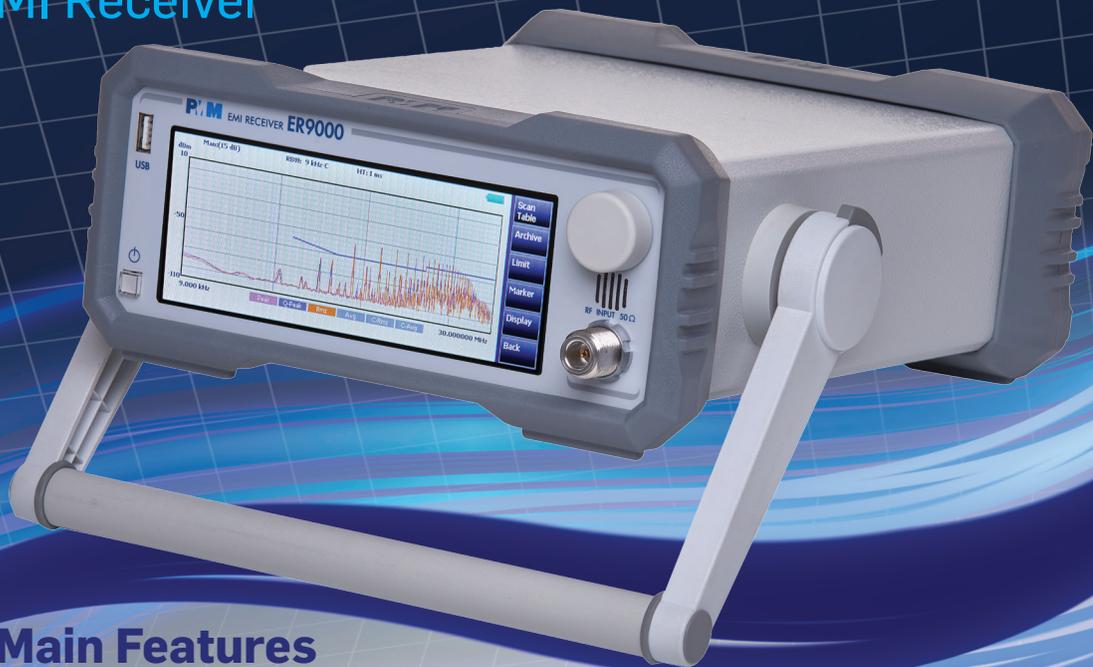# ER9000

EMI Receiver

Main Features

- ER9000 Opt.00: 10 Hz to 30 MHz frequency range
- ER9000 Opt.01: 10 Hz to 3 GHz frequency range
- Compliant with CISPR 16-1-1, MIL-STD-461, ANSI C63.2 and FCC
- Compliant with CISPR 14-1 when in conjuction with CA0010
- Conducted and radiated emission tests
- Direct analog to digital conversion up to 30 MHz
- Combination of EMI test receiver and spectrum analyzer
- Operates gapless FFT
- Very fast measuring time
- User port for driving external LISNs and ancillaries
- Internal CW generator and CISPR pulse generator
- 140 dBμV (2 W) maximum input level without damage
- Touchscreen color display
- Free PES PMM Emission Suite Software with Smart Detector function
- Robust, compact construction, battery operated

Top performance and superb accuracy make the full CISPR 16-1-1 compliant EMI receiver PMM ER9000 the ideal instrument for any conducted and radiated measurement from 10 Hz up to 3 GHz. Despite its compact size, the PMM ER9000 features a built-in battery and touch-screen color display, making it even easier and faster to use this portable receiver for debugging and certification tests in any EMC laboratory.

A full compliant span as fast as two seconds in band B and as fast as one minute in bands C+D is the result of a state-of-the-art design featuring FFT architecture to optimize measurement speed.

Other technical improvements include an extremely effective front end with efficient preselector and two-stage preamplifier for lower noise or lower saturation, for outstanding performance, and a user port suited for external devices like LISNs and switching boxes for even faster testing times.

Very easy to operate, the PMM ER9000 features an internal CW generator that can be used for self-calibration routines and for generating RF signals (e.g. for EUT testing), and a CISPR pulse generator perfect for assessing receiver performance in accordance with CISPR standards.Effective communication is ensured by a traditional Ethernet port as well as a fiber optic port.An external DDA Click Analyzer makes the use of this measurement system more attractive and profitable than ever.

The compact size and rugged yet lightweight design make the PMM ER9000 the perfect solution for in-situ testing.

PMM Emission Suite software (included free of charge) is the ideal companion for this high performance receiver, featuring a full set of user-friendly functions and spectrogram for all EMI applications, test measurement and EUT debugging.

The receiver can be ordered with two different frequency ranges: 10 Hz to 30 MHz (PMM ER9000 opt. 00), or 10 Hz to 3 GHz (PMM ER9000 opt. 01). Users can upgrade from version opt. 00 to version opt. 01 at any time.

ER9000
EMI Receiver
SPECIFICATIONS

Frequency range	
Range	10 Hz to 30 MHz (Opt. 00) 10 Hz to 3 GHz (Opt. 01)
Resolution	0.1 Hz; 10Hz above 30 MHz
Reference frequency	< 1 ppm
Spectrum method analysis	FFT, size up to 8192, minimum overlap 89%
RF Input	Zin 50 Ω, N fem.
VSWR	
10 dB RF att.	< 1.2; < 2 above 1 GHz
0 dB RF att.	< 1.6; < 2 above 30 MHz
Attenuator	0 dB to 55 dB (5 dB steps)
Preamplifier gain	20 dB; 10 dB above 30 MHz Low saturation preamplifier (after preselector)
	20 dB; 10 dB above 30 MHz Low noise preamplifier (before attenuator)
Pulse limiter	Built in (selectable) below 30 MHz

Max input level (without equipment damage)	
Sinewave AC	140 dBμV (2 W); 137 dBμV (1 W) above 30 MHz
Voltage pulse spectral density	176 dBμV/MHz below 150 kHz; 130 dBμV/MHz below 30 MHz; 97 dBμV/MHz below 1 GHz
Max. pulse voltage	200V (≤ 20 μs)
Max. DC voltage	25V; 50V above 1 kHz

Preselector	(Thirteen BP filters – 7.5 / 15 MHz BW to ADC)		
Frequency ranges	10 Hz to 9 kHz	150 kHz to 15 MHz	30 MHz to 96.6 MHz tracking
	1 kHz to 9 kHz	15 MHz to 22.5 MHz	96.6 MHz to 311 MHz tracking
	9 kHz to 150 kHz	22.5 MHz to 30 MH	311 MHz to 1000 MHz tracking
	150 kHz to 7.5 MHz	15 MHz to 30 MHz	1 GHz to 3 GHz
	7.5 MHz to 15 MHz		

IF bandwidth	
3 and 6dB	10 Hz, 20 Hz, 30 Hz, 50 Hz, 100 Hz, 200 Hz, 300 Hz, 500 Hz,
	1 kHz, 2 kHz, 3 kHz, 5 kHz, 10 kHz, 20 kHz, 30 kHz, 50 kHz, 100 kHz, 200 kHz, 300 kHz, 500 kHz,
	1 MHz, 2 MHz, 3 MHz
CISPR 16-1-1	200 Hz, 9 kHz, 120kHz, 1 MHz

Displayed Average Noise Level

Preselector OFF, preamplifiers OFF, Ht 1s		Preselector OFF, low noise preamplifiers ON, Ht 1s		Preselector ON, preamplifiers OFF, Ht 1s		Preselector ON, low sat. preamplifiers ON, Ht 1s	
9 kHz to 150 kHz (200 Hz RBW)	< -17 dBμV	9 kHz to 150 kHz (200 Hz RBW)	< -32 dBμV	9 kHz to 150 kHz (200 Hz RBW)	< -14 dBμV	9 kHz to 150 kHz (200 Hz RBW)	< -27 dBμV
0.15 MHz to 30 MHz (9 kHz RBW)	< 0 dBμV	0.15 MHz to 30 MHz (9 kHz RBW)	< -19 dBμV	0.15 MHz to 30 MHz (9 kHz RBW)	< 3 dBμV	0.15 MHz to 30 MHz (9 kHz RBW)	< -14 dBμV
30 MHz to 300 MHz (120 kHz RBW)	< 4 dBμV	30 MHz to 300 MHz (120 kHz RBW)	< -9 dBμV	30 MHz to 300 MHz (120 kHz RBW)	< 1 dBμV	30 MHz to 300 MHz (120 kHz RBW)	< -5 dBμV
300 MHz to 3 GHz (120 kHz RBW)	< 10 dBμV	300 MHz to 3 GHz (120 kHz RBW)	< -4 dBμV	300 MHz to 3 GHz (120 kHz RBW)	< 6 dBμV	300 MHz to 3 GHz (120 kHz RBW)	< 0 dBμV

Detectors	Peak, Quasi-Peak, Average, RMS, RMS-Average, C-Average.
	Smart Detector function above 30 MHz

Scan time

	A band (9 kHz to 150 kHz) 200 Hz RBW	B band (150 kHz to 30 MHz) 9 kHz RBW	C band (30 MHz to 300 MHz) 120 kHz RBW	D band (300 MHz to 1 GHz) 120 kHz RBW	E band (1 GHz to 3 GHz) 1 MHz RBW
SWEEP MODE (CISPR: preselector ON, QP detector)	< 2 s (Hold time 1 s)	< 3 s (Hold time 1 s)	< 20 s (Hold time 1 s)	< 40 s (Hold time 1 s)	< 160 s (Hold time 1 s)
	< 3 s (Hold time 2 s)	< 5 s (Hold time 2 s)	< 40 s (Hold time 2 s)	< 80 s (Hold time 2 s)	< 320 s (Hold time 2 s)
ANALYZER MODE (preselector OFF, Peak detector, Hold time lowest)	< 50 ms (Ht 27 ms)	< 10 ms (Ht 525 us)	< 100 ms (Ht 32 us)	< 500 ms (Hold time 32 us)	< 400 ms (Hold time 4 us)

Level measuring time	
(Hold time)	CISPR 16-1-1 as default.
	2 us to 120 s

Measurement accuracy **S/N > 20 dB**	10 Hz to 9 kHz	± 1.0 dB (typ.)
	9 kHz to 30 MHz	± 0.8 dB
	30 MHz to 1 GHz	± 1.0 dB
	1 to 3 GHz	± 1.5 dB

Stand alone main measure function **Or with free system SW PMM Emission Suite**	Manual, spectrum analyser and sweep modes, Waterfall
	Standard and user definable limits
	Conversion and correction factors
	Control of DDA (Click) analyser, LISNs and other accessories.
	Auto diagnosis, Auto calibration, Test reporting

Units (80 to 200 dB selectable dynamic)	dBm, dBμV, dBμA, dBpW, dBμV/m, dBμA/m, dBpT
Demodulation	AM – FM Internal loudspeaker
RF output	Zout 50 Ω, BNC fem.
Tracking (manual mode) & CW generator	
Frequency range	10 Hz to 30 MHz
Level range	60 to 90 dBμV (0.1 dB step)
Level accuracy	0.5 dB
CISPR pulse generator	
PFR	1 to 1000 Hz
PRF uncertainty	< 0.1%
Autocalibration	Internal reference source
Display	Color 6.2" TFT LCD touch panel
I/O Interface	RS-232 DB9, USB 2.0 type A and B, User port, DB15 (Drives PMM LISNs and accessories), Serial optical interface RP02, GigE 10/100Base-T RJ45
Operating temperature	-5° to 45°C
Power supply	10 - 15 Vdc, 2.5A with AC universal adapter/charger; Li-Ion rechargeable & replaceable battery
Dimensions	235x105x300 mm
Weight	5.0 kg

Ordering information:

ER9000 Option 00 (10 Hz to 30 MHz)
ER9000 Option 01 (10 Hz to 3 GHz)
Includes: RS232 cable, USB-RS232 serial converter, USB cable, BNC-BNC cable, N-m to BNC-f adapter, 10 m plastic fiber optic for PC, USB-fiber optic adapter, AC/DC power adapter, PES PMM Emission Suite Software, soft carrying case, user's manual, standard calibration certificate

Optional accessories:

9010/RAV RMS-Avg detector
9010-RMA rack mount adapter for 19" rack
9010/CC Rigid Carrying Case.
Upgrades:
ER9000/00/UP/01 from ER9000 Opt. 00 to ER9000 Opt. 01 (10 Hz to 3 GHz)

Related products

Receivers

- 7010/01: EMI Receiver 9 kHz to 1 GHz
- 7010/02: EMI Receiver 9 kHz to 30 MHz
- 7010/03: EMI Receiver 9 kHz to 3 GHz
- 9010F: EMI Receiver 10 Hz to 30 MHz
- 9010/03P: EMI Receiver 10 Hz to 300 MHz
- 9010/30P: EMI Receiver 10 Hz to 3 GHz
- 9010/60P: EMI Receiver 10 Hz to 6 GHz
- 9030: EMI Receiver 30 MHz to 3 GHz
- 9060: EMI Receiver 30 MHz to 6 GHz
- 9180: EMI Receiver 6 GHz to 18 GHz
- ER8000/00: EMI Receiver 9 kHz to 30 MHz
- ER8000/01: EMI Receiver 9 kHz to 3 GHz
- FR4003: Field Receiver 9 kHz to 30 MHz
- CA0010: Click Analyzer 150 kHz to 30 MHz

Antennas

- BC-01: Biconical Antenna 30 to 200 MHz
- BL-01: Biconical Log Periodic Antenna 30 MHz to 6 GHz
- DR-01: Double-ridged Horn Antenna 6 to 18 GHz
- LP-02: Log Periodic Antenna 200 MHz to 3 GHz
- LP-03: Log Periodic Antenna 800 MHz to 6 GHz
- LP-04: Log Periodic Antenna 200 MHz to 6 GHz
- VDH-01: Van der Hoofden Test Head 20 kHz to 10 MHz
- TR-01 / TR-01 A: Antenna Tripod
- Antenna Set AS-02 / AS-03 / AS-04 / AS-05 / AS-06 / AS-07 / AS-08
- RA-01: Rod Antenna 9 kHz to 30 MHz
- RA-01-HV: Rod Antenna 150 kHz to 30 MHz
- RA-01-MIL: Rod Antenna 9 kHz to 30 MHz

LISN/Probes

- L2-16B: single phase AMN, 16 A
- L3-32: 4 lines, 3-phase AMN, 32 A
- L3-64: 4 lines, 3-phase AMN, 63 A
- L3-64/690V: 4 lines, 3-phase AMN, 63 A
- L3-100: 4 lines, 3-phase AMN, 100 A
- L1-150M: single-path, 50 Ohm AMN, 150 A
- L1-150M1: single-path, 50 Ohm AMN, 150 A
- L1-500/690V: single phase AMN, 500 A
- L3-500/690V: 4 lines, 3-phase AMN, 500 A
- SBRF4: RF Switching Box
- SHC-1/1000: Voltage probe, 1000 Vac, 35 dB
- SHC-2/1000: Voltage probe, 1000 Vac, 30 dB