E7000A-SA Series
RF Analyzer

Key Benefits

- Perform cable feedline and antenna system analysis, spectrum analysis and power measurements in a single instrument
- Intuitive menu structure enables ease of use and quick measurements
- Performs comprehensive signal analysis for complete site profile and monitoring of signal environment
- Detect signal degradation and system performance over time with trace overlay
- Quickly identifies, locates and maps signal interference
- Handheld, lightweight, field-proven design withstands harsh environments and lighting conditions

Verify cell site performance – Cable feed line and antenna systems, RF transmission settings and spectrum signal analysis.

The E7000A-SA RF Analyzer combines the functionality of cable and antenna system analysis, spectrum analysis and power measurements, covering all measurements required for installation, deployment, maintenance and troubleshooting the physical layer of the wireless base station.

Designed specifically for wireless communications field engineers and technicians, the E7000A-SA Series RF Analyzers provide a full range of measurement capability to accurately characterize, maintain and troubleshoot wireless communication sites such as return loss, distance-to-fault location, tower mounted amplifier gain, antenna-to-antenna isolation, channel power, adjacent channel power, occupied bandwidth and field strength measurements. Interference Analysis function features spectrogram, RSSI, signal identification and location capability.

Standard Measurements & Applications
(Cable & Antenna Analysis)

- Reflection – Return Loss or VSWR
- Fault Location – DFT/RL or DTF/VSWR
- Cable Loss
- 1-Port Phase
- Smith Chart

Standard Measurements & Applications
(Spectrum Analysis)

- Spectrum Analysis
- Channel Power
- Occupied Bandwidth (OBW)
- Adjacent Channel Leakage Ratio (ACLR)
- Field Strength
- AM/FM

Optional Measurement Modes

- High Precision Power Meter (DML-015)
- Interference Analysis (DML-110)
- Coverage Mapping (DML-120)
- Transmission Measurement (DML-025)
- GPS Receiver (DML-999)
Key Measurements

Distance-to-Fault (DTF) identifies the fault location of impairments within the cell-site transmission cable system. Fault location impairments and discontinuities can be detected by either DTF-Return Loss or DTF-VSWR measurements.

- E7000 A-Series can identify faults up to 5,000 feet (1,524m)
- High resolution enables up to 2,065 data points for locating pesky faults
- E7000 A-Series includes over 90 different cable types with the ability to add more
- User definable limit-line automatically indicates pass/fail condition
- Up to 6-Markers can be set for detailed analysis

Power Meter measures true RMS power for both CW and digitally modulated signals with an external power sensor

- Users can set minimum and maximum power limits to automatically indicate pass/fail status

Interference Analysis can detect signal as low as -152 dBm and supports spectrogram display, RSSI, signal strength and signal ID capabilities.

- Spectrogram display features a three-dimensional display of frequency, power and time of spectrum activity enabling identification of intermittent signal interference, tracking these signals over time. The dual display screen allows for easy, simultaneous viewing of both the spectrum and spectrogram analysis
- Received Signal Strength Indicator (RSSI) observes and reports the signal strength of a single frequency over time
- Signal strength meter helps to locate interfering signals with the use of a directional antenna

Key Features

- Dual Display enables users to reduce test time by making two measurements simultaneously
- Trace Overlay enables users to easily detect signal and system degradation over time
- 2065 Data Points enables users to detect faults that may otherwise go undetected. Also enables users to sweep cables up to 4,921ft. Allows users to fix minor faults before they become large problems
- Multiple Display Modes enables users to set the display to lighting condition. Modes include standard view, nighttime, high contrast
- Connectivity enables easy connection to PC’s, storage devices and field sensors through the E7000A-SA USB port. LAN Ethernet port provides link to application software with PC
- Measurement Center Software provides users with all the necessary functionality to manage measurements and increase the instruments, including:
  - Quickly exchange data via USB or LAN connection
  - Retrieve or save measurements results
  - Export measurement results
  - Analyze measurement results and activate multiple markers and limit lines
  - Compare measurement results
  - Create and export new cable types, frequency bands and test setups
  - Generate and print reports
## Specifications: Cable Analyzer

<table>
<thead>
<tr>
<th>Feature</th>
<th>Specification</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Frequency</strong></td>
<td>Frequency Range: 1 MHz – 4.4 GHz</td>
</tr>
<tr>
<td></td>
<td>Resolution: 1 kHz</td>
</tr>
<tr>
<td><strong>Measurement Speed</strong></td>
<td>Reflection: &lt; 1.0 mS/point</td>
</tr>
<tr>
<td></td>
<td>DTF: &lt; 1.25 mS/point</td>
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<tr>
<td></td>
<td>Data Points: 130, 259, 517, 1033, 2065</td>
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<tr>
<td><strong>Measurement Accuracy</strong></td>
<td>Corrected Directivity: 42 dB (typical, after standard OSL calibration) 38 dB (typical, after eCAL calibration)</td>
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<tr>
<td><strong>Output Power</strong></td>
<td>O dBm (Nominal)</td>
</tr>
<tr>
<td></td>
<td><strong>Interference Immunity</strong></td>
</tr>
<tr>
<td></td>
<td>On-channel: +20 dBm @ &gt;1 MHz of carrier frequency</td>
</tr>
<tr>
<td></td>
<td>Off-channel: +13 dBm within ± 10 kHz of carrier frequency</td>
</tr>
<tr>
<td><strong>Measurements</strong></td>
<td>Return Loss: 0 to 60 dB</td>
</tr>
<tr>
<td></td>
<td>VSWR: 1:1 to 65:1</td>
</tr>
<tr>
<td></td>
<td>DTF Range (Distance): 1500 meters (4921 feet)</td>
</tr>
<tr>
<td><strong>Connectors (Reflection/RF Out)</strong></td>
<td>RF Out: Type N, female, 50Ω</td>
</tr>
<tr>
<td></td>
<td>RF Out Damage Level: 25 dBm, ± 50 VDC peak</td>
</tr>
</tbody>
</table>

### Power Sensors

- **In-line Bi-Directional High Power Sensor, 300 MHz to 4GHz, 2mW to 150W, N(f) 50Ω**
  - E7000A-050

- **Terminal Power Sensor**
  - E7000A-040

### Standard Accessories

- Rechargeable Li-Ion battery
  - E8000-0300
- AC-DC adapter
  - FSP065-RAB
- Vehicle Plug-in lighter adapter
  - E7000-0400
- 1.5m RF Test Port Cable, N(m), 6GHz
  - E7000-0702
- Calibration Combo Open/Short/Load, N(m), 6GHz
  - E7000-0700
- Soft carry case
  - E7000-0600
  - E7000-0200

### Optional Accessories

- **Precision "Y" Open/Short/Load Calibration Combination, N(m), DC-6GHz, 50Ω**
  - E7000-700
- Calibration Combo "Y" Open/Short/Load, N(f), DC-6GHz, 50Ω
  - E7000-709
- Calibration Combo "T" Open/Short/Load, 7/16 DIN(m), DC-6GHz, 50Ω
  - DCAL-6DM-C
- Calibration Combo "T" Open/Short/Load Calibration Combination, 7/16 DIN(f), DC-6GHz, 50Ω
  - DCAL-6DF-C
- RF Test Port Cable, Armored, phase stable, 1.5m, N(m) to N(f), 18GHz, 50Ω
  - DTC-18NMNF-1.5
- RF Test Port Cable, Armored, phase stable, 1.5m, N(m) to 7/16 DIN(f), 18GHz, 50Ω
  - DTC-18NMDM-1.5
- RF Test Port Cable, Armored, phase stable, 3.0m, N(m) to 7/16 DIN(m), 18GHz, 50Ω
  - DTC-18NMDM-3.0
- RF Test Port Cable, Armored, phase stable, 3.0m, N(m) to 7/16 DIN(f), 18GHz, 50Ω
  - DTC-18NMDF-3.0
- RF Test Port Extension Cable, phase stable, 1.5m, N(f) to N(f), 18GHz, 50Ω
  - DTC-18NFSF
- RF Test Port Extension Cable, phase stable, 1.5m, N(f) to N(f), 18GHz, 50Ω
  - DTC-18NFNF-1.5
- Precision Adapter Kit, 50Ω (PNMDM, PNFD, PNMDF, PNFD, PDFDF, PDFDM 90°)
  - DPAK-6G100
- Precision Adapter, N(m) to N(m), DC to 18GHz, 50Ω
  - DPA-18NMNM
- Precision Adapter, N(f) to N(f), DC to 18GHz, 50Ω
  - DPA-18NFNF
- Precision Adapter, N(f) to 7/16 DIN(m), DC to 18GHz, 50Ω
  - DPA-18NFDM
- Precision Adapter, N(f) to 7/16 DIN(f), DC to 18GHz, 50Ω
  - DPA-18NFDF
- Precision Adapter, N(f) to SMA(f), DC to 18GHz, 50Ω
  - DPA-18NFSF
- Precision Adapter Kit, 50Ω (PNFNF, PNFD, PNFDF, PNTF)
  - DPAK-1000
- Precision Adapter, N(m) to N(m), DC to 18GHz, 50Ω
  - DPA-NMNM
- Precision Adapter, N(f) to N(m), DC to 18GHz, 50Ω
  - DPA-NFNM
- Precision Adapter, N(f) to N(f), DC to 18GHz, 50Ω
  - DPA-NFNF
- Precision Adapter, N(f) to 7/16 DIN(m), DC to 6GHz, 50Ω
  - DPA-NFDM
- Precision Adapter, N(f) to 7/16 DIN(f), DC to 6GHz, 50Ω
  - DPA-NFDF
- Precision Adapter, N(f) to SMA(f), DC to 6GHz, 50Ω
  - DPA-NFSF
### Specifications: Spectrum Analyzer

#### Frequency

<table>
<thead>
<tr>
<th>Description</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Frequency Range</td>
<td>9 kHz – 3.0 GHz</td>
</tr>
<tr>
<td>Tuning Resolution</td>
<td>1 Hz</td>
</tr>
<tr>
<td>Aging</td>
<td>&lt; ± 1.0 ppm/yr</td>
</tr>
<tr>
<td>Frequency Span</td>
<td>1 kHz to 3 GHz in 1-2-5 sequence (automode), and 0 Hz (zero span)</td>
</tr>
</tbody>
</table>

#### Bandwidth

<table>
<thead>
<tr>
<th>Description</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Resolution Bandwidth (RBW)</td>
<td>10 Hz to 3 MHz in 1-3 sequence (auto or manually selectable)</td>
</tr>
<tr>
<td>Video Bandwidth (VBW)</td>
<td>10 Hz to 1 MHz in 1-3 sequence (auto or manually selectable)</td>
</tr>
</tbody>
</table>

#### Spectral Purity (Phase Noise)

- @ 1 kHz Offset from carrier: -85 dBc/Hz
- @ 10 kHz Offset from carrier: -95 dBc/Hz
- @ 100 kHz Offset from carrier: -100 dBc/Hz

#### Amplitude

- Dynamic Range: > 95 dB
- Measurement Range: DANL to maximum safe input level
- Maximum Safe Input: +30 dBm (peak power, input attenuation > 15 dB), 50 VDC
- Amplitude Accuracy: ≤ ± 1.0 dB
- Attenuator Range: 0 dB to 55 dB in 5 dB steps

#### Displayed Average Noise Level (DANL)

(Input terminated, RBW = 10 kHz, Attn = 0 dBm, Sample Detector)

- Preamp Off: ≤ -142 dBm, typical (1 MHz – 1 GHz)
- Preamp On: ≤ -155 dBm, typical (1 MHz – 1 GHz)

#### Connectors

- RF In: Type N, female, 50 Ω
- RF In Damage: +30 dBm, +50 VDC

#### Connectivity

- USB host: Type A, 1-Port (connect flash drive for data transfer)
- USB client: 5-pin mini-B (connect to PC for data transfer)
- LAN: 10M/100M LAN Port

#### Display

- Type / Size: TFT LCD / 6.5” (640 x 480)

#### Data Storage

- Internal: 1 GB, > 2000 saved measurement files
- External: Limited by size of USB flash drive

#### Battery

- Type: Li-Ion, 11.1 V, 5.2 AH
- Operation: > 6 hours, continuous; 8.0 hrs, idle (CA mode) > 4.5 hours, continuous; 8.0 hrs, idle (SA mode)

#### Environmental

- Operating Temperature: -10°C to + 55 °C
- Storage Temperature: -20 °C to + 75 °C
- Shock: Mil-PRF-28800F Class 2

#### EMC

- European EMC: IEC/EN 61326-1:2006

#### AC Power

- AC Adapter Output: 15-19 VDC
- AC Adapter Input: 100 - 240 VAC, 50-60 Hz

#### Size & Weight

- Size: 258 mm x 173 mm x 74 mm (10.2 in x 6.8 in x 2.9 in)
- Weight: 2.2 kg (4.85 lbs)

### Optional Accessories

- RF Test Port Cable, Armored, 1.5m, N(m) to N(f), 18 GHz, 50 Ω: DTC-18NMNF-1.5
- RF Test Port Cable, Armored, 1.5m, N(m) to 7/16 DIN(f), 18 GHz, 50 Ω: DTC-18NMDF-1.5
- RF Test Port Cable, Armored, 3.0m, N(m) to 7/16 DIN(m), 18 GHz, 50 Ω: DTC-18NMDM-1.5
- RF Test Port Cable, Armored, 3.0m, N(m) to 7/16 DIN(m), 18 GHz, 50 Ω: DTC-18NMDM-3.0

### Attenuators

- 10W, 6dB, DC-6GHz, N(m) to N(m): DATT-6NFNM-10-6
- 50W, 30dB, DC-6GHz, N(m) to N(m): DATT-6NFNM-50-30
- 100W, 40dB, Bi-Directional, DC-18GHz, N(m) to N(m): DATT-6NFNM-100-40

### Directional Antennas

- 806-960 MHz, N(f), 10 dBi, Yagi: ET0860D
- 822-900 MHz, N(f), 10 dBi, Yagi: ET0850D
- 824-960 MHz, N(f), 10 dBi, Yagi: ET0824D
- 885-970 MHz, N(f), 10 dBi, Yagi: ET0900D
- 1710-1880 MHz, N(f), 10 dBi, Yagi: ET1800D
- 1850-1990 MHz, N(f), 10 dBi, Yagi: ET1900D
- 1920-2170 MHz, N(f), 10 dBi, Yagi: ET2100D
- 2400-2500 MHz, N(f), 10 dBi, Yagi: ET2400D
- 9 kHz to 20 MHz, log periodic: ET0020L
- 20 MHz to 200 MHz, log periodic: ET0200L
- 200 MHz to 500 MHz, log periodic: ET0500L
- 500 MHz to 3 GHz, log periodic: ET3000L

### Portable Antennas

- 470-860 MHz, SMA(m), 50 Ω: ET0470P
- 806-866 MHz, SMA(m), 50 Ω: ET0850P
- 870-960 MHz, SMA(m), 50 Ω: ET0900P
- 1710 to 1880 MHz, SMA(m), 50 Ω: ET1800P
- 1850 to 1990 MHz, SMA(m), 50 Ω: ET1900P
- 1920 to 2170 MHz, SMA(m), 50 Ω: ET2100P
- 2400 to 2500 MHz, SMA(m), 50 Ω: ET2400P
- 5725 to 5875 MHz, SMA(m), 50 Ω: ET5800P

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