

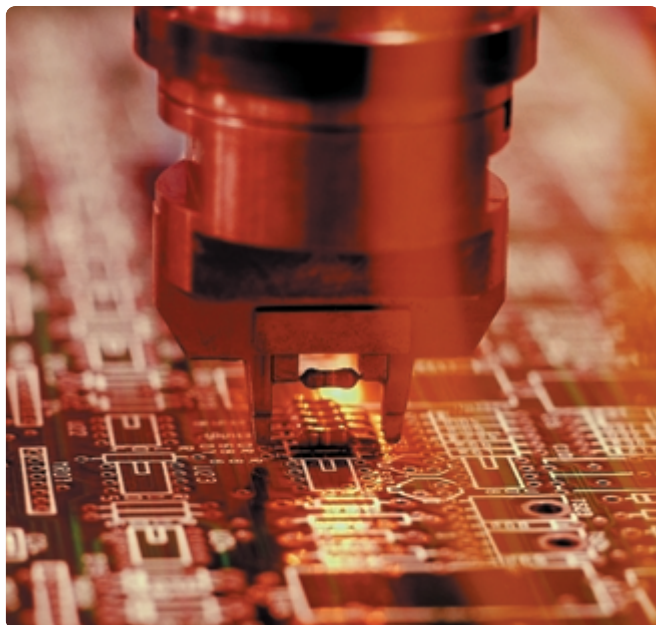
# Agilent E7400 A-Series EMC Analyzers, Precompliance Systems, and EMI Measurement Software

E7401A, E7402A, E7403A, E7404A  
E7405A, 84105EM, 84115EM, and E7415A



Evaluate, diagnose, and document  
your product's EMI performance.

## EMC precompliance measurements



Early evaluation of your design's EMI performance is essential for a successful product. Whether your industry is information technology, communications, automotive, medical, or industrial equipment, your product must comply with EMC requirements before it can be introduced to the marketplace.

With Agilent Technologies' EMC precompliance solution, you get all the features that make in-house EMC precompliance testing a simple reality:

- Pre-programmed, automated measurements that require no special knowledge or training, so you can begin making EMC measurements as soon as your EMC analyzer arrives.
- Interactive software that allows you to perform tests from your PC, or capture measurements made directly from the front panel.
- Automatic remeasure functions for consistent, repeatable results.

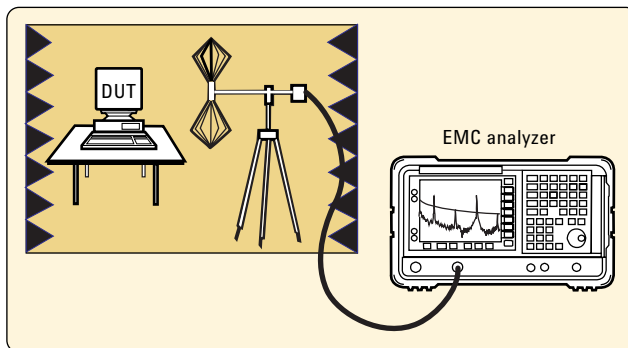
***Make EMC testing part of your design strategy to insure the fastest time-to-market possible.***

# Common EMC measurements

## Radiated emissions measurements

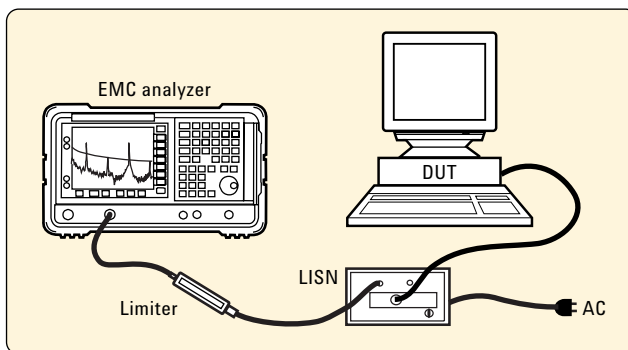
Emissions radiating into free space from a DUT are measured using a broadband antenna connected to an EMC analyzer or receiver. The DUT is rotated to find the maximum emissions.

The key to repeatable measurements is to choose an area free of reflective objects. Place the test equipment and DUT in the same positions each time measurements are made.



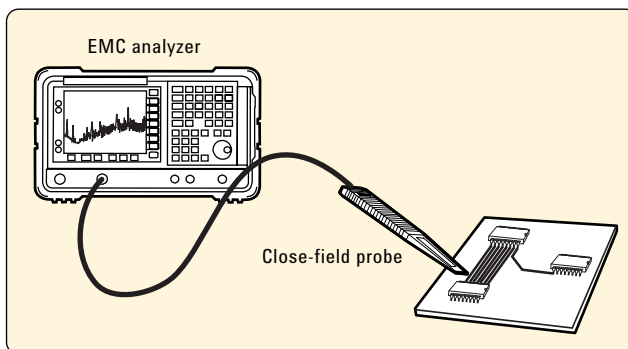
## Conducted emissions measurements

Conducted emissions measurements are used to detect interference or noise placed on power lines or data lines by electronic devices. The diagram shows the interconnection of the device under test (DUT) to the measurement equipment. The line impedance stabilization network (LISN) is used to couple the noise or interference from the power line to the EMC analyzer.

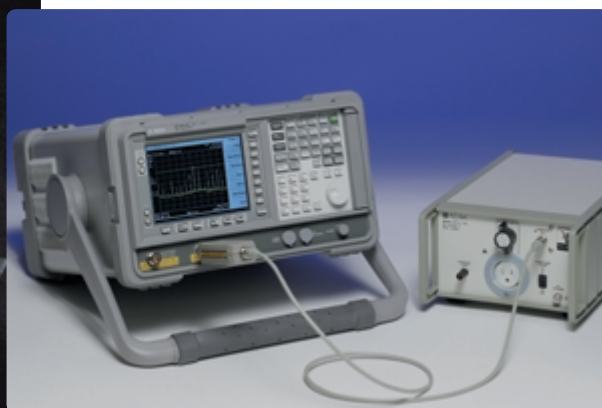
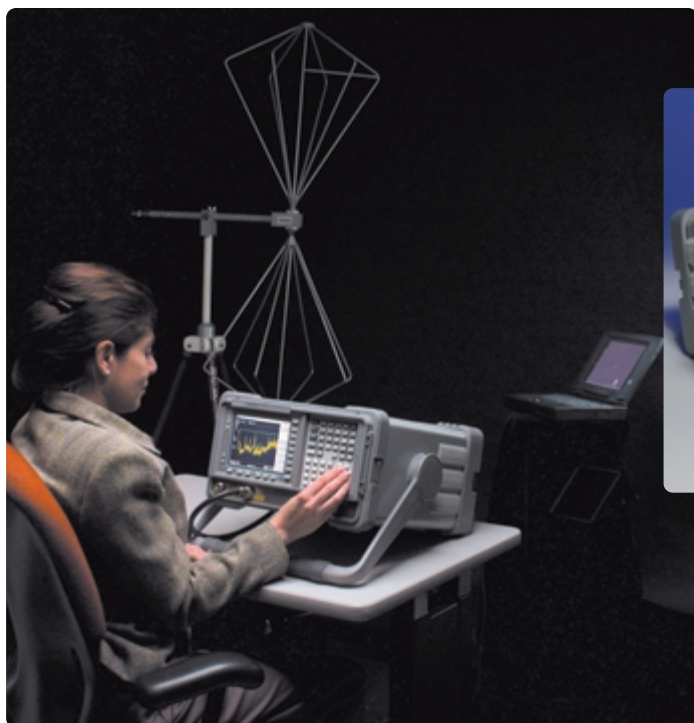


## Diagnostics and problem isolation

Once a problem has been detected using radiated and conducted emissions measurements, the next step is to isolate it. The close field probes are excellent devices for quickly locating the source of the emissions.



## EMC precompliance systems



### 84115EM preproduction evaluation system

The Agilent 84115EM has everything you need to perform radiated and conducted emissions measurements and test your product to all the major commercial regulatory agency requirements. Limits for the FCC, ENs, ANZ, BCIQ, and VFG are available on disk for direct loading into the EMC analyzer, or recall from the EMI measurement software included with the system. Develop your own limits and store on a disk using the EMC analyzer's internal disk drive.

Two antennas, biconical and log periodic, are included as default options with the system as well as a line impedance stabilization network (LISN), limiter, tripod, cable, and close field probe set. The LISN is offered with NEMA, SCHUKO, or British power outlets.

### 84115EM preproduction evaluation system

#### Default configuration

E7400 A-Series EMC analyzer<sup>1</sup>

- biconical antenna, 30 MHz to 300 MHz
- log periodic antenna, 200 MHz to 2 GHz
- line impedance stabilization network (LISN) (NEMA, SCHUKO, or British)
- tripod
- limiter
- cable
- 11945A close field probe kit
- E7415A measurement software

<sup>1</sup> Includes quasi-peak detector, average detector, EMI bandwidths, AM/FM demodulation with speaker, GPIB and parallel ports and built-in preamplifier.

# EMI precompliance measurement systems



## 84105EM design development system

Isolate and evaluate emissions hot spots with the Agilent 11945A close field probe set. The probes are calibrated in magnetic field strength units so that the emissions displayed on the EMC analyzer with the corrections applied, are in dBuA/meter. With the field strength known, the current at a specific frequency can be derived.

Since the probes measure magnetic field strength versus electric field strength, the repeatability is very good. Measurement repeatability is very important when remeasuring a device after a repair has been implemented.

Use the probes to locate RF leaks in shielding and cabinets.

## 84105EM system

84105EM includes an E7400 A-Series EMC analyzer, and a 11945A close field probe set.

## E7400 A-Series EMC analyzers

The heart of the EMI precompliance measurement system is the Agilent E7400 A-Series EMC analyzer. This EMC analyzer has all the capabilities needed to perform EMI measurements including quasi-peak detector, average detector, EMI bandwidths, limit lines, and correction factors for antennas, cable, and amplifiers.

- With the built-in disk drive, it is easy to export measurement results to a word processor or spreadsheet.
- The brilliant color display makes it easy to differentiate between traces, limit lines, and margins.
- The availability of five models allows you to pick the frequency range you need.

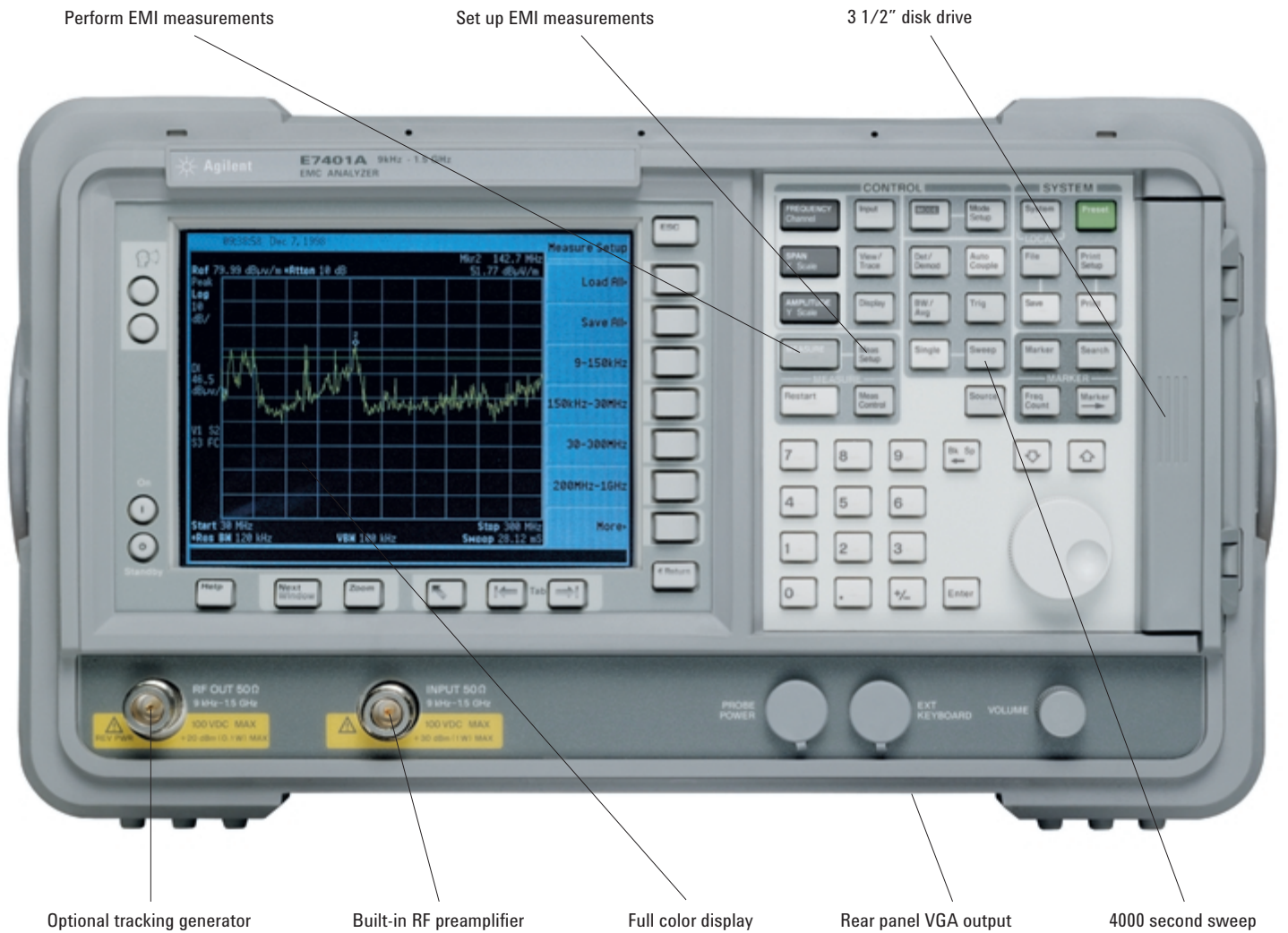
E7401A	9 kHz to 1.5 GHz
E7402A	9 kHz <sup>1</sup> to 3 GHz
E7403A	9 kHz <sup>1</sup> to 6.7 GHz
E7404A	9 kHz <sup>1</sup> to 13.2 GHz
E7405A	9 kHz <sup>1</sup> to 26.5 GHz

## Fast, accurate measurements for greater throughput

- The fast warm-up time means that you can start making calibrated measurements very quickly after turn-on.
- Attach a color monitor to the VGA output and you can view the signals at a distance while maximizing DUT emissions.
- The Agilent E7400 A-Series is ruggedly constructed with rubber encased frames.

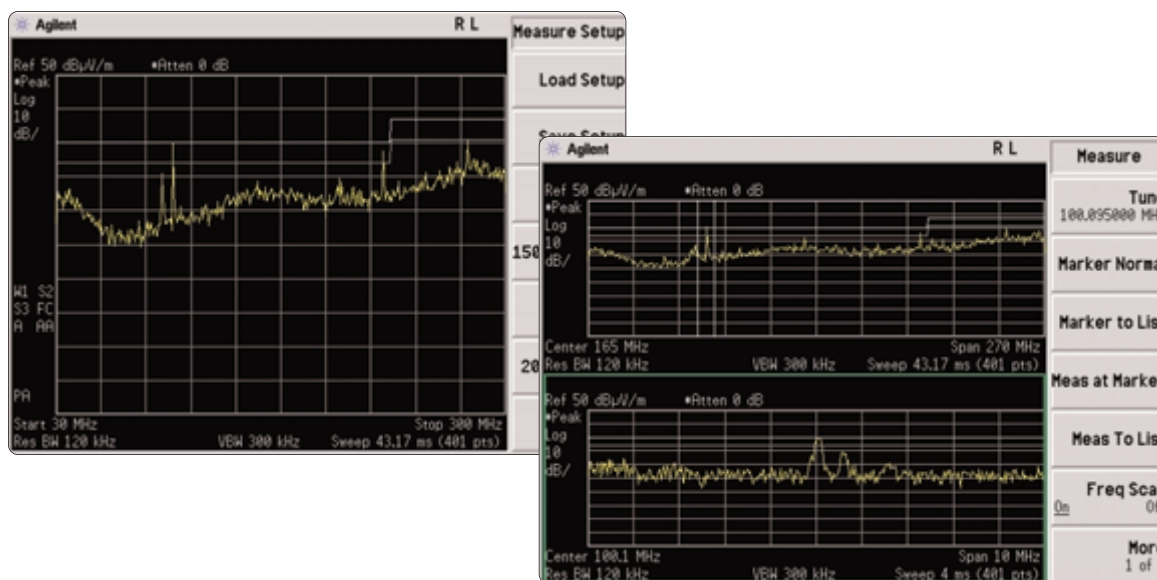
1. Optional 30 Hz low frequency extension.

# The Agilent E7400 A-Series EMC analyzer



**The Agilent E7400 A-Series  
EMC analyzer  
offers a standard  
three-year  
global warranty**

## EMI precompliance measurements (setup)



Setting up the E7400 A-Series EMC analyzer is completed in three easy steps: (1) select the band for the test; (2) choose the limit line; and (3) select the correction factors for the transducers, cables, and amplifiers.

### Setting up EMI bands

There are four standard EMI bands to choose from: band A (9 kHz to 150 kHz), band B (150 kHz to 30 MHz), band C (30 MHz to 300 MHz), and band D (200 MHz to 1 GHz). When the band is chosen, the correct EMI bandwidth is selected along with the correct sweep time and averaging bandwidth.

### Limit lines

The supplied 3.5" disk contains the limit lines for most of the inter-national regulatory agencies including FCC, ENs, BCIQ, ANZ, and VFG.

### Correction factors

Correct your measurements for transducer losses, cable attenuation, and amplifier gains. The supplied disk has typical transducer factors for most generally used transducers, amplifiers, and cables. Edit the correction factors to resemble your transducer's factors and store on a disk for later retrieval.

After you have set up the Agilent E7400 A-Series EMC analyzer, the next step is to measure the signals that are close to or above the limit. The process is simple, place the marker on the signal and press "measure at marker." If you want to take a closer look at the signal, use the zone window feature.

### Zone window and measure at marker

Take a closer look at a signal while viewing the broad spectrum. With the measure at marker feature, you can measure the quasi-peak, peak, and average value of signals automatically. You can then place the results in an internal list.

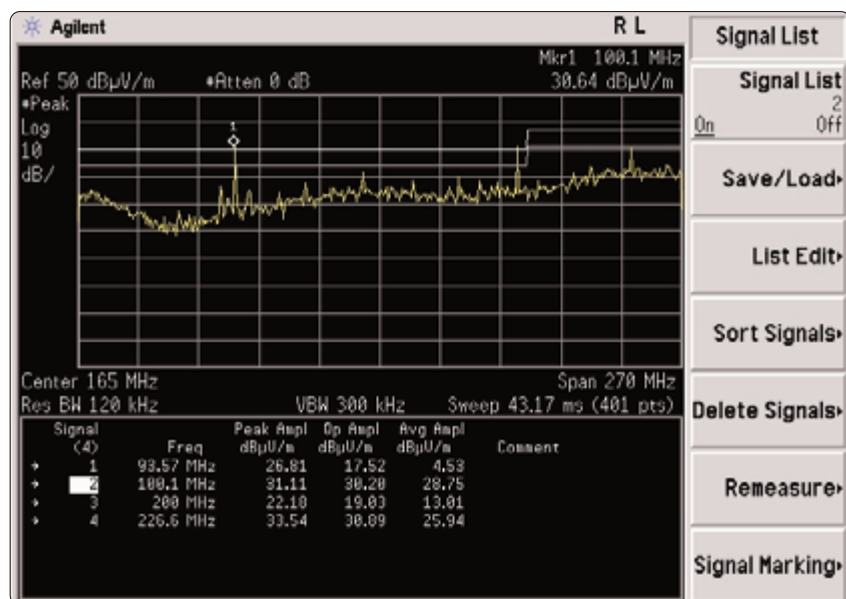
### Marker to list

To quickly save the frequency and amplitude of a signal without performing a measurement, use the marker-to-list feature. This is very useful for a group of signals that were obtained during a trace maximum-hold process.

### Automatic measurements

The fastest and easiest method of measuring several signals above a limit or margin is to use the automatic measurement feature. Each signal is measured and the results are placed in the list without operator intervention.

## EMI precompliance measurements (test)



### Signal list

The signal list function offers a great deal of flexibility. An operator can sort by frequency or amplitudes, mark duplicate signal and delete marked signals. The mark-duplicate feature is ideal for removing ambient signals.

### EMI precompliance measurements (output)

#### Report and list definition

The end result of any EMI measurement is the report. A report usually contains information about the DUT, the tester name, date of the test, and comments about the test results. In addition, the report should have graphical representation of the results as well as a list of suspect signals.

### The Agilent E7400 A-Series EMC analyzer offers:

- full color display
- 3.5" disk drive
- automatic EMI measurements
- five minute warm-up
- built-in preamp
- three-year warranty
- signal list manipulation
- 4000 second sweep for full span QP measurements
- continuous background calibration
- ±1.5 dB amplitude accuracy
- ±1% span accuracy
- built-in counter
- rugged, portable design
- log sweep
- GPIB interface

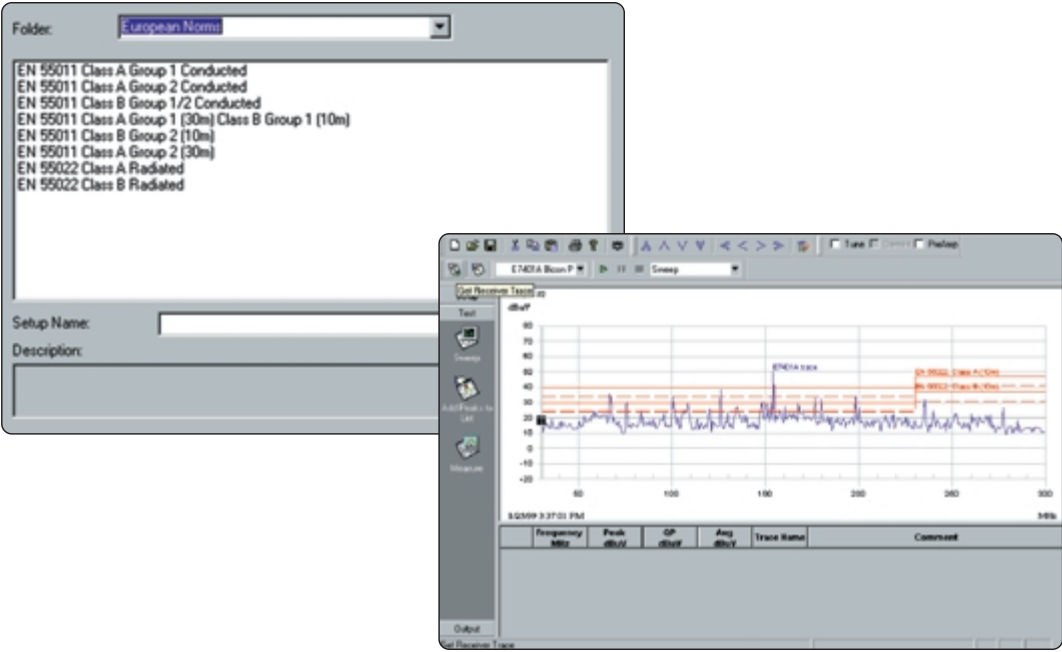
### The Agilent E7400 A-Series EMC options summary:

- 1DN** tracking generator
- 1D5** high stability time base
- 1D6** time gated sweep
- A4J** IF and sweep ports
- 1AX** replace GPIB with RS-232<sup>1</sup>
- AYX** fast time-domain sweeps
- BAB** APC 3.5 connector for E7405A
- UKB** low frequency extension to 30 Hz<sup>2</sup>
- UK6** calibration certificate
- AYU** yellow carrying case
- UK9** front panel cover

1. 1AX not compatible with E7415A PC software  
2. Not available with E7401A



# Agilent E7415A EMI measurement software



**Use EMI measurement software automation for:**

- fast, easy measurement setup
- repeatable measurement results
- export measurement results to your word processor or spreadsheet

## Measurement setup

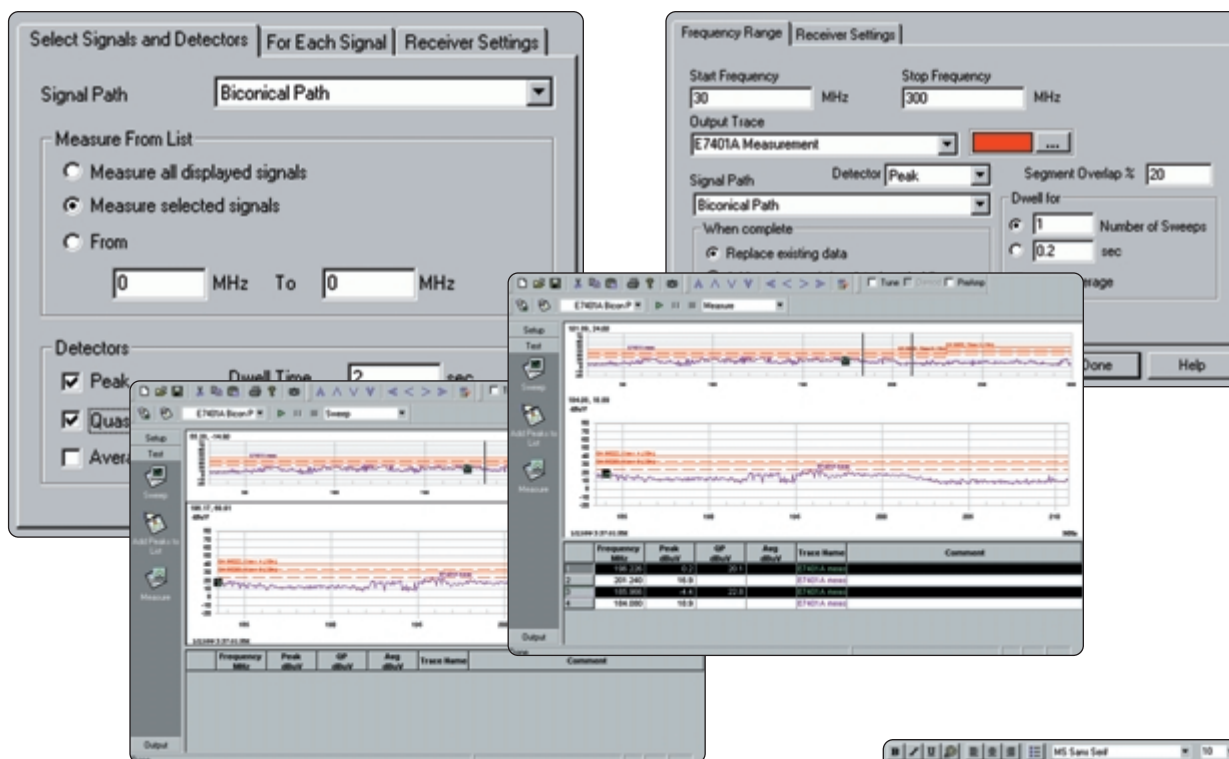
For the first-time user, the setup process is extremely easy. Just click on the regulation you wish to test to and all the parameters are automatically set, including bandwidths, limit lines, and typical transducer factors. You are now ready to make EMI measurements.

In addition, you can easily customize the setup libraries to meet your own specific needs.

## Choose the level of automation you need

View the EMC analyzer's trace. Capture the EMC analyzer's display and present it on the graph view of the software. Perform measurements directly with the E7400 A-Series EMC analyzer and then move the results to the E7415A EMI measurement software for report generation and archival.

# EMI measurement software

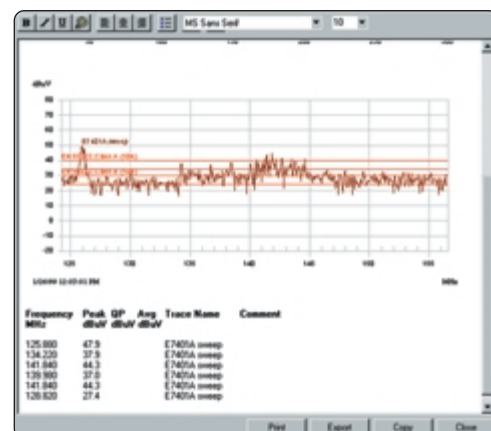


## Sweep the frequency band you want with the resolution you need

The E7415A EMI software gives you the flexibility to sweep over a frequency range and choose the frequency resolution and other measurement parameters such as bandwidth and attenuation. Or, use the auto-select feature to choose the appropriate bandwidths, amplitude setting, and frequency resolution for the frequency band of interest.

## Zoom in on an area of the frequency span and mark signals

Zoom into any section of your trace with a few clicks of the mouse. With a few more clicks you can store signals to a list. The E7415A software makes the finding and tracking of signals simple and intuitive.

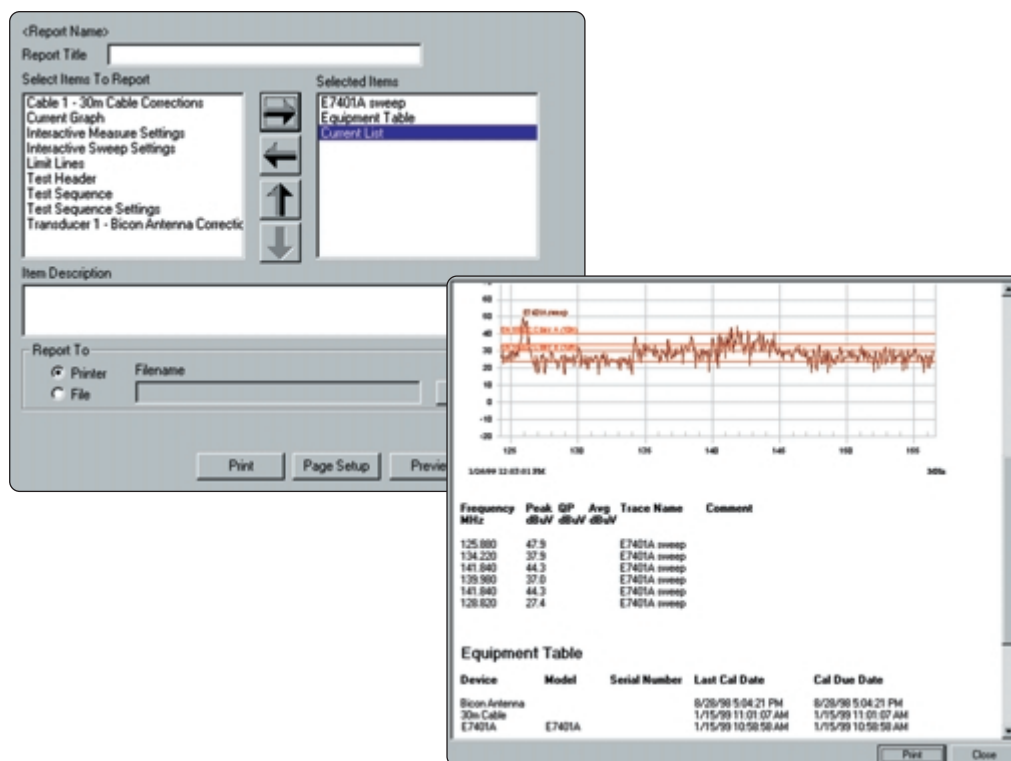


## Measure peak, quasi-peak, and average values of signal

Making peak, QP, and average measurements is as simple as selecting the signals of interest, choosing the required detection, and then letting the E7415A software do the rest of the work.

Graphs and results can then be readily stored or printed using the "snapshot" feature.

# EMI measurement software



## Create a report

The final and most important step in making EMI measurements is report generation. The E7415A EMI measurement software makes it easy for you to create a report. Simply select the items you wish to have included in the report, such as a current graph, signal list, correction factors, and header information.

## E7415A Option 001 report generator

The E7415A Option 001 allows you to purchase a second version of the E7415A software including only the report generation functionality at a reduced price. You can then streamline your measurement process by developing EMI reports on one computer while the E7415A EMI measurement software is performing EMI measurements on a separate computer.

## Supported EMI receivers and analyzers

The Agilent E7415A software supports the following EMC analyzers and receivers.

- E7400 A-Series EMC analyzers
- 8590EM Series EMC analyzers
- 8542E and 8546A EMI receivers

## Supported operating systems

- Windows® 95
- Windows® 98
- Windows NT® 4.0

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