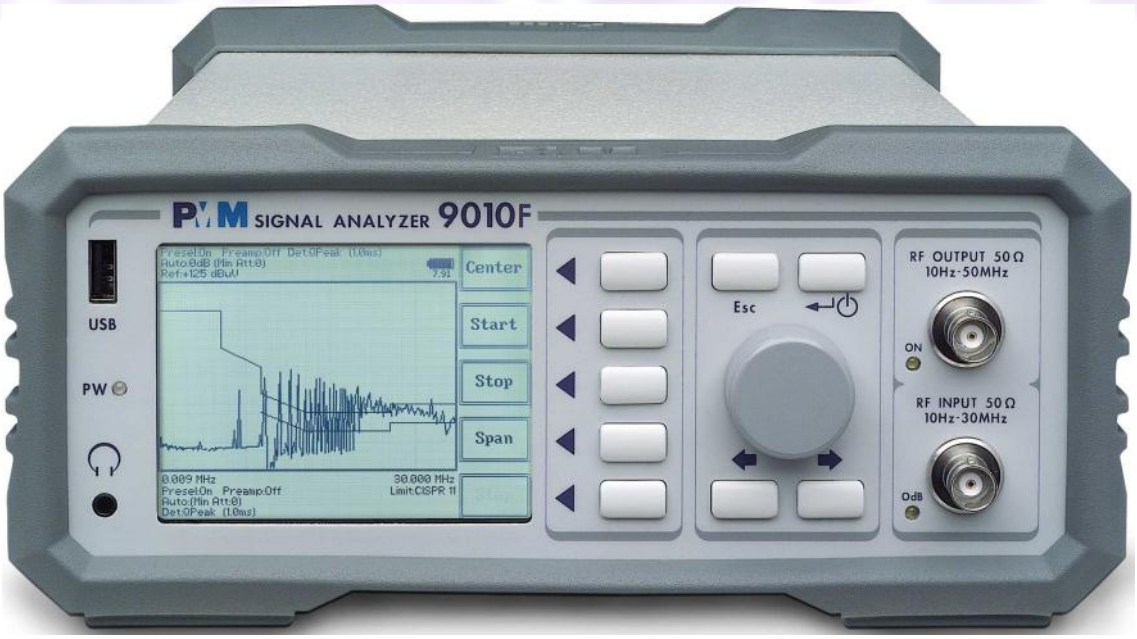

PMM 9010F

FFT Time Domain Digital EMI Receiver & Real time Analyzer

- FFT-based, gapless EMI receiver & Analyzer, 10 Hz – 30 MHz
- Full compliance to CISPR 16-1-1
- Reduces test time from hours to seconds
- Real-time spectrum analysis
- Rugged, light weight, small size, internal battery for best portability
- User-friendly in stand-alone and with the powerful PMM Emission Suite
- Expandable to higher frequencies

Applications

Measurement of conducted and radiated emissions of EUT in full compliance to CISPR, IEC-EN standards.
Analyzing the emissions in short time is particularly suitable for EUT with short operation cycles, e.g. electric tools, food machinery and in general all appliances with electric motors subjected to over-heating if run for too long time.
Fast and reliable tests provide the designer of an immediate feedback in the try-and-test process, an effective contribution to reduce the product time-to-market.

Description

The new EMI Receiver **PMM 9010F** is based on very advanced analog to digital conversion and data processing technology that applies the FFT frequency spectrum analysis in full compliance with all the tests required by the standard CISPR 16-1-1.
Same modular construction, compact size and low power consumption of the other renowned models in PMM's Digital Receivers family: PMM 9010, 9010/03P, 9010/30P.

Measurement speed

CISPR detectors as the Q-Peak, C-RMS and C-AVG detectors are characterized by a long settling time: measurements must be performed with a long observation time (hold time) of 1 - 2 seconds for each frequency step; setting hold times lower than 1s can reduce the test time but at the cost of possible severe errors and under-estimation of the levels.
PMM 9010F overcomes this limitation by scanning the entire spectrum in **less than 25 seconds** with hold time of 1 second and for all detectors, instead of nearly 5 hours (*).
Such methods for reducing the test time e.g. pre-testing, Smart Detectors and Frequency Tables are no more needed.

Noise and sensitivity

PMM 9010F's very advanced design provides outstanding performances not only in terms of measurement speed, but also in terms of noise floor level.
In a typical conducted emissions test configuration:

- Hold time: 1 s
- Detector: QP
- Preselector: ON - Preamplifier OFF

the noise floor is less than -7 dBµV in the band A (9 – 150 kHz) and 5 dBµV in the band B (0,15 – 30 MHz), corresponding to less than -137 and -141 dBm/Hz respectively.
When a higher sensitivity is required, the internal preamplifier reduces the noise floor to less than -24 dBµV in band A, and -7 dBµV in band B, corresponding to less than -154 dBm/Hz in both cases.

Analyzer mode

The Analyzer mode is particularly useful in EUT development, and is even faster: it features real-time spectrum analysis over a full span of 30 MHz (RBW 300 kHz) or 1,84 MHz (RBW 9 kHz CISPR).

PMM Emission Suite (PES)

Easy, user-friendly, always updated PC software supplied with the PMM 9010F for real-time measurements, save, recall and edit settings, factors, limits, scans etc. Specific functions automatize the measurements. Reporting and data import-export included.

Ancillaries

PMM 9010F together with the PES drives all the PMM ancillaries like LISN and RF switches.

Implementations and upgrading

Like all the models of the family, the PMM 9010F can be expanded in frequency - up to 18 GHz - and added of the options very easily and safely by the user itself. Details provided in the last page.

Service

Designed having in mind the EMC real world, PMM receivers are very difficult to damage. Should the case, immediate and effective support is provided by the International Sales Network.

Calibration

Almost all of the receiver is calibration-free, lifetime. The internal reference provides for auto-calibrating RF front-end - attenuators, preselector, preamplifier - and A/D conversion. Accredited calibration certificate available (option).

(*) Considering a frequency step of 1/4 RBW

SPECIFICATIONS			
Frequency range	10 Hz to 30 MHz		
Resolution	0.1 Hz		
Reference frequency	< 1 ppm		
RF input	Z_{in} 50 Ω, BNC fem.		
VSWR	10 dB RF att.	< 1.2	
	0 dB RF att	< 1.6	
Attenuator	0 dB to 35 dB (5 dB steps)		
Preamplifier gain	20 dB (after preselector)		
Pulse limiter	Built in (selectable)		
Max input level			
(without equipment damage)	137 dBµV (1 W)		
Sinewave AC voltage pulse spectral density	97 dBµV/MHz		
Preselector	One LP and six BP filters		
IF bandwidth	6 dB bandwidth:	1, 3, 10, 30, 100, 300 kHz	
	CISPR 16-1-1	200 Hz, 9 kHz	
Noise level @ Hold time 1 s		Quasi-peak dBµV	Average dBµV
Preselector OFF, preamplifier OFF	9 to 150 kHz (200 Hz RBW)	< -13	< -16
	0.15 to 30 MHz (9 kHz RBW)	< 5	< 0
Preselector OFF, preamplifier ON,	9 to 150 kHz (200 Hz RBW)	< -27	< -30
	0.15 to 30 MHz (9 kHz RBW)	< -9	< -14
Preselector ON, preamplifier OFF	9 to 150 kHz (200 Hz RBW)	< -7	< -10
	0.15 to 30 MHz (9 kHz RBW)	< 5	< 0
Preselector ON, preamplifier ON	9 to 150 kHz (200 Hz RBW)	< -24	< -27
	0.15 to 30 MHz (9 kHz RBW)	< -7	< -12
Spurious response	Peak, Hold time 100 ms	< -7 dBµV, < 3 dBµV above 150 kHz	
Detectors	Peak, Quasi-Peak, Average, RMS, RMS-Average, C-Average, APD (1)		
Scan time			
SWEEP MODE	A band (9 - 150 kHz)	< 5 s	Hold time 1 s, 200 Hz RBW
Full CISPR: preselector ON, QP detector	B band (150 kHz - 30 MHz)	< 20 s	Hold time 1 s, 9 kHz RBW
ANALYSER MODE	A band (9 - 150 kHz)	< 0.5 s	Hold time 2.2ms, 200 Hz RBW
preselector OFF, Peak detector	B band (150 kHz - 30 MHz)	1 s	Hold time 1 s, 300 kHz RBW
		1 s	Hold time 50 ms, 9, 10 kHz RBW Gapless (2)
		<0.1 s	Hold time Auto, 30 kHz RBW
Level measuring time (Hold time)	CISPR 16-1-1 as default. 0.1 ms to 120 s		
Stand-alone display & measure functions	Marker, marker peak, marker to center, highest peaks, move peak to Analyzer & Manual modes. Store -load: up to 11 traces (sweep mode), two panels, 4 conversion factors Built-in limits: CISPR 11, 14, 22. Others and custom limits: make and upload by PMM Emission Suite Battery charge and voltage Display style, contrast, backlight Click functions (optional) (1)		
Display units			
Stand alone	dBm, dBµV		(80 to 120 dB display dynamic)
With PMM Emission Suite SW	dBm, dBµV, dBµA, dBpW, dBµV/m, dBµA/m, dBpT		(80 to 200 dB display dynamic)
Measurement accuracy	10 Hz to 9 kHz	± 1.0 dB Typ	
S/N > 20 dB	9 kHz to 30 MHz	± 0.8 dB	
RF output	Tracking (manual mode) & CW generator, Z_{out} 50 Ω, BNC fem.		
Frequency range	10 Hz to 50 MHz		
Level range	60 to 90 dBµV (0.1 dB step)		
Level accuracy (10 Hz to 30 MHz)	0.5 dB		
Autocalibration	Internal reference source		
I/O Interface	RS-232	High speed Optical (2 channels)	
	USB rear (front for future extension)	User port (Drives PMM LISNs and accessories)	
	Bluetooth (optional)	IEEE-488 (optional)	
Operating temperature	-5° to 45°C		
Power supply	10 - 15 Vdc, 2.5A Li-Ion rechargeable & interchangeable battery (8h avg. duration) AC universal adapter/charger		
Dimensions	235x105x335 mm		
Weight	4.3 kg		

(1) Soon available
(2) Not a single pulse missed

Ordering information

9010F	EMI receiver 10 Hz - 30 MHz CISPR 16-1-1 full-compliance

Including:

- internal generator 10 Hz – 30 MHz
- AC adapter (mod. 9010/AC)
- PC software PMM Emission Suite
- Standard Calibration Certificate
- RS232/USB adapter
- N-BNC adapter
- Control cables (USB, RS-232), BNC-BNC cable

Optional accessories and functions

9010/MIL (*)	MIL-STD-461 RBW Filters
9010/CLICK (*)	Click Analyzer function, CISPR 14-1 full-compliance, including: - Switching Operation Box, control cables - 2x20 dB attenuator
9010/BTA	RS-232 to BlueTooth adapter for 9010
BP01	Li-Ion Battery Pack
9010/AC	Additional AC adapter/charger for BP01 (one already supplied with 9010F)
9010/CC	Rigid carrying case
9010/UKAS	UKAS CISPR-16-1-1 accredited calibration certificate for Bands A, B (9 kHz - 30 MHz)
9010/UKAS-Click	UKAS accredited calibration certificate for 9010F + 9010/Click to CISPR-16-1-1 & CISPR-14-1

Frequency upgrades (*)

9030	Extension unit 30 MHz - 3 GHz, full compliant to CISPR 16-1-1 (UKAS accredited calibration on option)
9060	Extension unit 30 MHz - 6 GHz, full compliant to CISPR 16-1-1 (UKAS accredited calibration on option)
9180	Extension unit 6 – 18 GHz, full compliant to CISPR 16-1-1 (UKAS accredited calibration on option)

Ancillary equipments

LISN - controlled by the PMM 9010/30P receiver to automatically select the lines to measure

- L1-150M Single line LISN, 150A
- L2-16A Two lines, Single phase, 16A LISN
- L3-32 Four lines, 3-phase, 32A LISN
- L3-64 Four lines, 3-phase, 64A LISN
- L3-100 Four lines, 3-phase, 100A LISN
- L3-500 Four lines, 3-phase, 350A LISN

CISPR 16-1-2 Voltage Probes

- SHC-1/1000 35 dB CISPR, 1500 ? , 1 kV
- SHC-2 30 dB CISPR, 1500 ? , 300 V

Antennas

- RA-01 Rod Antenna 9 kHz – 30 MHz
- BC-01 Biconical Antenna 30-200 MHz
- DR-01 Double-ridged Antenna 6 -18 GHz
- LP-02 Log Periodic Antenna 200 MHz - 3 GHz
- LP-03 Log Periodic Antenna 800 MHz - 6 GHz
- TR-01 Tripod for PMM Antennas

EN55015 (CISPR 15) components

- F-300M-16 CDN 150 kHz - 300 MHz; 250 VAC - 16A, 50/60 Hz for power circuitry testing with phase, neutral and PE
- RF-300 3-axis Loop Antenna System for CISPR 15 EN55015
- RF-300C Calibration kit for RF-300
- TRF-1 Balance/unbalance transformer
- DL-xx Dummy Lamps according to the Standard
- VDH-01 Van der Hoofden test-head for IEC 62493 (human exposure to emf generated by lighting equipment)

(*) Functions available in 2012, field-installable by user

PMM a brand of narda Safety Test Solutions® an L3 Communications Company

Narda Safety Test Solutions Srl
Via Leonardo da Vinci, 21/23
20090 Segrate (Milano) - ITALY
Phone.: +39 02 269987-1
Fax: +39 02 269987-00
E-Mail: support@narda-sts.it
Internet: www.narda-sts.it