N9038B MXE EMI Receiver

Summary of Key Specifications

Frequency ranges	Minimum: 3 Hz Maximum: 3.6, 8.4, 26.5, and 44 GHz
CISPR bandwidths	200 Hz, 9 kHz, 120 kHz, 1 MHz
MIL STD bandwidths	10 Hz, 100 Hz, 1 kHz, 10 kHz, 100 kHz, 1 MHz
CISPR detectors	Quasi-peak, EMI-average, RMS-average
Measurement detectors	Peak, negative peak, sample, normal, RMS, average
Displayed average noise level (DANL)	–167 dBm at 1 GHz, preamplifier and noise floor extension on
Amplitude accuracy	± 0.5 dB @ 1 GHz
Third-order intermodulation (TOI) distortion	+15 dBm at 1 GHz, preselector on, preamp off

The X-Series difference

Future-ready

Optimize your investment and extend instrument longevity with upgradeable processor, memory, connectivity, and more to keep your test assets current today and tomorrow.

Consistent measurement framework

Achieve measurement integrity across your organization and drive more productivity in less time by leveraging a proven foundation for signal analysis and identical operation across the X-Series instruments.

Broadest set of applications

Address the changing demands of technology with additional measurement applications, the ability to run software inside the open Windows operating system, and a first-to-market track record in emerging standards.

Stay ready, stay in sync, and arrive ahead—with the Keysight X-Series.

www.keysight.com/find/X-Series

KEYSIGHT TECHNOLOGIES

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Keep the Test Queue Flowing

In EMC testing, success depends on tools that can help you do more in less time—today and tomorrow. That's why we created the MXE: it's a standards-compliant EMI receiver and diagnostic signal analyzer built on an upgradeable platform. In the lab and on the bench, it provides the accuracy, repeatability, and reliability you need to test with confidence.

The MXE makes it easy to test in accordance with CISPR 16-1-1:2019 and MIL-STD-461G. Choose the frequency coverage you need—up to 3.6, 8.4, 26.5, or 44 GHz—and fully test devices with outstanding accuracy and excellent sensitivity across the required ranges.

Through the front panel or remotely with software, you can evaluate emissions and identify suspect signals using EMC measurements and a variety of intuitive displays. The extensive set of built-in analysis tools helps you diagnose the causes of noncompliant emissions.

With all these capabilities and more, the MXE enables you and your team to keep the test queue flowing.

Extend instrument longevity with easy upgradability

To keep your instrument current and extend its longevity, the MXE offers easy upgradability of hardware and software capabilities. For example, you can enhance platform performance through CPU and memory upgrades, and add functionality with a simple license key.

Leverage the proven reliability of a mature hardware platform

Uptime is essential in a test lab and that's why we built the MXE on the robust Keysight X-Series signal analyzer platform. In addition, the MXE carries the benefits of Keysight's standard one-year warranty and responsive service and support team.

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Maximize Throughput in Compliance Testing

The MXE is ideally suited for high-performance EMC testing in commercial and military applications. The instrument offers a range of CISPR- and MIL-STD-compliant capabilities—detectors, bandwidths, and more—as well as features that further enhance the accuracy and throughput of EMC testing and data analysis.

Simplify setup

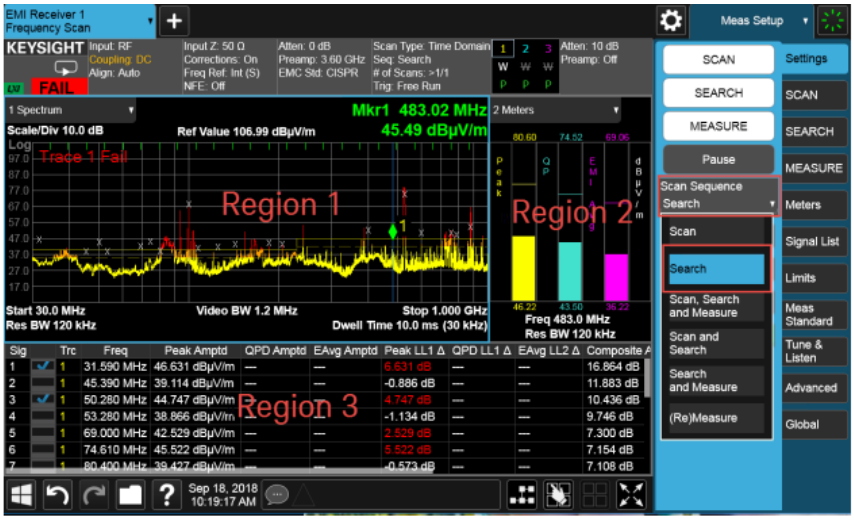
The MXE contains a number of features that simplify the setup process for compliance measurements. For example, you can use setup tables to create specific measurement configurations for a variety of frequency ranges and antennas. You can also reduce overall setup time by saving and recalling frequently used custom instrument settings. In addition, the MXE can remotely control switching functions in external LISNs.

To accelerate identification of suspect emissions, access the built-in library of limit lines and activate the relevant regulatory limits. You can also define custom limit lines with the easy-to-use editor. To ensure appropriate limit testing, the MXE can automatically correct measured amplitudes for specific transducers, antennas, cabling, and external preamplifiers using customer-configured amplitude correction files.

Accelerate data collection

The MXE is designed to help you see signal activity—quickly and easily—from multiple perspectives. The comprehensive user display allows you to see both a broad overview of the emissions environment and a detailed view of the signal amplitude at a single frequency.

Easily capture emissions data using built-in automated scan, search, and measure functions that mirror recommended commercial and military testing procedures. The multi-trace and max hold capabilities let you view emissions from the current position of the device under test (DUT) along with the maximum emissions from all DUT positions. During monitoring, the three color-coded detectors are updated simultaneously to ensure accurate results.



- Region 1: Spectrum and setting information of the scan table, trace/detector, and input/output
- Region 2: Meter graphs, metrics, and related setting information
- Region 3: Signal list with suspect signals populated by searching

The MXE receiver display provides a simplified view into the emissions performance of the DUT.

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Easily identify suspect signals

With built-in measurement and analysis functions, the MXE makes it easy to identify suspect emissions. For example, the unique color-coded trace display capability clearly identifies signals that exceed the selected limit lines and margins.

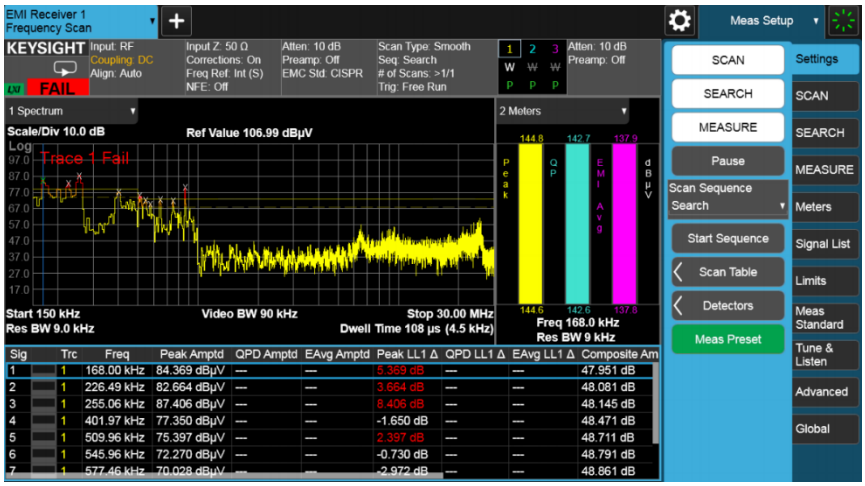
When creating suspect lists, you can choose between traditional frequency scanning and rapid time domain scanning. Time domain scans significantly reduce the time needed to create a list of suspect emissions prior to making final measurements.

Built-in limit testing makes it easy to create emission suspect lists. The receiver can automatically move out-of-limit signals to the signal list, where you can perform measurements with a single touch.

Simplify final measurements

The list function in the MXE makes it easy to perform final emissions measurements for all supported standards. When you need to control tower or turntable position, internal frequency lists can be passed to automation software. When orientation optimization isn't required, built-in capabilities help you complete final measurements with ease.

When final measurements are complete, you can conveniently create reports in HTML or PDF format with customized content that includes amplitude corrections, limits, scan tables, trace data, signal lists, and screen shots.



Search for signals above a limit line.

All-digital IF architecture

A digital intermediate frequency (IF) receiver architecture improves measurement accuracy. By comparison, an analog IF architecture implements gain blocks, log amps, resolution bandwidths, and detectors with analog hardware. Even the best of these designs exhibit performance differences when receiver settings are changed from the settings used for calibration. These differences are then exacerbated over temperature.

The all-digital IF architecture includes digital realizations of the key components, which operate on the signal after it has been digitized. Digital IF can improve EMC measurement throughput by minimizing the need for users to bring the signal being measured to the top of the reference level. Analog receivers require this step for every measurement to minimize the effects of analog hardware errors.

In addition, digital IF architecture reduces the occurrence of IF overload, even if signals are above the reference level.

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Enhance Your Lab with the Latest Capabilities

As an EMI receiver and diagnostic signal analyzer, the MXE puts a wealth of capabilities at your fingertips. New receiver technology reduces measurement time and ensures you are prepared for future requirements.

Go faster with time domain scanning

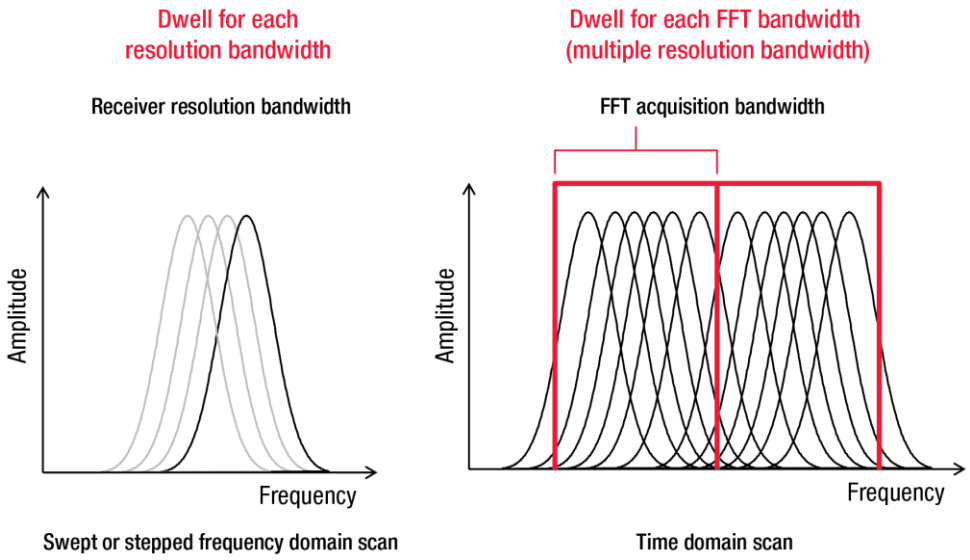
The MXE offers three types of frequency scanning: swept, stepped, and time domain. Time domain scan decreases total test time by reducing overall prescan collection times when longer measurement dwell times are required.

Time domain scan speeds measurements by using high-overlap fast Fourier transforms (FFTs) to collect emissions data simultaneously over an acquisition bandwidth that is multiple resolution bandwidths wide. This is in contrast to frequency-domain measurements, which collect data in individual resolution bandwidths.

With time domain testing, you can collect suspect lists rapidly, greatly improving overall test time and throughput.

Automate click measurements

Use the MXE's built-in disturbance analyzer to easily make discontinuous disturbance, or click, measurements as specified in CISPR 14-1. Simplify and automate data collection, analysis, and report generation for these commonly tested emissions for more efficient testing.



Comparison of resolution and FFT acquisition bandwidths.

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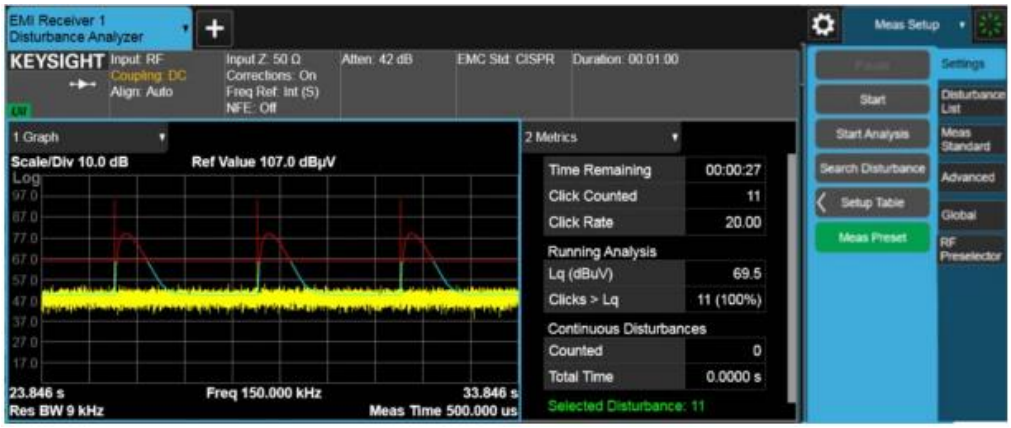
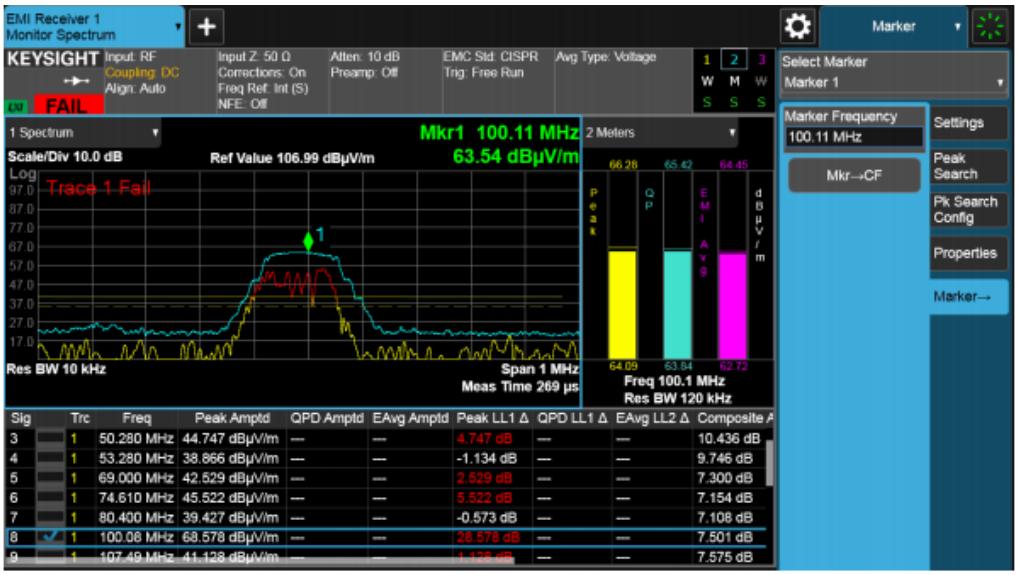


Simplify and automate data collection, analysis, and report generation for click measurements.

Find the maximum with monitor spectrum

In EMC testing, capturing the maximum value of each emission frequency is crucial. Doing so enables accurate characterization of the DUT.

To ensure that you have identified the frequencies of maximum emissions in your suspect list, the MXE offers a new feature called monitor spectrum. This feature offers both live-spectrum and meter displays that make it easy to see emission levels and find the maximum while adjusting the center frequency. Ultimately, monitor spectrum improves overall measurement time by reducing the time it takes to prepare your signal list for final measurements.



Monitor spectrum identifies frequency of peak emissions.

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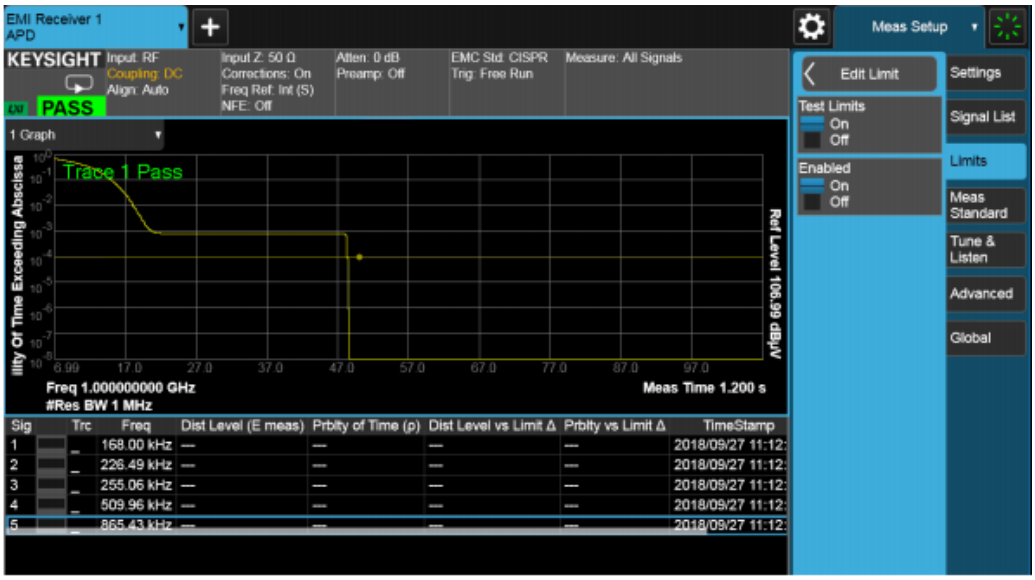
Be ready for APD measurements

The MXE helps future-proof your lab by offering the amplitude probability distribution (APD) function for emissions testing of microwave ovens.

To characterize slowly-varying emissions, the APD function displays the probability of an emission reaching or exceeding a given level. To facilitate use of this new function, the MXE also offers specific limit-line types that can be used with built-in evaluation capabilities to simplify DUT testing.



Be ready for the APD function.

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Gain Insight with Extensive Diagnostic Capabilities

Verifying product compliance is just one facet of EMI testing. Solving emissions problems can present a wide range of challenges, and the MXE offers a number of tools that will help you see and understand what's happening.

Leverage powerful spectrum analysis

Investigate out-of-compliance emissions with the MXE's built-in X-Series spectrum analysis capabilities, which include a rich set of resolution and video analysis bandwidths, detectors, and marker functions. In addition, the MXE includes the X-Series PowerSuite measurements for characterization of transmitted signals.

Switching between receiver and spectrum analyzer modes is greatly simplified with the global center frequency function, which links the viewed frequencies. When analyzing an emission, any modification of its frequency will be automatically updated in the MXE's suspect list, simplifying the final measurement process.

Changing the vertical or horizontal resolution of the display is as easy as touching the screen and spreading or pinching two fingers.

Enhance precompliance measurements

You can leverage the power and usability of the MXE when making precompliance measurements. The Keysight EMI measurement application (N6141EM0E) puts the functionality of the MXE inside any of our X-Series signal analyzers: UXA, PXA, MXA, EXA, or CXA. The excellent sensitivity of the X-Series signal analyzers translates into highly accurate emissions measurements.

Learn more here.

See amplitude variations vs time with Strip Chart

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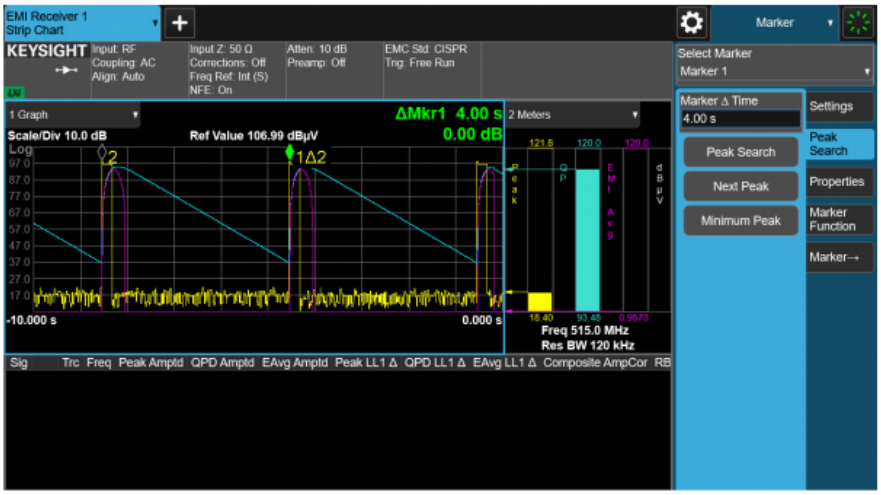
Characterize the variation of signal amplitude versus time using Strip Chart, a Keysight-exclusive feature which plots data for up to three detectors. All collected data is gapless, with a two-hour time record. This feature is especially useful for capturing the azimuthal emissions characteristics of a DUT when testing on a turntable.

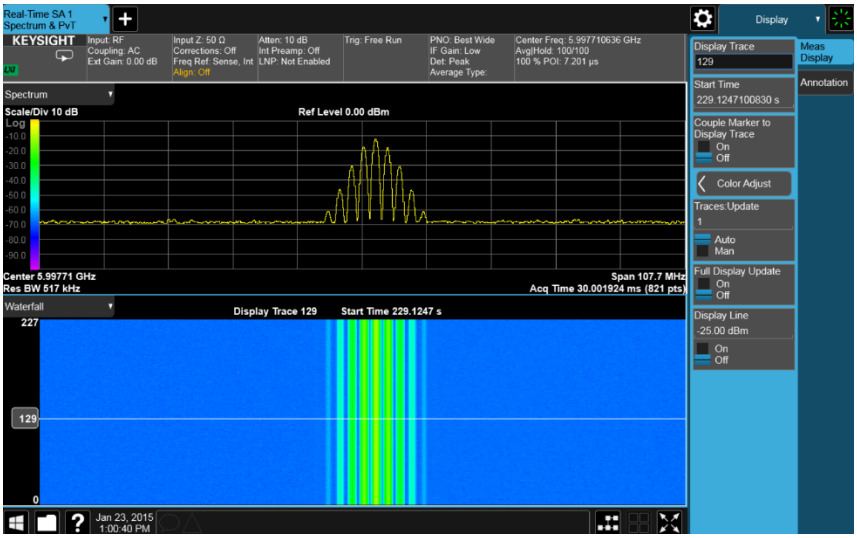
The frequency used for the Strip Chart display is coupled to the suspect list, making it easy to view each signal in the suspect list.



Strip Chart mode provides a unique, gap-free view that is useful for tracking DUT performance as a function of turntable or antenna position.

View varying emissions with spectograph displays

Observe how emissions spanning a broad spectral range change over time using the built-in spectrograph display. Tracking any variations in spectral data can provide clues about the origins of out-of-compliance emissions.



Spectrogram displays and the signal-marker capability help you understand the amplitude–and time-varying nature of emissions.

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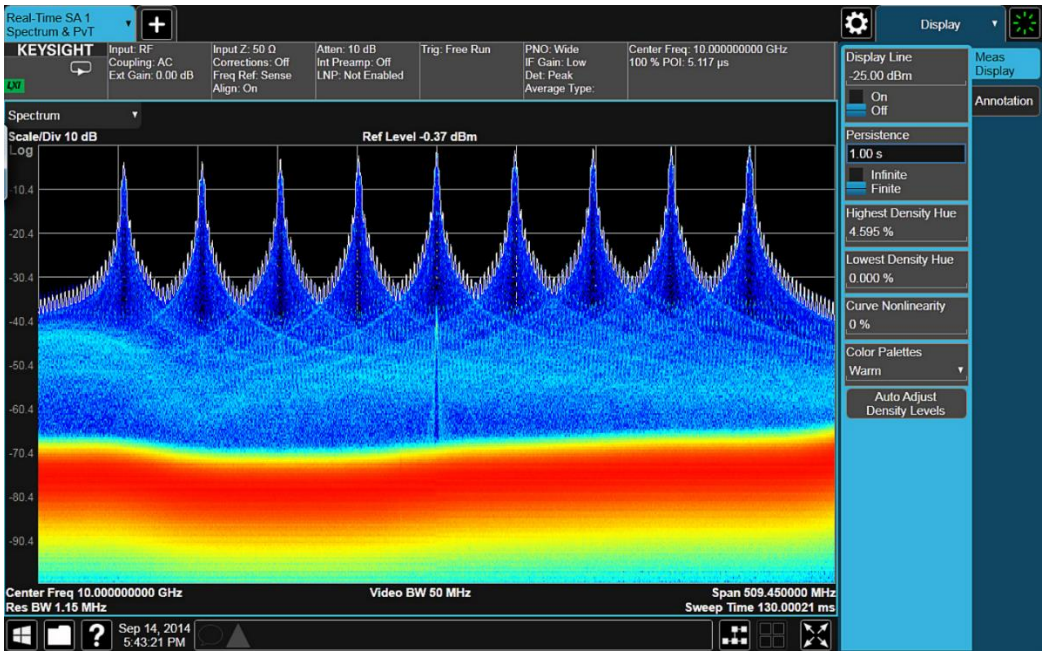
Capture transient signals with real-time spectrum analysis

Diagnose high-speed transient signals using real-time spectrum analysis (RTSA) with frequency mask trigger capability. Preselected microwave RTSA enables image-free, over-the-air signal analysis so you can more quickly and easily analyze sources of radiated emissions.



RTSA lets you see and understand high-speed transient signals that are difficult to capture.

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Build a Complete EMI Test Solution

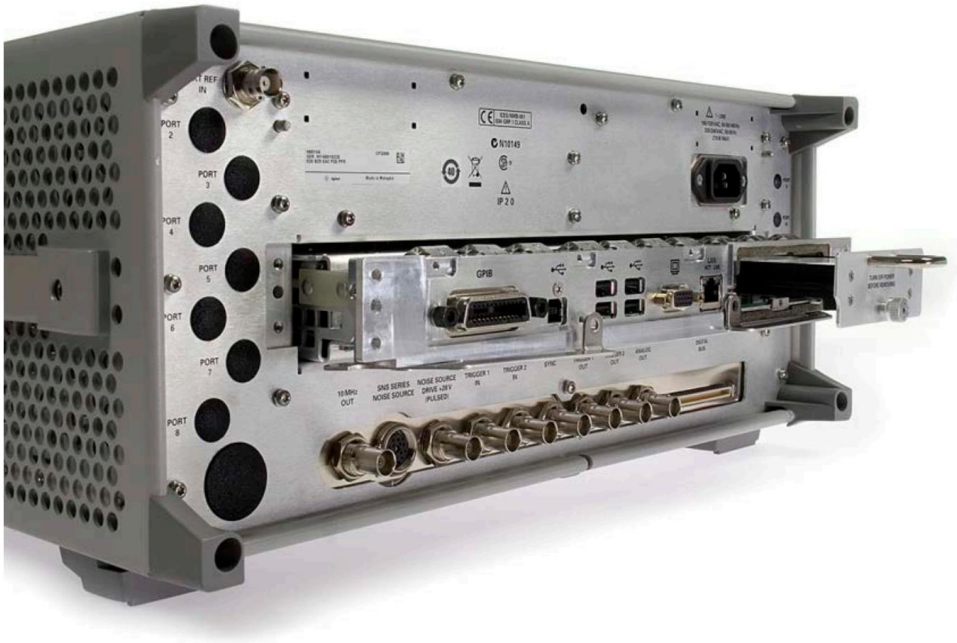
Our qualified Keysight Solution Partners provide a single point of contact to purchase complete EMI measurement solutions that meet commercial and military specifications. In addition to the MXE EMI receiver, they can provide equipment including chambers, probes, towers and antennas, and services such as integration, installation, training, and support. To further simplify testing, they also offer automation software that can meet your specific needs.

If you need to go beyond emission and immunity, our solution partners can provide ESD, line harmonics, droop testing, and more.

Protect Your Investment with an Upgradeable Platform

To keep your instrument current and extend its longevity, the MXE offers easy upgradability of hardware and software. When needed, you can enhance platform performance through upgradable CPU, memory, disk drives, and I/O ports. Internally, the mechanical assembly has three expansion slots that can accommodate future enhancements.

On the software side, simple license-key upgrades are all it takes to add functionality or measurement applications. For example, the external source control option lets the MXE interface with a variety of Keysight signal generators, enabling stimulus/response testing up to 20 GHz. For detailed signal analysis, the library of available measurement applications includes analog demodulation, phase noise, and noise figure.



Making EMI Compliance Measurements

Make sure you know the basics of EMI compliance testing. These tests ensure your devices pass EMC (electromagnetic compatibility) testing. This includes radiated and conducted emissions testing, and radiated and conducted immunity testing.

Find out more in this application note.

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MXE Front and Rear Panels

Comprehensive display provides view of spectrum, meters, and suspect list.

View up to three different detectors.

Save files fast with the quick-save feature.

Three USB 2.0 ports conveniently located on the front of the instrument.

Second input pulse-protected to 2 kW.

Identify signals and view information easily on the 10.6 inch, multi-touch screen.

Navigate the interface using your fingers, or a mouse and keyboard.

Get answers quickly with the comprehensive, context-sensitive embedded help system.

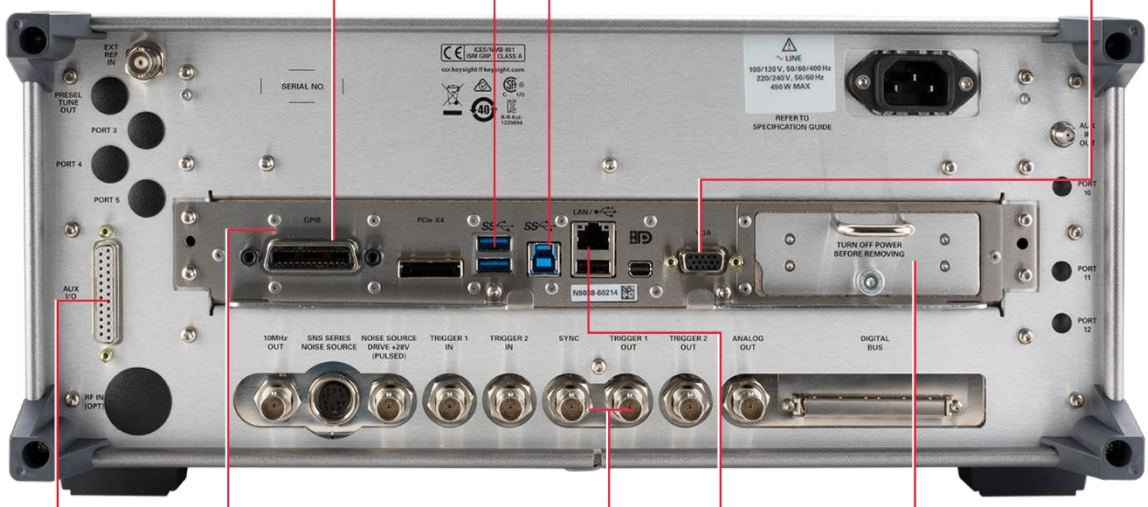
Test devices up to 44 GHz.

Send and receive SCPI commands over the GPIB interface.

Connect external peripherals and transfer data via the USB 3.0 (type-A port) interface.

Acquire IQ waveform data quickly or control the MXE remotely from an external PC over the USB 3.0 (type-B port) interface.

View the display on an external monitor by connecting to the VGA video output.



Auxiliary/IO port for LISN control.

Removable CPU enables processor, memory, and I/O upgrades.

Synchronize other test equipment with the analyzer using the external trigger output signals.

Control the MXE remotely over 1000Base-T LAN.

Removable solid-state drive. Additional solid-state drive available for instrument security.

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Related Literature

Keysight MXE EMI receiver

Publication Title	Publication Number
N9038B MXE EMI Receiver - Data Sheet	3120-1525.EN
N9038B MXE EMI Receiver - Configuration Guide	3120-1527.EN
X-Series Measurement Application Brochure	5989-8019EN

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