

## **TECHNICAL SPECIFICATION FOR RF (TEST & MEASUREMENT) DEVICE**

Test and measuring device supports the following measurement functions:

*A- Cable and Antenna Analyzer, 2 MHz to 4 GHz.*

*B- Spectrum Analyzer, 100 kHz to 4 GHz.*

*C- Power Meter.*

*D- Interference Analyzer.*

*E- Channel Scanner .*

*F- GPS Receiver .*

*G- High Accuracy Power Meter.*

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### *A- Cable and antenna analyzer*

#### **1- Measurements.**

VSWR\_ Return Loss\_ Cable Loss\_ Distance-to-Fault (DTF) Return Loss\_ Distance-to-Fault (DTF) VSWR\_ 1-Port Phase\_ Smith Chart.

#### **2- Frequency.**

**Frequency Range** 2MHz TO 4GHz.

**Frequency Accuracy**  $\leq \pm 2.5$  ppm @ 25 °C

**Frequency Resolution** 1kHz, (RF immunity low) 100 kHz, (RF Immunity high)

#### **3- Output Power.**

**High** 0 dBm ,typical.

**Low** -30dBm,typical.

#### **4- Interference Immunity.**

**On-Channel** +17 dBm @ > 1.0 MHz from carrier frequency

**On-Frequency** 0 dBm within  $\pm 10$  kHz of the carrier frequency

#### **5- Return Loss.**

**Measurement Range** 0 to 60 dB

**Resolution** 0.01 db

**6- VSWR.**

**Measurement Range** 0 to 65

**Resolution** 0.01

**7- Cable Loss.**

**Measurement Range** 0 to 30dB

**Resolution** 0.01 dB

**8- Distance-to-Fault.**

**Vertical Range Return Loss** 0 to 60 dB.

**Vertical Range VSWR** 1 to 65.

**Fault Resolution (meters)**  $(1.5 \times 10^8 \times v_p) / \Delta F$  ( $v_p$  = velocity propagation constant,  $\Delta F$  is F2-F1 in Hz).

**Horizontal Range (meters)** 0 to (Data Points-1) x Fault Resolution, to a maximum of 1500 meters (4921 ft).

**9- 1-Port Phase.**

**Measurement Range** -180° to +180°

**Resolution** 0.01°

**10 -Smith Chart.**

**Resolution** 0.01

**11-Measurement Accuracy.**

**Corrected Directivity** > 42 dB, OSL Calibration

> 38 dB, InstaCal™ Calibration

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**B-Spectrum Analyzer**

**1- Measurements.**

Field Strength - Occupied Bandwidth - Channel Power - ACPR - AM/FM/SSB Demodulation - Coverage Mapping - C/I - Emission Mask.

**2- Frequency.**

**Frequency Range** 100 kHz to 4 GHz,

**Frequency Reference** Aging:  $\pm 1.0$  ppm/year

Accuracy:  $\pm 1.5$  ppm (25 °C  $\pm$  25 °C)

**Frequency Span** 10 Hz to 4 GHz including zero span  
**Sweep Time** Minimum 100 ms, 10  $\mu$ s to 600 seconds in zero span  
**Sweep Time Accuracy**  $\pm$  2% in zero span

**3- Bandwidth.**

**Resolution Bandwidth (RBW)** 10 Hz to 3 MHz in 1–3 sequence  $\pm$  10%  
**Video Bandwidth (VBW)** 1 Hz to 3 MHz in 1–3 sequence  
**RBW with Quasi-Peak Detection** 200 Hz, 9 kHz, 120 kHz  
**VBW with Quasi-Peak Detection** Auto VBW is On, RBW/VBW = 1

**4- Amplitude Ranges.**

**Dynamic Range** > 95 dB (2.4 GHz), 2/3 (TOI-DANL) in 10 Hz RBW  
**Measurement Range** DANL to +26 dBm  
**Display Range** 1 to 15 dB/div in 1 dB steps, ten divisions displayed  
**Reference Level Range** –120 dBm to +30 dBm  
**Attenuator Range** 0 to 55 dB, 5.0 dB steps  
**Maximum Continuous Input** +43 dBm  
**Amplitude Units** Log Scale : dBm, dBV, dBmv, dB $\mu$ V  
Linear Scale: nV,  $\mu$ V, mV, V, kV, nW,  $\mu$ W, mW, W, Kw

**5- Amplitude Accuracy.**

**100 kHz to 4.0 GHz**  $\pm$  1.25 dB,  $\pm$  0.5 dB typical

**6- Markers.**

**Marker types** Normal, noise marker  
**Number of markers or delta markers** 6.  
**Marker functions** Peak, next peak, peak left, peak right, marker to center, minimum search.

**7- Displayed Average Noise Level (DANL).**

10 Hz RBW, 10 Hz VBW, 50 ohm termination on input, 0 dB attenuation, average detector.

### **Preamplifier OFF**

**20 to 30 °C**

10 MHz to 2.4 GHz	-130 dBm (typical).
> 2.4 GHz to 5.0 GHz	-125 dBm (typical).

### **Preamplifier ON**

**20 to 30 °C**

10 MHz to 2.4 GHz	-148 dBm (typical).
> 2.4 GHz to 5.0 GHz	-145 dBm (typical).

**-10 to 55 °C**

10 MHz to 2.4 GHz	< -141 dBm.
> 2.4 GHz to 5 GHz	< -138 dBm.

## **8- Spurs Residual responses**

**Input terminated, 0 dB attenuation, preamplifier off, RBW ≤ 1 kHz, VBW auto-coupled.**

20 MHz to 3 GHz	-90 dBm (nominal).
> 3 GHz to 6 GHz	-85 dBm (nominal).

## **Spurious responses**

**Input mixer level -30 dBm**

$RF_{sig} = RF_{tune} + 417 \text{ MHz}$	-70 dBc (nominal).
$RF_{sig} = RF_{tune} + 1.716 \text{ GHz}$	-80 dBc (nominal).

**Input mixer level -10 dBm, first IF image response**

$RF_{sig} = RF_{tune} - 2 \times 0.8346 \text{ GHz}$ ,	
for $RF_{tune}$ 5.7 to 6.0 GHz	-50 dBc (nominal).

**Sidebands** -80 dBc (nominal).  
-60 dBc (nominal) when battery charging, 260KHZ offset.

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### C- Power Meter.

**Frequency** Center/Start/Stop, Span, Frequency Step, Signal Standard,  
Channel Full Band.

**Amplitude** Maximum, Minimum, Offset, Relative On/Off, Units, Auto  
Scale.

**Average** Acquisition Fast/Med/Slow, of Running Averages.

**Limits** Limit On/Off, Limit Upper/Lower

**Frequency Range** 10 MHz to 4 GHz

**Span** 1 kHz to 100 MHz

**Display Range** -140 dBm to +30 dBm,  $\leq 40$  dB span

**Measurement Range** -120 dBm to +30 dBm

**Offset Range** 0 to +100 dB

**VSWR** 1.5:1 typical.

**Maximum Continuous Input** +43 dBm without attenuator.

**Accuracy** Same as Spectrum Analyzer.

**Application Options** Impedance (50  $\Omega$ , 75  $\Omega$ , Other).

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### D- Interference Analyzer

- Measurements**
- Spectrum
  - Field Strength
  - Occupied Bandwidth
  - Channel Power
  - Adjacent Channel Power (ACPR)

- AM/FM/SSB Demodulation
- Carrier-to-Interference ratio (C/I)
- Spectrogram (Collect data up to 72 hours)
- Signal Strength
- Received Signal Strength Indicator (RSSI)
- Signal ID (up to 12 signals)
- Center Frequency
- Bandwidth
- Signal Type (FM, GSM, W-CDMA, CDMA, Wi-Fi, LTE)
- Closest Channel Number
- Number of Carriers
- Signal-to-Noise Ratio (SNR) > 10 dB
- Interference Mapping
- Triangulate location of interference with on display maps

Application Options Bias-Tee (On/Off), Impedance (50 Ω, 75 Ω, Other).

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**E- Channel Scanner.**

<b>Number of Channels</b>	1 to 20 Channels (Power Levels)
<b>Measurements</b>	Graph/Table, Max Hold (On/5 sec/Off), Freq/Channel, Current/Max, Single/Dual Color
<b>Scanner</b>	Scan Channels, Scan Frequencies, Scan Customer List,scan script
<b>Amplitude</b>	Reference Level, Scale
<b>Custom Scan</b>	Signal Standard, Channel, # of Channels, Channel Step Size, Custom Scan
<b>Frequency Range</b>	100 kHz to 4 GHz (S332E)
<b>Frequency Accuracy</b>	± 10 Hz + Time base error

**Measurement Range** -110 dBm to +26 dBm

**Application Options** Bias-Tee (On/Off), Impedance (50  $\Omega$ , 75  $\Omega$ , Other)

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#### F- GPS Receiver.

**Setup** On/Off, Antenna Voltage 3.3/5.0 V, GPS Info

**GPS Time/Location Indicator** Time, Latitude, Longitude and Altitude on display Time, Latitude, Longitude and Altitude with trace Storage

**High Frequency Accuracy** Spectrum Analyzer, Interference Analyzer, CW  
Signal Analyzers.

**when GPS Antenna is connected**  $< \pm 50$  ppb with GPS On, 3 minutes after satellite  
lock in selected mode.

**Connector** SMA, Female.

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### General Specifications.

#### 1-Connectors

**RF Out Type** N, female, 50  $\Omega$

**RF Out Damage Level** 23 dBm,  $\pm 50$  VDC

**RF In Type** N, female, 50  $\Omega$

**RF In Damage Level** +43 dBm peak,  $\pm 50$  VDC

**GPS** SMA(f)

**External Power** 5.5 mm barrel connector, 12.5 VDC to 15 VDC,  $< 4.0$  Amps

**USB Interface (2)** Type A, Connect USB Flash Drive and Power Sensor

**USB Interface** 5-pin mini-B, Connect to PC for data transfer

**Headset Jack** 2.5 mm mini-phone plug

**External Reference In** BNC, female, 50  $\Omega$ , Maximum Input +10 dBm 1 MHz, 5  
MHz, 10 MHz, 13 MHz

**External Trigger/Clock Recovery** BNC, female, 50  $\Omega$ , Maximum Input  $\pm$  50 VDC.

## **2- Display.**

**Type Resistive** Touchscreen

**Size** 8.4" daylight viewable color LCD

**Resolution** 800 x 600

## **3- Battery.**

**Type** Li-Ion

**Battery Operation** 4.0 hours,

## **4- POWER.**

**Power supply** External DC input 12 to 16 VDC.

**External AC power adapter** **Input** 100 to 290 VAC, 50 to 60 Hz; 1.25 to 0.56 A.

**Output** 12 VDC, 5 A.

## **5- EMC.**

Complies with European EMC Directive 2004/108/EC.

IEC/EN 61326-2-1).

CISPR Pub 11 Group 1, Class A.

AS/NZS CISPR 11.

ICES/NMB-001.

## **6- Safety.**

Complies with European Low Voltage Directive 2006/95/EC

IEC/EN 61010-1 2nd Edition

Canada: CSA C22.2 No. 61010-1-04

USA: UL 61010-1 2nd Edition.

## **7- Environmental.**

**Meets MIL-PRF-28800F Class 2 specification**

**Humidity** 95% at 40 °C

**Operating Temperature** -10 °C to 55 °C

**Storage** -40 °C to 71 °C

## 8- Weight & size.

Weight < 4 Kg.

Size < 300mm × 200mm × 100mm.

## 9- ESD.

IEC/EN 61000-4-2, functional up to 20 kV test.

## 10- Internal storage.

Internal Trace/Setup Memory 2,000 traces, 2,000 Setups.

## 11- Languages.

English, Chinese, French, Spanish, Russian, German.

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## Line Sweep Tools.

### 1-Trace Capture.

**Browse to Instrument** View and copy traces from the test equipment to our PC using Windows Explorer

**Open legacy files** Open DAT files captured with Hand Held Software Tools.

**Open Current files** Open VNA or DAT files

**Capture plots to** The Line Sweep Tools screen, DAT files, Database, or JPEG

### 2- Traces.

**Trace Types** Return Loss, VSWR, DTF-RL, DTF-VSWR, Cable Loss, Smith

**Trace formats** DAT, VNA, CSV, PNG, BMP, JPG, HTML, Data Base, and PDF.

### 3- Connectivity.

**Connections** Connect to PC using USB, Ethernet, or Serial.

**Firmware Updates** Product Update: download latest firmware version .