOR/RDSO/LKO

संदर्भ सिगनल आरेख सं. REF.SIG.PLAN.NO.	सिगनल व दूर संचार SIGNAL & TELECOMMUNICATIONS
अर्द्ध पैपू IPU. 1005B Alt-1 & LPI-SC Sec.U.0043	KAVACH LINGAMPALLI (LPI)
संशोधन REVISION	KAVACH RFID TAG / TIN LAYOUT
आरेखकार DRAWN	व. न. रेलवे आरेख सं. S.C.RLY.DRG.NO.
	KAVACH IPU.1005B Alt-1
	शीट SHEET
	कुल शीट 01



<h2 style="text-align: center;">TELAPUR(TLPR)</h2> <p style="text-align: center;">Secunderabad Division, SC Railway</p>				REF: SIP: IPU.0147A/AII-2 TOC: TC. 0147A
TCAS RFID TAG / TIN LAYOUT				RFID_TAG_LAYOUT_TLPR_2.0.1
NOT DRAWN TO SCALE				
	Prepared By	Checked By	Checked By	
SIGN.				 <b>HBL Power Systems Ltd.</b>
NAME	G ARCHANA	CH MASTANAIAH	V VARUN KUMAR	

REV. NO	REVISION HISTORY	DATE
0	Initial Version	13.03.2023
1	For the purpose of station to station communication, border signal is changed from S6TLPR/S50D LPI to S50 of LPI and from S6LPI/20D TLPR to S20 of TLPR. The RFID tags R-566, R-598, R-600 are moved to TLPR from LPI and RFID tags R-603, R-601, R-605 are removed from TLPR & added in LPI.	28.07.2023

LEGEND	
	NORMAL TAG
	SIGNAL FOOT TAG
	TIN DISCRIMINATION /TURNOUT TAG
	EXIT TAG
	GATE TAG
	ADJUSTMENT/JUNCTION TAG
	ADJACENT LINE TAG

	TLPR	UP	DN	OTHER
STATION ID	501	526	527	—
RFID ALLOTMENT	550 – 599	551–563	144–150 550–566	565,567–573
TIN ALLOTMENT	73 – 80	73 & 75	74,76 & 78	77 & 79
BORDER RFID TAG'S	175,551		148,002	
TOTAL NO. OF TAGS are 37				

<p style="text-align: center;">APPROVED BY EXE./ DIRECTOR TELE-II</p>		
SSE/PROJ/HQ/SCR	ASTE/PROJ/HQ/SCR	Dy.CSTE/P/HQ/SCR
JE/SSE/RDSO/LKO	ADE/RDSO/LKO	DIRECTOR/RDSO/LKO

संदर्भ: सिगनल आरेख सं. REF:SIG.PLAN.NO.	सिगनल व दूर संचार SIGNAL & TELECOMMUNICATIONS			
आई पीयू IPU.0147A Alt-2 & TC. 0147A	KAVACH तेलपूर TELAPUR(TLPR)			
संशोधन REVISION	KAVACH RFID TAG / TIN LAYOUT			
आरेखकार DRAWN	व. म. रेल्वे आरेख सं. S.C.RLY.DRG.NO.	KAVACH IPU.0147A Alt-2	शीट SHEET 01	कुल शीट SHEETS 01