Quick Fact Sheet

**LMR Master™ S412E**

*Land Mobile Radio Modulation and Signal Analyzer, Vector Network Analyzer, and Spectrum Analyzer*

**S412E**

9 kHz to 1.6 GHz Spectrum Analyzer, 500 kHz to 1.6 GHz Vector Network Analyzer

**RUGGED, PORTABLE, POWERFUL**

The LMR Master S412E is a compact handheld multi-function analyzer that has been specifically developed for technicians and engineers who install and maintain public safety, utility and private mobile communications systems. The S412E combines our industry-standard cable & antenna analysis with the unmatched performance of our spectrum analyzers, then adds in powerful signal analysis and generation capabilities — including coverage mapping tools for both outdoor and indoor performance analysis — to create the ultimate battery powered LMR field service instrument for system commissioning, preventative maintenance, troubleshooting and compliance testing of mission critical systems.

**Land Mobile Radio Analyzer Highlights**

- Analyzes Narrowband FM analog systems
- Analyzes P25, P25 Phase 2, DMR (MOTOTRBO™), NXDN™, dPMR, IT-R PTC, and TETRA digital systems
- 9 kHz to 1.6 GHz frequency coverage (Optional extension to 6 GHz)
- Internal signal generator: 0.1 dB resolution, 0 dBm to -130 dBm
- P25, P25 Phase 2, NXDN, and DMR BER test patterns including 1011, 1031, and V.52/O.153
- PTC ITCR, PTC ACSES
- Duplex test: Simultaneous analysis and generation of analog or digital LMR signals
- Independent control of both receive/transmit frequencies and test patterns
- TETRA Base Station Receiver Sensitivity Measurements
- LTE Analyzer for Public Safety LTE
- GSM Measurements for GSM-R railway systems

**Vector Network Analyzer Highlights**

- 1-path, 2-port Vector Network Analyzer (VNA) w/ quad trace display
- 500 kHz to 1.6 GHz frequency coverage (Optional extension to 6 GHz)
- Intuitive Graphical User Interface (GUI) with convenient touchscreen
- VNA-quality error correction for directivity and source match
- Outstanding calibration stability, up to 16 hours
- Arbitrary data points up to 4001
- IF bandwidth selection of 10 Hz to 100 kHz
- 100 dB transmission dynamic range
- 850 μs/data point sweep speed

**Spectrum Analyzer Highlights**

- Measurements: Occupied Bandwidth, Channel Power, ACPR, C/I, Coverage Mapping
- Interference Analyzer: Spectrogram, Signal Strength, RSSI, Mapping
- 9 kHz to 1.6 GHz frequency coverage (Optional extension to 6 GHz)
- Dynamic Range: > 95 dB in 10 Hz RBW
- DANL: -152 dBm in 10 Hz RBW
- Frequency Accuracy: 120 ppb standard (25 °C +/- 25 °C); < 50 ppb after 3 minutes with GPS lock

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**Handheld Size:** 273 x 199 x 91 mm, (10.7 x 7.8 x 3.6 in), **Lightweight:** 3.6 kg, (7.9 lbs)
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Land Mobile Radio Modulation and Signal Analyzer, Vector Network Analyzer, and Spectrum Analyzer S412E

Key Specifications

Land Mobile Radio Analyzer

- **VNA Frequency**: 500 kHz to 1.6 GHz, (Upgradable to 6 GHz)
- **Receiver Frequency**: 9 kHz to 1.6 GHz (Upgradable to 6 GHz)
- **Signal Generator**: 0 dBm to −130 dBm, 0.1 dB resolution, 2 dB accuracy (typical)
- **Supported Modes**: Analog FM, P25 FDMA and P25 Phase 2 TDMA, NXDN™, ETSI DMR, PTC (ITC-R), ETSI TETRA, dPMR
- **Phase Noise**: −100 dBc/Hz max @ 10 kHz offset at 1 GHz

General

- **Internal Memory**: 2,000 traces, 2,000 Setups
- **External Memory**: Limited by the size of the external USB Flash drive
- **Display**: Resistive touch screen, 8.4" daylight viewable color LCD, Resolution 800 x 600
- **Temperature**: Operating Temperature –10 ºC to 55 ºC
- **Battery**: Li-Ion, 3.0 hours typical
- **Dimensions**: 273 mm x 199 mm x 91 mm (10.7 in x 7.8 in x 3.6 in)
- **Weight**: 3.6 kg, (7.9 lbs)

Standard Accessories

- **Part Number**: Description
  - 2000-0691-R: Stylus with Coiled Tether
  - 2000-1797-R: Screen Protector Film, 8.4 inch (2, one installed)
  - 2000-1654-R: Soft Carrying Case
  - 633-75: Rechargeable 7500 mAh Li-Ion Battery
  - 40-187-R: AC-DC Adapter
  - 806-141-R: Automotive Power Adapter, 12 VDC, 60 W
  - 3-2000-1498: USB A-type to Mini USB B-type Cable, 3.05 m (10 ft)
- **Certificate of Conformance**: Three Year Warranty (one year on battery)

Optional Accessories

- **Tx/Rx Input Protection Module**
- **NEON Signal Mapper**

Options

**Option** | **Description**
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10 | High Voltage Variable Bias Tee
6 | 6 GHz Coverage on Spectrum Analyzer
16 | 6 GHz Coverage on Vector Network Analyzer
15 | Vector Voltmeter
19 | High-Accuracy Power Meter (requires external power sensor)
25 | Interference Analyzer (Option 31 recommended)
27 | Channel Scanner
31 | GPS Receiver (requires suitable GPS antenna)
37 | IEEE 802.16 Mobile WiMAX Over-the-Air Measurements (requires Option 6; Option 31 required for full functionality)
46 | IEEE 802.16 Fixed WiMAX RF Measurements (requires Option 6)
47 | IEEE 802.16 Fixed WiMAX Demodulation (requires Option 6)
66 | IEEE 802.16 Mobile WiMAX RF Measurements (requires Option 6)
67 | IEEE 802.16 Mobile WiMAX Demodulation (requires Option 6)
98 | Standard Calibration (ANSI Z540-1-1994)
99 | Premium Calibration (ANSI Z540-1-1994) plus printed test data
431 | Coverage Mapping (requires Option 31)
444 | EMF Measurements (requires Anritsu Isotropic Antenna)
509 | AM/FM/PM Analyzer
521 | P25/P25p2 Analyzer Measurements
522 | P25/P25p2 Coverage Measurements (requires Options 31 and 521)
531 | NXDN Analyzer Measurements
532 | NXDN Coverage Measurements (requires Options 31 and 531)
573 | dPMR RF Analyzer Measurements
572 | dPMR Coverage Measurements (requires Option 31 and 531)
541 | LTE RF Measurements
542 | LTE Modulation Quality
546 | LTE Over-the-Air Measurements (requires Option 31)
548 | LTE 256-QAM Demodulation (requires Option 542)
580 | GSM/GPRS/EDGE Measurements
581 | TETRA Analyzer Measurements
582 | TETRA Coverage Measurements (requires Options 31 and 581)
591 | DMR (MOTOTRBO) Analyzer Measurements
592 | DMR (MOTOTRBO) Coverage Measurements (requires Options 31 and 591)
721 | PTC ITCR Analyzer
722 | PTC ITCR Coverage Measurements (requires Options 31 and 721)
731 | PTC ACSES Analyzer
733 | PTC ACSES Coverage Measurements (requires Options 31 and 731)

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