ELECTRO-METRICS

TECHNICAL DATA

EM-2115A
EMI Analyzer/Receiver
Field Strength Meter
9 kHz - 1 GHz
For Commercial and Military Testing

EM-2115A*:	9 kHz - 1 GHz Rear Panel GPIB Connector – Standard

*The EM-2115A Analyzer/Receiver is dedicated to professional EMI measurements to meet FCC, VDE, ANSI, MIL-STD-461/462 and others.
(See "Special Features" on page 2.)

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Special Features

- Applications-Engineered for VDE 0871-0875, SAE-J551, SAE-J1816, SAE ARP1972, DO-160, MIL-STD-461/462A/B/C/D/E, and other specifications tests.
- Bandwidths tailored to conform with ANSI C63.2, VDE 0876, MIL-STD-462D/E, and DEF-STAN 59-41 (Part 3).
- A total of five (5) bandwidths, three bandwidths selectable at each tuned frequency including FCC/VDE requirements provide optimum analysis capability for all types of signals.
- Built-in microprocessor for ease of control of all front-panel functions from computer via IEEE-488 Bus (GPIB) with:
    - Simplified commands
    - Digital data outputs
    - Easy -to-use software.
- Operation with standard oscilloscope as preselected spectrum analyzer.
- Supplementary LED displays show frequency range and attenuation.
- LED amplitude display corrected for attenuation and calibration.
- LED frequency display accurate to ±0.1% + 1 count.
- Supplementary analog meter and BFO to facilitate tuning.
- Advanced circuits measure true Average and true RMS, Peak, Quasi-Peak and Slideback, for any waveform.
- Software available.
- Optional battery/charger module for field operation.

Used for FCC/VDE/CISPR and military requirements.

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Description

The EM-2115A Interference Analyzer is designed to perform emission testing to CISPR, ANSI, FCC, SAE plus other applicable commercial, government, and military (MIL-STD-461, 462) - both domestic and international - standards from 9 kHz to 1 GHz.

The EM-2115A uses a built-in microprocessor to control the operation of the analyzer through information keyed in by the front panel controls. In addition, front panel controls are directly accessible from a computer through the IEEE-488 Interface Bus (GPIB). Computer controlled operation and software writing are facilitated by the simplified receiver commands for all control functions and by its digitally-processed data outputs.

The analyzer uses LED displays to provide highly visible and accurate readings of tuned frequency and signal strength. The frequency display is accurate to ±0.1% +1 count and the amplitude display, which includes attenuation, is accurate to ±2 dB. Separate LED displays enhance the main displays and indicate the frequency range in use and the level of attenuation. To make tuning easier, the digital displays are augmented by a front panel analog meter. Tuning of CW signals is further aided by inclusion of a Beat Frequency Oscillator (BFO).

Advanced detector circuits provide True Average, Direct Peak, True RMS, Quasi-Peak, and Slideback Peak. The "True Average" detector provides the true time-averaged value of the amplitude of any signals appearing at the RF input that are within its pass band. This feature allows for valid analysis of certain types of EMI that could otherwise be misinterpreted by the operator. The peak detector responds to the peak value of the logarithm of the bandwidth-defined input signal and is calibrated in terms of the sinewave RMS equivalent in dB. The Quasi-Peak detector works with proper bandwidths and weighting factors (with warning indications for improper selection). The Slideback Peak detector is a rapid rise and decay detector similar to an envelope detector, but with the addition of a threshold level control.

The bandwidths of the EM-2115A have been tailored to conform fully with the ANSI C63, VDE 0876 MIL-STD-462D and DEF-STAN 59-41 (Part 3). A choice of three bandwidths is available at each frequency including those required for Quasi-Peak.

Calibrated spectrum analyzer type presentations are available by connecting the receiver to a conventional oscilloscope. Sweep features include variable scan rate oscilloscope. Sweep features include variable scan rate and variable dispersion (0.1% to 100% of the octave band selected). Appropriate outputs for X-Y plotting utilizing the above sweep features are also available.

An optional Battery/Charger Module, EM-2126, is also available which permits field testing at remote locations such as site surveys, field strength measurements near power lines and antenna measurements.

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Specifications

Equipment:	EM-2115A Interference Analyzer
Type:	Superheterodyne
Final IF Frequencies:	
Bands 1-7:	175 kHz
Bands 8-10:	1.6 MHz
Bands 11-15:	8.7 MHz
IF Bandwidths:	200 Hz ±20 Hz 1 kHz ±100 Hz 9.5 kHz ±500 Hz 105 kHz ±5 kHz 1 MHz ± 100 kHz
Frequency Range:	9 kHz - 1 GHz
RF Band Selection:	Dual pushbutton, 8 digit LED display indicates actual frequency range coverage.
Frequency Display:	6-Digit ½ inch LED
Frequency Accuracy:	±0.1% +1 count +0.2 resolution BW
Frequency Tuning:	Dual 10-turn coarse and 100-turn medium per band.
Fine Tune Control:	0.1% of Frequency Range, nominal
Input Impedance:	50 Ohms, nominal
RF Input Connector:	Type TNC
AFC:	Selectable by Front Panel Switch
IF, Image, Spurious:	
Rejection:	60 dB typical, 45 dB worse case
Gain Flatness:	±1 dB typical, ±3 dB worse case

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Specifications *(continued)*

Voltage Measurement:

Range:	0.01 µV to Volt (160 dB), 60 dB display range plus 100 dB of attenuation.
Voltage Accuracy:	±2 dB
Amplitude Display:	3-digit ½ inch LED with 1 dB resolution. Also uncalibrated 2-inch analog meter for ease in tuning.

Detector Functions:

Peak:	Direct-peak response, calibrated in terms of RMS equivalent sinewave. Associated dump circuitry controls sample time.
Quasi-Peak:	Refer to sensitivity, Table 2.
Average:	Video averaging, nominal 150 ms time constant
Crest Factor:	50 dB minimum.
RMS:	True rms of detected video signal, nominal 150 ms time constant
Crest Factor:	30 dB minimum
Slideback:	Metered threshold biased envelope detector for visual or aural extinction of peak levels.
Calibrator:	Impulse generator, 9 kHz to 1000 MHz, nominal 80 Hz rate. Automatically activated when Calibration button is depressed. Digital amplitude display automatically compensated.

Specifications subject to change without notice.
Unless otherwise specified, product is manufactured in Johnstown, NY USA.

Rev: 020809

Table 1
Receiver Average Sensitivity vs Bandwith

1	0.009-0.035	-35	-28	-18	--	--	+30
2	0.035-0.075	-37	-30	-20	--	--	+28
3	0.070-0.150	-37	-30	-20	--	--	+28
4	0.120-0.250	-37	-30	-20	--	--	+28
5	0.250-0.500	-37	-30	-20	--	--	+28
6	0.5-1.1	-37	-30	-20	--	--	+28
7	1.1-2.4	-37	-30	-20	--	--	+28
8	2.4-5.5	--	-30	-20	-10	--	+20
9	5.5-12.5	--	-30	-20	-10	--	+20
10	12.5-30	--	-30	-20	-10	--	+20
11	25-50	--	--	-13	-4	+6	+18
12	50-100	--	--	-12	-2	+8	+20
13	100-200	--	--	-12	-2	+8	+20
14	200-500	--	--	-10	0	+10	+22
15	500-1000	--	--	-6	+4	+14	+28

1. Narrowband sensitivities based on average detector and broadband sensitivities based on peak detector.
2. Impulse sensitivity of widest available bandwidth in each frequency range in dB (uV)/MHz.

Table 2
Receiver Quasi-Peak Sensitivity vs Bandwidth

1	0.009-0.035	-30	--	--
2	0.035-0.075	-30	--	--
3	0.070-0.150	-30	--	--
4	0.120-0.250	--	-14	--
5	0.250-0.500	--	-14	--
6	0.5-1.10	--	-14	--
7	1.1-2.4	--	-14	--
8	2.4-5.5	--	-14	--
9	5.5-12.5	--	-14	--
10	12.5-30	--	-14	--
11	25-50	--	--	-2
12	50-100	--	--	-2
13	100-200	--	--	0
14	200-500	--	--	0
15	500-1000	--	--	+4

Spectrum analysis Controls: For driving conventional oscilloscope or X-Y plotters. three modes: Manual, continuous or single sweep with variable rate and dispersion. Sweep times range from 0.01 to 3000 seconds based on control settings and band selected, with each setting variable over a range of 10 to 1. Dispersion is variable from 0.1% to 20% (100% at click stop) of the band selected.

IEEE-488 (GPIB) Controllable Functions and Outputs: Front panel functions may be controlled through the GPIB interface. Frequency, amplitude and status indication outputs.

Additional Outputs:

Post IF:	
Bands 1-10:	3 mVrms into 50 Ohms, nominal
Bands 11-15:	1 mVrms into 50 Ohms, nominal
Pre IF:	1 mV nominal into 50 Ohms, nominal
AM Video:	50 mV peak into 91 Ohms, nominal
FM Video:	100 mV peak into 91 Ohms, nominal
Audio:	100 mW nominal into 8 Ohms, nominal
Blanking:	5 volt pulse selectable for positive or negative polarity. Factory set to +5 V.
Horizontal:	0 to 1.5 V nominal into 1 k Ohms or greater.
Vertical:	0 to 1.5 V nominal into 1 k Ohms or greater for 60 dB. Selectable between peak, quasi peak, quasi-peak, rms, average or slideback. Selectable marker for spectrum analysis.
Physical Characteristics:	
Size:	178 mm high x 425 mm wide x 571 mm deep (less handles). (7”x16 3/4”x22¼”)
Weight:	30 kg (66 pounds).
Power Requirements:	115 V/230 V +10% 50-60 Hz. 75 watts at 115 V 60 Hz nominal.

Optional EM-2126 Battery/Charger Module available for field operation.

Temperature:	
Operating:	0°C - 50°C (32°F - 122°F)
Specifications hold for:	25° ±5°C (77° ±41°F)