


File Ref:	<b>Infrastructure Telecommunication – Standard Specifications</b>	
Approve Date: 20/06/2022	<b>Specification and Schedule of quantities</b>	
Title:	<b>Supply and Delivery of Train and trunk radio system</b>	


Train radios play a vital role in the daily operations within the railway environment. The train radio (including the train handset) has a direct effect on the daily running of trains. According to railway safety regulations, a train driver may not start a journey without a direct means to communicate from the train to the central control and the relevant operations departments and groups. As such the train radio with train handsets provides such a means of communication

## **TRAIN RADIO**

The trunk radio shall be fully compliant with MPT1327 signalling to be compatible and programmable on the TFR radio network. radio must comply with the approved TFR trunking mode and conventional monde radio list

It shall be of a rugged and robust design such as to withstand the harsh railway environment. It shall have the following features:

- Multi-Network Capability
- Multi Registration Capability
- Common and Inter Fleet Calls
- Individual and Group Calls
- Access to Telephone Network PABX/PSTN Dialing
- Status Message Calls
- Priority Calls
- Emergency Calls
- Driver/Guard and TCO Calls
- Data Calls (Short data on the control channel and long data on the traffic channel)
- Last number redials
- User-Controlled Incoming Call Stacking
- 10 Programmable Memory Locations
- Test Mode

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The technical specification of the train radio must be compatible or similar and equivalent in design to the existing train radio that is currently used by PRASA RAIL.

### 13. GENERAL TRAIN RADIO SPECIFICATION

#### Key Features

- Large LCD display – four lines of alphanumeric text
- Six programmable function keys and an alphanumeric keypad
- 1500 conventional channels with built-in CTCSS and DCS
- Data capable – supports 1200/2400 baud FFSK data as standard
- Internal high-speed data modem (12 kbps on NB channels/19.2 kbps on WB channels) (software option)
- All MPT 1327 call types
- Multiple network capability - up to four different trunked networks
- Voice inversion scrambling
- Built-in MAP 27 interface as standard
- Supports short data messages and ANI
- Incoming calls can be queued for future reference and call back
- Lone workers function to improve worker safety
- Multiple auxiliary ports and expansive internal options area
- Direct connect GPS and GPS display option

GENERAL SPECIFICATION			
VHF	Band	Operational Frequency	Transmit Power
	A4	66–88MHz	25W
	B1	136–174MHz	25W
	B1	136–174MHz	50W
	C0	174–225MHz	25W
	D1	216–266MHz	25W
UHF	G2	350–400MHz	40W
	H5	400–470MHz	25W
	H5	400–470MHz	40W


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	H6	450–530MHz	25W
	H7	450–520MHz	40W
<b>700/800MHz</b>	<b>K5</b>	<b>Transmit Receive</b>	<b>30W (&lt;806MHz)</b> <b>35W (&gt;806MHz)</b>
		762–776MHz	
		762–776MHz	
		792–825MHz	
		850–870MHz	
		850–870MHz	
<b>900MHz</b>	<b>L3</b>	896–941MHz 935–941MHz	30W
<b>Frequency Stability</b>		$\pm 1.5\text{ppm}$	
<b>Channel/Network Capacity</b>		1500 Conventional Channels 300 Scan/Vote Groups 4 MPT 1327 Trunked Networks	
<b>Power Supply</b>		10.8–16VDC	
<b>Channel Spacing</b>		12.5/20/25kHz	
<b>Channel Increment</b>		7.5/12.5/15/20/25/30kHz	
<b>Dimensions (WxDxH)</b>		7.3 x 7.2 x 2.8in (185 x 182 x 70mm) 8.1 x 7.2 x 2.8in (205 x 182 x 70mm)	
<b>25W/30/35/40/50W</b>			
<b>Weight</b>			
<b>25W</b>		49.4oz (1.4kg)	
<b>30/35/40/50W</b>		56.4oz (1.6kg)	
<b>Operational Temperature</b>		-22°F to +140°F (-30°C to +60°C)	
<b>Sealing</b>		IP54	
<b>RF Connector</b>		50 ohm BNC or Mini UHF	
<b>Interface Connectors</b>		3 Interface Connectors with Serial Ports	
<b>Speaker Output</b>		Supplied with 10W external speaker	

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TRANSMITTER		
OUTPUT	VHF/UHF (TIA/EIA )	700/800/900MHz (TIA /EIA )
25W	25W, 12W, 5W, 1W	
30W		
35W	30W, 15W, 5W, 2W	
40W UHF	40W, 20W, 15W, 10W	35W, 15W, 5W, 2W
50W VHF	50W, 25W, 15W, 10W	
MODULATION		
12.5kHz	±2.5kHz	±2.5kHz
20kHz	±4kHz	±4kHz
25kHz	±5kHz	±5kHz
FM Hum and Noise		
12.5kHz	-38dB	-33dB
20kHz	-41dB	-38dB
25kHz	-43dB	-40dB
Conducted/Radiated Emissions		
	-36dBm < 1GHz	
	-30dBm > 1GHz	
Audio Response Bandwidth		
	300Hz–3kHz	300Hz–3kHz
Audio Response		
	Flat or pre-emphasized	Flat or pre-emphasized
Audio Distortion		
	< 3% at 1kHz 60% deviation	< 3% at 1kHz 60% deviation
Transmit Rise Time		
	20ms	20ms
Duty Cycle		
25W	33%	
30/35W		20%
40/50W	20%	

RECEIVER SPECIFICATION		
VHF/UHF (TIA/EIA)	700/800mHz (TIA/EIA)	
Sensitivity**	0.28µV (<-118dBm) for 12dB SINAD	0.22µV (-120dBm) for 12dB SINAD 0.35µV (<-116dBm) for 20dB SINAD
Intermodulation	75dB	82dB
Selectivity		
12.5kHz	65dB	67dB

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<b>20kHz</b>	70dB	75dB
<b>25kHz</b>	75dB	79dB
<b>Spurious Response</b>	75dB	> 90dB***
<b>Hum and Noise</b>		
<b>12.5kHz</b>	-40dB	-44dB
<b>20kHz</b>	-41dB	-47dB
<b>25kHz</b>	-43dB	-48dB
<b>Audio Response Bandwidth</b>	300Hz–3kHz Flat or de-emphasized	300Hz–3kHz Flat or de-emphasized
<b>Audio Response</b>		
<b>Audio Distortion</b>	< 3% at 1kHz 60% deviation	< 3% at 1kHz 60% deviation

<b>Military Standard 810 F*</b>		
	<b>Method</b>	<b>Procedure</b>
<b>Applicable MIL-STD</b>		
<b>Low Pressure</b>	500.4	2
<b>High Temperature</b>	501.4	1, 2
<b>Low Temperature</b>	502.4	1, 2
<b>Temperature Shock</b>	503.4	1
<b>Solar Radiation</b>	505.4	1
<b>Rain</b>	506.4	1, 3
<b>Humidity</b>	507.4	1
<b>Salt Fog</b>	509.4	1
<b>Dust</b>	510.4	1
<b>Vibration</b>	514.5	1
<b>Shock</b>	516.5	1, 6

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REGULATORY DATA			
	Frequency	FCC Description	IC Description
<b>25W</b>	136-174	CASTMAB1C	737A-TMAB1C
	216-266	CASTMAD1C	
	400-470	CASTMAH5C	737A-TMAH5C
	450-530	CASTMAH6C	737A-TMAH6C
<b>30W</b>	896-941	CASTMAL3D	737A-TMAL3D
<b>35W</b>	806-869	CASTMAK5D	737A-TMAK5D
<b>40W</b>	400-470	CASTMAH5D	
	450-520	CASTMAH7D	
<b>50W</b>	136-174	CASTMAB1D	

Please note the train handset must be compatible with the train radio.

## 6. Functional

This is for mounting against a flat surface to support and secure the handset in a convenient position for the drivers. It has mounting holes, a magnet and side plates to prevent the handset from sliding off the magnet. Stronger magnetic mounts in the mounting brackets are to be supplied