# VIAVI Solutions

## VIAVI 8800SX

Digital Radio Test Set

### General Specifications

<table>
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<th>User Interface</th>
<th>RF Generator (continued)</th>
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<tbody>
<tr>
<td><strong>Dimensions</strong></td>
<td><strong>Output Level</strong></td>
</tr>
<tr>
<td>13.50 in (W) x 11.54 in (L) x 5.75 in (D)</td>
<td>Range T/R Port: -50 to -125 dBm</td>
</tr>
<tr>
<td>34.3 cm (W) x 29.3 cm (L) x 14.6 cm (D)</td>
<td>ANT Port: -30 to -90 dBm</td>
</tr>
<tr>
<td><strong>Display Size</strong></td>
<td>GEN Port: -5 to -65 dBm</td>
</tr>
<tr>
<td>30.5 cm (12 in)</td>
<td><strong>Accuracy</strong> ±2 dB; ±1.5 dB (Typ)</td>
</tr>
<tr>
<td><strong>Weight</strong></td>
<td><strong>Resolution</strong> 1 dB</td>
</tr>
<tr>
<td>7.71 kg (17 lbs) Base Unit</td>
<td>0.1 dB (0 to -6 relative to selected level); HOLD ATTEN: ON</td>
</tr>
<tr>
<td><strong>Internal Battery</strong></td>
<td><strong>Port VSWR</strong></td>
</tr>
<tr>
<td>2.5+ Hour at Full Backlight</td>
<td>ANT Port &lt;1.5:1 Typical</td>
</tr>
<tr>
<td><strong>Rugged</strong></td>
<td>GEN Port &lt;1.5:1 Typical</td>
</tr>
<tr>
<td>30 G Shock, MIL-STD 28800F Class 3</td>
<td>T/R Port &lt;1.2:1</td>
</tr>
<tr>
<td><strong>Direct Input Power</strong></td>
<td>SSB Phase Noise</td>
</tr>
<tr>
<td>50 W Continuous, 125 W Cyclical</td>
<td>-90 dBc/Hz at 20 kHz offset</td>
</tr>
<tr>
<td><strong>In-Line Power Meter</strong></td>
<td>-95 dBc/Hz at 1 GHz at 20 kHz offset, Typical</td>
</tr>
<tr>
<td>500 W, 4% Accuracy</td>
<td><strong>Spurious</strong></td>
</tr>
<tr>
<td><strong>Record &amp; Playback</strong></td>
<td>Harmonics: -30 dBc, -42 dBc Typical</td>
</tr>
<tr>
<td>Digital Audio Quality</td>
<td>Non-Harmonics: -40 dBc, -50 dBc Typical (±20 kHz offset from carrier; 0 to 1 GHz)</td>
</tr>
<tr>
<td><strong>Quick Presets</strong></td>
<td>Residual FM</td>
</tr>
<tr>
<td>Ultra-Fast Test Setup</td>
<td>&lt;20 Hz rms in 300 Hz to 3 kHz BW</td>
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<tr>
<td><strong>Frequency Lists</strong></td>
<td>&lt;4 Hz rms, Typical &lt;100 MHz</td>
</tr>
<tr>
<td>Tx Frequency, Tx Level; Rx Frequency</td>
<td>&lt;6 Hz rms, Typical &lt;800 MHz</td>
</tr>
<tr>
<td><strong>Fast Stack</strong></td>
<td>&lt;1 Hz rms, Typical &gt;800 MHz</td>
</tr>
<tr>
<td>Instant Access to Multiple Meters</td>
<td><strong>Residual AM</strong></td>
</tr>
<tr>
<td><strong>Tracking Generator</strong></td>
<td>&lt;0.5% rms in 300 Hz to 3 kHz BW</td>
</tr>
<tr>
<td>VSWR, Return Loss, Distance-to-Fault, Tuning Duplexers</td>
<td><strong>RF Generator Modulation</strong></td>
</tr>
<tr>
<td><strong>LMR System Support</strong></td>
<td><strong>RF Generator Modulation Type</strong></td>
</tr>
<tr>
<td>P25</td>
<td>Group Modulation</td>
</tr>
<tr>
<td>P25 Phase II</td>
<td>Analog None, FM and AM</td>
</tr>
<tr>
<td>DMR</td>
<td>Digital P25 (C4FM, H-CPM, H-DQPSK), DMR, dPMR, ARIB T98, NXDN™, PTC</td>
</tr>
<tr>
<td>NXDN™</td>
<td>DTMF None, FM and AM</td>
</tr>
<tr>
<td>dPMR</td>
<td>DCS None, FM and AM</td>
</tr>
<tr>
<td>ARIB T98</td>
<td>Two-Tone Sequential None, FM and AM</td>
</tr>
<tr>
<td>AM/FM</td>
<td>Tone Remote None, FM and AM</td>
</tr>
<tr>
<td>PTC</td>
<td>Tone Sequential None, FM and AM</td>
</tr>
</tbody>
</table>

### RF Generator

<table>
<thead>
<tr>
<th><strong>Port Input Protection</strong></th>
<th><strong>Frequency</strong></th>
</tr>
</thead>
<tbody>
<tr>
<td>GEN Port</td>
<td><strong>Range</strong> 2 MHz to 1000 MHz &lt;2 MHz to 100 kHz Usable Range</td>
</tr>
<tr>
<td>T/R Port</td>
<td><strong>Accuracy</strong> Same as timebase</td>
</tr>
<tr>
<td>T/R Port</td>
<td><strong>Range</strong> 1 Hz</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th><strong>Output Level</strong></th>
<th><strong>Port VSWR</strong></th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Range</strong> T/R Port: -50 to -125 dBm</td>
<td>ANT Port &lt;1.5:1 Typical</td>
</tr>
<tr>
<td>ANT Port: -30 to -90 dBm</td>
<td>GEN Port &lt;1.5:1 Typical</td>
</tr>
<tr>
<td>GEN Port: -5 to -65 dBm</td>
<td>T/R Port &lt;1.2:1</td>
</tr>
<tr>
<td><strong>Accuracy</strong> ±2 dB; ±1.5 dB (Typ)</td>
<td>SSB Phase Noise</td>
</tr>
<tr>
<td><strong>Resolution</strong> 1 dB</td>
<td>-90 dBc/Hz at 20 kHz offset</td>
</tr>
<tr>
<td>0.1 dB (0 to -6 relative to selected level); HOLD ATTEN: ON</td>
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<td><strong>Port VSWR</strong></td>
<td><strong>Spurious</strong></td>
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<td>GEN Port &lt;1.5:1 Typical</td>
<td>Non-Harmonics: -40 dBc, -50 dBc Typical (±20 kHz offset from carrier; 0 to 1 GHz)</td>
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<tr>
<td>T/R Port &lt;1.2:1</td>
<td>Residual FM</td>
</tr>
<tr>
<td>SSB Phase Noise</td>
<td>&lt;20 Hz rms in 300 Hz to 3 kHz BW</td>
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<tr>
<td>-90 dBc/Hz at 20 kHz offset</td>
<td>&lt;4 Hz rms, Typical &lt;100 MHz</td>
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<tr>
<td>-95 dBc/Hz at 1 GHz at 20 kHz offset, Typical</td>
<td>&lt;6 Hz rms, Typical &lt;800 MHz</td>
</tr>
<tr>
<td><strong>Residual AM</strong></td>
<td>&lt;1 Hz rms, Typical &gt;800 MHz</td>
</tr>
<tr>
<td>&lt;0.5% rms in 300 Hz to 3 kHz BW</td>
<td><strong>RF Generator Modulation</strong></td>
</tr>
<tr>
<td><strong>RF Generator Modulation Type</strong></td>
<td><strong>Group</strong> Modulation</td>
</tr>
<tr>
<td>Analog</td>
<td>None, FM and AM</td>
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<td>P25 (C4FM, H-CPM, H-DQPSK), DMR, dPMR, ARIB T98, NXDN™, PTC</td>
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<td>Two-Tone Sequential</td>
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<td>Tone Remote</td>
<td>None, FM and AM</td>
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<tr>
<td>Tone Sequential</td>
<td>None, FM and AM</td>
</tr>
</tbody>
</table>
### RF Generator Modulation (continued)

#### FM Modulation - Internal (GEN 1, GEN 2)

**Modulation Frequency Range**
- **Range:** 0 Hz to 20 kHz
- **Resolution:** 0.1 Hz
- **Accuracy:** Timebase ±2 Hz
- **FM Deviation Range:**
  - Range: Off
  - Resolution: 1 Hz
  - **Accuracy:** ±5% at 1 kHz rate; 2 kHz to 50 kHz deviation (±1% typical)
  - ±10% at 150 Hz to 3 kHz rate; 2 kHz to 50 kHz deviation

#### Total Harmonic Distortion:**
- 3% (1000 Hz rate; >2 kHz Deviation, 300 Hz - 3 kHz BP filter)
- Resolution: 1 Hz
- Accuracy: ±5% at 1 kHz rate; 2 kHz to 50 kHz deviation (±1% typical)
- ±10% at 150 Hz to 3 kHz rate; 2 kHz to 50 kHz deviation

#### FM Modulation - External (MIC, AUDIO IN)

**Microphone In**
- **Alternate MIC Configurations**
  - Range 1: 2-15 mVrms (8 mVrms Typical)
    - Pin 2-OPEN, Pin 6-GND
  - Range 2: 35-350 mVrms (100 mVrms Typical)
    - Pin 2-GND, Pin 6-OPEN
    - (Range 2 enables a nominal 3 Vdc bias voltage)
  - Range 3: 2-32 mVrms (20 mVrms Typical)
    - Pin 2-OPEN, Pin 6-OPEN

- **MIC Frequency Range:**
  - 300 Hz to 3 kHz
- **MIC Level:**
  - Off, 0 Hz to 80 kHz
- **MIC Modulation Accuracy:**
  - ±20% (300 Hz to 1.2 kHz)
  - ±30% (>1.2 kHz)
- **MIC Slope:**
  - Positive voltage yields positive deviation

**Audio In**
- **AUD IN Input Range:** 30 V, 3 V
- **AUD IN Switchable Loads**
  - 3 V Range: 150 ohms, 600 ohms, 1 k ohms, High Z
  - 30 V Range: High Z
- **AUD IN Input Levels**
  - 3 V Range: 0.05 to 3.2 Vrms
  - 30 V Range: 3 Vrms - 30 Vrms
- **AUD IN AM Frequency Range**
  - 300 Hz to 5 kHz
- **AUD IN Level Sensitivity**
  - 3 V Range: 1% / 35 mVrms Typical (High Z Load)
  - 30 V Range: 1% / 35 Vrms Typical (High Z Load)

#### AM Modulation - Internal (GEN 1, GEN 2)

**Modulation Frequency Range**
- **Range:** 0 Hz to 20 kHz
- **Resolution:** 0.1 Hz
- **Accuracy:** Timebase ±2 Hz
- **Range:** Off, 0 Hz to 100% (GEN1 and GEN2 Selectable)
- **Resolution:** 0.1%
- **Total Harmonics Distortion:**
  - 3% (20% to 90% mod, 1000 Hz rate, 300 Hz to 3 kHz BP filter)
- **Modulation Accuracy:**
  - 10% setting, 150 Hz to 5 kHz rate
  - 10% to 90% modulation

#### AM Modulation - External (MIC, AUDIO IN)

**Microphone In**
- **Alternate MIC Configurations**
  - MIC Connector Pins
- **Range 1:** 2-15 mVrms (8 mVrms Typical)
  - Pin 2-OPEN, Pin 6-GND
- **Range 2:** 35-350 mVrms (100 mVrms Typical)
  - Pin 2-GND, Pin 6-OPEN
  - (Range 2 enables a nominal 3 Vdc bias voltage)
- **Range 3:** 2-32 mVrms (20 mVrms Typical)
  - Pin 2-OPEN, Pin 6-OPEN

**MIC Frequency Range:**
- 300 Hz to 3 kHz

**MIC Modulation Accuracy**
- ±20% (300 Hz to 1.2 kHz)
- ±30% (>1.2 kHz)

**Audio In**
- **AUD IN Input Range:** 30 V, 3 V
- **AUD IN Switchable Loads**
  - 3 V Range: 150 ohms, 600 ohms, 1 k ohms, High Z
  - 30 V Range: High Z
- **AUD IN Levels**
  - 3 V Range: 0.05 to 3.2 Vrms
  - 30 V Range: 3 Vrms - 30 Vrms
- **AUD IN AM Frequency Range**
  - 300 Hz to 5 kHz
- **AUD IN Level Sensitivity**
  - 3 V Range: 1% / 35 mVrms Typical (High Z Load)
  - 30 V Range: 1% / 35 Vrms Typical (High Z Load)

#### AFG1 and AFG2

**Frequency**
- **Range:** 0.0 Hz to 20.0 kHz
- **Resolution:** 0.1 kHz
- **Accuracy:** Timebase ±2 Hz

**Output Level**
- **Audio Out Port Impedance:** <1 ohm
- **Audio Level Out**
  - 0 Vrms to 1.57 Vrms
- **Resolution:** 0.001 Vrms
- **Accuracy:** ±10%; >100 mVrms, 30 Hz to 3 kHz
- **Distortion:** <3% (1 kHz rate, sine 300 Hz to 3 kHz)

#### RF Receiver

**Port Input Protection**
- **ANT Port**
  - ±20 dBm (Input Power Alarm Typical)
- **T/R Port**
  - ±52 dBm CW
- **T/R Port**
  - >+90°C (Temperature Alarm Typical)

**Frequency**
- **Range:** 2 MHz to 1000 MHz
- **Accuracy:** Same as Timebase
- **Resolution:** 1 Hz
### RF Receiver (continued)

#### Input Amplitude

<table>
<thead>
<tr>
<th>Sensitivity</th>
<th>ANT: -80 dBm, typical 10 dB SINAD (-110 dBm with preamp) T/R: -40 dBm, typical, 10 dB SINAD</th>
</tr>
</thead>
</table>

<table>
<thead>
<tr>
<th>Minimum Level Receiver Measurements</th>
<th>ANT: -60 dBm Preamp off, -80 dBm Preamp On, RF Error Meter T/R: -20 dBm Preamp Off, -40 dBm Preamp On, RF Error Meter</th>
</tr>
</thead>
</table>

<table>
<thead>
<tr>
<th>DEMOD Meters</th>
<th>ANT: Distortion, SINAD, Modulation, AF Counter T/R: Modulation, Distortion, SINAD, AF Counter</th>
</tr>
</thead>
</table>

<table>
<thead>
<tr>
<th>Maximum Input Level Receiver Measurements</th>
<th>ANT: +10 dBm (Auto, Preamp off) T/R: +47 dBm CW, FM +41 dBm AM</th>
</tr>
</thead>
</table>

### Receiver Demodulation Types

- AM, FM, DMR, dPMR, ARIB T98, NXDN, P25 (C4FM, H-CPM, H-DQPSK), PTC

### AM Modulation - External (MIC, AUDIO IN)

<table>
<thead>
<tr>
<th>IF Bandwidth</th>
<th>FM: 5 kHz, 6.25 kHz, 8.33 kHz, 10 kHz, 12.5 kHz, 25 kHz, 30 kHz, 100 kHz, 300 kHz AM: 5 kHz, 6.25 kHz, 8.33 kHz, 10 kHz, 12.5 kHz, 25 kHz, 30 kHz</th>
</tr>
</thead>
<tbody>
<tr>
<td>Audio Filter Bandwidth</td>
<td>FM: C-WT BP, CCITT BP, NONE, 15 kHz LP, 300 Hz LP, 300 Hz HP, 5 kHz LP, 300 Hz to 5 kHz BP, 300 Hz to 3 kHz BP, 300 Hz to 20 kHz BP, 3 kHz LP AM: C-WT BP, CCITT BP, NONE, 15 kHz LP, 0.3 kHz LP, 0.3 kHz HP, 5 kHz LP, 300 Hz to 5 kHz BP, 300 Hz to 3 kHz BP, 0.3 kHz to 20 kHz BP, 3 kHz LP</td>
</tr>
<tr>
<td>Audio Output, Level Sensitivity</td>
<td>FM: 3 Vrms/kHz Dev/IF BW (kHz, ±15%) AM: 7 mVrms/% AM, ±15%</td>
</tr>
<tr>
<td>LO EMISSIONS</td>
<td>≤-50 dBc</td>
</tr>
</tbody>
</table>

### RF Frequency Error Meter

<table>
<thead>
<tr>
<th>Units</th>
<th>Hz, PPM</th>
</tr>
</thead>
<tbody>
<tr>
<td>Range</td>
<td>±200 kHz, ±1000 PPM</td>
</tr>
<tr>
<td>Resolution</td>
<td>1 Hz</td>
</tr>
<tr>
<td>Accuracy</td>
<td>Timebase ±1 Hz</td>
</tr>
</tbody>
</table>

### RSSI (Receive Signal Strength Indicator) RF Power Within Receiver IF Bandwidth

<table>
<thead>
<tr>
<th>Units</th>
<th>dBm, Watts, microWatts</th>
</tr>
</thead>
<tbody>
<tr>
<td>Range</td>
<td>-120 dBm to +60 dBm</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>RF Level Range</th>
<th>T/R Port (preamp off): -50 dBm to +47 dBm ANT Port (preamp off): -90 dBm to +10 dBm ANT Port (preamp on): -110 dBm to -10 dBm</th>
</tr>
</thead>
<tbody>
<tr>
<td>Resolution</td>
<td>0.01 dBm</td>
</tr>
<tr>
<td>Accuracy</td>
<td>±3 dB; (1.5 Typical) Normalized</td>
</tr>
<tr>
<td>Ext Attenuation</td>
<td>-50 to +50 dB, 0.01 dB resolution</td>
</tr>
</tbody>
</table>

### RF Power Meter (Broadband RF Power Into T/R Port)

<table>
<thead>
<tr>
<th>Maximum Input Level</th>
<th>50 Watts continuous, +25°C, ±10°C</th>
</tr>
</thead>
<tbody>
<tr>
<td>Alarms</td>
<td>+49 dBm (Input RF Power Alarm) &gt;+90°C (+194°F) (Temperature Alarm)</td>
</tr>
<tr>
<td>Meter Range</td>
<td>+20 to +53 dBm</td>
</tr>
<tr>
<td>Meter Floor</td>
<td>0.10 W/+20 dBm</td>
</tr>
<tr>
<td>Averaging Range</td>
<td>1 to 99</td>
</tr>
<tr>
<td>Display Units</td>
<td>Watts, dBm</td>
</tr>
<tr>
<td>Resolution</td>
<td>0.01 W, 0.01 dBm</td>
</tr>
<tr>
<td>Accuracy</td>
<td>10% of reading, (6% Typical) Ext Attenuation -50 to +50 dB, 0.01 dB resolution</td>
</tr>
</tbody>
</table>

### FM Deviation Meter

<table>
<thead>
<tr>
<th>Range</th>
<th>500 Hz to ±100 kHz</th>
</tr>
</thead>
<tbody>
<tr>
<td>Meter Type</td>
<td>Peak+, Peak-, (Peak-Peak)/2, RMS</td>
</tr>
<tr>
<td>Resolution</td>
<td>0.01 Hz</td>
</tr>
<tr>
<td>Accuracy</td>
<td>±10% of reading, 500 Hz to 100 kHz Deviation ±5% of reading, 1 kHz to 10 kHz Deviation (150 Hz to 1 kHz rate) ±3% of reading, 1 kHz to 10 kHz Deviation (1 kHz to 1.5 kHz rate)</td>
</tr>
</tbody>
</table>

### AM Percent Meter

<table>
<thead>
<tr>
<th>Range</th>
<th>5% to 100%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Modes</td>
<td>Peak+, Peak-, (Peak-Peak)/2, RMS</td>
</tr>
<tr>
<td>Resolution</td>
<td>0.001%</td>
</tr>
<tr>
<td>Accuracy</td>
<td>±5% of reading, 1 kHz rate 30% to 90% modulation, 3 kHz LPF</td>
</tr>
</tbody>
</table>

### SINAD Meter

<table>
<thead>
<tr>
<th>Measurement Sources</th>
<th>AUD IN, Demod</th>
</tr>
</thead>
<tbody>
<tr>
<td>DEMOD</td>
<td>FM: &gt;2 kHz Deviation (IF BW set appropriately for received modulation BW) AM: &gt;25% Modulation (IF BW set appropriately for received modulation BW)</td>
</tr>
</tbody>
</table>

### AUDIO IN Port

<table>
<thead>
<tr>
<th>Frequency Range</th>
<th>300 Hz to 10 kHz</th>
</tr>
</thead>
<tbody>
<tr>
<td>Input Level</td>
<td>3 V (Audio Config setup): 0.9 Vp-p to 9 Vp-p 30 V (Audio Config setup): 9 Vp-p to 90 Vp-p</td>
</tr>
<tr>
<td>Audio Frequency Notch</td>
<td>1 kHz</td>
</tr>
<tr>
<td>Reading Range</td>
<td>0 dB to 60 dB</td>
</tr>
<tr>
<td>Resolution</td>
<td>0.001 dB</td>
</tr>
<tr>
<td>Accuracy</td>
<td>±1.5 dB, reading &gt;8 dB, &lt;40 dB</td>
</tr>
</tbody>
</table>
### Distortion Meter

**Measurement Sources** AUD IN, Demod

- **DEMOD**
  - FM: >2 kHz Deviation (IF BW set appropriately for received modulation BW)
  - AM: >25% Modulation (IF BW set appropriately for received modulation BW)

### Audio IN Port

**Frequency Range** 300 Hz to 10 kHz

**Input Level**
- 3 V (Audio Config setup): 0.9 Vp-p to 9 Vp-p
- 30 V (Audio Config setup): 9 Vp-p to 90 Vp-p

**Audio Frequency Notch** 1 kHz

**Reading Range** 0% to 100%

**Resolution** 0.001%

**Accuracy** ±10% of reading +0.1% Distortion, >1% to <20%

### Audio Frequency Counter

**Measurement Sources** AUD IN, Demod

- **DEMOD**
  - FM: 15 Hz to 20 kHz Rate (IF BW set appropriately for received modulation BW)
  - AM: 100 Hz to 10 kHz Rate (IF BW set appropriately for received modulation BW)

### AUDIO IN PORT

**Frequency Range** 300 Hz to 20 kHz

**Input Level**
- 3 V (Audio Config setup): 28 mVp-p to 9 Vp-p
- 30 V (Audio Config setup): 280 mVp-p to 90 Vp-p

**Frequency Range** 15 Hz to 20 kHz

**Resolution** 0.1 Hz

**Accuracy** ±1 Hz

### Audio Frequency Level Meter

**Measurement Sources** AUD IN, SCOPE

- **Input Range**
  - Aud In Range: 3 V, 30 V
  - Scope Range: 2 VDC, 40 VDC
  - Frequency Range: 200 Hz to <5 kHz

- **Load Selection**
  - Scope: High Z
  - Aud In: 3 V Input Range: High Z, 150 ohms, 600 ohms, 1 Kohms
  - 30 V Input Range: 10 K

### Input Level

- **Aud In Port**
  - 3 V Range: 10 mV rms to 3.2 V rms
  - 30 V Range: 1 V rms to 30 V rms

- **Scope Port**
  - 2.0 VDC Range: 10 mV rms to 1 V rms
  - 40 VDC Range: 1 V rms to 28.28 V rms

- **Display Unit**
  - Resolution: Volts: 0.001 V
  - mV: 0.001 mV
  - dBuV: 0.001 dBuV
  - dBm: 0.001 dBm
  - Watts: 0.001 W

**Accuracy** ±5% AUD IN Port

### P25 MEASUREMENTS

#### Modulation Fidelity

- **Range** 0 to 10%

- **Resolution** 0.1%

- **Accuracy** <5.0% of reading (2.5 to 10%)

#### Symbol Deviation

- **Range** 1620 to 1980 Hz

- **Resolution** 0.1 Hz

- **Accuracy** ±10 Hz (1620 to 1980 Hz)

#### Symbol Clock Error

- **Range** ±12 ppm

- **Resolution** 0.01 ppm

- **Accuracy** 1 ppm (±0.0048 Hz)

### DMR MEASUREMENTS

#### FSK Error

- **Range** 0 to 10%

- **Resolution** 0.1%

- **Accuracy** <5.0% of reading (2.5 to 10%)

#### Symbol Deviation

- **Range** 1745 to 2140 Hz

- **Resolution** 0.1 Hz

- **Accuracy** ±10 Hz

#### Symbol Clock Error

- **Range** ±12 ppm

- **Resolution** 0.01 ppm

- **Accuracy** ±1 ppm (±0.0048 Hz)

### Oscilloscope

- **Source** SCOPE, AUD IN, Demod

- **Bandwidth** 5 kHz

#### Input Impedance

- **Scope Input** 2.0 V Range: 53 K ohm
  - 40 V Range: 1 M ohm

- **Audio I/O Input** 3 V Range: 150 ohm, 600 ohm, 1 k ohm, High Z
  - 30 V Range: 10 k ohm

- **Coupling** Scope: AC, DC and GND
  - Audio In: AC only
  - FM Internal Demod: DC
  - AM Internal Demod: AC
### Oscilloscope (continued)

**Vertical Range**
- **Scope, Audio In**: 10 mV to 10 V-div in a 1, 2, 5 sequence
- **FM Internal Demodulation**: 0.1 kHz to 50 kHz/div in a 1, 2, 5 sequence
- **AM Internal Demodulation**: 5, 10, 20, 50%/div
- **Vertical Accuracy**: 10% of full scale (DC to 5 kHz)
- **Horizontal Sweep**: 0.5 ms/div to 0.1 sec/div
- **Horizontal Accuracy**: 3% of full scale

**Markers**
- Two markers displays vertical measurement (Voltage, kHz, % modulation)
- Displays Delta in time between markers

**FM Internal Demodulation**
- 0.1 kHz to 50 kHz/div in a 1, 2, 5 sequence

**AM Internal Demodulation**
- 5, 10, 20, 50%/div

**Vertical Accuracy**
- 10% of full scale (DC to 5 kHz)

**Horizontal Sweep**
- 0.5 ms/div to 0.1 sec/div

**Horizontal Accuracy**
- 3% of full scale

**Trigger Type**
- Internal (Auto, Normal)

**Trigger Level**
- Variable on vertical scale

### Channel Analyzer

**Range**
- 2 MHz to 1 GHz

**Span**
- 10 kHz to 5 MHz (1, 2, 5 steps)

**Windows**
- Hanning, Flat Top, Rectangle

**Vertical Scale**
- 2, 5, 10, 15, 20 dB/div

**Marker Bandwidth**
- 1 kHz to 5 MHz (1, 2, 5 steps)

**Marker Offset**
- ±1 kHz to ±1/2 Span (1, 2, 5 steps)

**Power Band Width (PdB) Accuracy**
- ±3 dB typical (30 dB signal to noise)

**Noise Floor**
- -123 dBm (preamp off)
- -140 dBm (preamp on) (span 100 kHz), typical

### Digital Multimeter (DMM)

**AC/DC Voltmeter**
- **Range**: 200 mV, 2 V, 20 V, 200 V, 2000 V, Auto (150 VAC RMS to VDC MAX input, Category II)
- **Resolution**: 3.5 digits (2000 counts)
- **Accuracy**
  - DC: ±1% FS ±1 count
  - AC: ±5% FS ±1 count +25 mV

**AC/DC Ammeter**
- **Range**: 200 mA, 2 A, 20 A, Auto (20 A range uses optional shunt connected to Voltmeter)
- **Maximum Open Circuit Input Voltage**: 30 V RMS referenced to COMMON or EARTH GROUND, Category I
- **Resolution**: 3.5 digits (2000 counts)
- **Accuracy**
  - DC: ±5% FS ±1 count
  - AC: ±5% FS ±1 count

**AC Volts Frequency Range**
- 50 Hz to 10 kHz

**Ohmter**
- **Range**: 200 ohms, 2 k ohms, 20 k ohms, 200 k ohms, 2 M ohms, 20 M ohms, Auto
- **Resolution**: 3.5 digits (2000 counts)
- **Accuracy**: ±5% FS ±1 count

### In-Line Power Meter

**RF Measurement Type**
- Average Power, Peak, Burst, Crest, CCDF

**Frequency Range**
- 25 MHz to 1 GHz

**Power Range**
- 500 mW to 500 W Average
- 13.3 W to 13000 W Peak

**Insertion VSWR**
- <1.05

**Insertion Loss**
- <0.05 dB

**Directivity**
- 29 dB up to 50 MHz
- 30 dB from 51 to 1000 MHz

### Average Power

**Average Forward Power Range**
- 500 mV to 200 W Average

**Peak/Average Ratio, Max**
- 12 dB

**Accuracy, Average Forward Power**
- ±4% of reading +166 mW
- Maximum accuracy performance at 25°C (±10°C) (77°F ±50°F)

**Return Loss**
- 0 to 23 dB

**VSWR**
- 115 to 99.9

### Burst Average Power

**Peak Envelope Power**
- Burst Average Power Range
  - 13.5 W to 500 W Average

**Burst Width**
- 1 µs to 5 ms

**Repetitions Rate Min**
- 200 Hz

**Duty Cycle (D)**
- 0.001 to 1.0 (D=Burst Width/Period)

**Accuracy, Burst Average Power**
- ±6% of reading +0.116/D mW

**Crest Factor**
- Measurement Range
  - 500 mW to 300 W, 13.3 W Minimum Peak

**Measurement Range**
- 0.1 to 100%

**Threshold Measurement Range**
- 13.5 to 500 W

**Uncertainty**
- ±0.2%

**Level Set Accuracy**
- As Peak Envelope, Power Accuracy +2.0%

### Speaker Output

**Speaker**
- On or OFF

**Output**
- 75 dBA min at 0.5 m, 600 to 1800 Hz, max volume
- Speaker disconnects when headphones installed.
**Volume Control**

- **Level Range**: Scale 0 to 100

**Timebase**

- **Temperature Stability**: ±0.15 ppm at -20°C to 70°C (-4°F to 158°F)
- **Aging**
  - 0.5 ppm/First Year
  - 0.3 ppm/After First Year

**External 10 MHz Reference Input**

- **External Input Frequency Range**: 10 MHz ±150 Hz
- **External Input Level**: -10 dBm to +10 dBm
- **Max Input**: +15 dBm

**Freq-Flex (Externally Referenced Timebase Calibration)**

- **Input Frequency Range**: 2 MHz to 1000 MHz
- **Reference Input Port**: T/R: >-20 dBm
  - Antenna: >-40 dBm
- **Freq-Flex Accuracy**: <0.5 Hz from external source applied + Stability + Aging
  - Example: 10 MHz External Input, after Freq-Flex = ±0.5 Hz from external input.

**I/O Connections**

- **T/R Connector Type**: N-Type Female
- **ANT Connector Type**: N-Type Female
- **GEN Connector Type**: N-Type Female
- **Scope Connector Type**: BNC Female
- **AUD IN Connector Type**: BNC Female
- **AUD OUT Connector Type**: BNC Female
- **Headphone Jack**: 3.5 mm Jack
- **USB Connectors (Qty 3)**: Type: USB Type A
- **External 10 MHz Reference Input**: BNC Female
- **Ethernet Connector Type**: RJ45
- **DC Power in Connector**: 2-position 2.5 mm Jack
- **GND Connector**: Banana
- **DMM (Qty 3)**: Banana (Optional)
- **IN (In-Line Power Meter)**: N-Type Female (Optional)
- **OUT (In-Line Power Meter)**: N-Type Female (Optional)

**Front Panel Indicators**

- **SYS Indicator**: Green: 88XX Power On/Awake Mode
  - Blue: 88XX Sleep Mode
  - Red: 88XX Shutting Down
  - Green/Red Flashing: Battery Temperature >60°C (>140°F)
  - Green Flashing: Battery Life <5%
- **BAT Indicator**: Green: Battery at full charge
  - Amber: Battery is charging

**Microphone Connector**

- **6 PIN MIC CONNECTOR**

<table>
<thead>
<tr>
<th>Pin Number</th>
<th>Name</th>
<th>Characteristic</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>GROUND</td>
<td>75 dBA min at 0.5 m, 600 to 1800 Hz, max volume</td>
</tr>
<tr>
<td>2</td>
<td>SPEAKER+</td>
<td>Output</td>
</tr>
<tr>
<td>3</td>
<td>PTT</td>
<td>Input</td>
</tr>
<tr>
<td>4</td>
<td>Mic/Audio</td>
<td>Input</td>
</tr>
<tr>
<td>5</td>
<td>MICSEL 1</td>
<td>GND, open with pullup</td>
</tr>
<tr>
<td>6</td>
<td>MICSEL 2</td>
<td>GND, open with pullup</td>
</tr>
</tbody>
</table>

**Environmental/Physical**

- **Overall Dimensions**: 34.3 cm (W) x 29.3 cm (L) x 14.6 cm (D)
  - 13.5 in (W), 11.54 in (L) x 5.75 in (D)
- **Weight**: 17 lbs (No hardware options installed)
- **Temperature**: Storage: -40°C to +71°C (-40°F to +159.8°F), MIL-PRF-28800F, Class 3
  - Note: Battery must not be subjected to temperatures below -20° C, nor above +60° C
- **Relative Humidity**: Operation 5 to 95%, tested in accordance with MIL-PRF-28800F, Class 3
- **Altitude**: Battery Only Operation 4,600 m (MIL-PRF-28800F, Class 3)
  - AC Power Supply Operation 3,048 m (MIL-PRF-28800F, Class 3)
- **Shock, Functional**: Operation 30 G Shock (Functional Shock), tested in accordance with MIL-PRF-28800F, Class 3
- **Vibration**: Operation 5 to 500 Hz random vibrations, tested in accordance with MIL-PRF-28800F, Class 3
- **Bench Handling**: Operation Tested in accordance with MIL-PRF-28800F, Class 3

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1: Battery operation over temperature based on actual temperature rise of battery and instrument usage
2: Battery must not be subjected to temperature below -20° C nor above +60° C
### Environmental/Physical (continued)

<table>
<thead>
<tr>
<th>Compliance</th>
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</thead>
<tbody>
<tr>
<td><strong>EMC</strong></td>
</tr>
</tbody>
</table>
| Emissions and Immunity | MIL-PRF-28800F, Class 3  
EN61326-1, Class A  
EN61000-3-2  
EN61000-3-3 |
| Safety | UL 61018-1  
EN61010-1  
CSA C22.2 No 61010-1 |
| Reliability | 20,000 hours at 25°C (77°F) |

<table>
<thead>
<tr>
<th>AC Input Power (AC to DC Converter/Charger Unit)</th>
</tr>
</thead>
<tbody>
<tr>
<td>AC Input Voltage Range</td>
</tr>
<tr>
<td>AC Input Voltage Fluctuation</td>
</tr>
<tr>
<td>Transient Overvoltage</td>
</tr>
<tr>
<td>Usage Environment</td>
</tr>
<tr>
<td>Operating Temperature</td>
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<tr>
<td>Storage Temperature</td>
</tr>
<tr>
<td>EMI</td>
</tr>
<tr>
<td>Safety</td>
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</table>

<table>
<thead>
<tr>
<th>DC Input Power</th>
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<tbody>
<tr>
<td>Voltage Range</td>
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<tr>
<td>Maximum Power</td>
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<tr>
<td>Typical Power</td>
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<tr>
<td>Fused</td>
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</tbody>
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<table>
<thead>
<tr>
<th>Supplemental Items</th>
</tr>
</thead>
<tbody>
<tr>
<td>Battery Type</td>
</tr>
<tr>
<td>Note: Battery must not be subjected to temperatures below -20°C, nor above +60°C</td>
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<table>
<thead>
<tr>
<th>Battery Operation Time</th>
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</thead>
<tbody>
<tr>
<td>100% Backlight</td>
</tr>
<tr>
<td>Minimum Backlight (still viewable)</td>
</tr>
<tr>
<td>Battery Charge Time</td>
</tr>
<tr>
<td>Note: Battery to be charged at temperatures between 0°C and +45°C (32°F and +113°F)</td>
</tr>
<tr>
<td>Charge dead battery (&lt;10% capacity) for 20 minutes before operation on external DC power</td>
</tr>
</tbody>
</table>