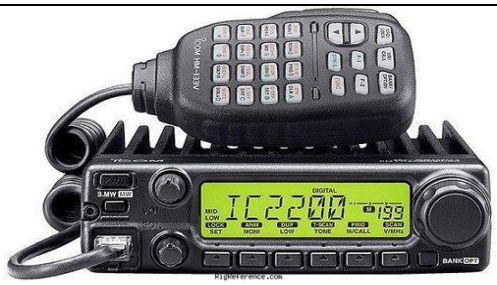
84. SPECIFICATION OF VHF DIGITAL MOBILE/BASE STATION TRANS RECEIVER SET

Sl No	PARAMETER	SPECIFICATION	TRAIL /TEST PROCEDURE
1	**General**		
	i) Frequency Range	136 - 174 MHz (Full band)	Functional check: B.O.O. will check operation of radio set by programming lowest, highest and any random frequency in 136-174 MHz range with the help of measuring instruments.
	ii) No of Channel	255 or higher	BOO will check all these parameters one by one with the help of standard testing instruments. If the standard test instruments are not available then firm must produce certificate of any Govt. accredited lab or National Accreditation Board for Testing and Calibration Laboratories (NABL) approved laboratory or International Laboratory Accreditation Corporation (ILAC) approved laboratory.
	iii) Channel spacing	12.5 KHz or better	
	iv) Frequency stability	± 1.5 PPM or better	
	v) Protocol & Technology	Digital DMR (TDMA) Technology.	BOO will check all these parameters with the help of standard testing instruments. If the standard test instruments are not available then firm must produce certificate of any Govt. accredited lab or National Accreditation Board for Testing and Calibration Laboratories (NABL) approved laboratory or International Laboratory Accreditation Corporation (ILAC) approved laboratory
	vi) Type of Emission (Modulation)	Analog : 11K0F3E Digital : 4FSK or equivalent technique complying to open standard / nonproprietary Digital Protocol as defined by international standard bodylike ETSI/PCC etc.	BOO will check all these parameters with the help of standard testing instruments. If the standard test instruments are not available then firm must produce certificate of any Govt. accredited lab or National Accreditation Board for Testing and Calibration Laboratories (NABL) approved laboratory or International Laboratory Accreditation Corporation (ILAC) approved laboratory.
	vii) Type of operation	Simplex, press to talk	Simplex means set either work in receive mode or in transmit mode. Same will be checked practically.
	viii) Weight	Less than 2000 gms	BOO will check practically to measure weight by weighing machine.
	ix) Power source	13.8 Volt DC ±15%	Apply 13.8 VDC ± 15% from power supply and check that whether set is working properly or otherwise.
	x) Protection	(i) Reverse polarity protection	i) BOO will check it by connecting Radio set

		(ii) Protection against high VSWR	with DC supply in reverse polarity and switch the set to"ON' position. There should not be any harm to the Radio Set. ii) BOO will check by switching "ON' Radio set and removing antenna/dummy load and PTT be pressed. In such a condition there should not be any harm to Radio set.
2	**Transmitter**		
	i) RF Power output	25 Watts (programmable / Selectable)	B.O.O. will check all these parameters in the entire frequency range mentioned in the QR with the help of standard testing instruments. If the standard test instruments are not available then firm must produce certificate of any Govt. accredited lab or National Accreditation Board for Testing and Calibration Laboratories [NABL] approved laboratory or International Laboratory Accreditation Corporation (ILAC) approved laboratory.
	ii) FM Hum / Noise	-40 dB or better	
	iii) Modulation Limiting	± 2.5 KHz @ 12.5 KHz	
	iv) Adjacent Channel Power	-60 dB or better	
	v) Audio Distortion	Less than 3%	
3	**Receiver**		
	i) Sensitivity	i) Analog :- 0.30 µVfor 12 dB SINADor better ii) Digital :- 0.30 µV at 5% BER or better	B.O.O. will check all these parameters in the entire frequency range mentioned in the QR with the help of standard testing instruments. If the standard test instruments are not available then firm must produce certificate of any Govt. accredited lab or National Accreditation Board for Testing and Calibration Laboratories [NABL] approved laboratory or International Laboratory Accreditation Corporation (ILAC) approved laboratory.
	ii) Selectivity (Adjacent Chanel)	60 dB or better	
	iii) Inter-modulation	70 dB or better	
	iv) Audio output	3 W or more	
	v) Audio Response	+1,-3 dB	
	vi) Rated Audio Distortion	Less than 3%	
4	**ENVIRONMENTAL SPECIFICATION**		
	i) Operating Temperature	-30^0C to $+60^0$C	Firm must produce certificate of any Government accredited Lab. or NABL or ILAC approved laboratory.
	ii) Storage Temperature	-40^0C to $+70^0$C	
	iii) Humidity	Max. 95% @ $+40^0$C non-condensing	
	iv) Environmental standard (i.e) Low & HighTemperature, Low pressure, Temperature Shock, Solar Radiation, Rain, Salt Fog, Vibration, Dust & Shock	As per MIL 810 C,D,E,F	Firm must produce certificate of any Government accredited Lab. or NABL or ILAC approved laboratory for the desired or better MIL standard.
	v) Dust & water	IP 54 or better	Firm must produce certificate of any

	Intrusion		Government accredited Lab. or NABL or ILAC approved laboratory.
5	**Accessories**		
	i) Microphone	DTMF Microphone should be supplied with Radio	B.O.O. will check physically ad practically that DTMF Microphone supplied with radio and is working properly.
	ii) Battery cable & Mounting fixtures	Should be supplied with Radio	Physically check by connecting battery cable & mounting fixtures with radio.
	iii) Antenna	i) 0dB/3dB gain whip antenna with 3 meters, Co-axial cable with connector, magnetic base / mounting bracket for vehicle use will be provided as per quantity mentioned in list of store. **ii)** 3dB/6dB gain Omni Directional antenna with 30 meter RF Cable for base station will be provided **as per quantity mentioned in list of store.**	Physically check by connecting antenna with all its accessories with radio set and check serviceability whether antenna matched or not.
	iv) Programming kit	All necessary programming software and hardware required for the set will be provided **as per quantity mentioned in list of store.**	Physically check to assess that all necessary software and hardware required for programming are available and working properly.
	v) Literature	i) User's manual with each radio sets should be provided free of cost in soft as well as hard copy. **ii)** Technical repairing manual with complete block diagram, circuit layout etc should be provided in soft as well as hard copy **as per quantity mentioned in list of store.**	Physically check to confirm that User and Technical manual are available in Hard as well as in Soft Copy.
6	**Configuration**		
	i) Caller ID display	Should be available	By programming two radio sets with same frequency and different ID and making call from one radio and check display in another radio set, ID of caller radio should be displayed.
	ii) Busy channel lock out	Should be available	Programmed one radio with busy channel lock out option and make call from another radio on same frequency. In the mean time if we want to make call from first radio, its transmitter will remain disable till PTT of second radio is released.
	iii) Scan with priority	Should be available	Radio sets programmed with priority scanning on pressing the scan button will start scanning channels with the priority.
	iv) Transmitter Time Out Timer (TOT)	The time should be programmed to best suit the application	PTT of Radio set programmed with TOT option be pressed continuously. Radio set comes automatically in reception mode after completion of time programmed for TOT option.

	v) LCD display	Should be available	Practical/Physical check by switching on the radio set, there should be display on the LCD screen.
	vi) Mode of calls	Selective Call, Group Call, Inter and Intra Group call facility	BOO will check it practically by making call.
	vii) Remote Radio Kill / Stun / Revive facility	Should be available	BOO will check it practically by sending kill command to particular radio. Radio set received kill command will get killed. Similarly, Set should revive if we send the revive command to killed radio.
	viii) Mode of operation	Radio should operate in analog mode and digital mode. (Compatible with existing all type of VHF analogue radio sets viz : Motorola, Icom, Kenwood, Vertex etc.)	BOO will be check practically by making call from existing analog sets to digital set after setting it in Analog mode and vice-versa. For checking interoperability with existing digital radio system, if available, make calls between them and the proposed radio sets (in digital mode) and verify proper communication should happen if both digital radio systems are based on same technology.
	ix) Emergency Button	Allows a user to obtain help in critical situations.	BOO will check it practically by pressing emergency button.
	x) SMS Texting	Should be capable of sending pre-defined messages & short messages from keypad as Optional.	BOO will check it practically by sending pre-defined message from one radio to another. Message should be displayed in the screen of receiving radio.
	xi) Programming	Front panel programming with password protection or PC programming.	BOO will check it practically by programming radio from front panel having password protection. Similarly, Board will also program radio with the help of PC, Radio set should be programmed from front panel as well as from PC also.
	xii) Support GPS	Inbuilt GPS system with accuracy of less than 10 meters **(facility should be available in the radio set and should be demonstrated during trial. NDRF may be opt to purchase the tariff of GPS later on)**	Firm will demonstrate features related with GPS, GIS and Networking mentioned at Sl.No.6 (xii to xiv) to Board of Officers during trial.
	xiii) Networking	Should be IP based for automatic roaming etc. **(facility should be availablein the radio set and should be demonstrated during trial. NDRF may opt to use this facility later on)**	
	xiv) GIS	Radio should have application protocol interface along with software applications to provide locations and messaging on PC/Console. **(Standard slot facility should be available in the radio set for connection of PC or other hardware and should**	

		be demonstrated duringtrial. NDRF may opt to purchase the tariff hardware and software for GIS later on)	
7	Field Trial	The actual performance of the radio set will be assessed.	Field trial of equipment will be conducted by a Board of Officers in the operational area of the force in the presence of Vendor/representative of firms to ascertainthe user satisfaction before the proposal is accepted. Radio equipment with all required accessories will be provided by the participating firm's on "**No Cost No Commitment"** basis at the indenter discretion.