

EMI Measuring Receiver 9kHz - 2.75GHz

SMR 4503

- Fully CISPR 16-1 compliant
- Mil Standards met above 150 kHz
- Frequency accuracy of 10^{-6}
- Overranging protection by preselection and auto-ranging
- 8.5" TFT-colour display

The SMR 4503 is a further development based on the successful SCR 3500 series of receivers for making compliant measurements to CISPR 16-1/99, VDE, EN, ETS, FCC, ANSI and VCCI.

Higher frequency needs

As clock frequencies are ever increasing, the need to measure harmonics grows, with some standards requiring measurement of the 10th harmonic.

If the fundamental frequency approaches the limit value, the 3rd and 5th harmonics increase as well. For example, a 900 MHz computer has to be tested up to 2700 MHz. This was taken into account when the CISPR 16 and CISPR 22 were passed and the new receiver generation, SMR 45xx, was developed.

Manual or automatic operation

The SMR 4503 can be used in stand-alone manual mode and can be configured from the front panel to create semi-automatic test. The instrument is simple to operate being menu guided and having a key related help function. Powerful firmware allows numerous storage functions for device presetting, measured data, frequency spectrum and tables, limit lines, transducer correction factors and direct data generation.

The SMR 4503 can be used as the heart of a fully automatic test system controlled by software.

With Schaffner's flexible 'EMC Compliance 3' test software, this receiver can form the core of a fully complaint CISPR 16 emission test system. When using an OATS, fully anechoic chamber or GTEM cell, Schaffner's software can fully integrate all parts of the system for simple but accurate testing.

Wide dynamic range

The new input attenuator accepts input power which is three times higher than conventional receivers. A preamplifier behind preselection increases the sensitivity.

Together with the low overall noise figure of the instrument, signals from -26 to $+137$ dB μ V can be measured accurately.

Easy operation

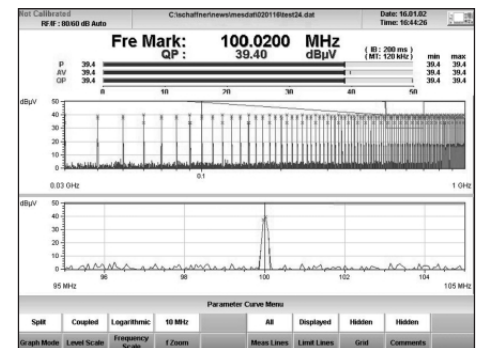
More softkeys in the larger colour TFT display allow direct access to the basic functions. With a low number of sub-menus and the "Back-Button", the paths through the user surface will be short. Predefined settings can be changed, saved and recalled to "Quick-Start" scans or sweeps.



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Clear display

3½ digit display of tuned frequency and up to three detectors using analog-like bargraphs clearly displays results. Voltage over frequency or over time are displayed on a grid simultaneously. For monitoring signal drift, a 'time versus level' mode is available. Preset limit lines can be stored and recalled as required.



Time domain analysis

An oscilloscope style of display of demodulated signals allows the analysis of click-disturbances down to a high resolution. Timebase and level-range are adjustable.

Marker and zoom functions simplify operation.

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Technical Specifications

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Frequency range	9 kHz - 2.75 GHz	Overload display	on TFT-Display, protects the receiver from overload in conjunction with program control for RF and IF-attention
Resolution	100 Hz (1 kHz at IF-bandwidth 1 MHz)		> 90 dB; range 9 kHz - 30 MHz
Accuracy	$< 1 \times 10^{-6} \pm 1$ Hz	Interference immunity	> 70 dB; range 30 - 1005 MHz
Frequency Tuning	via key-pad or tuning knob, step width programmable	Image frequency resistance	> 60 dB; range 1005 - 2100 MHz
Display	8-digits, TFT-color display		> 50 dB; range 2.1 - 2.75 GHz
Tuning Indication	LED, combined with IF-bandwidth at BW \leq 120 kHz	IF frequency resistance	> 90 dB; range 9 kHz - 30 MHz
IF-bandwidth (- 6 dB)		Inherent reception points	> 70 dB; range 30 MHz - 2.75 GHz
according to CISPR16-1	200 Hz; range 9 kHz - 30 MHz		< -10 dB μ V; range 9 kHz - 30 MHz
	9 kHz; range 50 kHz - 2.75 GHz	Operating modes	< 0 dB μ V; range 30 MHz - 2.75 GHz
	120 kHz; range 30 MHz - 2.75 GHz	RF- spectrum analysis	
	1 MHz; range 30 MHz - 2.75 GHz	Marker-sweep	
	Z = 50 Ω , N - connector	Frequency-sweep	
RF-input		Frequency tables-sweep	
VSWR		Automatic frequency scan (pre/final)	
at > 10 dB RF-attenuation	< 1.2 ; range 9 kHz - 1700 MHz	Time domain analysis	
	< 1.5 ; range 1700 MHz - 2750 MHz	AM, FM, integral loudspeaker	
at > 0 dB RF-attenuation	< 2 ; range 9 kHz - 2.75 GHz	RS232, Centronics, Ethernet	
Input selectivity		IEC-Bus (IEC625-2/IEEE 488-2)	
9 kHz - 1005 MHz	4 switchable and 6 tracking filter	PS2-Keybaord, PS2-Mouse,	
1005 - 2750 MHz	2 tracking filters in series with switchable bandpass filters	USB, Userport, VGA connector	
		Trigger input	
RF-attenuation		U _A = U _E + approx. 10 dB at 50 Ω	
9 kHz - 1005 MHz	0 - 80 dB, step 5 dB	B(-3 dB) : approx. 20 kHz (<30 MHz)	
1005 - 2750 MHz	0 - 60 dB, step 5 dB	B(-3 dB) : approx. 2.5 MHz (>30 MHz)	
		ca. 90 dB μ V at 50 Ω	
Level display		(to full scale)	
digital	TFT-color display 8.4" (600 x 800)		
analogue	3 1/2-digits, resolution 0.1 dB	Video output	approx. 2 V at 10 k Ω
Detection Modes	units selectable	Envelope demodulator	(to full scale)
range 9kHz - 2750 MHz	bargraph, adjustable range 5 - 60 dB	10 MHz Ref. frequency	
Measure time	Peak / QP / AV (LD, LN)	Input	50 mV to 2 V at 50 Ω
	100 μ s - 100 s	Output	approx. 100 mV (sine) at 50 Ω
Voltage measurement range		Output	
CW-Signal	-26 - +130 dB μ V (depend on IF-bandwidth and frequency range)	Headphones / loudspeaker	\geq 8 Ω , approx. 400 mW
Pulse signal	-20 - +130 dB μ V	Power supply	Safety class I to VDE 0411 (IEC 85 - 264 V _{AC} ; 47 - 440 Hz
according to CISPR 16-1	(depend on CISPR-frequency range)	Wide range mains supply	approx. 90 VA
Pulsrate 100 / 25 Hz		Power consumption	100 - 375 V _{DC}
(range 9 kHz - 1005 MHz)		external DC supply	(11 - 33 V _{DC} : optional, with external DC / DC-converter)
Measurement accuracy		Supply for accessories	\pm 15 V / 200 mA
Sinusoidal voltage error	< 1.5 dB; range 9 kHz - 1005 MHz		+ 5 V / 200 mA
	< 2 dB ; range >1005 - 2750 MHz	General data	
Pulse shaped voltage level calibration	according to CISPR16-1	EMC-safety requirements	as per EN 61326-1 1997
Noise display	Harmonic generator up to 2750 MHz	Operating temperature (non condensing)	and EN 61326/A1 1998
(average / typical values)		Storage temperature range	0 ° - 45 ° C
range < 30 MHz	- 34 dB μ V, B = 200 Hz	Max. relative humidity	-20 ° - 60° C
	- 17 dB μ V, B = 9 kHz	Protection grade	95 %/ 30 ° C
range \geq 30 - 2750 MHz		Shock examination	IP 30
	- 14 dB μ V, B = 9 kHz	Shock sequence test	Ea 18-300-9/3 DIN IEC 68-2-27
	- 3 dB μ V, B = 120 kHz	Dimensions (W x H x D)	Eb 6-150-3000/3 DIN IEC 68-2-29
	6 dB μ V, B = 1 MHz	Weight	450 mm x 220 mm x 520 mm
			approx. 25 kg