

1) PORTABLE RADIO TEST SET WITH DIGITAL COMMUNICATION TESTING FACILITY

Specification

| S. No. | Parameters | Specifications |
|-------------|---|--|
| 1. | General Characterization | |
| | Operating voltage | AC 220+10% @50Hz, DC: 24/12V Internal/External |
| | Display Size | Minimum 6" full color LCD or Better |
| | USB port | inbuilt |
| | Ethernet | inbuilt |
| | Calibration Support | Calibration facilities should be available in India free of cost during the guarantee/warranty period |
| | Field up gradations | <ul style="list-style-type: none"> i. The product should field upgradable to other Digital Technologies such as P25 Phase I & II testing, DMR Radio with repeater, NXDN, dPMR, PTC. ii. The equipment should be capable of performing tests of digital/analog radio set and contain all functionalities in one stand-alone unit. iii. Service support should be available in India. |
| 2. | Signal Generator For receiver test | |
| | Frequency Range | 2 MHz to 1000 MHz |
| | Frequency Resolution | 1Hz or better |
| | Output level range | T/R Port: -50 to -125dBm (duplex) Gen Port: -5 to -65 dBm |
| | Resolution | 0.1dB or better |
| | Port protection limit | <ul style="list-style-type: none"> a. T/R Port: 50W for 5 Minutes and 150W for 30s b. Antenna Port: +20 dBm with warning above +17dBm c. Gen Port: +20 dBm with warning above +17dBm (Remove power immediately when alarm sounds) |
| | Harmonics | -20dBc Max or better |
| | Non-Harmonics | -30dBc Max or better |
| 2.1. | Modulation | |
| | Selection Mode | OFF, AM, FM |
| 2.2. | FM Modulation | |
| | Deviation Range | 0 to +75KHz or better |
| | Deviation accuracy | 5% of setting |
| | Resolution | 10Hz or better |
| | Modulation range | DC to 20 KHz or better |
| 2.3. | AM Modulation | |
| | AM depth range | 0-100% or better |
| | Accuracy | Up to 10% |
| | Modulation Bandwidth | DC to 20 KHz or better |
| | Resolution | 1Hz |

| | | |
|-------------|---|---|
| 3. | Receiver (Transmitter test) | |
| | Frequency range | 2MHz to 1GHz or better |
| | Demodulation selection | OFF, AM, FM |
| | Signal Code | 1KHz tone, Private line, Digital Private line, Single tone, Two-tone paging, 3/6 tone paging, POCSAG, external input from both supplied microphone and BNC input. |
| | Sensitivity | Less than -25dBm (10dB SINAD) or better |
| 3.1. | Demodulation Measurement | |
| | a. FM Deviation | Range: 500Hz to +100KHz or better |
| | Accuracy | ±3% |
| | Range | 20Hz to 20KHz |
| | b. AM Deviation | Range; 5% to 100% |
| | Accuracy | Up to 5% |
| | AM rate | 20Hz to 15KHz or better |
| 4. | RF Power Meter | |
| | a. Range 0.10 to 125Watt, Resolution 0.01W | |
| | b. VSWR (with attenuator <10dB): Better than 1.20:1 | |
| 5. | Signal to Noise Ratio Meter | |
| | Frequency range | 300Hz to 3KHz or better |
| | Range | -80dB to 0 dB or better |
| | Accuracy | ±1dB |
| 6. | Audio Frequency Counter | |
| | Range | 20 to 20KHz |
| | Wave Shape | Sine or Square |
| 7. | SINAD meter | |
| | Frequency range | 300Hz to 3KHz or better |
| | Accuracy | ±1.5dB |
| | Range | 0 to 50dB or better |
| | Level | 0.9 Vpp to 90 Vpp or better |
| 8. | Distortion meter | |
| | Distortion range | 1% to 50% or better |
| | Freq range | 300Hz to 3KHz |
| | Resolution | 10% or better |
| 9. | Audio Generator | |
| | Frequency Range | Sine: DC to 20KHz or better |
| | Level range | 0 to 1.57 Vrms |
| | Modulation type | 1KHz tone, Single tone, DTMF, Two-tone paging etc. |
| 10. | Oscilloscope | |
| | Frequency range (vertical) | 100 to 5KHz or better |
| | Input range (vertical) | 10mV to 10 V |
| | Accuracy (vertical) | 10% of full scale |
| | Accuracy (Horizontal) | 3% of full scale |
| | Marker Functions | Time with Amplitude, deviation or % depth |
| 11. | Digital Multimeter | |
| | Voltage Range | 200mV to 1000V, or more (150VAC rms or VDC max input) |
| | AC voltage freq range | 50Hz to 10KHz |
| | Accuracy | AC +5% full-scale ±1 LSB DC ±1% full scale ±1 LSB |

| | | |
|--------------|--|---|
| | AC/DC ampere meter | 200mA to 20A or better Auto (20A range uses optional shunt connected to voltmeter) |
| | Resolution | 3 digit or more (up to 2000 Counts) |
| | Ohmmeter | Full scale range: 200 Ohms to 20Mohms, Auto |
| 12. | RF Spectrum Analyzer | |
| | Frequency range | 2MHz to 1 GHz |
| | Frequency resolution | 1Hz |
| | Span | 10 KHz to 5 MHz |
| | Noise Floor | -140 dBm |
| 13. | Tracking generator | |
| | Tracking generator output | Refer to RF Spectrum Analyzer section for: - Frequency range and accuracy - Output level range, resolution and accuracy |
| | Tracking generator controls | Output port selection, RF level, reference cal |
| 14. | DMR Radio Technology | |
| | RF Signal Generator | 250KHz - 1GHz or better |
| | Output level | Same as in case of signal generator |
| | Modulation | 4-FSK |
| | Test Pattern | STD IB 1030, STD IB CAL, STD IB 511 (.153) |
| | Duplex Radio/Repeater) | Testing facility should be available |
| | Vocoder test | Vocoder testing facility should be available |
| 14.1. | DMR Measurement FSK-Error | Test Facility should be available |
| | Range | 0 to 10% |
| | Resolution | 0.1% |
| | Accuracy | <5.0% of reading |
| 14.2. | Symbol Deviation | |
| | Range | 1745 to 2140 Hz |
| | Resolution | 0.1 Hz |
| | Accuracy | +/- 10 Hz |
| 14.3. | Symbol clock Error | |
| | Range | +/- 12ppm |
| | Resolution | 0.01 Pm |
| | Accuracy | +/- 1 ppm |
| 14.4. | DMR Repeater Test | Test Facility should be available |
| 15. | Environmental and Safety Standard | MIL Standard |
| 16. | Accessories | |
| | | All required accessories for testing all parameters of equipment and User/Maintenance Manual must be provided. |
| | | BNC Male to TNC Male cable |
| | | N Male to BNC Female Adapter |
| | | TNC Male to BNC Female Adapter |
| | | Spare Internal Battery |
| | | External Battery charger |
| | | Power Cord |
| | | DC Cord/Cigarette adapter |
| | | Antenna |
| | | Microphone |
| | | Oscilloscope Probe |
| | | 24V to 12V converter |
| | | Soft carry case |
| | | Hard Transit case |
| | | Remote front Panel |
| | | Operational Manual Hard/Soft Copy |
| | | Technical Manual Hard/Soft Copy |