



सत्यमेव जयते

**Government of India
Ministry of Railways**

Telecom Directorate

Schedule of Technical Requirement (STR)

For

LED Based Display Systems

Research Designs and Standards Organisation
Manak Nagar, Lucknow – 226011

DOCUMENT CONTROL SHEET

NAME	ORGANIZATION	FUNCTION	LEVEL
Joint Director/ Telecom-IV	RDSO	Member	Prepare
Executive Director/ Telecom	RDSO	-	Approve

REVISIONS

Version	Chapter/ Annexure	Revision	Effective Month/Year
STR for LED Based Display Systems	-	FIRST ISSUE	October 2006
	All pages	Revision 1.0	August 2009
	All pages	Revision 2.0	August 2019

I. SCOPE:

The Schedule of Technical Requirement (STR) covers Machinery & Plants, Testing & Measuring equipments and Quality Assurance Plan required for manufacturing of following items as per RDSO specification.

S.N.	Description of Item	Specification No.
1.	Integrated Passenger Information System consisting of Train Indication, Coach Guidance and PC based Announcement System	RDSO/SPN/TC/61/2015 Revision 4.0 or latest
2.	Digital Clock with GPS Synchronisation	RDSO/SPN/TC/62/2008 Revision 3.0 or latest
3.	True Colour Video-cum-Train Information Display System	RDSO/SPN/TC/67/2013 Revision 3.0 or latest

Vendor shall also comply norms issued by RDSO time to time in this connection and other relevant laws of the country.

This STR shall be applicable to all vendors applying for registration.

II. ESSENTIAL MACHINERY AND PLANTS REQUIRED FOR PRODUCTION:

Sr. No.	Requirement of Machinery & Plants		Details of Machinery & Plants available with the Vendor						Calibration Details
	Description	Qty. Required	Qty. Available	Model	Make	Machine No.	Year of Built	Range/capacity	Due Date of Calibration
1.	One integrated Hot & Cold Chamber or Two separate (one Hot & one Cold) chamber	1 No.							
2.	Computer Aided Design System with Workstation/ Desktop PC (for designing of mechanical structures)	1 No.							
3.	Microcomputer Based Development Workstation/ Desktop PC for Hardware & Software (Workstation should be used for PCB design and for writing, compilation & generating executable/binary/hex files of code.)	1 No.							
4.	Programmer cum Eraser (Programmer cum Eraser as required for embedded software)	1 No.							
5.	Temperature Controlled Soldering/ De-soldering Stations (for soldering and de-soldering components at required temperature)	2 Nos.							
6.	Dust free environment for manufacturing/assembly	1 No.							

Sr. No.	Requirement of Machinery & Plants		Details of Machinery & Plants available with the Vendor						Calibration Details
	Description	Qty. Required	Qty. Available	Model	Make	Machine No.	Year of Built	Range/capacity	Due Date of Calibration
7.	Re-Flow Solder Line consisting of i) Automatic/ Semiautomatic Integrated Soldering Machine ii). Aqueous Cleaner for Automatic/ Manual Cleaning and Degreasing (To be indicated in QAP, if outsourced)	1 No.							
8.	Component Forming Machine (for formation of components with leads) (To be indicated in QAP, if outsourced)	1 No.							
9.	PCB Populating Machine (for placing SMD components) (To be indicated in QAP, if outsourced)	1 No.							
10.	Powder coating plant (for powder coating of cabinet of display and CDC rack) (To be indicated in QAP, if outsourced)	1 No.							
11.	Power cycling equipment	1 No.							

III. ESSENTIAL TESTING & MEASURING EQUIPMENTS REQUIRED FOR QUALITY ASSURANCE:

Sr. No.	Requirement of Essential Testing Equipments		Details of Testing & Measuring Equipments available with the Vendor						Calibration Details
	Description	Qty. Required	Qty. Available	Model	Make	Machine No.	Year of Built	Range/capacity	Due Date of Calibration
1.	Pentium IV or latest PC system with serial communication facility (for general usage)	1 No.							
2.	Storage Dual Beam Oscilloscope of 20 MHz or above bandwidth (for measuring noise levels, duty cycles in multiplexing, voltage, frequency etc.)	1 No.							
3.	Digital Multimeter minimum 4 digits display with facility of diode & transistor testing.	1 No.							
4.	True R.M.S Digital Multimeter minimum 4 ½ digits with facility for frequency measurement (for measuring voltage, current, resistance, frequency etc.)	1 No.							
5.	Minimum 500 Volts Mega ohm Meter (for conducting insulation resistance test)	1 No.							
6.	AC High Voltage Tester (for conducting high voltage test)	1 No.							
7.	LCR Meter (for measuring inductance, capacitance and resistance of components)	1 No.							
8.	IC Tester (for testing of IC's)	1 No.							
9.	1 Ø Variac range of 0 to 300 Volts having adequate power handling	1 No.							

Sr. No.	Requirement of Essential Testing Equipments		Details of Testing & Measuring Equipments available with the Vendor						Calibration Details
	Description	Qty. Required	Qty. Available	Model	Make	Machine No.	Year of Built	Range/capacity	Due Date of Calibration
	capacity (for testing the operating voltage range of display systems)								
10.	Chromameter/ Spectrometer (for measuring luminous intensity, wave length or color co-ordinates of LED's)	1 No.							
11.	Illumination Test Fixture (for measuring intensity of light emitted by LED's)	1 No.							
12.	Dispersion Angle Fixture (for measuring viewing angle of LED's)	1 No.							
13.	Resistive load (for conducting load tests)	1 No.							
14.	Analog/ Digital Vernier Calliper	1 No.							
15.	Screw Gauge/ Digital Micrometer	1 No.							
16.	Steel Scale/ Measuring tape	1 No.							
17.	Bench Vice	1 No.							
18.	Drill Machine	1 No.							
19.	Electro-Static Discharge Protected Work Bench (to protect IC's and other components from ESD effect)	1 No.							
20.	Dark Enclosure for measurement of illumination, chromaticity & dispersion angle of LED's.	1 No.							
21.	Computerised Test Setup with relevant software (for testing sub	1 No.							

Sr. No.	Requirement of Essential Testing Equipments		Details of Testing & Measuring Equipments available with the Vendor						Calibration Details
	Description	Qty. Required	Qty. Available	Model	Make	Machine No.	Year of Built	Range/capacity	Due Date of Calibration
	assembles modules of display system)								
22.	Test Jigs and Fixtures (for testing sub assemblies)	1 No.							
23.	Test setup for verification of communication parameters/ protocol between different equipments.	1 No.							

Note:-

1. Plant & Machinery and Testing & Measuring equipments shall be of adequate capacity & range to manufacture & test the product as per RDSO specification & drawings.
2. Manufacturer shall submit a dully notarized undertaking for ownership of Plant & Machinery and Testing & Measuring Equipments.
3. Outsourcing of processes mentioned at Sr. No.7, 8, 9 & 10 of Clause II shall be from ISO 9001 certified firm.
4. Recommended technical requirements of Chromameter/ Spectrometer suitable for measurement of LED's used in Display Systems are mentioned in Clause IV.
5. Checks and tests shown in Quality Assurance Flow Chart (Clause V) are only indicative. All necessary checks & tests as necessary to ensure quality shall be carried out at every stage of manufacturing and proper record of all checks & tests shall be maintained.

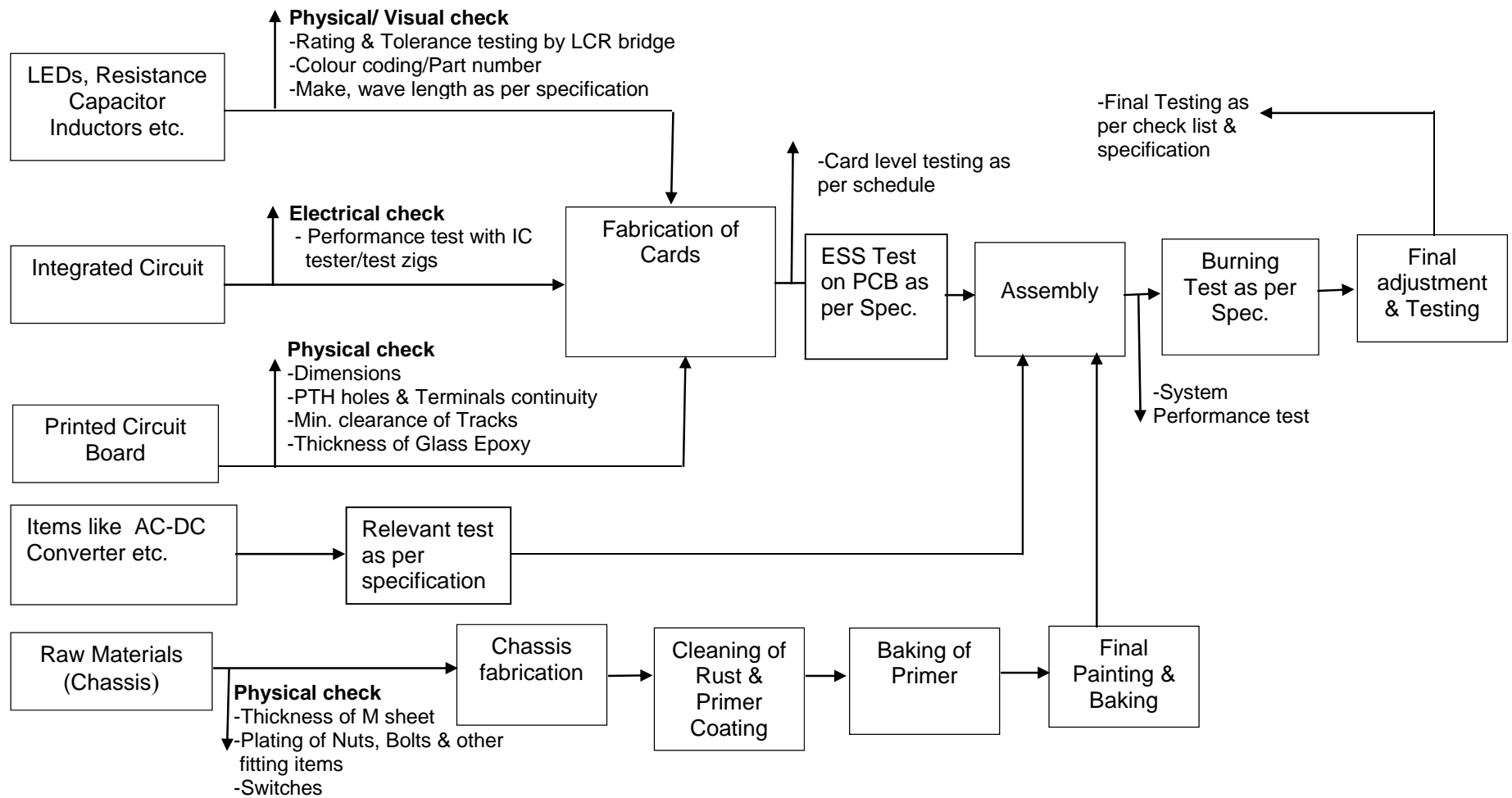
IV. Recommended technical requirements of Chromameter/ Spectrometer suitable for measurement of LED parameters used in Display Systems:

1. Chromameter/Spectrometer should be capable of following measurements of LED:
 - (a). Luminous intensity / Illuminance.
 - (b). Colour co-ordinates/Wave length.

2. Minimum measurement ranges and measurement accuracy of Chromameter/Spectrometer should be as given below:
 - (a). Luminous intensity: 0.4mcd to 4cd./ Illuminance: 0.1 to 44 LUX.
 - (b). Measurement accuracy for Luminous intensity/ Illuminance : +/- 7 % or better.
 - (c). Wave length: 450 nm to 650 nm. (Wave length can be calculated from color co-ordinates.)
 - (d). Measurement accuracy for wave length: +/- 0.5 nm or better.
 - (e). Measurement accuracy for chromaticity (x, y): +/- 0.005 or better.

3. Equipment and accessories should be duly calibrated and calibration certificate with proper traceability to a national calibration laboratory like PTB (German Calibration Service) or NIST (US National Institute of Standards & Technology) or JCSS (Japan Calibration Service System) or NPL New Delhi shall be submitted along with the equipment.

V. Quality Assurance Flow Chart for LED Based Display Systems:



UNDERTAKING OF THE FIRM

“I hereby give an undertaking that at any time after approval is accorded, some machinery is found deficient without intimation to RDSO, and then it will be presumed that machinery was not there since beginning and firm will be withdrawn immediately.”

Date:

Signature

Name in capitals & Designation

Place:

Stamp of the firm

Note:

1. Details of Machinery & Plants and Testing & Measuring Equipments should be furnished by the vendor in complete as per format of STR. Vendor should also furnish the details of the ownership.
2. It should be mandatory to inform the RDSO through Fax (followed by confirmation copy through courier /speed post) as soon as any machinery is removed from the firm's premises (even for repair etc.) RDSO should be informed again, when is brought back and made operational.
