TECHNICAL ADVISORY NOTE(TAN)			
Subject	25 W VHF Radio Installation guidelines.		
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1. Scope:

This document provides the details of special measures to be taken during installation of 25 W VHF radio as per RDSO specification no RDSO/SPN/TC/107-2018 Ver 2.1.

2. Introduction:

VHF (Very High Frequency) communication is widely used over Indian Railways along the track by Loco Pilots/ Train Managers, Operating, security and maintenance staff. Since VHF system works on Line-of-Sight Communication principle, some limitations regarding the range can be felt if the Line of Sight is not available due to hilly terrains, ghat sections, thick forest/vegetation/buildings/curves, etc. Further VHF signals can also be affected by weather conditions such as heavy rain, snow, or fog etc.

3. Typical Parts:

S.No.	Name	Description	Image
1.	25 W VHF Radio	This comes alongwith handset having PTT arrangement.	
2.	Power Supply	220V AC /12 V DC Radio Power supply having load capacity of 10-15 amp	
3.	Battery	12 V/110 AH Battery or as per choice of purchaser	

4.	Antenna Cable	High Quality Low Loss coaxial cable	
5.	Surge Arrestor	To be connected in between Antenna Cable and Radio	
6.	Antenna	Aerial type (To be used for vehicle mount Radio)	
7.	Antenna	Ground Plane Antenna (To be used with Fixed Radio installation)	
8.	Solar Module	For Charging the battery (Optional)	

Typical parts of 25 W VHF radio with GP Antenna

4. Installation practice to be followed for 25 W Static VHF Digital Radio:

4.1. **Choose the right location**, Mount the radio within easy reach of the operator.

4.2. **Antenna Selection & Installation**:

4.2.1. Use GP antenna with 0-6 dB gain depending upon site requirement and mount it at atleast 20 feet height on roof, height may be increased depending upon site requirement. During installation of antenna mast, ease of maintenance should be kept in mind. Sufficient support should be provided to prevent falling of antenna.

4.2.2. Ensure a clear line of sight without obstructions and well protected from physical damage.

4.2.3. Ensure that the antenna is securely mounted and properly grounded.

4.2.4. Height of Class-A protection should be more than antenna height on Roof top.

4.2.5. Separation between Class ‘A’ protection devices and VHF antenna shall be at least 2 meters vertically and 3 meters horizontally.

4.3. Use high-quality coaxial cable (e.g., RG-213) and minimize cable length to reduce signal losses.

4.4. **Power Supply & Grounding**:

4.4.1. Connect Radio directly to battery with an appropriate fuse (typically 10A).

4.4.2. Ground the radio properly with telecom earth grid to minimize electrical noise.

4.5. **Microphone & Speaker Placement**:

4.5.1. Mount the microphone in an accessible location. If using an external speaker, place it where audio is clear but away from potential interference.

4.5.2. Identify the terminals on COM port to connect for voice logging. The Recording port of the VHF set needs to be checked at the time of installation and every 15 days after installation.

4.6. Programming of Radio:

4.6.1. Required spot frequency to be programmed as per uses.

4.6.2. Transmitter power should be set as per permission/license obtained from WPC.

4.6.3. For 12.5 K Hz voice channel emission is set as 11KOF3E and 4FSK. For 2slot DMR TDMA data, emission is 7K60F1D (Not used in Railway at present) and for 2slot DMR TDMA voice, emission is to be kept as 7K60F1E.

4.6.4. It should be ensured that programming has been done by OEM/supplier accordingly.

4.7. **Wiring & Connections**:

4.7.1. To avoid interference, coaxial cables should be separated from power supply cables by a minimum of 2 inches (5 cm). Secure cables properly to avoid wear and tear.

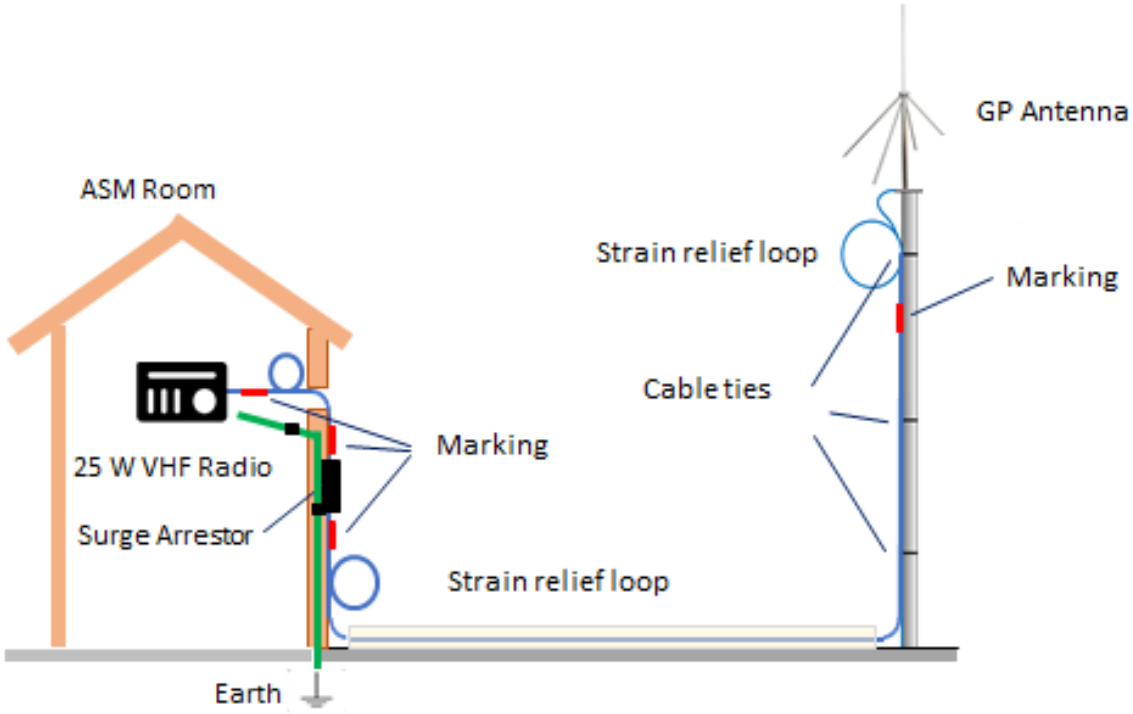
4.7.2. Keep cables clean and tidy (label, use cable ties & ducts).

4.7.3. Avoid twists, tangles, sharp bends, and strain on connectors.

4.7.4. Regularly clean the terminals of batteries Fortnightly and record cell voltages monthly.

4.8. WPC clearance:

4.8.1. WPC license to be obtained from DoT (Department of Telecommunications) before use of Radio.



Laying of Antenna cable

5. Safety:

5.1. Be sure not to energize the radio if antenna is not connected as this may damage radio itself.

5.2. As with all electrical equipment, few basic precautions which should be taken to avoid hurting or damaging the radio:

5.2.1. Read the instructions in the handbook provide by OEM carefully. Be sure to save it for future reference. Read and follow all warning and instruction labels on the radio and owner's manual.

5.2.2. Be sure the "PTT" key is not pressed when you do not need to transmit.

5.2.3. Do not operate the radio near unshielded electrical blasting caps or in an explosive atmosphere.

5.2.4. Do not expose the radio to extremely hot or cold temperature (out of the range between -20°C to +60°C).

5.2.5. Do not expose the transceiver to excessive vibrations as well as dusty or rainy locations.

5.2.6. Service if any should be carried out by authorized personals only.

5.2.7. In case requiring extensive repair work, contact your local dealer for assistance.

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