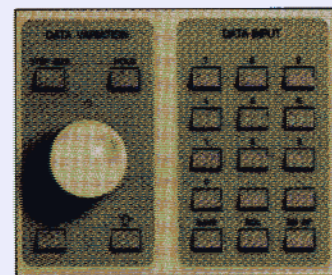


PMM 9000 EMI SIGNAL ANALYZER

More than just a receiver: thanks to its unique features PMM 9000 is the centerpiece of EMC System easy to use for fast and accurate measurements

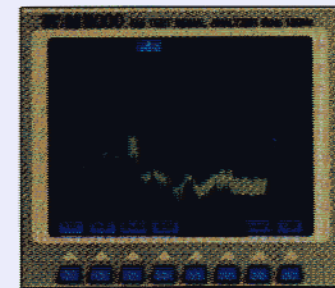
The PMM 9000 receiver is certainly the best price/performance EMI system on the market; it has been designed to solve any EMC measurement problem. Measurements are



really fast and easy to perform: with only few keystrokes it is very simple to load the limits, make the measurements with three simultaneous detectors (P, QP and A), save readings and print the test report. The PMM 9000 offers several unique characteristics which make the unit more than just a receiver: the "action" feature, for example, provides functionality of a

complete automatic system without any external PC. It can control all kinds of LISNs (Line Impedance Stabilisation Network), perform a sequence of measurements, find the worst case reading and at the end print or save data only when the signals are below (or above) the limit.

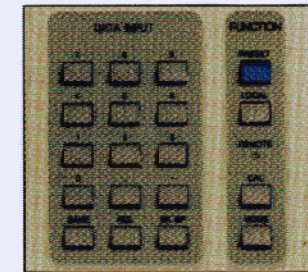
All that may be programmed, stored and then repeated completely



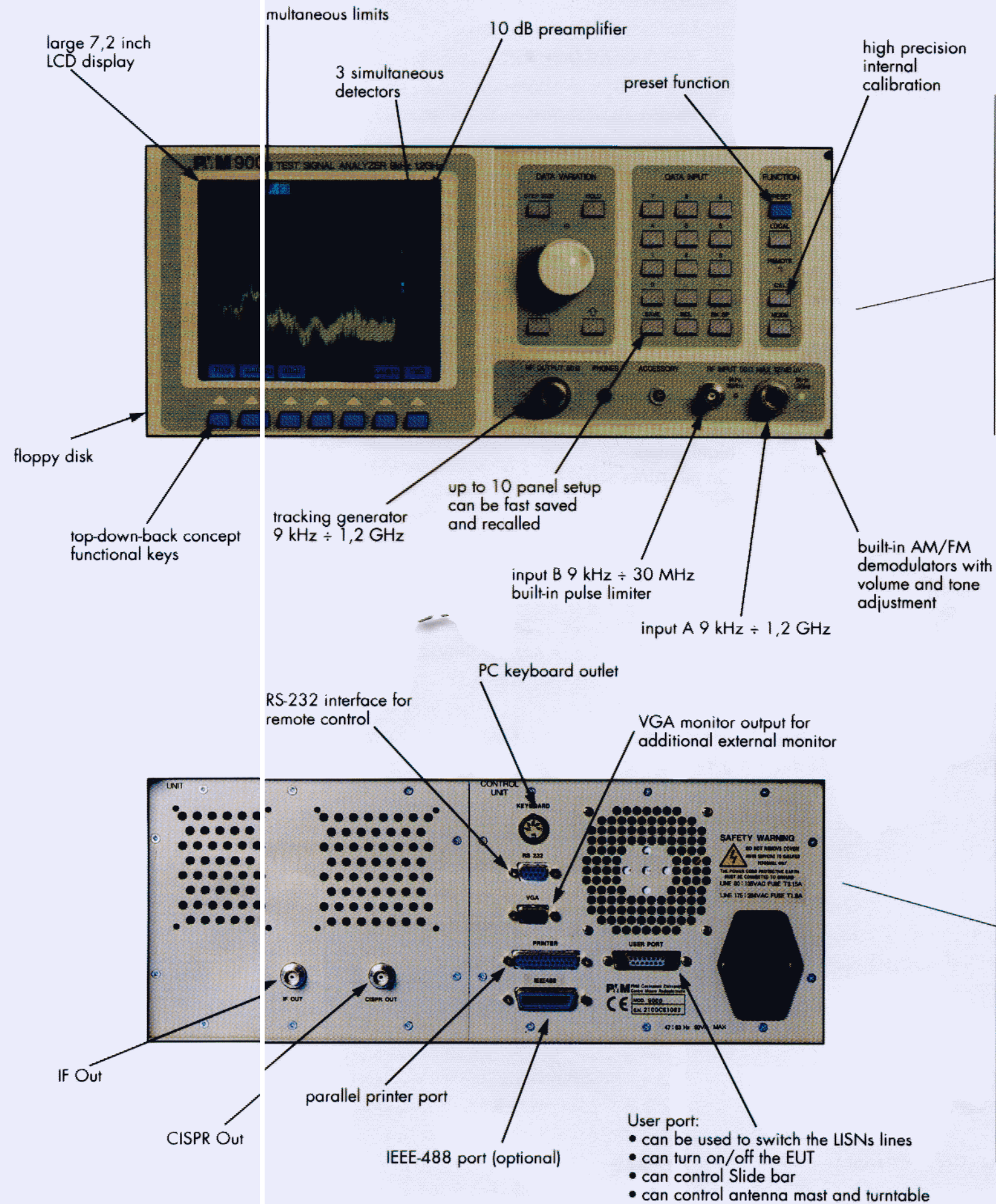
automatically as many times as are needed with no operator at all!! The built-in hard disk as well as 3 1/2 inch floppy drive give extra convenience to save,

load or transport data.

Two separate inputs are available (one with a built-in pulse limiter) for performing conducted and



radiated emissions up to 1,2 GHz offering convenience and simple setup. The internal tracking generator can be used to calibrate PMM 9000 as well as for any other possible application, e.g. to develop and test your own filters before putting them in production, or to test insertion loss measurement according to EN 55015.



- Built-in loudspeaker for listening the signals.
- Headphone output is provided for convenience.
- The display can be tilted for better view, depending upon the ambient light conditions.
- "Action" feature can switch LISN or control external devices to turn-on EUT before starting the measurement and switch them off when measurements are completed.

- The PMM 9000 can also drive an external VGA monitor to give a remote, or simply a bigger, display.
- Via RS-232 and GPIB/IEEE-488 interface all PMM 9000 functions can be controlled. All commands and strings (e.g. file names) can be easily entered using an external keyboard.
- 8 bit output "User Port" programmable to drive any external device. (For example, if measurements exceed the chosen limit the PMM 9000 can stop the EUT).

FEATURES	BENEFITS
<ul style="list-style-type: none"> • Fully CISPR 16 compliance • From 9 kHz to 1,2 GHz • 3 simultaneous detectors • Internal tracking generator • Built-in floppy and hard disk • PC architecture • Two inputs • User port (programmable) 	<ul style="list-style-type: none"> • Final certification • Conducted and radiated emission • Fast measurements • High testing throughput • Calibration, filter design, etc • Data easily saved and exported • The most user friendly and easy to interface EMI receiver on the market

Easy to use for fast and accurate measurements

SWEEP MODE

(Fig. 1)

Entering "Sweep Mode" the PMM 9000 gives the possibility to make measurements according to all EMC standards with only 3 keystrokes.

- Load the limits. Two limits may be selected and viewed simultaneously.
- Load one measurement setup. PMM 9000 displays all the available setups and by default loads the last one used.
- Execute measurement and see the results. When the test is done, data can easily be printed or saved into the hard or floppy disk.

The PMM 9000 also offers a very convenient way to evaluate and analyse the test results.

ZOOM FUNCTION

(Fig. 2)

The Zoom Function allows a detailed analysis of the displayed graph. The Zoom Function can

be activated several times, as necessary, to see any simple peak of the measurement curve. To define the portion of graph to be enlarged, Start and Stop frequency of the Zoom are selected and the entire Zoom window can be moved all along the swept frequency range.

MARKER AND WORST POINTS

(Photo)

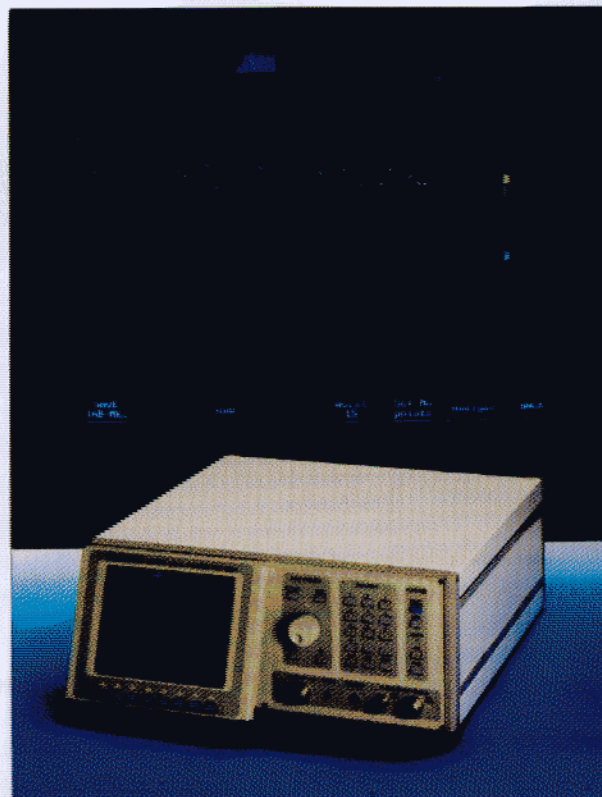
Marker and Worst Points give the possibility to highlight the most critical signals measured with the sweep function, analysing them one by one.

The PMM 9000 infact may show the frequency and the level associated with the marker position, and of course, by operating the rotary knob, the entire sweep can be freely explored.

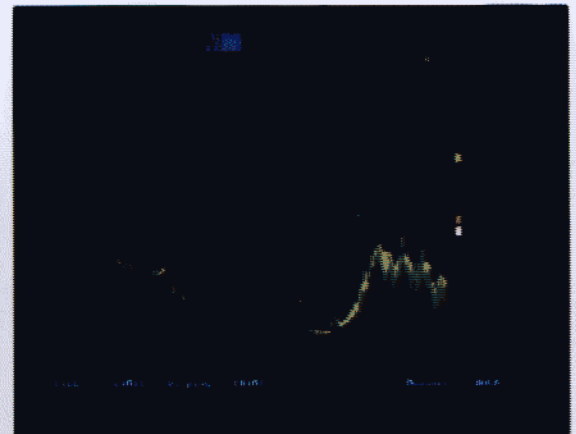
With the **Worst function** the PMM 9000 automatically shows the worst "n" frequencies, where "n" is the user defined number of points which shall be highlighted.

On the same screen, the receiver may also show the frequency and the level of the

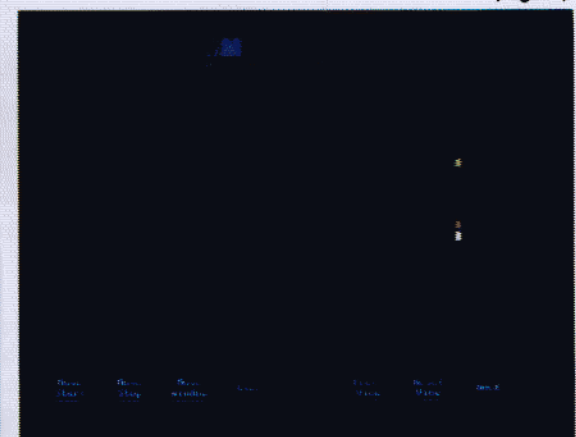
worst case frequencies for an easy and immediate evaluation of measurement results. With either of these function in use, a specific frequency can be selected using the marker, and then closely analysed with the **Manual Mode** of operation.



(Photo)

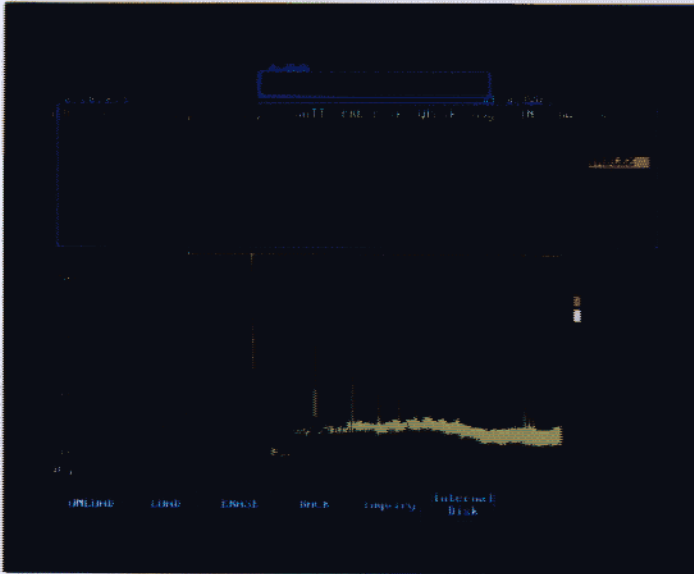


(Fig. 1)



(Fig. 2)

PMM 9000: Ideal automatic EMI receiver



(Fig. 3)

SCAN TAB

(Fig. 3)

Unattended tests and huge time savings are now easily available with the PMM 9000: this new receiver can perform several tasks fully automatically without any external controller.

The user can establish up to eight test sequences to be measured with different setup parameters.

Thanks to the two input channels the PMM 9000 can start a conducted emission test on one channel, then do radiated emissions using the second channel, combine the two graphs together and display them in a single range configuration display.

Infact, it is also possible to select two or more frequency ranges, perform the measurements and then put all traces on

a single graph.

ACTION MODE

(Fig. 3)

The Action Mode of operation is not simply a sequencer which allows the user to easily define step by step - through an intuitive learning process - what to do during a measurement.

But indeed the PMM 9000 offers, a unique capability to take some decisions and manipulate data before passing to the next programmed sequence. For example, the PMM 9000 calculates the **Worst case** after a predefined number of sweeps, **Stops** the sweeping allowing the user to change the test antenna and repeats the measurement using **Quasi-Peak** detector only for those frequencies that are above or below the

limit of a user defined offset.

The receiver can also sweep through a fixed number of frequencies (**table**), where the table may be created automatically with the **point #** function.

Moreover, **Action** gives you the capability to activate the **Output User Port**, e.g.

changing the lines to be measured on the LISNs or turning on/off the EUT.

Having used these functions, it is possible to **Save** everything either into the floppy or to the hard disk.

For example, the user can activate the EUT, start the measurement and repeat it 20 times, calculate the worst case and save data to the disk. The user can then choose the highest 30 points, make a table and repeat the measurement on those points with the Quasi-Peak detector, saving the final results to the disk using another file name.

For any single action the user can display messages to inform which operation, if any, has to be done before continuing, or to inform the operator of what is currently running.

All the available elementary functions (Actions) can be combined onto a Macro to be executed

before leaving any active sequence.

The user can then move to the next sequence where another Macro can be programmed.

CLICK MODE

In the click mode it is possible to observe the discontinuous interference ("clicks" as defined in CISPR 16-1) in amplitude and duration. PMM 9000 can evaluate the click rate N considering the number of clicks or the switching operations, with the indication of the short clicks (<10 ms), the long clicks (>10 and <200 ms) and the events other than clicks (>200 ms). The calculation of the click limit "Lq" and the evaluation of the test considering the upper quartile method is done in a complete automatic way which complies with the criteria of EN 55014. Using the "right away" option in the setup, PMM 9000 will stop the test automatically when the limits are exceeded. As usual the test results with the indication of the number of clicks and all the relevant data can be saved, printed or exported in WINDOWS™ using the WIN9000 utility.

Spectrum mode of operation. A powerful answer for fast and accurate signal analysis

MANUAL MODE

(Fig. 4)

Using Manual Mode the PMM 9000 allows a close look at the analysed signals. All detectors are active and the display offers both analogue and digital readouts. The user can define the Center frequency, the Span bandwidth and demodulate the signals to help identify them both audibly and visually. The Receiver bandwidth can be selected from 200 Hz up to 1 MHz, while Spectrum IF Resolution is 10 kHz and 30 kHz. Marker with Delta and Peak functions have been added for easier and better positioning of where to make the measurements and for deeper evaluate the signals. With the **Toggle** feature the analysis can be switched from input B (9 kHz - 30 MHz) to input A (9 kHz - 1,2 GHz), and vice versa. For low frequency signals the PMM 9000 offers a different and more convenient display of the readings.

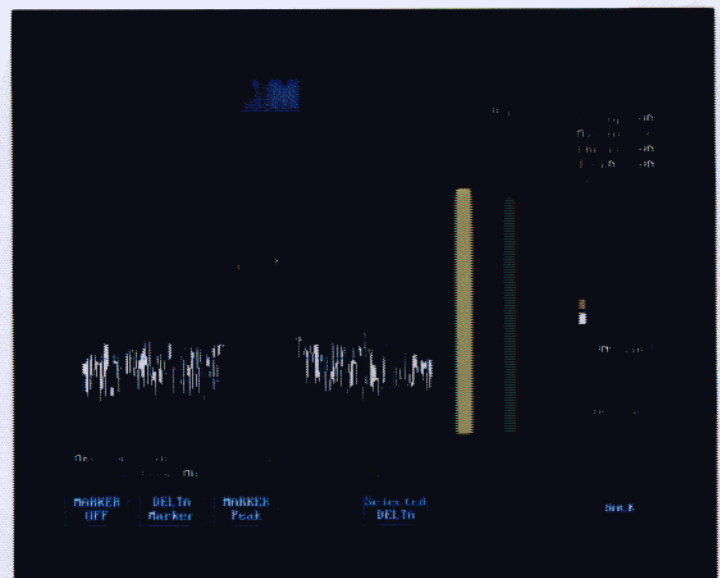
DIGITAL MODE

(Fig. 5)

In this mode of operation the user can read frequency and level of each detector simultaneously, with a resolution of 0,1 dB on levels and 10 or 100 Hz for frequency (10 Hz below 150 kHz; 100 Hz above 150 k Hz). The PMM 9000 LCD display also shows all functions selected by the user like attenuation in use, preamplifier on/off, bandwidth selected etc. It is easy to jump back and forth from Manual mode to Sweep mode to perform sweep measurements or spectrum analysis.



(Fig. 4)



(Fig. 5)



PMM 9000: Emi Signal Analyzer

SPECIFICATIONS

Frequency range	9 kHz ÷ 1,2 GHz (Input A) 9 kHz ÷ 30 MHz (Input B)
Resolution	10 Hz (Range 9 kHz ÷ 150 kHz) 100 Hz (Range 150 kHz ÷ 1,2 GHz)
Setting error	< 2x10 ⁻⁶
RF input	Z _{in} 50 Ω N connector (Input A) Z _{in} 50 Ω BNC connector (Input B)
VSWR	< 1.2 with ≥ 10 dB RF attenuation < 2 with 0 dB RF attenuation
Oscillator reradiation at RF input	< 20 dBμV
Interference rejection	> 80 dB
Preamplifier gain	10 dB

Preselector filters

7 Fixed bandpass filters	9 kHz	to	< 40 kHz
	40 kHz	to	< 150 kHz
	150 kHz	to	< 500 kHz
	500 kHz	to	< 3 MHz
	3 MHz	to	< 10 MHz
	10 MHz	to	< 20 MHz
	20 MHz	to	< 30 MHz
5 Tracking bandpass filters	30 MHz	to	< 70 MHz
	70 MHz	to	< 170 MHz
	170 MHz	to	< 330 MHz
	330 MHz	to	< 600 MHz
	600 MHz	to	1000 MHz

Maximum input level (without equipment damage)

Sinewave AC voltage	127 dBμV
Pulse spectral density	90 dBμV/MHz

Display units

W, dBm, dBμV, dBμA, dBpW,
dBμV/m, dBμA/m, VA

Noise indication (dBμV)

Freq. MHz	BW kHz	Peak (dBμV)		Qpeak (dBμV)		AVG (dBμV)	
		Preamp. OFF	Preamp. ON	Preamp. OFF	Preamp. ON	Preamp. OFF	Preamp. ON
0,009÷0,05	0,2	-2	-7	-5	-10	-7	-12
0,05÷0,15		-7	-12	-9	-14	-12	-17
0,15÷30	9	-2	-7	-7	-12	-9	-14
30÷300	120	8	3	3	-2	1	-4
300÷1000		12	7	6	1	4	-1
1000÷1200		14	9	8	3	6	1

Measuring Error (After calibration)

Frequency	150 kHz ÷ 500 MHz ± 1 dB 9 kHz ÷ 150 MHz ± 1,5 dB 500 MHz ÷ 1 GHz ± 1,5 dB 1 GHz ÷ 1,2 GHz ± 2 dB
-----------	--

RF output (Tracking generator)

Frequency range	Z _{out} 50 Ω, N connector 9 kHz ÷ 1,2 GHz
Level	90 dBμV ± 1 dB

Intermediate frequency

Range 9 kHz÷30 MHz	139,3/10,7/0,455 MHz
Range 30 MHz÷1200 MHz	1889,3/139,3/10,7 MHz

IF bandwidths (-6 dB)

0,2/9/120/1000 kHz
(CISPR tolerance)

Level measuring time

Peak, Quasi-Peak and Average,
simultaneous detection: 2 ms to 30 s
(CISPR default)

Spectrum

Span/division	20/50/100/200 kHz
IF resolution	10/30 kHz

Interface

Parallel, RS232, User Port,
(IEEE488 optional)

Hard disk

min. 540 MBytes

Operating temperature

10 to 40°C

Power

90÷135 Vac or 175÷264 Vac,
90 VA, 47÷63 Hz

Size

650x180x470 (WxHxD) mm

Weight

21 kg.

Accessories included

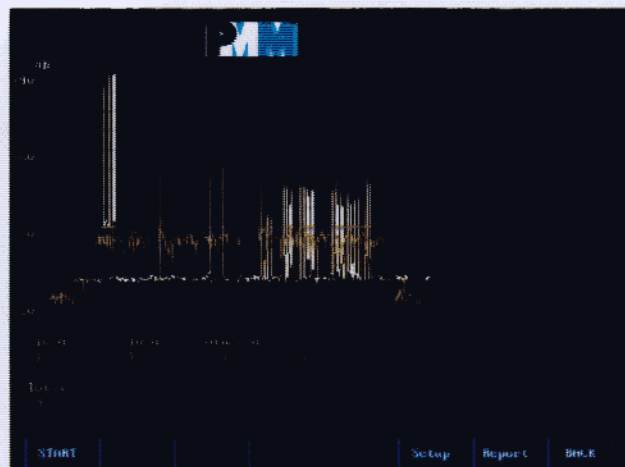
Software on 3 1/2" floppy disk
power and calibration cable
operating manual
Win9000 application software

Conformity

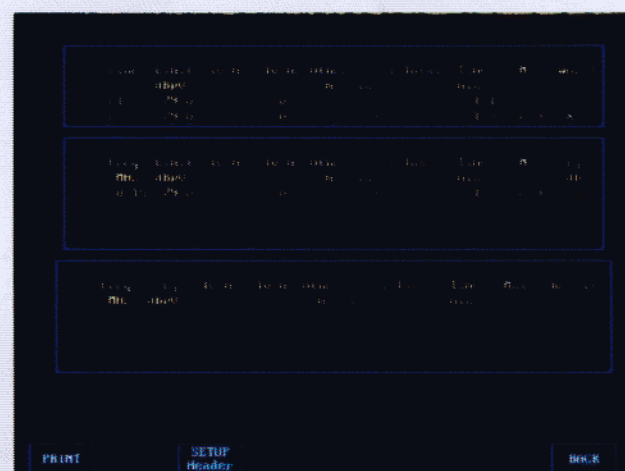
EMC and Safety Directives

Options accessories

- LISN's (1-phase or 3-phase) L2-16, L1-150, L3-32, L3-64, L3-100, L2-D
- Pulse limiter PL-01
- High current voltage probes SHC-1 o SHC-2
- Antenna set AS-01
- RF probe set for electric and magnetic near fields measurements EMCO 7405
- RF emission clamp F-201 according to CISPR 14 for radiated power measurements on household appliances
- Automatic slide bar SB-600
- Van Veen Loop, balanced/unbalanced transformer and dummy lamps according to CISPR 15
- IEEE - 488 I/O Interface
- Click Hw/Sw module option



PMM 9000 display of click mode option measurement



Typical Lq calculation report