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Government of India - Ministry of Railways
Research Designs & Standards Organisation
Lucknow – 226011
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No. MW/RFID

Date : 09.05.2018

All CMEs, CRSEs, All CWMs & Wagon Builders (as per attached list)

Sub: Fitment of RFID tags: specification of RFID tags.
Ref: Railway board's letter no. 2016/M(N)/951/1 dated 07.05.18

Vide letter under reference above, revised version of RFID tags specification (v4,0 dated 27.04.2018) has been advised

Copy of above letter is enclosed herewith for information and further necessary action.

D.A. As above.

(P.K. Pandey)
Director/Wagon
for Director General

Copy to:

1. Exe. Director/QA (Mech.), RDSO, Lucknow-226011
2. Director/I&L, 3, Koilaghat Street, Kolkata-700 001.

भारत सरकार GOVERNMENT OF INDIA
रेल मंत्रालय MINISTRY OF RAILWAYS
(रेलवे बोर्ड RAILWAY BOARD)

No. 2016/M(N)/951/1

रेल भवन, नई दिल्ली- 110001, तिथि
Rail Bhavan, New Delhi-110001, dated 07.05.2018

ED/Wagon
R.D.S.O.
Lucknow

Sub: Fitment of RFID tags: Specification of RFID tags.

- Ref:** 1) CRIS's Ir..No.2016/CRIS/NDLS-HQ/CC/PROJECT/RFID/0225/Pt.1 dt.27/4/18
2) CRIS's Ir..No.2016/CRIS/NDLS-HQ/CC/PROJECT/RFID/0225/Pt.1 dt.26/4/17 (for draft WTC) *copy enc*
3) CRIS's Ir..No.2016/CRIS/NDLS-HQ/CC/PROJECT/RFID/0225/Pt.1 dt.21/4/17 (for
specification) *Copy enclosed.*
4) RDSO's Ir.No.MW/Specification dated October 7, 2016

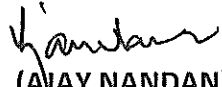
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Vide CRIS 's letters u/r (2&3) specifications for RFID tags, methodology for data on Board of RFID tags and method of NTC for RFID inspection were advised.

CRIS vide their letter dt.27.04.18 have released revised conversion on specification of tags.

It is to advise that the revised version of specification of tags may be circulated amongst of agencies involved in fitment of RFID on wagons.

DA: *a/a*


(AJAY NANDAN)
Exec. Director Mech. Engg. (Fr)
Railway Board

Copy to:

EDME/Dev
CAO/COFMOW }
}

for kind information & necessary action



रेलवे सूचना प्रणाली केन्द्र

(रेल मंत्रालय भारत सरकार का संगठन)

CRIS

CENTRE FOR RAILWAY INFORMATION SYSTEMS
(An Organisation of the Ministry of Railways, Govt. of India)

No.: 2016/ CRIS/ NDLS-HQ/CC/PROJECT/RFID/ 0225/ Pt-1

27/04/18

EDME/ Fr,
Railway Board,
New Delhi 110001

Sub: Specification of Tags for use for Identification of Vehicles on Indian Railways (V4.0 dated 27/4/18)

Ref: 1) This office's letter of even no. dated 21/4/17 (for specification.)

2) This office's letter of even no. dated 26/4/17 (for draft WTC.)

3) Letter no. 2016/CRIS/NDLS-ITPI/WS-C/PROJECT/RFID/0102/PT-1 dated 20/7/17 for pvt wagons

1 Fitment of RFID tags was started by CRIS on 1/7/17 with newly manufactured wagons. The associated specification was issued by CRIS vide ref 1) above.

2 Vide reference 2) above a draft format for WTC was proposed by CRIS for expediting the fitment process for newly manufactured wagons. By default, since one year has passed it is no longer applicable and *the associated letter (ref 2 above) consequently stands withdrawn*. In its place a proper vendor approval and testing regime is absolutely critical and the same has been incorporated into the specification.

3 Over the last one year or so, several vendors have approached CRIS for manufacture of RFID tags in order to address the larger requirements of RFID tags for the rollout over Indian Railways. This increases the criticality of having a proper vendor approval and standardised testing regime.

4 It was felt that it would be prudent to draw upon the guidelines in use by RDSO for vendor approval and product testing and use them as a basis with suitable modifications as necessary for use by CRIS. As such, procedures (broadly based on RDSO's ISO guidelines for Vendor Approval Process) have been incorporated into the specification clearly delineating the role of CRIS, Tag manufacturers and Inspection Agencies. Massive effort has gone into this area to align these specifications with RDSO practices.

5 CRIS started the process of upgrading the specification last year in April '17. Thereafter, CRIS continued to constantly interact with stakeholders such as RDSO (I&L), tag manufacturers, wagon builders, private wagon owners, STQC/ ERTL etc. Their inputs have

चारणक्यपुरी, नयी दिल्ली-110021

CHANAKYAPURI, NEW DELHI-110021

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been taken and all necessary and relevant changes have been incorporated into this new version of the specification. This full process has taken almost an year with the final letter from STQC being received on 23/4/18.

6 Major changes: These are briefly summarised below:

6.1 A para on the basic parameters of the tag design added akin to the RDSO concept of 'Basic Design'. Most of these items existed in the earlier specification, they have now been collated appropriately.

6.2 A new para has been added detailing all the Specifications and testing modalities. Importantly AAR tests which cannot be done in the country have been replaced by their nearest equivalent IEC standards - which have been confirmed to be practical in India.

6.3 A new para added for Company Code requirement for privately owned wagons. *Letter under ref 3) above now stands withdrawn accordingly.* With this all individual letters on Tag specification have been converged into just one specification.

7 The new revised version (v4,0) of the specification for RFID tags for the Indian Railways is attached for necessary action at your end.

Kumar
27/4/18

CM/ IC/ CRIS
(For GM/ RFID/ CRIS)

Encl: As above in 7 pages

Copy for information without annexure to:

q/c

CAO/ COFMOW: This disposes of COFMOW's letter no COFMOW/IR/M-595 dt 17/4/18.
EDS(W)/RDSO, Manak Nagar, Lucknow; EDME/ Dev, Railway Board, New Delhi

No.: 2016/CRIS/NDLS-ITPI/WS-C/POLICY/RFID/0101/PT-1

Sub: Specification of Tags for use for Identification of Vehicles on Indian Railways (V4,0 dated 27/4/18)

CHANGE LIST (of latest changes):

V4,0:

- Para 1.5 – Elements moved to Para 2 (Design Basis) and Para 3 (Specifications)
- Para 1.6 – Moved to Para 2 (Design Basis)
- Para 2.1 – Moved to Para 3.1 and standard revised to V2 from v1.2
- Para 2.2.1 – Moved to Para 2.1
- Para 2.2.2 – Moved to Para 2.2
- Para 2.3 – Moved to Para 2.6
- Para 2.4 – azimuth angle changed to 90° from 110°
- Para 2.5 – Moved to Para 3.2
- Para 2.6 – Moved to para 3.3 and renamed as 'Tag dimensions'
- Para 2.7 – Revised and moved under para 3.5.1.6
- Para 2.8 – Revised and moved to para 3.4
- Para 2.9 – Moved to para 4.
- Para 2.10 – Moved to para 5.
- Para 2.11 – Moved to para 7.
- New Para 2 created on 'Design basis'. All elements moved in from earlier specification's para as indicated above.
- New Para 3 – Added para on 'Specifications'. Moved in some elements from earlier specification's para as indicated above.
- New Para 6 added on 'Requirement of Country Code for privately owned wagons'.

1 BACKGROUND:

1.1 The tags are for use with ALL types of Rolling Stock of the Indian Railways as well as major assemblies. These shall be an integral part of the Rolling Stock or the assembly itself.

1.2 The tags for vehicles shall be mounted on metal nominally at sole bar level. The base metal can be steel, stainless steel or aluminium as per relevant Indian Railways standards. For assemblies, the location shall be specified for each use case separately.

1.3 The tag specifications shall, in general, be as per GS1 standards and broadly aligned with the 'European Guideline for the Identification of Railway Assets using GS1 Standards'. The basic encoding standard applicable is GIAI-202 of GS1.

1.4 For understanding the data formats for use on the tags please read the latest version of the associated document 'Guidelines for Data onboard RFID Tags of the Indian Railways'.

2 DESIGN BASIS

2.1 Metal mount type of tags.

2.2 Generic: All standards as applicable for use of UHF RFID tags in India are applicable.

2.3 Railway's Working Environment:

2.3.1 The tags will work in conditions of EMI/ RFI since 25kV AC is used in overhead lines on tracks. Also, at the time of maintenance electric welding shall be done close to tags.

2.3.2 Trains run under the most severe climatic conditions. This includes sandstorms, pelting rain, snow, heat, vibrations etc.

2.4 Dynamic Performance: Minimum read rate based on circularly polarised reader antennas with 90° or more azimuth angle at a minimum distance of 1.5m under clear conditions with RSSI of -75 or better at 110 kmph 10 reads

2.5 Data Retention: Tags should be able to retain data for a period of 20 years or more.

2.6 Memory:

2.6.1 EPC memory suitable for GIAI-202 encoding. This area shall be password locked for write only.

2.6.2 User memory of 3 kb or higher. It is expected that the user memory shall be logically split into four functional areas (please read the latest tag data guidelines document in this connection)

2.6.3 Read-Write cycles endurance 100,000 cycles

2.7 Tag Housing: Life of housing material is expected to be 20 years or more.

2.8 Fixing Arrangement:

2.8.1 For Wagons – The tag is expected to be directly attached to the

solebar using non-break stem fasteners to the vehicle body. The fastener will be 1/4th inch (approximately 6.3 mm) in diameter.

2.8.2 For Coaching and Assemblies – Reserved for future use and shall be specified later. For LHB coaches and their derivatives it may be with adhesives.

2.8.3 The tags are to be fitted as per the relevant drawing for that particular vehicle/ assembly.

3 SPECIFICATIONS:

3.1 **Base standard:** EPC Gen2 V2 or higher.

3.2 **Static Performance:** Static performance shall be measured, in principle, as per TIPP- Tagged Item Performance Protocol Testing Methodology R1.0. However, the following variations in test conditions would apply:

3.2.1 Tag shall be tested while mounted centrally using non-break stem fasteners on a IS-2062 plate with a size of 300 mm x 100 mm with 8 mm thickness, i.e., similar to actual working conditions.

3.2.2 Tag shall be kept on the test platform with the backing plate vertical, i.e., similar to condition of actual operation.

3.2.3 The measuring equipment shall run parallel to the tag backing plate at a distance of 1.5m in a manner similar to the usage in the Railways. The orientation of the tag relative the measuring equipment shall not be changed during the test

3.2.4 Measurements would be limited to elevation angles of 0° and 30° only (antenna 1 and 2 positions).

3.2.5 Platform orientation shall be limited to azimuth angles of 0° and 60°.

3.2.6 Commonly, the worst case scenario could be 60° azimuth and 30° elevation.

3.2.7 Accordingly, Sensitivity should be as under:

3.2.7.1 The best case sensitivity should be equal or better than –17 dBm

3.2.7.2 The worst case values should be more than – 25.5 dBm, i.e., the variation between the worst case and the best case should 50% or less, keeping in mind that the scale is negative.

3.3 **Tag Dimensions:** The geometrical envelope should be within those indicated in the attached diagram.

3.4 **Tag Housing:** The material of the housing should be such that it does not have a permanent set exceeding 0.5 mm at the boss when clamped with a force of 18kN.

3.5 Tests & Verification: The equipment shall be tested for functional capability, ability to withstand environmental conditions and for reliable performance under simulated field conditions as set forth below:

3.5.1 Type tests: These tests shall be done on a sampled lot of RFID tags. Such tests are required if any of the below criterion applies:

- 3.5.1.1 First approval of the tag manufacturer,
- 3.5.1.2 Change of this specification,
- 3.5.1.3 Change by manufacturer of his design and
- 3.5.1.4 Change by manufacturer of his manufacturing processes.

3.5.1.5 The manufacturer will be required to submit 8 (eight) prototypes to CRIS out of which one pair will randomly selected for type testing. At the actual time of testing one out of the pair shall be randomly chosen for the actual test and the other retained as control sample.

3.5.1.6 Tags shall be subjected to the following tests:

S/n	Parameter	Standard	Test Detail
1	Visual inspection	None	Visual inspection shall be carried out on all samples to ensure that there is no major damage
2	Dimensions of RFID Tags	As per para 3.3 of this document.	—
3	Marking	As per para 4 of this document.	—
4	Static Performance	As per para 3.2 of this document.	—
5	Shock test	AAR S-5702	As per clause no. 3.2.4.3.3
6	Spillage of liquid on housing of Tags	MIL-STD-810G Method 504.1 procedure II (clause 2.2 b)	Only with the following in Table 504.1-II: 1. Petrol [Gasoline, commercial] 2. Simulated sea water 3. Other Solvents (Isopropyl alcohol (2-propanol), acetone, etc)
7	Ingress Protection	IEC 60529	IP66
8	Impact protection	IEC 62262	IK10
9	Cold Test	IEC 60571	At -20°C for 16 hours as per clause 12.2.15
10	Dry heat Test	IEC 60571	70°C for 16 hours as per clause 12.2.5
11	Damp heat test, cyclic	IEC 60571	—
12	Salt mist test	IEC 60571	Class ST4
13	Vibration Tests (Simulated Long Life Testing)	IEC 60571	As per Category 2 of clause 9 in the connected specification IEC 61373

3.5.1.6.1 Tests from 1 to 5 above are to be carried out by a reputed agency having required facilities to carry out the same.

3.5.1.6.2 Remaining tests are to be carried out by a reputed agency certified to carry out the same.

3.5.2 Routine tests: Routine tests shall be conducted by the tag manufacturer as per their quality assurance plan(QAP)during manufacturing and records maintained for inspection by CRIS or by an agency so nominated by CRIS. The QAP itself shall require prior approval from CRIS. These tests are required to verify that the product is manufactured to the required quality standards set by the OEM themselves.

3.5.3 Acceptance tests: These tests shall be done by an agency so nominated by CRIS, based on sampling plan given below for regular supply. The acceptance test shall include:

3.5.3.1 Verification of type test reports, routine test conducted at manufacturer's premises.

3.5.3.2 Functional tests of the equipment as per item 1 to 3 from para 2.9.3.1.5 above.

3.5.3.3 Multiple write followed by read test. At least 10 full cycles to be carried out in immediate succession. One set at 0° and another set at 45° azimuth. No errors should be found in either a write operation or in a read after a write.

3.5.3.3.1 This test is to be done using portable readers. For each model of portable reader, CRIS shall indicate the distance from which the test is to be carried out – this information is model specific and as such cannot be given generically.

3.5.4 Sampling plan for Routine & Acceptance tests: Sampling shall be done as detailed below:

Manufacturing Batch size	Sample size
0-250	5
251-1000	10
1001-5000	15
more than 5000	20

3.5.4.1 Manufacturing batch here refers to the tags manufactured from a single combination of raw materials, i.e., a change in any of the raw materials used for tag manufacture shall imply a separate manufacturing batch.

4 Tag marking:

4.1 To be done at the back of the tag such that it is easily readable and is not obscured/ rubbed out over time due to vibration etc.

4.2 It should be moulded in raised letters as per tag drawing and indicate at the very least:

4.2.1 Manufacturer's identification mark.

4.2.2 Year (YY) and month (MM) of manufacture

4.2.3 Manufacturing Batch

4.2.4 Packaging Lot (optional)

4.3 QA/ QC marking of the manufacturer in the form of a Non-removable Holographic sticker on each tag.

5 Packaging of Tags:

5.1 10 tags to be kept in One package, each tag to be temporarily numbered individually using permanent marker/ sticker or equivalent. Such 10 tags to be kept in a suitable cardboard box or plastic pouch.

5.2 Each box should contain a list of TIDs of the enclosed tags with space in front of each TID so that it is possible to record wagon id where the tag was installed.

5.3 Each package, whether secondary or tertiary should have an associated Datamatrix or barcode on it with the corresponding HRI available on the package to identify the same. These should be as per the relevant GS1 standards.

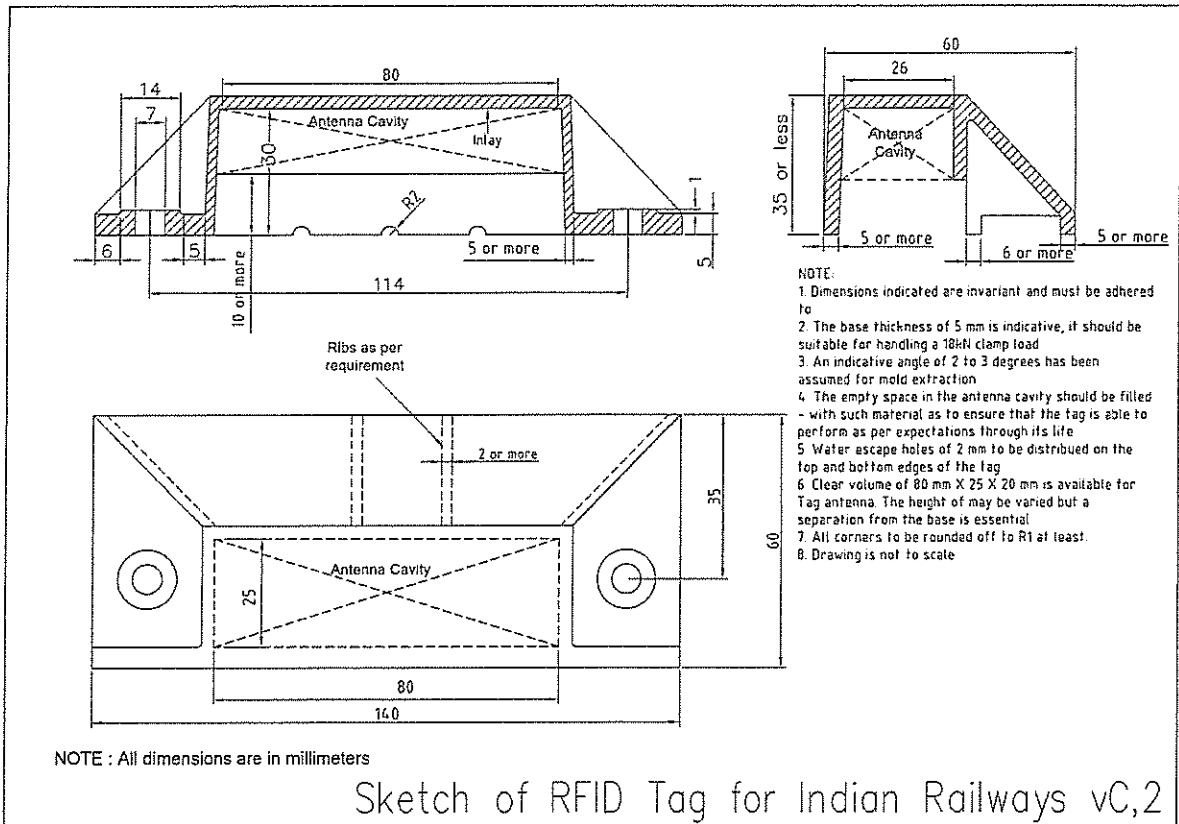
5.4 Damage protection during transit to be ensured

5.5 Holographic seal on each tag and package from the manufacturer to indicate their original nature.

6 Requirement of Country Code for privately owned wagons: All RFID tags fitted on vehicles running over the Indian Railways need to necessarily identify the owner of the vehicle as per the relevant international standards. As such, for privately owned wagons in India, their owning companies need to get a Company Code from GS1 India.

7 Warranty: Each tag shall be warrantied for two years from the date of fitment, i.e., the date when the tag has valid data written into it for the first time and this data is available for monitoring.

Schematic drawing for Tag



- NOTE:
1. Dimensions indicated are invariant and must be adhered to
 2. The base thickness of 5 mm is indicative, it should be suitable for handling a 18kN clamp load
 3. An indicative angle of 2 to 3 degrees has been assumed for mold extraction
 4. The empty space in the antenna cavity should be filled - with such material as to ensure that the tag is able to perform as per expectations through its life
 5. Water escape holes of 2 mm to be distributed on the top and bottom edges of the tag
 6. Clear volume of 80 mm X 25 X 20 mm is available for Tag antenna. The height of may be varied but a separation from the base is essential
 7. All corners to be rounded off to R1 at least.
 8. Drawing is not to scale

CENTRE FOR RAILWAY INFORMATION SYSTEMS
CHANKYAPURI, NEW DELHI 110021

No.: 2016/ CRIS/ NDLS-HQ/CC/PROJECT/RFID/ 0225/ Pt-1

21/04/17

✓ ~~EDME/~~ Fr,
Railway Board,
New Delhi 110001

~~MC/~~Please find with
no reply
↓SRL
25/4/17

Sub: Specification of Tags for use for Identification of Vehicles on Indian Railways
(V3.1 dated 21/4/17)

Ref: 1) This office's letter of even no. dated 17/1/17
2) This office's letter of even no. dated 21/9/16

1 The use of RFID tags is now entering the rollout stage for wagons. At the same time, for coaching use, the same RFID tags are in advanced stages of fixation trials on the Gateman Express. As the use of RFID tags is now expanding there are new use cases and aspects coming into light.

2 As a part of the constant interaction that CRIS does with stakeholders some requests/ issues had been raised with CRIS about the specification issued vide 1) above. These requests have been gone through and the following changes incorporated into the specification:

2.1 The scope of the specification has been expanded from pure Wagons to also cover Coaching as well as major assemblies.

2.2 Fixing arrangements updated in line with RDSO's directives on non-break stem fasteners for use on wagons. Clauses for other fixation use cases have also been indicated.

2.3 All para relating to data onboard tags, that had been given for information, have been removed and incorporated into a separate document "Guidelines for Data onboard RFID Tags of the Indian Railways". This would allow the data standards to evolve independently of the Tag standards.

2.4 Some minor para re-positioning done to correctly explain the application of the affected para.

2.5 Testing clauses updated to reflect the change in tag design issued vide ref 2 above, as well as the fact that reader antenna now being kept at 1.5 m from Vehicle side vs 3m earlier.

RL

2.6 Warranty clause added.

2.7 Tag marking has been simplified in acknowledgement of the fact that each tag is already uniquely identified and a lot of data is available per tag in any case.

3 A copy of the updated specification is enclosed for information and necessary action.


GM/ CRIS/ RFID 21/5/17

Encl: As above in 5 pages

Copy for information and necessary action to:

EDME/ Dev; EDME/ Chg; EDEE/RS - Railway Board, New Delhi
EDS(W); EDS(Chg) - RDSO, Manak Nagar, Lucknow

No.: 2016/ CRIS/ NDLS-ITPI/ WS-C/ POLICY/ RFID/ 0101/ PT-1

Sub: Draft Specification of Tags for use for Identification of Vehicles on Indian Railways (V3,1 dated 21/04/17)

1 BACKGROUND:

1.1 The tags are for use with ALL types of Rolling Stock of the Indian Railways as well as major assemblies. These shall be an integral part of the Rolling Stock or the assembly itself.

1.2 The tags for vehicles shall be mounted nominally at sole bar level. The base metal can be steel, stainless steel or aluminium as per relevant Indian Railways standards. For assemblies, the location shall be specified for each use case separately.

1.3 The tag specifications shall, in general, be as per GS1 standards and broadly aligned with the 'European Guideline for the Identification of Railway Assets using GS1 Standards'. The basic encoding standard applicable is GIAI-202 of GS1.

1.4 For understanding the data formats for use on the tags please read the associated document 'Guidelines for Data onboard RFID Tags of the Indian Railways'.

1.5 Railway's Working Environment:

1.5.1 The tags will work in conditions of EMI/ RFI since 25kV AC is used in overhead lines on tracks. Also, at the time of maintenance electric welding shall be done close to tags.

1.5.2 Trains run under the most severe climatic conditions. This includes sandstorms, pelting rain, snow, heat, vibrations etc.

1.5.3 Tags should be resistant to spillage of bulk commodities carried and/or used by the Railways:

1.5.3.1 Motor Oil

1.5.3.2 Sulphuric Acid (10%, pH 2)

1.5.3.3 Sodium Hydroxide (10%, pH 13)

1.5.3.4 Generally good against Methanol (moderate concentration), glycerine, ethylene glycol etc.

1.6 Fixing Arrangement:

1.6.1 For Wagons – The tag is expected to be directly attached to the solebar using non-break stem fasteners (similar to small diameter huck-bolt) to the vehicle body. The fastener will be 1/4th inch (approximately 6.3 mm) in diameter.

1.6.2 For Coaching and Assemblies – Reserved for future use and shall be specified later. For LHB coaches and their it may be with adhesives.

1.6.3 The tags are to be fitted as per the relevant drawing for that particular vehicle/ assembly.

2 SPECIFICATIONS:

2.1 **Base standard:** EPC Gen2 V1.2 or higher.

2.2 **Generic:**

2.2.1 Metal mount type of tags.

2.2.2 All standards as applicable for use of UHF RFID tags in India are applicable.

2.3 **Memory:**

2.3.1 **EPC memory** suitable for GIAI-202 encoding. This area shall be password locked for write only.

2.3.2 **Data Retention:** Tags should be able to retain data for a period of 20 years or more.

2.3.3 **User memory** of 3 kb or higher. It is expected that the user memory shall be logically split into four functional areas (please read the tag data guidelines document in this connection)

2.3.4 **Read-Write cycles endurance** 100,000 cycles

2.4 **Dynamic Performance:** Minimum read rate based on circularly polarised reader antennas with 110° or more azimuth angle at a minimum distance of 1.5m under clear conditions with RSSI of –75 or better at 110 kmph 10 reads

2.5 **Static Performance:** Static performance shall be measured, in principle, as per

TIPP- Tagged Item Performance Protocol Testing Methodology R1.0. However, the following variations in test conditions would apply:

2.5.1 Tag shall be tested while mounted centrally using non-break stem fasteners on a IS-2062 plate with a size of 300 mm x 100 mm with 8 mm thickness, i.e., similar to actual working conditions.

2.5.2 Tag shall be kept on the test platform with the backing plate vertical, i.e., similar to condition of actual operation.

2.5.3 The measuring equipment shall run parallel to the tag backing plate at a distance of 1.5m in a manner similar to the usage in the Railways. The orientation of the tag relative the measuring equipment shall not be changed during the test

2.5.4 Measurements would be limited to elevation angles of 0° and 30° only (antenna 1 and 2 positions).

2.5.5 Platform orientation shall be limited to azimuth angles of 0° and 60°.

2.5.6 Commonly, the worst case scenario could be 60° azimuth and 30° elevation.

2.5.7 Accordingly, Sensitivity should be as under:

2.5.7.1 The best case sensitivity should be equal or better than -17 dBm

2.5.7.2 The worst case values should be more than -25.5 dBm, i.e., the variation between the worst case and the best case should 50% or less, keeping in mind that the scale is negative.

2.6 **Size:** The geometrical envelope should be within those indicated in the attached diagram.

2.7 **Environmental standards:** AAR S-5702 for Vehicle Exterior Body Mounted shall be applicable with the following changes:

2.7.1 Operating Maximum Temperature +70°C

2.7.2 Mechanical Shock Shipping 36-in drop

2.7.3 Abrasive Tests only Salt Fog and Blowing Sand

2.8 Tag Housing:

2.8.1 IP66

2.8.2 Life of housing material should be 20 years or more

2.9 Tag marking:

2.9.1 To be done at the back of the tag such that it is easily readable and is not obscured/ rubbed out over time due to vibration etc.

2.9.2 It should be moulded in raised letters as per tag drawing and indicate at the very least:

2.9.2.1 Manufacturer's identification mark.

2.9.2.2 Year (YY) and month (MM) of manufacture

2.9.2.3 Batch & Lot of packaging (optional)

2.9.3 QA/QC marking of the manufacturer in the form of a Non-removable Holographic sticker on each tag.

2.10 Packaging of Tags:

2.10.1 10 tags to be kept in One package, each tag to be temporarily numbered individually using permanent marker/ sticker or equivalent. Such 10 tags to be kept in a suitable cardboard box or plastic pouch.

2.10.2 Each box should contain a list of TIDs of the enclosed tags with space in front of each TID so that it is possible to record wagon id where the tag was installed.

2.10.3 Each package, whether secondary or tertiary should have an associated Datamatrix or barcode on it with the corresponding HRI available on the package to identify the same. These should be as per the relevant GS1 standards.

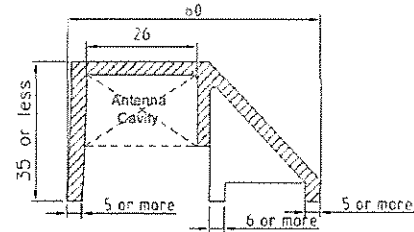
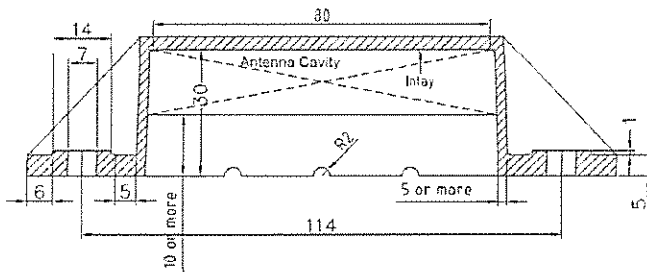
2.10.4 Damage protection during transit to be ensured

2.10.5 Holographic seal on each tag and package from the manufacturer to indicate their original nature.

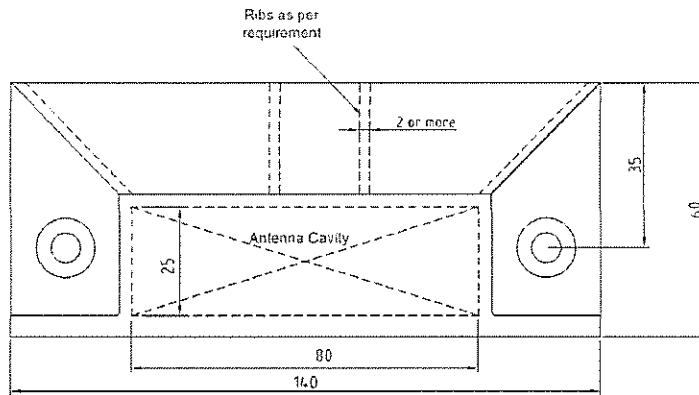
2.11 **Warranty:** Each tag shall be warrantied for two years from the date of fitment, i.e., the date when the tag has valid data written into it for the first time and this data is available for monitoring.

– X –

Schematic drawing for Tag



- NOTE**
1. Dimensions indicated are invariant and must be adhered to
 2. The base thickness of 5 mm is indicative. It should be suitable for handling a 12kN clamp load
 3. An indicative angle of 2 to 3 degrees has been assumed for mold extraction
 4. The empty space in the antenna cavity should be filled - with such material as to ensure that the tag is able to perform as per expectations through its life
 5. Water escape holes of 2 mm to be distributed on the top and bottom edges of the tag
 6. Clear volume of 80 mm X 25 X 20 mm is available for Tag antenna. The height of may be varied but a separation from the base is essential
 7. All corners to be rounded off to R1 at least
 8. Drawing is not to scale



NOTE : All dimensions are in millimeters

Sketch of RFID Tag for Indian Railways vC,2

S No. 6

CENTRE FOR RAILWAY INFORMATION SYSTEMS
CHANKYAPURI, NEW DELHI 110021

No.: 2016/ CRIS/ NDLS-HQ/CC/PROJECT/RFID/ 0225/ Pt-1

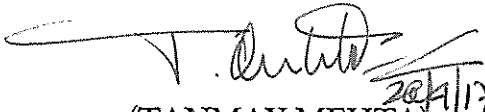
26/04/17

✓ EDME/ Fr,
Railway Board,
New Delhi 110001

FR-64

Sub: Standardised Work Test Certificate (WTC) format for RFID Tags

- 1 The issue about a standardised WTC format for use in the interaction between wagon manufacturer and Tag manufacturer was raised with CRIS. Inputs were taken from PUs etc.
- 2 Accordingly a draft WTC format for RFID Tags being procured by wagon manufacturer's from Tag manufacturer's is enclosed.
- 3 For necessary action.


(TANMAY MEHTA)
GM/ CRIS/ RFID

Encl: As above in one page

Copy for information and necessary action to:

EDS(W), RDSO, Manak Nagar, Lucknow

Copy for information to:

EDME/ Dev - Railway Board, New Delhi

WORK TEST CERTIFICATE
<On the letterhead of the manufacturer>

- 1 Manufacturer's Ref No. For this document:
- 2 Purchaser's Ref No and Date:
- 3 Part Description:
- 4 Despatch particulars:
- 5 Specification Reference (including it's Version no):
- 6 Quantity:
 - 6.1 Ordered:
 - 6.2 Inspected:
 - 6.3 Balance Quantity (if any):
- 7 Address of Manufacturing Unit:
- 8 Manufacturer's identification:
 - 8.1 On the Package(s):
 - 8.2 List of Tag TID(s):
- 9 **Certificate:**
 - 9.1 The material identified above has been manufactured, processed and tested in accordance with the requirements for RFID Tags as indicated by the competent authority and conforms to the requirements thereof.
 - 9.2 All the relevant records as well as other technical information will be retained for a minimum period of three years.
 - 9.3 All the material has been packed and marked in compliance with the specifications indicated in the contract.
- 10 We guarantee to replace at the destination any Tag where the Tag does not function as per requirements in line with the specifications indicated in the contract.

Authorised Signatory
(Name & Designation w/ Supplier's Stamp)