**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-7/2019-20-C (HF) Dated, the 12th Sep'2019

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 HF Transreceiver Man-Pack and static.**

Please find enclosed QRs and TDs of HF Transreceiver Man-Pack and static as Annexure-A & Annexure-B respectively duly approved by the competent authority is forwarded herewith for further necessary action.

Encl: (QRs & TDs of HF Transreceiver Man-Pack and static)

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

## QRs OF HF MANPACK TRANSCEIVER

### 1.1 General Specification

| S.N | Parameters | Specifications |
|---|---|---|
| 1 | Frequency Range | 2.0 MHz to 29.9999 MHz channel spacing 10 Hz. |
| 2 | Modes | SSB(J3E) USB, LSB, AM, CW/MCW |
| 3 | Preset | 100 Channels or more |
| 4 | Frequency Stability | ±1 PPM or better |
| 5 | Built-in-test | Front panel testing. |
| 6 | Input Power | +12V DC Nominal (10.8V to 14.8V) |
| 7 | Battery life Duty Cycle:5 / /90 | 10 Ah (Li-Ion or Ni-Mh) or more 20 Hrs or More |
| 8 | EMI / EMC | MIL-STD- 461/462C or ETSI or CISPR 22 or IEC 61000-4 Series (TEC/EMI/TEL-001/01 FEB-09) or latest standard. |
| 9 | Weight | Less than 7 Kg with battery |
| 10 | Antenna Impedance | 50 Ω Unbalanced |
| 11 | Protection | (i) Reverse Polarity protection |
| | | (ii) Protection against high VSWR. |
| 12 | Roles | Manpack |
| 13 | Headphone Impedance | Up to 600Ω |
| 14 | Cooling | Convection from case |
| 15 | VSWR | Better than 1.5 |
| 16 | Visual display | Front panel LCD/LED display or latest technology |
| 17 | Interface | RS-232 / USB |
| 18 | Programming | PC programming software and front panel Programming. |
| **1.2** | **Transmitter Specifications** | |
| 1. | RF Power | 5W to 25W PEP (Low, Medium , High) (User programmable) |
| 2. | Spurious Emission Suppression | ≥ 46 dB below PEP |
| 3. | Side Band Suppression | ≥ 50 dB or better |
| 4. | Carrier Suppression | ≥ 40 dB or better |
| 5 | Inter modulation distortion | 30 dB minimum below PEP |
| 6. | Audio Response | Within ±6 dB from 350Hz to 2700Hz. |

| S.N | Parameters | Specifications |
|---|---|---|
| 7. | Side Tone Level | Better than 0.1 mW into 150Ω load for 5mV of audio input at 1 KHz. |
| 8. | Modulation Sensitivity | 1 to 10 mV at 1 KHz for full power under SSB mode. |
| **1.3** | **Receiver Specification** | |
| 1. | Receiver Sensitivity | -107 dBm for 10 dB SINAD or better |
| 2. | Image Rejection | ≥70 dB or better |
| 3. | IF Rejection | ≥70 dB or better |
| 4. | In band Inter Modulation Distortion | 35 dB minimum below PEP |
| 5. | Audio Response | Within ±6 dB from 350Hz to 2700Hz |
| 6. | Audio Output | 1W or more across loudspeaker |
| 7. | Audio Frequency Harmonics Distortion. | ≥ 25 dB or better |
| **1.4** | **Environmental Parameters** | |
| 1. | Operating Temperature | -30°C to +55° C |
| 2. | Storage Temperature | -30°C to +60°C |
| 3. | Humidity | 95% non-condensing @ 40°C. |
| 4. | Dust | MIL-STD-810F or better or JSS-55555 (As laid down in Class L3 of JSS-55555, revision No.2) |
| 5. | Vibration | |
| 6. | Shock | |
| 7. | Water Intrusion | |
| 8. | Altitude | |
| **1.5** | **Features** | |
| 1. | Selective calling | Digital FSK Coding |
| 2. | Scanning | 5 channels per second or better |
| 3. | Flash messages | Minimum 60 characters |
| 4. | Vocoder | MELP/CELP (1200/2400bps) or better |
| 5. | RS-232 control | The Radio set should have capability to operate at 4800 baud rate or better. |
| 6. | Inbuilt Data Modem | MIL-STD -188 -110A/B/C single tone ≥ 4800 bps |
| 7. | Tunable receiver | Continuous tunable. |
| 8. | Radio kill/un-kill | Should have kill/un-kill function. |
| 9. | Audio input sockets | Mic and external socket. |
| 10. | Squelch | Voice/Digital squelch |
| 11. | Push to talk. | Suitable Microphone to be provided. |

| S.N | Parameters | Specifications |
|---|---|---|
| 12 | Audio Socket | Suitable headgear should be provided. |
| **1.6** | **Optional Features** (As per user requirement) | |
| 1. | Communication Security | AES 128 bit or AES 256 bit or SAG approved (As per user requirement) |
| 2. | ALE 2G/ALE 3G | ALE 2G as per Appendix "A" and ALE 3G as per Appendix "C" of MIL-STD-188-141B |
| 3. | Frequency Hopping | Hop Rate: ≥ 6 hops per second |
| 4. | GPS Interface | Inbuilt GPS with polling facility. |

WO/C Satnam Singh
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BSF

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BPR&D

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Md. Jawed Akhtar, IPS,
ADG (Work&Comn), CRPF

Approved/~~Not Approved~~

Rajeev Rai Bhatnagar, IPS
DG, CRPF

## TRIAL DIRECTIVES OF HF MANPACK TRANSCEIVER

All parameters/specifications mentioned in QRs will be checked by the Board of Officers by ascertaining/verifying following checks in the presence of Vendor/Supplier/Manufacturer. In case of any discrepancies/problem, the vendor/rep of firm will demonstrate the features to the Board of officer of the force concerned. Further, if proper testing instrument for testing these parameters is not available with user organization, firm will provide the same.

(a) Physical Checks: In this category, specifications of the equipment will be checked physically as per QRs.

(b) Functional Checks: The vendors will show all the features/configuration of the equipment functioning on ground to the board of officers during trials.

**1.1 General Specification**

| S.N | Parameters | Specifications | Trial Directives |
|---|---|---|---|
| 1 | Frequency Range | 2.0 MHz to 29.9999 MHz channel spacing 10 Hz. | 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 | Modes | SSB(J3E) USB, LSB, AM, CW/MCW | 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 | Preset | 100 Channels or more | BOO will check it practically by setting the channels in the radio set. |
| 4 | Frequency Stability | ±1 PPM or better | BOO will check parameter practically by using the standard test instrument. |
| 5 | Built-in-test | Front panel testing. | BOO will check practically. |

| S.N | Parameters | Specifications | Trial Directives |
|---|---|---|---|
| 6 | Input Power | +12V DC Nominal (10.8V to 14.8V) | BOO will check practically and will ensure that radio set works properly. |
| 7 | Battery life Duty Cycle:5 /5 /90 | 10 Ah (Li-Ion or Ni-Mh) or more 20 Hrs or More | The firm will produce certificate of Govt. Lab. or NABL/ILAC accredited laboratory and BOO will check practically. |
| 8 | EMI / EMC | MIL-STD- 461/462C or ETSI or CISPR 22 or IEC 61000-4 Series (TEC/EMI/TEL-001/01 FEB-09) or latest standard. | The firm will produce certificate of Govt. Lab. or NABL/ILAC accredited laboratory. |
| 9 | Weight | Less than 7 Kg with battery | BOO will measure weight with help of weighing machine |
| 10 | Antenna Impedance | 50 Ω Unbalanced | BOO will check practically. |
| 11 | Protection | (i) Reverse Polarity protection<br>(ii) Protection against high VSWR. | BOO will check practically and firm will produce OEM certificate. |
| 12 | Roles | Manpack | BOO will check practically. |
| 13 | Headphone Impedance | Up to 600Ω | BOO will check practically and firm will produce OEM certificate. |
| 14 | Cooling | Convection from case | BOO will check Physically. |
| 15 | VSWR | Better than 1.5 | BOO will check practically. |
| 16 | Visual display | Front panel LCD/LED display or latest technology | BOO will check practically. |
| 17 | Interface | RS-232 / USB | BOO will check practically. |
| 18 | Programming | PC programming software and front panel programming. | BOO will check practically by software and front panel programming. |

| S.N | Parameters | Specifications | Trial Directives |
|---|---|---|---|
| **1.2** | **Transmitter Specifications** | | |
| 1. | RF Power | 5W to 25W PEP (Low, Medium , High) (User programmable) | BOO will check practically. |
| 2. | Spurious Emission Suppression | ≥ 46 dB below PEP | BOO will check practically. |
| 3. | Side Band Suppression | ≥ 50 dB or better | BOO will check practically. |
| 4. | Carrier Suppression | ≥ 40 dB or better | BOO will check practically. |
| 5 | Inter modulation distortion | 30dB minimum below PEP | BOO will check practically. |
| 6. | Audio Response | Within ±6 dB from 350Hz to 2700Hz. | BOO will check practically. |
| 7. | Side Tone Level | Better than 0.1 mW into 150Ω load for 5mV of audio input at 1 KHz. | BOO will check practically. |
| 8. | Modulation Sensitivity | 1 to 10 mV at 1 KHz for full power under SSB mode. | BOO will check practically. |
| **1.3** | **Receiver Specification** | | |
| 1. | Receiver Sensitivity | -107 dBm for 10dB SINAD or better | BOO will check practically. |
| 2. | Image Rejection | ≥70 dB or better | BOO will check practically. |
| 3. | IF Rejection | ≥70 dB or better | BOO will check practically. |
| 4. | In band Inter Modulation Distortion | 35 dB minimum below PEP | Firm will produce OEM certificate. |
| 5. | Audio Response | Within ±6 dB from 350Hz to 2700Hz | BOO will check practically. |
| 6. | Audio Output | 1W or more across loudspeaker | BOO will check practically. |
| 7. | Audio Frequency Harmonics Distortion. | ≥ 25 dB or better | BOO will check practically. |

| S.N | Parameters | Specifications | Trial Directives |
|---|---|---|---|
| **1.4** | **Environmental Parameters** | | |
| 1. | Operating Temperature | -30°C to +55° C | The firm will produce certificate of Govt. Lab. or NABL/ILAC accredited laboratory. |
| 2. | Storage Temperature | -30°C to +60°C | |
| 3. | Humidity | 95% non-condensing @ 40°C. | |
| 4. | Dust | MIL-STD-810F or better or JSS-55555 (As laid down in Class L3 of JSS-55555, revision No.2) | |
| 5. | Vibration | | |
| 6. | Shock | | |
| 7. | Water Intrusion | | |
| 8. | Altitude | | |
| **1.5** | **Features** | | |
| 1. | Selective calling | Digital FSK Coding | Firm will produce OEM Certificate. |
| 2. | Scanning | 5 channels per second or better | |
| 3. | Flash messages | Minimum 60 characters | BOO will check practically. |
| 4. | Vocoder | MELP/CELP (1200/2400bps) or better | Firm will produce OEM certificate. |
| 5. | RS-232 control | The Radio set should have capability to operate at 4800 baud rate or better. | BOO will check practically. |
| 6. | Inbuilt Data Modem | MIL-STD -188 -110A/B/C single tone ≥ 4800 bps | Firm will produce OEM Certificate. |
| 7. | Tunable receiver | Continuous tunable. | BOO will check practically. |
| 8. | Radio kill/un-kill | Should have kill/un-kill function. | BOO will check practically. |
| 9. | Audio input sockets | Mic and external socket. | BOO will check practically. |
| 10. | Squelch | Voice/Digital squelch | BOO will check practically. |
| 11. | Push to talk. | Suitable Microphone to be provided. | BOO will check practically. |
| 12. | Audio Socket | Suitable headgear should be provided. | BOO will check practically. |

| S.N | Parameters | Specifications | Trial Directives |
|---|---|---|---|
| **1.6** | **Optional Features (As per user requirement)** | | |
| 1. | Communication Security | AES 128 bit or AES 256 bit or SAG approved (As per user requirement) | Firm will produce OEM Certificate. |
| 2. | ALE 2G/ALE 3G | ALE 2G as per Appendix "A" and ALE 3G as per Appendix "C" of MIL-STD-188-141B | Firm will produce OEM Certificate. |
| 3. | Frequency Hopping | Hop Rate: ≥ 6 hops per second | Firm will produce OEM Certificate. |
| 4. | GPS Interface | Inbuilt GPS with polling facility. | BOO will check practically. |

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