GOVERNMENT OF INDIA
(Ministry of Home Affairs)
DIRECTORATE GENERAL
CENTRAL RESERVE POLICE FORCE
EAST BLOCK-7, SEC-1, R.K. PURAM, NEW DELHI-110066
(Email:- comncell@crpf.gov.in Tele/Fax:011-26107493)

No. B.V-7/2020-21-C (HFHP) Dated, the 01st February'2021

To

1. DIG (Comn), ITBP
   Block No. 2, CGO Complex
   Lodhi Road, New Delhi-03

2. DIG (Comn), NSG
   Meharam Nagar
   Palam, New Delhi-37

3. DIG (Comn), SSB
   East Block-V, R.K Puram
   New- Delhi-66

4. AIG (Comn), CISF
   Block No. 13, CGO, Complex
   Lodhi Road, New Delhi-03

5. DIG (Prov), BSF
   Block No. 10, CGO Complex
   Lodhi Road, New Delhi-03

6. Liaison Office, Assam Rifle
   Room No-171, North Block, MHA
   New Delhi -01

Subject: **Regarding QRs/TDs of "1KW (High Power) HF Transceiver Radio Set".**

Please find enclosed QRs/TDs of "1KW (High Power) HF Transceiver Radio Set as Annexure-"A" duly approved by the competent authority is forwarded herewith for further necessary action.

Encl: (QRs & TDs of "1KW (High Power) HF Transceiver Radio Set")

{P.R.Jha, DC (Comn)}
For DIG (Equipment)
Directorate General, CRPF

QRs OF 1 KILO WATT HF (HP) TRANS-RECEIVER

S.N	Parameter	Specifications
A).	**GENERAL:**	
1.	Frequency range	2 MHz to 29.9999 MHz or higher tunable at 10 Hz steps or better
2.	Mode of operation	SSB (J3E), USB, LSB, AM/AM(E), CW/MCW, AFSK and WBHF
3.	Presets	100 or more preset channels
4.	Frequency stability	± 1ppm or better
5.	Built in Test (BITE)	On-line and operator initiated
6.	Input power	AC mains 190 V to 260 V/50 Hz single phase
7.	Power consumption	Upto 6 KVA
8.	EMC/EMI	MIL-STD 461/462C or ETSI or CISPR22 or IEC 61000-4 Series (TEC/EMI/TEL-001/01 Feb 09) or better
9.	Antenna impedance	50 Ω Unbalanced
10.	Protection	i). Protection against high VSWR
		ii). Over Voltage and under voltage protection.
		iii). Protection against high temperature
11.	Roles	Static
12.	Headphone	Should be compatible with radio set
13.	Cooling	Forced air/liquid cooling system/Heat sink
14.	VSWR	Better than 1.5
15.	Visual display	Front panel digital display
16.	Metering indications	Front panel meters-indications for RF output, VSWR and high temperature
17.	Interface	RS-232/USB/Ethernet/EIA 530
18.	Programming	PC programming software and front panel programming
19.	Communication security	SAG approved encryption only
20.	Mounting	Mountable into suitable racks
21.	Weight	150 Kg maximum
B).	**DRIVER TRANSMITTER (EXCITER) SPECIFICATIONS:**	
1.	Spurious Emission	Better than 40 db below PEP
2.	Side Band suppression	Better than 50 dB
3.	Carrier suppression	Better than 40 dB

S.N	Parameter	Specifications
4.	Inter modulation distortion	Better than 25 dB (below PEP)
5.	Audio response	Within ±6 dB (300 Hz to 2700 Hz
6.	Side Tone Level	Better than 0.1 mW into headphone for 5 mV audio input at 1 kHz
7.	Modulation sensitivity	1 to 10 mV at 1 kHz for full power under SSB mode
C).	**RECEIVER SPECIFICATIONS:**	
1.	Receiver sensitivity	(-)111dBm @ 10dB SINAD or better
2.	Image frequency rejection	Better than 70 dB
3.	IF rejection	Better than 70 dB
4.	In Band inter modulation distortion	35dB below PEP or better
5.	Audio response	Within ±6 dB per octave for 300 Hz to 2700 Hz ; 1 kHz as reference
6.	Audio output	Minimum 10 mW (Across Headphones) Minimum 1W (across Loudspeaker)
7.	Audio frequency Harmonic distortion	Better than 25 dB
D).	**POWER AMPLIFIER SPECIFICATIONS:**	
1.	Power output	1000 Watts ±1 dB (CW/PEP)
2.	Power levels	Variable in steps/continuously
3.	Spurious and Harmonic emission	Better than 60 dB below PEP
4.	VSWR	3:1 maximum
5.	Emission compliance	MIL-STD-188-141D
E)	**ANTENNA TUNING UNIT: (MAY BE INTEGRATED TO POWER AMPLIFIER OR A SEPARATE UNIT)**	
1.	Power rating	1000 watt ± 1dB or higher
2.	VSWR	Typical 1.5:1
3.	Tuning	Automatic
4.	Tune time	less than 5 sec
5.	Antenna connector types	There should be facility to connect any of the following antennas- i. Long Wire antenna ii. Whip antenna iii. Broad band antenna

S.N	Parameter	Specifications
6.	Provision for using single antenna for transmitter and receiver	
F).	**ENVIRONMENTAL PARAMETERS:**	
1.	Operating Temperature	-10°C to +45°C
2.	Storage Temperature	-20°C to +60°C
3.	Humidity	95% non-condensing (-20°C to +60°C)
4.	Dust	MIL-STD-810F or better or JSS-55555 or equivalent
5.	Vibration	MIL-STD-810F or better or JSS-55555 or equivalent
6.	Shock	MIL-STD-810F or better or JSS-55555 or equivalent
7.	Altitude	MIL-STD-810F or better or JSS-55555 or equivalent
G).	**FEATURES:**	
1.	Selective calling	Digital FSK coding
2.	Scanning	5 channel per sec or better
3.	ALE 2G/3G/4G (As per user requirement)	ALE 2G as per Appendix "A" and ALE 3G as per Appendix "C" of MIL-STD-188-141B and ALE 4G as per Appendix "G" of MIL-STD-188-141D
4.	ALE link quality data resolution	i. Local: 5bit SINAD, 5 bit BER ii. Remote: 5 bit SINAD, 5 bit BER
5.	Flash message	Predefined message
6.	Vocoder	MELP/ACLP/TWELP (600/800/1200/2400 bits) or better
7.	Data MODEM (Built in/external)	i. MIL-STD-188-110A single tone ≥ 4800 bps ii. 120 kbps in WBHF mode
8.	Data communication	Provision for data communication
9.	Tele Call	The radio set should have capability to dial and operate data.
10.	Controls	i. Front panel controls ii. Ethernet:- Remote HTML or remote control software iii. Serial RS-232/RS-422 remote software control. iv. Interlock:- Antenna interlock to prevent keying PA when not connected.
11.	Software updates	Via USB (Local) or Ethernet (Remote)

S.N	Parameter	Specifications
12.	Tunable receiver	Continuous tunable
13.	Remote operation	Capability to operate from remote location
14.	Audio input sockets	Microphone and external socket
15.	Squelch	Digital squelch
16.	Push to talk	Suitable microphone to be provided
17.	Compatibility	Should be compatible with existing HF radio sets/receivers

(SUB.M.K.Singh, Assam Rifles) (Sandesh Kumar,AC, SSB) (Karan Singh, AC, ITBP)

(R.K.Singh, AD, DCPW) (Dr. Raveesh Kumar,PSO(W), BPR&D) (Maj. Rajan Kumar, NSG)

(Bhaiya Lal, DC, BSF) (P. R. Jha, DC(Comn), CRPF) (Harjinder Singh, DIG(Eqpt), CRPF)

(Virendra Agrawal, DIG(Comn),CRPF) (Ravideep Singh Sahi, IG(Comn &IT), CRPF) (Zulifiquar Hasan, IPS,ADG(HQ), CRPF)

Approved/Not Approved

Dr. A P Maheshwari, IPS

DG, CRPF

Trial Directives of 1 KILO WATT HF (MP) TRANS-RECEIVER

Evaluation/trial of the equipments will be carried by the Board of Officers in presence of the vendor or representative of the vendor and actual performance of the equipment to be noted in the proceeding.

2. All parameters / Specifications mentioned in the QRs will be checked by the BOO by ascertaining/ verifying following checks-

a). Physical /Functional Checks: The vendors will show all features/configuration of the equipment to the board of officers during technical evaluation. Standard test equipments and procedure shall be used for testing /checking the parameters.

b). Submission of certificate: - Parameters/specifications, which cannot be checked/measured due to non availability of testing/measuring facilities or lack of expertise, a certificate of test from Govt. approved Lab/NABL or ILAC accredited Lab confirming the Specifications/parameters may be submitted by vendor to the BOO to check and verify the certificates submitted by the vendors.

S.N	Parameter	Specifications	Trial Directives
A).	GENERAL:		
1.	Frequency range	2 MHz to 29.9999 MHz or higher tunable at 10 Hz steps or better	BOO will check frequency range of HF set by programming lowest, highest and any random frequency in 2.0-29.9999 MHz range and will measure with the help of standard testing instruments. The RF output and sensitivity of radio set in entire band should be same.
2.	Mode of operation	SSB (J3E), USB, LSB, AM/AM(E), CW/MCW, AFSK and WBHF	BOO will check Modulation practically after switching "ON" the radio set and setting these modes one by one and firm will produce OEM certificate.
3.	Presets	100 or more preset channels	BOO will check it practically by setting the channels in the radio set.
4.	Frequency stability	± 1ppm or better	BOO will check parameter practically by using the standard test instrument.
5.	Built in Test (BITE)	On-line and operator initiated	BOO will check practically.

S. N	Parameter	Specifications	Trial Directives
6.	Input power	AC mains 190 V to 260 V/50 Hz single phase	BOO will check practically by connecting mentioned DC/AC voltages to radio set and will ensure that set works properly.
7.	Power consumption	Upto 6 KVA	BOO will check practically and firm will also submit OEM certificate.
8.	EMC/EMI	MIL-STD 461/462C or ETSI or CISPR22 or IEC 61000-4 Series (TEC/EMI/TEL-001/01 Feb 09) or better	The firm will produce certificate of Govt. Lab. or NABL/ILAC accredited laboratory.
9.	Antenna impedance	50 Ω Unbalanced	BOO will check practically and firm will also submit OEM certificate.
10.	Protection	i). Protection against high VSWR	BOO will check practically and firm will also submit OEM certificate.
		ii). Over Voltage and under voltage protection.	BOO will check practically and firm will also submit OEM certificate.
		iii). Protection against high temperature	BOO will check practically and firm will also submit OEM certificate.
11.	Roles	Static	BOO will check practically.
12.	Headphone	Should be compatible with radio set	BOO will check practically and firm will also submit OEM certificate.
13.	Cooling	Forced air/liquid cooling system/Heat sink	BOO will check practically.
14.	VSWR	Better than 1.5	BOO will check practically.
15.	Visual display	Front panel digital display	BOO will check practically.
16.	Metering indications	Front panel meters-indications for RF output, VSWR and high temperature	BOO will check practically.
17.	Interface	RS-232/USB/ Ethernet/ EIA 530	BOO will check practically.

S.N	Parameter	Specifications	Trial Directives
18.	Programming	PC programming software and front panel programming	BOO will check practically by software and front panel programming.
19.	Communication security	SAG approved encryption only	Firm will submit OEM Certificate.
20.	Mounting	Mountable into suitable racks	BOO will check practically.
21.	Weight	150 Kg maximum	BOO will check practically.
B).	**DRIVERTRANSMITTER (EXCITER) SPECIFICATIONS:**		
1.	Spurious Emission	Better than 40 db below PEP	BOO will check practically.
2.	Side Band suppression	Better than 50 dB	BOO will check practically.
3.	Carrier suppression	Better than 40 dB	BOO will check practically.
4.	Inter modulation distortion	Better than 25 dB (below PEP)	BOO will check practically.
5.	Audio response	Within ±6 dB (300 Hz to 2700 Hz	BOO will check practically.
6.	Side Tone Level	Better than 0.1 mW into headphone for 5 mV audio input at 1 kHz	BOO will check practically.
7.	Modulation sensitivity	1 to 10 mV at 1 kHz for full power under SSB mode	BOO will check practically.
C).	**RECEIVER SPECIFICATIONS:**		
1.	Receiver sensitivity	(-)111dBm @ 10dB SINAD or better	BOO will check practically.
2.	Image frequency rejection	Better than 70 dB	BOO will check practically.
3.	IF rejection	Better than 70 dB	BOO will check practically.
4.	In Band inter modulation distortion	35dB below PEP or better	Firm will submit OEM certificate.
5.	Audio response	Within ±6 dB per octave for 300 Hz to 2700 Hz ; 1 kHz as reference	BOO will check practically.
6.	Audio output	Minimum 10 mW (Across Headphones) Minimum 1W (across Loudspeaker)	BOO will check practically.
7.	Audio frequency Harmonic distortion	Better than 25 dB	BOO will check practically.

S.N	Parameter	Specifications	Trial Directives
D).	**POWER AMPLIFIER SPECIFICATIONS:**		
1.	Power output	1000 Watts ±1 dB (CW/PEP)	BOO will check practically.
2.	Power levels	Variable in steps/continuously	BOO will check practically.
3.	Spurious and Harmonic emission	Better than 60 dB below PEP	BOO will check practically.
4.	VSWR	3:1 maximum	BOO will check practically and firm will submit OEM certificate.
5.	Emission compliance	MIL-STD-188-141D	Firm will submit certificate of Govt. Lab. or NABL/ILAC accredited laboratory.
E)	**ANTENNA TUNING UNIT: (MAY BE INTEGRATED TO POWER AMPLIFIER OR A SEPARATE UNIT)**		
1.	Power rating	1000 watt ± 1dB or higher	BOO will check practically.
2.	VSWR	Typical 1.5:1	BOO will check practically.
3.	Tuning	Automatic	BOO will check practically.
4.	Tune time	less than 5 sec	BOO will check practically.
5.	Antenna connector types	There should be facility to connect any of the following antennas- i. Long Wire antenna ii. Whip antenna iii. Broad band antenna	BOO will check practically.
6.	Provision for using single antenna for transmitter and receiver		BOO will check practically.
F).	**ENVIRONMENTAL PARAMETERS:**		
1.	Operating Temperature	-10°C to +45°C	Firm will submit certificate of Govt. Lab. or NABL/ILAC accredited laboratory.
2.	Storage Temperature	-20°C to +60°C	
3.	Humidity	95% non-condensing (-20°C to +60°C)	
4.	Dust	MIL-STD 810 F or better or JSS-55555 or equivalent	
5.	Vibration	MIL-STD 810 F or better or JSS-55555 or equivalent	

S.N	Parameter	Specifications	Trial Directives
6.	Shock	MIL-STD 810 F or better or JSS-55555 or equivalent	Firm will submit certificate of Govt. Lab. or NABL/ILAC accredited laboratory.
7.	Altitude	MIL-STD 810 F or better or JSS-55555 or equivalent	
G).	**FEATURES:**		
1.	Selective calling	Digital FSK coding	BOO will check practically.
2.	Scanning	5 channel per sec or better	BOO will check practically.
3.	ALE 2G/3G/4G (As per user requirement)	ALE 2G as per Appendix "A" and ALE 3G as per Appendix "C" of MIL-STD-188-141B and ALE 4G as per Appendix "G" of MIL-STD-188-141D	Firm will submit certificate of Govt. Lab. or NABL/ILAC accredited laboratory.
4.	ALE link quality data resolution	i. Local: 5bit SINAD, 5 bit BER ii. Remote: 5 bit SINAD, 5 bit BER	Firm will submit certificate of Govt. Lab. or NABL/ILAC accredited laboratory.
5.	Flash message	Predefined message	BOO will check practically.
6.	Vocoder	MELP/ACLP/TWELP (600/800/1200/2400 bits) or better	Firm will submit OEM certificate.
7.	Data MODEM (Built in/external)	i. MIL-STD-188-110A single tone ≥ 4800 bps ii. 120 kbps in WBHF mode	Firm will submit OEM certificate.
8.	Data communication	Provision for data communication	BOO will check practically.
9.	Tele Call	The radio set should have capability to dial and operate data.	Firm will submit OEM certificate.
10.	Controls	i. Front panel controls ii. Ethernet:- Remote HTML or remote control software iii. Serial RS 232/RS 422 remote software control. iv. Interlock:- Antenna interlock to prevent keying PA when not connected.	BOO will check practically.
11.	Software updates	Via USB (Local) or Ethernet (Remote)	BOO will check practically.
12.	Tunable receiver	Continuous tunable	BOO will check practically.

S.N	Parameter	Specifications	Trial Directives
13.	Remote operation	Capability to operate from remote location	BOO will check practically.
14.	Audio input sockets	Microphone and external socket	BOO will check practically.
15.	Squelch	Digital squelch	BOO will check practically.
16.	Push to talk	Suitable microphone to be provided	BOO will check practically.
17.	Compatibility	Should be compatible with existing HF radio sets/receivers	BOO will check practically.

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