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Government of India
(Ministry of Railways)

S&T Directorate

Schedule of Technical Requirement (STR)

For

Electronic Signalling Equipments
SIQ 0001 (Ver. 2.1)

Research Designs and standards Organisation
Manak Nagar, Lucknow – 226011

09 Feb 2023

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STR FOR ELECTRONIC SIGNALLING EQUIPMENTS

LIST OF SPECIFICATIONS FOR VARIOUS TYPE OF ELECTRONIC SIGNALLING EQUIPMENT:

Sl. No.	ITEM DESCRIPTION	SPECIFICATION NO.
1.	ELECTRONIC (SOLID STATE INTERLOCKING) INTERLOCKING	1.RDSO/SPN/192/2019 or latest 2. RDSO/SPN/203/2011 or latest
2.	DATA LOGGER	IRS:S 99/2006 With amdt. III or latest
3.	AXLE COUNTER –UNIVERSAL TYPE	IRS:S 42/85 & DRG. No. S-15602-04 or latest
4.	BLOCK PROVING BY AXLE COUNTER (UNIVERSAL)	DRG. No. S-32001 or latest
5.	UNIVERSAL FAIL SAFE BLOCK INTERFACE	IRS :S 104/2012 or latest
6.	SINGLE SECTION DIGITAL AXLE COUNTER (SSDAC)	RDSO/SPN/177/2012 ver. 3 or latest
7.	MULTI SECTION DIGITAL AXLE COUNTER (MSDAC)	RDSO/SPN/176/2013 ver. 3 or latest
8.	AUDIO FREQUENCY TRACK CIRCUIT	RDSO/SPN/146/2001 or latest
9.	BLOCK PANEL WITH UFSBI / MUX AND DIGITAL AXLE COUNTER	IRS:S 105/2012 ver. 0 or latest
10.	BLOCK PROVING BY AXLE COUNTER (DIGITAL)	RDSO/S-32012 for Double Line or latest RDSO/S-32016 for Single Line or latest
11.	SOLID STATE BLOCK PROVING BY AXLE COUNTER (DIGITAL)	RDSO/SPN/175/2005 ver. 1 or latest

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12 .	Train Protection and warning system (TPWS)	RDSO/SPN/183/2016 rev 3.0 or latest
13.	Train Collision Avoidance System (TCAS)	RDSO/SPN/196/2020 Version-4 or latest
14	Advance Auxiliary Warning System (AAWS)	RDSO/SPN/213/2014 version 1.0 (Draft)
15	Failsafe network Multiplexer (FNmux)	RDSO/SPN/211/2022 version 1.0 or latest

ELECTRONIC SIGNALLING EQUIPMENTS: viz. Axle Counter, Data Logger, Electronic Interlocking (EI) Train Protection and warning system (TPWS), Train Collision Avoidance System (TCAS), Advanced Auxiliary Warning System (AAWS), Failsafe Network Multiplexer (FNmux) etc.

I. ESSENTIAL MACHINERY AND PLANTS REQUIRED FOR PRODUCTION:

1. Hot & cold climate chambers for temperature cycling
2. Burn-in chamber
3. Computer aided design system with workstations
4. Microcomputer based development workstations for hardware & software.
5. Flash Programmer or “ROM Programmer & UV Eraser (programmer & eraser as required for embedded software)”.
6. Temperature controlled manual soldering machine
7. Flow solder line consisting of (To be indicated in QAP, if outsourced)
 - Automatic Integrated soldering machine
 - Aqueous cleaner for automatic cleaning and degreasing
8. Video microscopic inspection equipment with minimum magnification of 32X particularly for EI, TPWS, TCAS, SSDAC, MSDAC, SSBPAC, AAWS, AFTC & FNmux.
9. Component forming machine (To be indicated in QAP, if outsourced).
10. PCB manufacturing & populating machine (To be indicated in QAP, if outsourced).
11. Suitable chamber for thermal cycling tests under Environmental Stress Screening (ESS) for PCB and sub system. (For TCAS only Specific directorate Head approval required for relaxation)

II. ESSENTIAL TESTING EQUIPMENTS REQUIRED FOR QUALITY ASSURANCE:

1. Latest PC system with requisite peripheral communication facility.
2. Storage dual beam/channel/trace oscilloscope of 20 MHz or above bandwidth.
3. True R.M.S digital multimeter – 4 digits display with facility of diode & transistor testing.
4. True R.M.S digital multimeter- 4 ½ digits suitable upto 50 KHz, high accuracy or better
5. Function generator.
6. Frequency counter 10 MHz.

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7. Variable DC power supply (+5V, +12V, 24V, 0-48V, 0-110V for EI & FNmux, 0-143V (min) for TCAS, 0- 130V for data logger) (of suitable current capacity as required).
8. Digital IC tester.
9. Operating cum indication panel and video display unit for control and operation of RDSO's standard layout for Electronic Interlocking (EI)&TCAS.
10. Million Megaohm meter (500V).
11. D.C. high voltage tester (0-5KV).
12. Digital LCRQ meter.
13. Variac (0 to 260VAC, of adequate power handling capacity).
14. Relay Test jig capable of supporting a min. of 100 miniature (OEN type or similar, operating at 24V) relays for EI , TCAS & FNmux .
15. Computerized test set up with relevant software.
16. Specialized test stations for testing electronic sub-assemblies/PCBs.
17. Train simulator apparatus (for axle counters).
18. Test jigs and fixtures.
19. Circuit measuring apparatus.
20. New and Worn out Rails (As per SOD) of section 52Kg, 60Kg, 90lb each of at least 5 meter length (for axle counter).
21. Track simulator (for AFTC).
22. Dummy wheel (for axle counter).
23. 01 axle each with 4 spokes trolley wheels (for axle counter).
24. 01 axle with material trolley wheels (for axle counter).
25. Rail dolly wheel, dip lorry wheel, motor trolley wheel (for axle counter).
26. Test setup for measurements of communication parameters/protocol between different equipments.
27. Computerized simulator setup for testing functionality of the system (for TPWS / TCAS / AAWS)
28. Printer
29. Fibre Optic loss insertion and measurement kit (where OFC is used).

Note : Every proposal for outsourcing of any activity/process shall be with following conditions:

- (a) Outsourcing can be done only from ISO 9001 certified firm.
- (b) Every such proposal shall be got approved by RDSO.

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2.1Quality Assurance flow chart for Electronic Signalling Equipments