LMR Master™ S412E Overview

Anritsu
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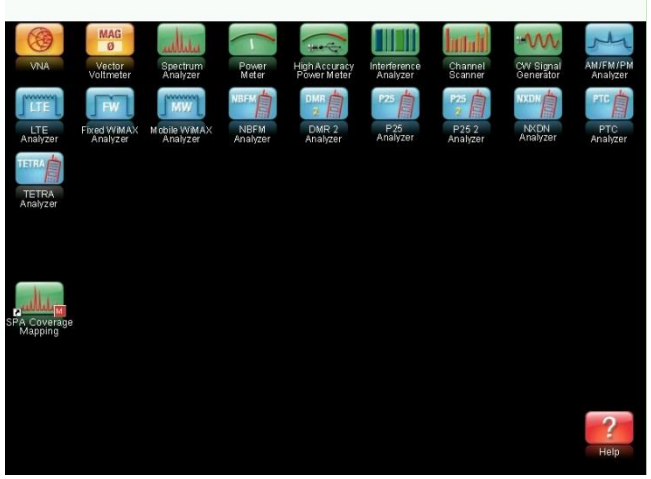
LMR Master S412E



- Combines two industry-leading products:
  - Spectrum Master™ Spectrum Analyzer
    - Performance + Features
  - Site Master™ Cable and Antenna Analyzer
    - 2 Port, 1 Path Vector Network Analyzer
    - 100 dB transmission dynamic range
- Adds: 1.6 GHz LMR Signal Generator
  - 0 to -130 dB range , 0.1 dB resolution
- Adds: LMR Signal Analyzers
  - P25 Phase 1 & Phase 2
  - TETRA
  - DMR (MotoTRBO™)
  - dPMR
  - NXDN™
  - NBFM
  - LTE (FirstNet) and GSM
  - PTC (Positive Train Control)
  - Transmitter and receiver measurements
  - Indoor and outdoor coverage mapping

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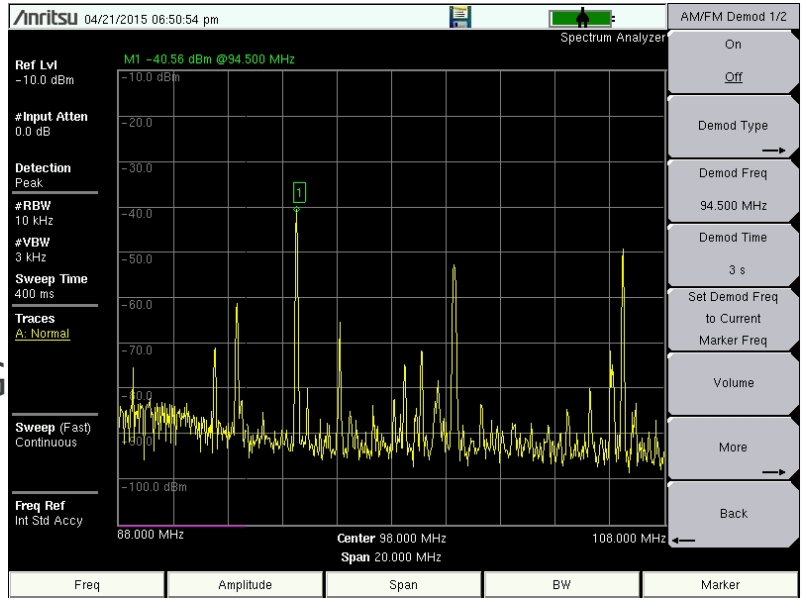
Spectrum Analyzer Highlights

- Measurements
  - Occupied Bandwidth, Channel Power, ACPR, C/I, Coverage Mapping
  - EMF Measurement System (Option 444)
  - Interference Analyzer (Option 25)
    - Spectrogram, Signal Strength, RSSI, Mapping
- Frequency Coverage
  - 9 kHz to 1.6 GHz (Optional extension to 6 GHz)
- Dynamic Range
  - > 95 dB in 10 Hz RBW
- DANL
  - -152 dBm in 10 Hz RBW
- Phase Noise
  - -100 dBc/Hz max @ 10 kHz offset at 1 G
- Frequency Accuracy
  - 120 ppb standard (25 °C ± 25 °C)
  - < 50 ppb after 3 minutes with GPS lock



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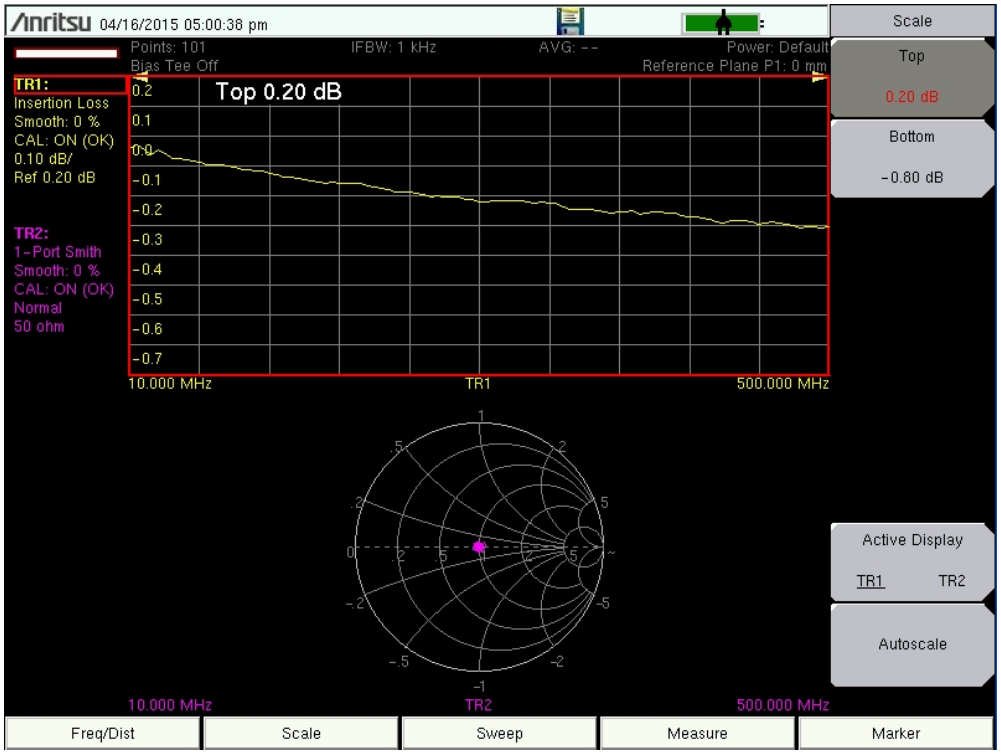
Vector Network Analyzer (VNA) Highlights

- 1-path, 2-port VNA with user-friendly Field Mode interface
- Display Options
  - Single, Dual, and 2 Trace Overlay
- Frequency Coverage
  - 500 kHz to 1.6 GHz (Optional extension to 6 GHz)
- Calibration Stability
  - up to 16 hours
- Data Points
  - up to 4001
- IF Bandwidth
  - 10 Hz to 100 kHz
- Dynamic Range
  - 100 dB transmission
- Sweep Speed
  - 850 us/data point



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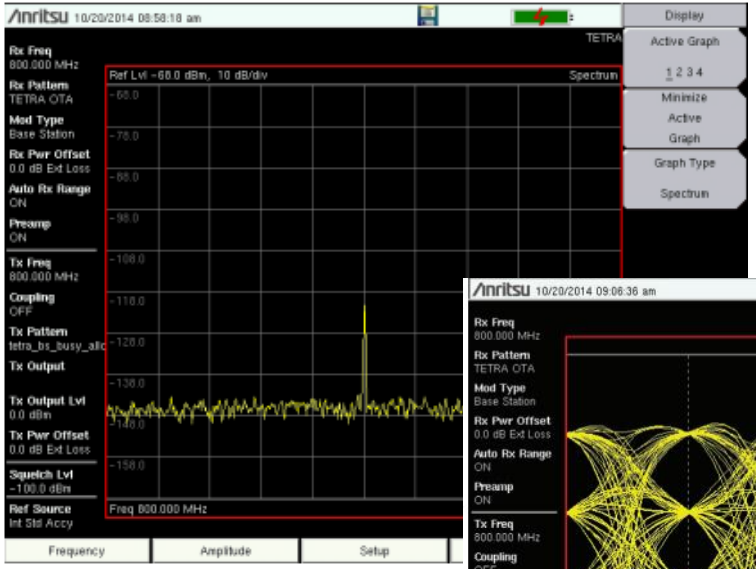
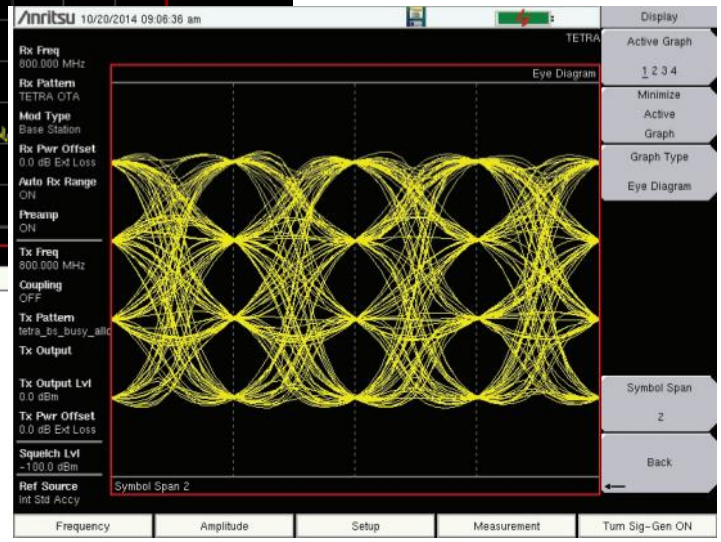
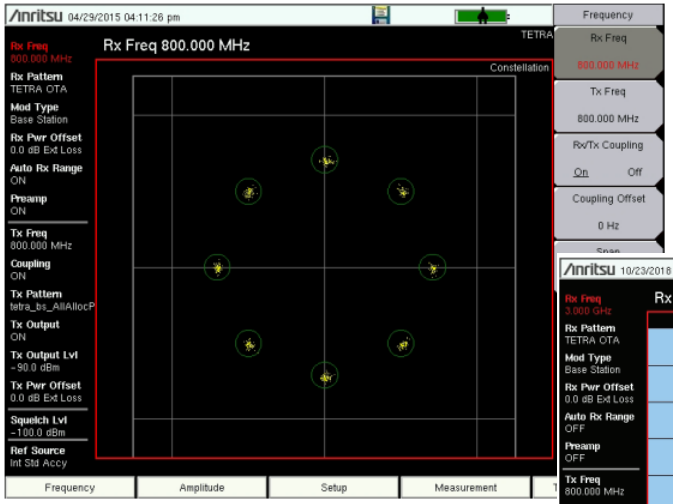
Tetra testing

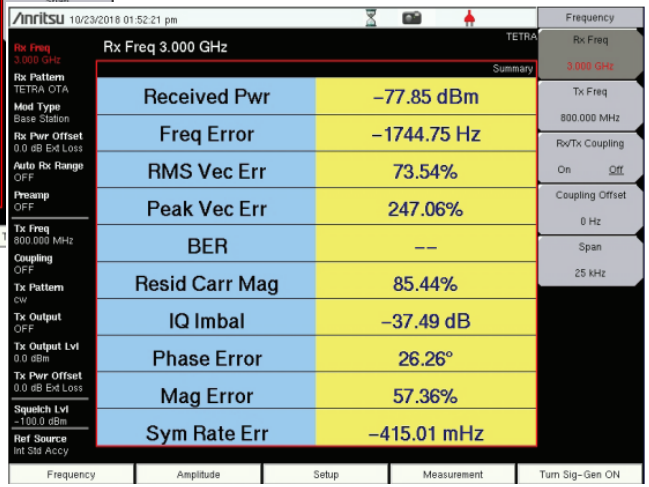
S412E is able to show

- Constellation Diagram
- TETRA Spectrum Graph
- TETRA Eye Diagram
- Summary Graph
- TETRA Summary Graph









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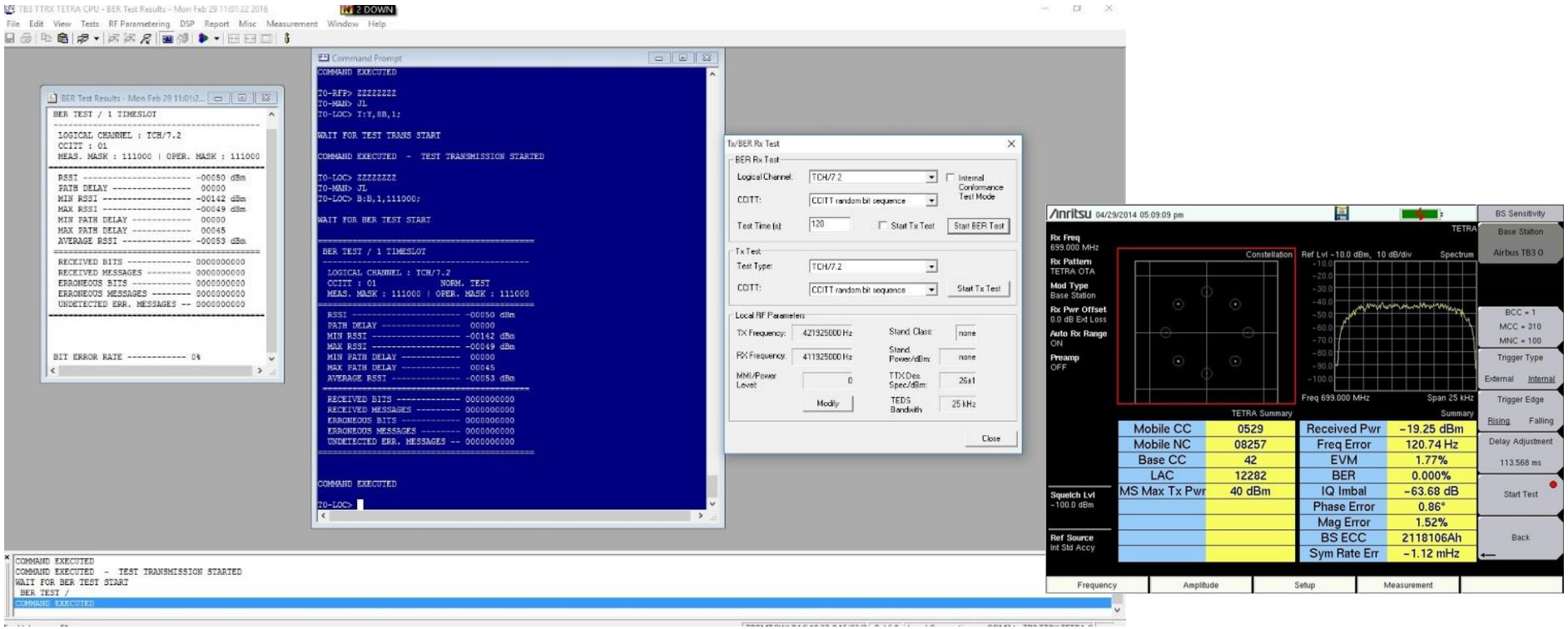
TETRA Base Station Sensitivity Measurements

- Synchronizes to TETRA Base Station
- Generates T1 TCH/7.2 signal
- Internal & External Sync
- Supports all major TETRA Base Station manufacturers



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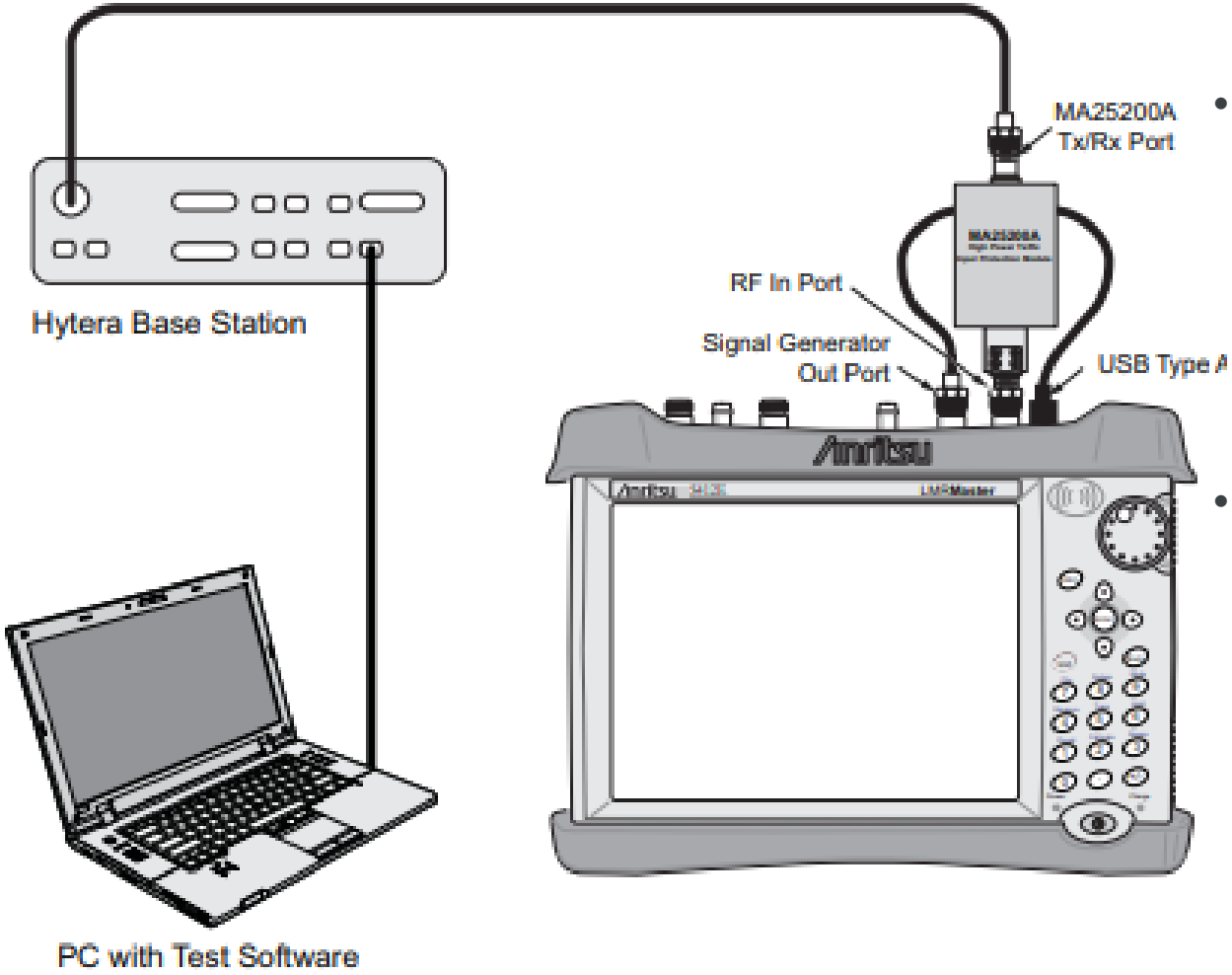
Hytera Base Station Setup



- Connect the MA25200A Input Protection Module/attenuator to the Hytera base station
- Connect the TB3 base station to a PC with the test software

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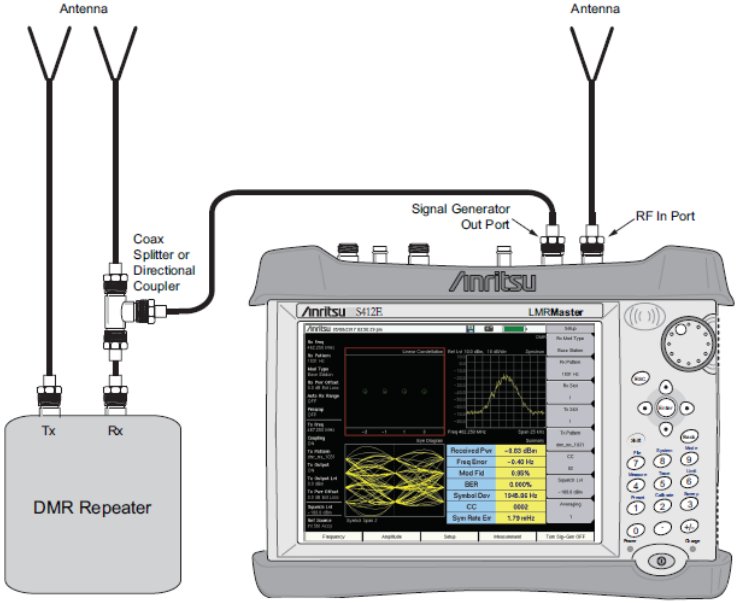
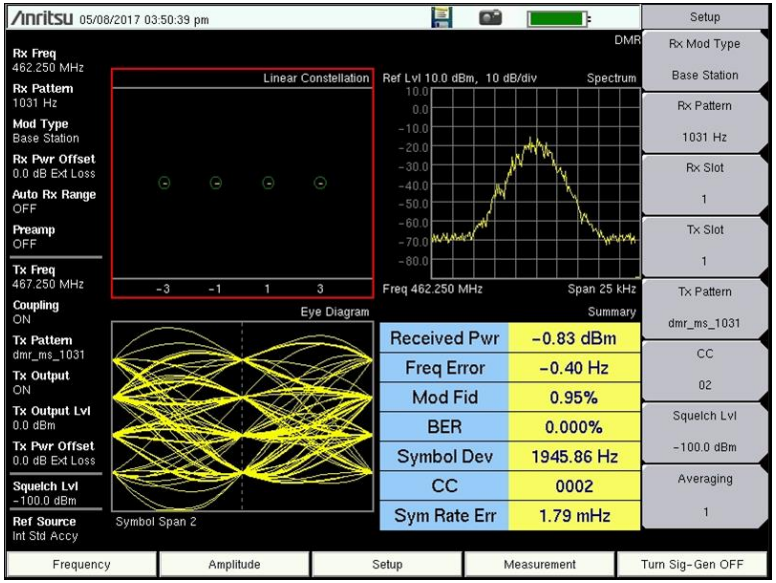
Live DMR Repeater Sensitivity Measurements

- Make DMR Repeater Receiver Sensitivity measurement on a live site
- LMR Master
  - Wakes up DMR Repeater
  - Generates 1031 Hz signal for audible reference
  - Loopback BER measurement on LMR Master



DMR Repeater Sensitivity Measurement Setup Example



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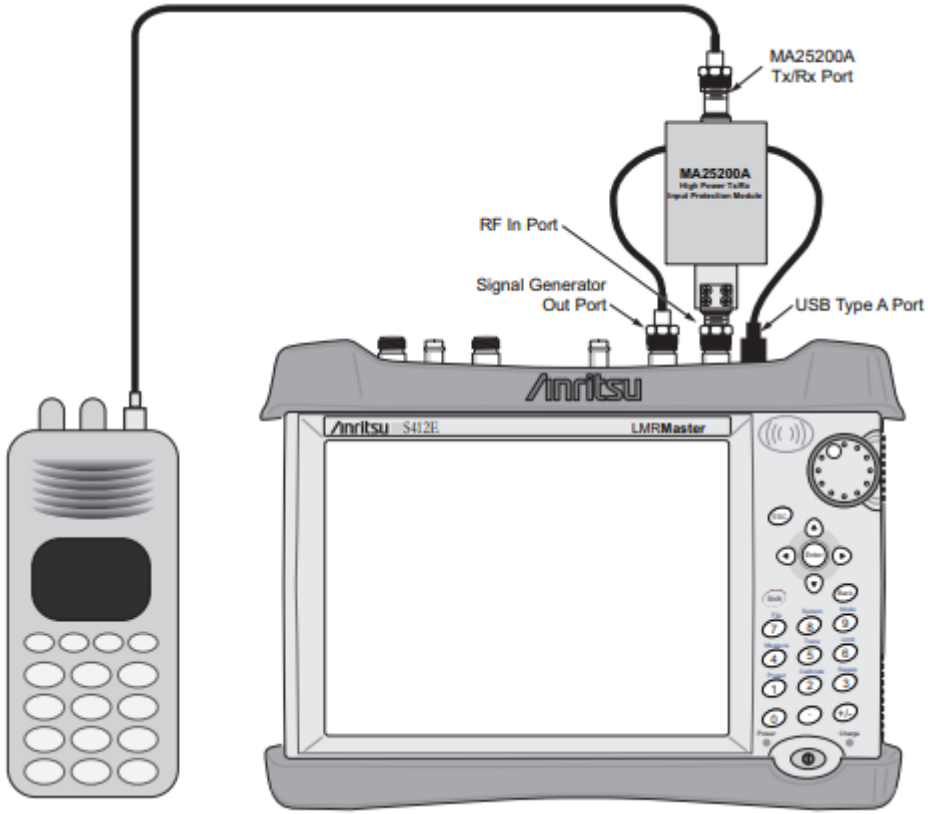
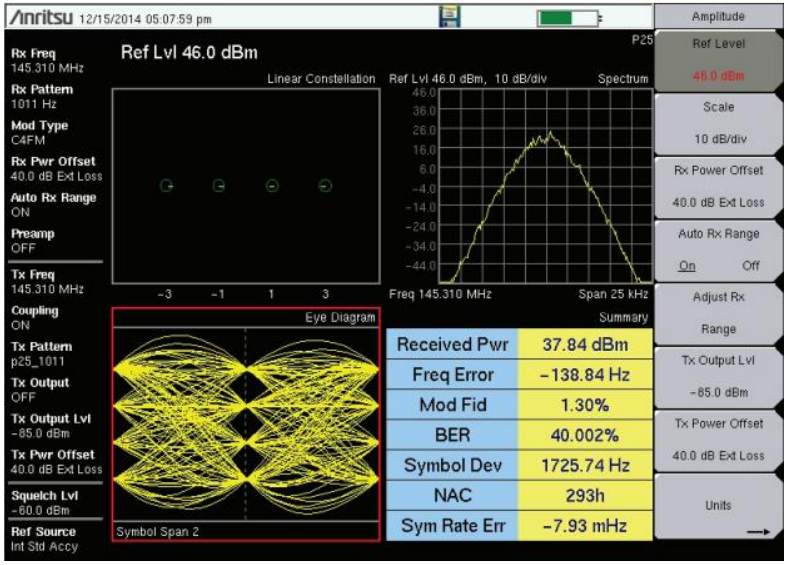
Handheld Transceiver connected to LMR Master



- S412E LMR Master to analyze the modulation quality and receiver sensitivity of a handheld transceiver (HT).



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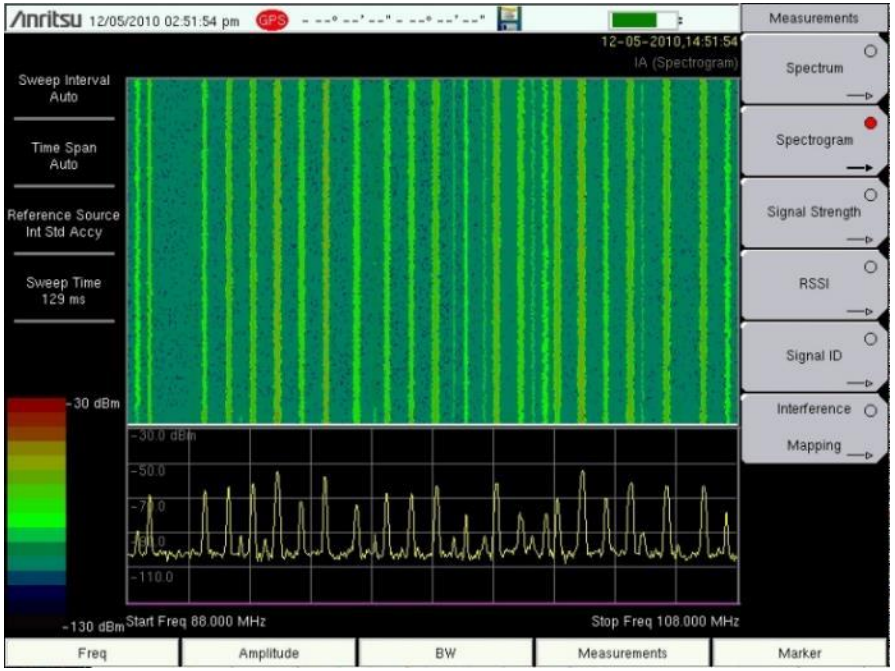
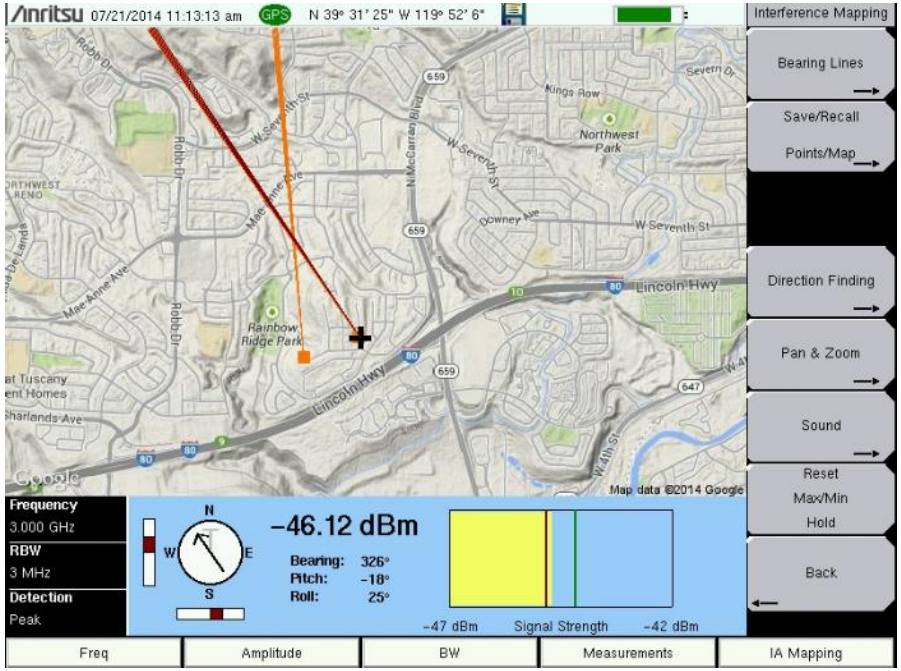
Only LMR Solution with Interference Hunting (Future upgrade)

- Spectrogram
  - 48 hours of spectrum history
- Channel Scanner
- Map on screen with antenna / compass for triangulation





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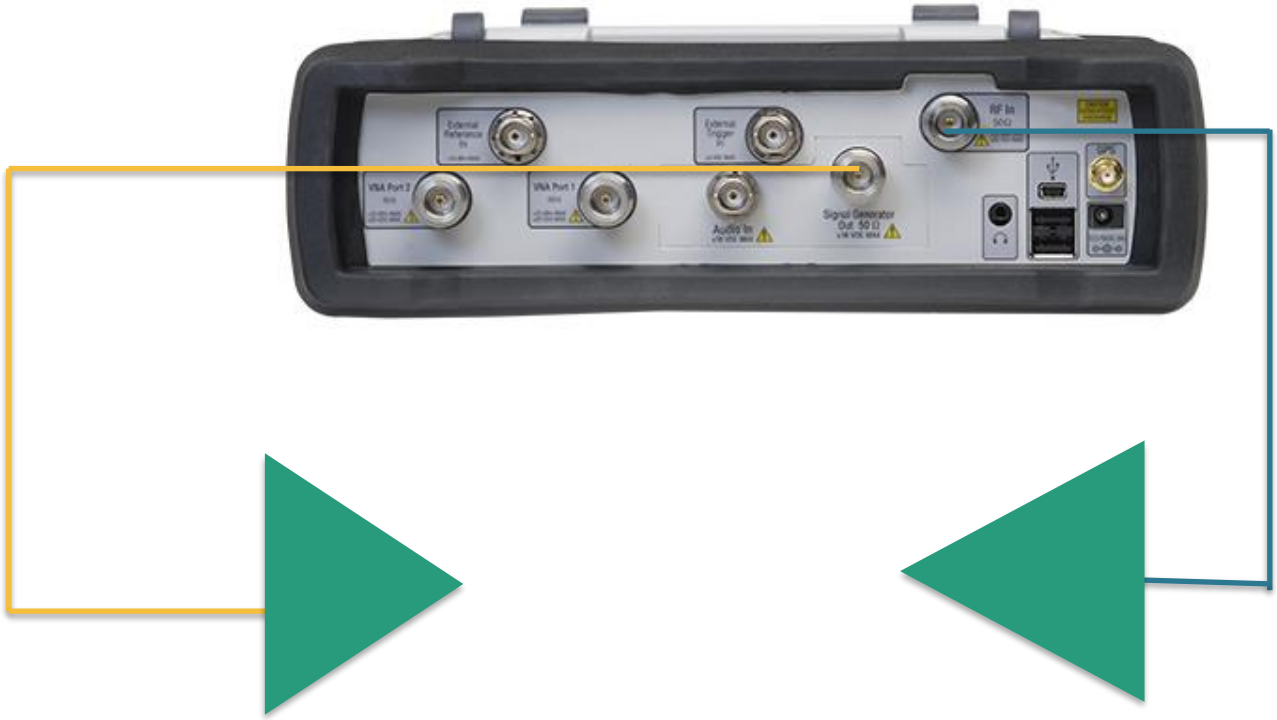
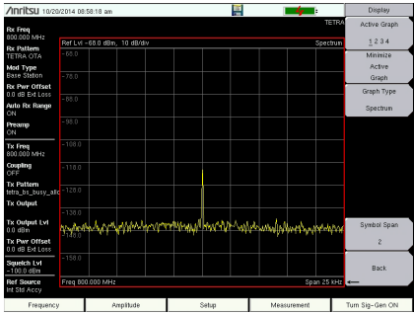
Propagation testing

Radio propagation is the way radio signals are transmitted from one point to another point

S412E can transmit Tetra signal and receive the Tetra signal simultaneously.





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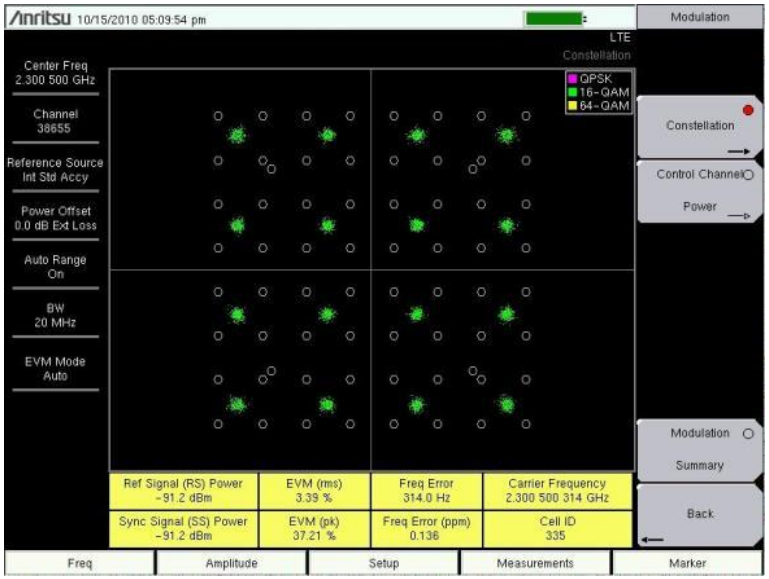
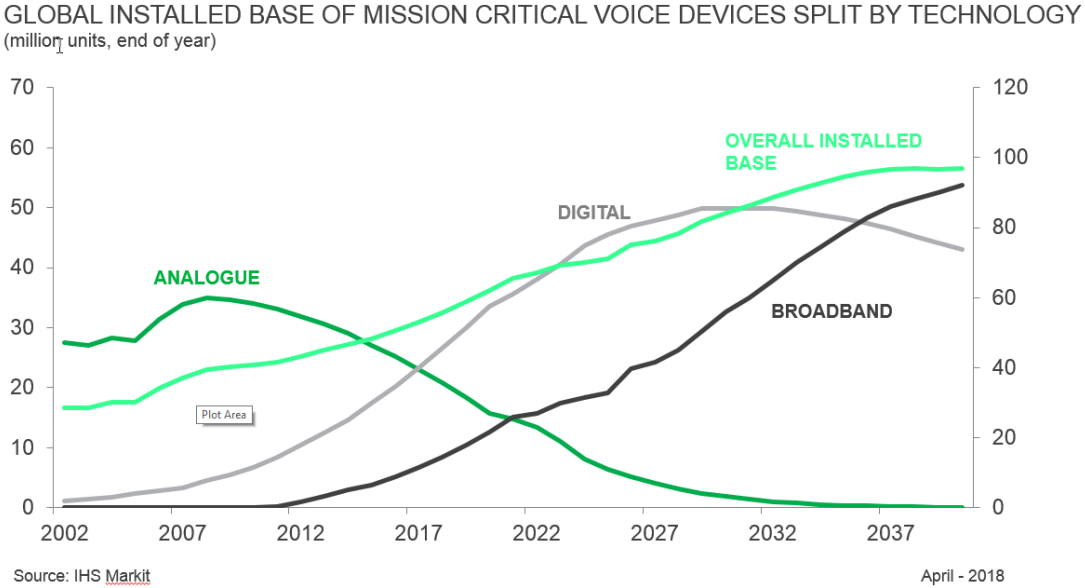
Only LMR Solution with LTE Measurements (Future upgrade)

- LTE will evolve to being the go-to mission critical standard
  - FirstNet (USA), ESN (UK), SafeNet (South Korea)
  - Major LMR manufacturers releasing LTE solutions
- LMR Master is the only instrument that can measure both LMR and LTE systems
  - Measure LTE transmitter
  - Analyze LTE modulation





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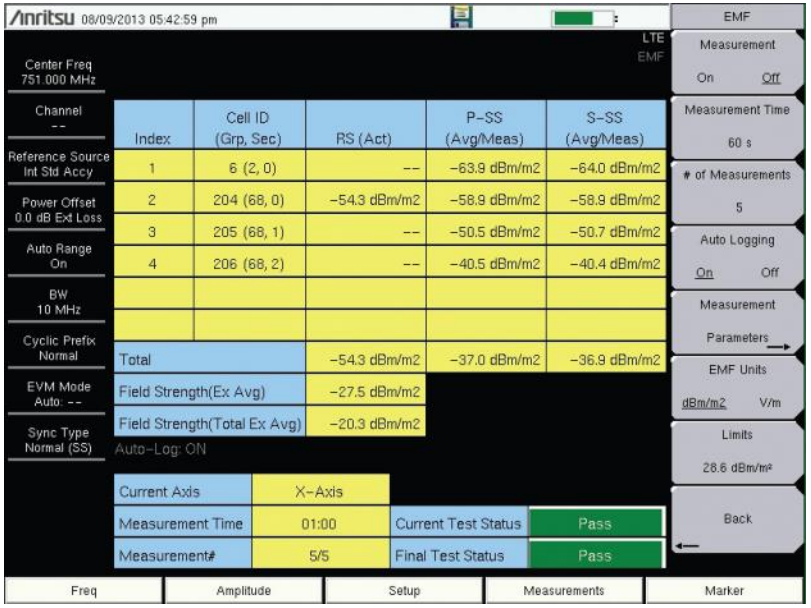
Only LMR Solution with Electromagnetic Field Measurements (Future upgrade)

- Measure radiation compliance with various national standards
- Targeted to both cellular operators and government regulators
- Easy to use, while providing the user numerous automated features
- Pass/Fail indicators on screen for immediate feedback on test results
- EMF measurements on demodulated LTE signals



Sample Display of EMF LTE Measurement

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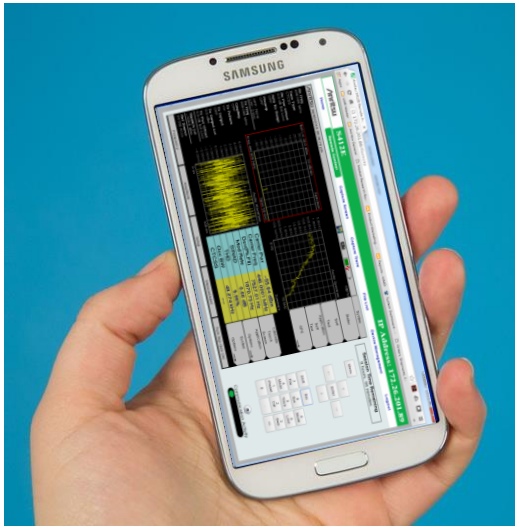
Only LMR Solution with Remote Control with Built-In Web Server

- Supports all modes and functions of the LMR Master
- Use any web browser
- Supports
  - Cell phones
  - Tablets
  - Laptop computers
  - Desktop computers



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Questions?

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