FieldFox All-in-One Pre-Compliance EMI Analyzer

Electromagnetic Interference (EMI) Pre-Compliance Tests

One of the key challenges in the wireless industry is to minimize noise and interference. Most unwanted signals that cause noise and interference are generated by base stations and mobile devices.

EMI performance verification and diagnostics are common tests for the lab, the manufacturing floor, field equipment, and regulatory inspections. EMI measurements help to:

1. Evaluate pre-compliance limits before formal compliance tests.

2. Identify issues like noise floor rise and interference generated by other equipment.

3. Perform equipment or network regulatory audits against various limits, such as CISPR 16-1-1.

4. Troubleshoot circuit boards.

5. Test potential system level performance impact due to EMI degradation.

Every FieldFox handheld analyzer includes the following accessories:

- AC/DC adapter
- Battery
- Soft carrying case
- LAN cable
- Quick Reference

Keysight FieldFox Covers EMI Applications

Keysight's FieldFox handheld analyzer provides a comprehensive solution to measure EMI, amplitude probability distribution (APD), FFT spectrum analysis, and real-time spectrum analysis with density and spectrogram displays. It also performs vector network analysis for full, two-port S-parameter measurements. It is an ideal, handheld solution to address all EMI troubleshooting issues in the field.

Electro Rent

KEYSIGHT TECHNOLOGIES

EMI scanning
(Option 361, requires spectrum analyzer Option 233)

- CISPR band support
- 6-dB CISPR resolution bandwidth (RBW) support: 200 Hz, 9kHz, 120kHz and 1MHz
- CISPR detectors: Peak, Quasi-Peak and EMI average
- Log frequency sweep
- User definable limit line
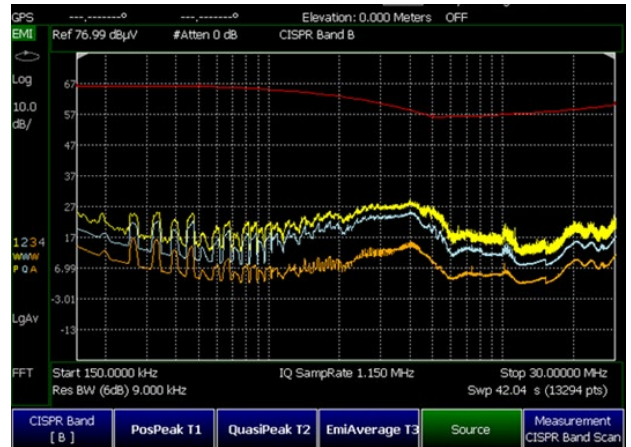- CISPR full band and zoom scan
- Fast SA scan

Figure 1. Simultaneous scan with 3 CISPR detectors displayed with a user-defined limit line

Amplitude probability distribution (APD) measurements
(Option 361, requires spectrum analyzer Option 233)

- Complementary cumulative distribution function (CCDF)
- Histogram

To characterize slowly varying emissions, such as emissions from a microwave oven, the FieldFox APD function displays the probability of an emission reaching or exceeding a given level.
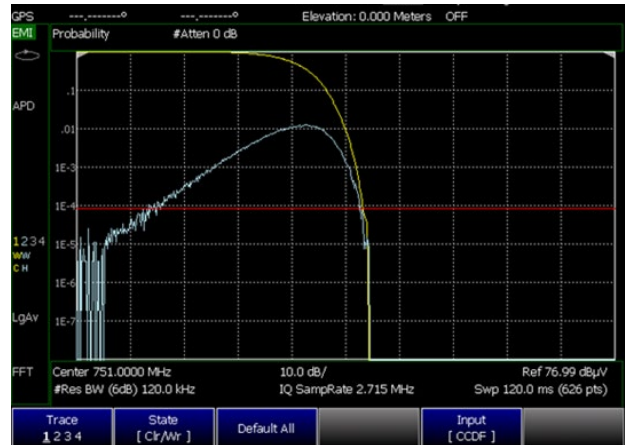

Figure 2. CCDF result with a reference and a limit line

Real time spectrum analyzer (RTSA)
(Option 350, requires spectrum analyzer Option 233)

- RTSA with 10, 40, or 120MHz of real time bandwidth reveals transient, wideband emissions that are difficult to detect
- Density display with persistency control enables faster and easier over-the-air analysis of sources for radiated emissions
- Spectrogram helps to view varying emissions over time and frequency, providing clues about the origins of out-of-compliance emissions
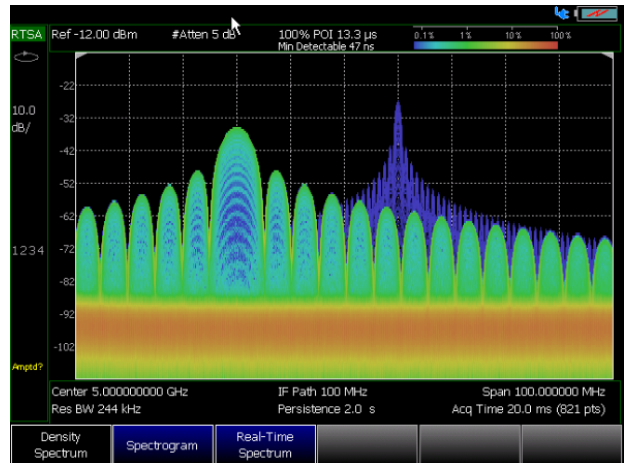- Real time spectrum trace with recording

Figure 3. RTSA's density display enables to detect unintentional, transient emissions

Vector network analysis (Option 210 and 211)

- Full 2 port S-parameters
- Magnitude and phase
- Group delay
- Impedance
- VSWR

Verifying product compliance is just one facet of EMI testing. To reduce or eliminate EMI issues, RF/MW filters are widely used. A VNA verifies the performance of the components and ensures there is no non-compliant EMI emissions from those components.
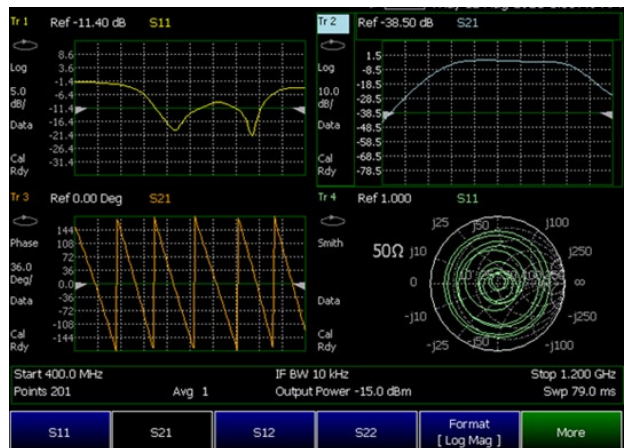

Figure 4. VNA offers full 2-port S-parameters to verify the RF/MW component design

Comparing Keysight EMI Pre-Compliance Solutions

Similar to the EMI measurements app on the FieldFox, Keysight also offers EMI pre-compliance solutions on the X-Series signal analyzers, including the X-Series N6141EM0E EMI measurements app and a basic EMC option (N90EMEMCB).

The following table compares features and capabilities of the various Keysight EMI pre-compliance solutions.

Features	X-Series N6141EM0E EMI measurements app	FieldFox analyzer Opt 361 EMI measurements app	X-Series SA Opt N90EMEMCB (formerly EMC)
CISPR 16-1-1 detectors	●	●	●
CISPR 16-1-1 bandwidths	●	●	●
CISPR band presets	●	●	●
MIL-STD 461 bandwidths	●	●[1]	●
Measure at marker testing	●	●	●
Log and linear display	●	●	
Simultaneous detectors	●	●	
Step and swept scans	●	●[2]	
Amplitude probability distribution (APD)	●[3]	●	
Time domain scan	●[3]	●	
Monitor spectrum	●[3]	●[4]	
Real-time scan	●	●[5]	
Signal list	●		
Scan table	●		
Automatic limit testing	●		
Delta to limit	●		
Strip chart	●		
Report generation	●		
Disturbance analyzer (click measurements)	●		
UI commonality with Keysight PXE/MXE receiver	●		

---

[1] Currently, peak detector and 3-dB RBW in SA mode, 6-dB RBW in APD mode

[2] FFT step scans

[3] Requires X-Series signal analyzer option DP2 or B40. Not available for CXA

[4] With fast SA scan (3-dB RBW only)

[5] With RTSA (option 350). The use cases may differ from the "real-time scan" offered with the Keysight EMI receiver

Carry Precision with You

Every piece of gear in your field kit had to prove its worth. Measuring up and earning a spot is the driving idea behind Keysight's FieldFox analyzers. They're equipped to handle routine maintenance, in-depth troubleshooting, and anything in between. Better yet, FieldFox delivers precise microwave measurements — wherever you need to go. Add FieldFox to your kit and carry precision with you.

Related literature	Publication number
FieldFox Handheld Analyzers, Configuration Guide	5992-3701EN
FieldFox Handheld Analyzers, Data Sheet	5992-3702EN
FieldFox Handheld Analyzers, Technical Overview	5992-3703EN

Conclusion

Keysight FieldFox analyzers are versatile, handheld network and signal analyzers. In addition to spectrum analysis, EMI, RTSA, and VNA, FieldFox provides many other functions such as 4G/5G demodulation, EMF measurement, cable and antenna test, noise figure measurement, and more. For more detail about the product capabilities, refer to www.keysight.com/find/FieldFox.

Electro Rent **&** Keysight Technologies
RIGHT *Instrument.* RIGHT *Expertise.*
Delivered RIGHT *Now.*

Electro Rent

800.553.2255
www.electrorent.com/us/manufacturers/
keysight-technologies

Learn more at: www.keysight.com

For more information on Keysight Technologies' products, applications or services, please contact your local Keysight office. The complete list is available at: www.keysight.com/find/contactus

KEYSIGHT
TECHNOLOGIES