

EMI Measuring Receiver 9kHz - 18GHz

SMR 4518

- 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 4518 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, a microwave oven at 2 GHz produces significant disturbances particularly at 6 GHz and 10 GHz. 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 4518 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 4518 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

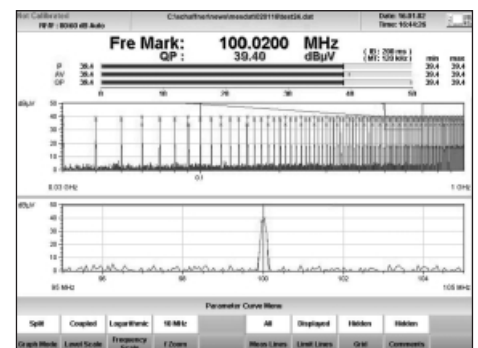
More softkeys in the larger colour TFT display allow direct access to the basic functions. With a low number of sub-menus and the "Back-Button", the paths through the user surface will be short. Predefined settings can be changed, saved and recalled to "Quick-Start" scans or sweeps.



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Clear display

3 1/2 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

SMR 4518

Frequency range	9 kHz - 18 GHz	range $\geq 7 \dots 18$ GHz	- 4 dB μ V, B = 9 kHz
Resolution	100 Hz (1 kHz at IF-bandwidth 1MHz)		16 dB μ V, B = 1 MHz
Accuracy	$< 1 \times 10^{-6} \pm 1$ Hz	Overload display	on TFT-Display, protects the receiver from overload in conjunction with program control for RF and IF-attention
Frequency Tuning	via key-pad or tuning knob, step width programmable		> 90 dB; range 9 kHz - 30 MHz
Display	8-digits, TFT-color display	Interference immunity	> 70 dB; range 30 - 1005 MHz
Tuning Indication	LED, combined with IF-bandwidth at BW ≤ 120 kHz	Image frequency resistance	> 60 dB; range 1005 - 2100 MHz
IF-bandwidth (- 6dB)			> 50 dB; range 2.1 - 2.75 GHz
according to CISPR16-1	200 Hz; range 9 kHz - 30 MHz		> 70 dB; range 2.75 - 18 GHz
	9 kHz ; range 50 kHz -18 GHz	IF frequency resistance	> 90 dB; range 9 kHz - 30 MHz
	120 kHz; range 30 MHz -18 GHz	Inherent reception points	> 70 dB; range 30 MHz - 18 GHz
	1 MHz; range 30 MHz -18 GHz		< -10 dB μ V; range 9 kHz - 30 MHz
	Z = 50 Ω , N - connector	Operating modes	< 0 dB μ V; range 30 MHz - 18 GHz
RF-input			RF- spectrum analysis
VSWR			Marker-sweep
at > 10 dB RF-attenuation	< 1,2 ; range 9 kHz - 2.75 GHz		Frequency-sweep
	< 1,5 ; range 2.75 - 7 GHz		Frequency tables-sweep
	< 1,7 ; range 7 - 12 GHz		Automatic frequency scan (pre/final)
	< 2 ; range 12 -18 GHz		Time domain analysis
	< 2 ; range 9 kHz - 2.75 GHz		AM, FM, integral loudspeaker
at > 0 dB RF-attenuation		Demodulation	RS232, Centronics, Ethernet
Input selectivity		Digital interfaces	IEC-Bus (IEC625-2/IEEE 488-2)
9 kHz - 1005 MHz	4 switchable and 6 tracking filter		PS2-Keyboard, PS2-Mouse,
1005 - 2750 MHz	2 tracking filters in series with switchable bandpass filters		USB, Userport, VGA connector
			Trigger input
2.75 - 18 GHz			U _A = U _E + approx.10 dB at 50 Ω
RF-attenuation	tracking filter (4 stage bandpass)		B(-3dB) : approx. 20 kHz (<30 MHz)
9 kHz - 1005 MHz	0 - 95 dB, step 5 dB		B(-3dB) : approx. 2.5 MHz (>30 MHz)
1005 - 2750 MHz	0 - 75 dB, step 5 dB		ca. 90 dB μ V at 50 Ω
2.75 - 18 GHz	0 - 70 dB, step 10 dB		(to full scale)
Level display	TFT-color display 8.4" (600 x 800)		
digital	3 1/2-digits, resolution 0,1 dB		
	units selectable		
analogue	bargraph, adjustable range 5 - 60 dB		
Detection Modes			
range 9kHz - 2750 MHz	Peak / QP / AV (LD, LN)		approx. 2 V at 10 k Ω
range 2.75 - 18 GHz	Peak / AV		(to full scale)
Measure time	100 μ s - 100 s		
Voltage measurement			
range			
CW-Signal	-26 - +137 dB μ V (depend on IF-bandwidth and frequency range)		
Pulse signal	-20 - +137 dB μ V		
according to CISPR 16-1	(depend on CISPR-frequency range)		
Pulsrate 100 / 25 Hz			
(range 9 kHz - 1005 MHz)			
Measurement accuracy			
Sinusoidal voltage error	< 1.5 dB; range 9 kHz - 1005 MHz		
	< 2 dB ; range >1005 - 2750 MHz		
	< 2.5 dB; range > 2.75 - 18 GHz		
	according to CISPR16-1		
	Harmonic generator up to 2750 MHz		
Pulse shaped voltage level calibration			
Noise display			
(average / typical values)			
range < 30 MHz	- 34 dB μ V, B = 200 Hz		
	- 17 dB μ V, B = 9 kHz		
range ≥ 30 - 2750 MHz			
	- 14 dB μ V, B = 9 kHz		
	- 3 dB μ V, B =120 kHz		
	6 dB μ V, B = 1 MHz		
	- 12 dB μ V, B = 9 kHz		
range ≥ 2.75 - 7GHz	8 dB μ V, B = 1 MHz		
		General data	
		EMC-safety requirements	as per EN 61326-1 1997
		Operating temperature (non condensing)	and EN 61326/A1 1998
		Storage temperature range	0 ° - 45 ° C
		Max. relative humidity	-20 ° - 60 ° C
		Protection grade	95 % / 30 ° C
		Shock examination	IP 30
		Shock sequence test	Ea 18-300-9/3 DIN IEC 68-2-27
		Dimensions (W x H x D)	Eb 6-150-3000/3 DIN IEC 68-2-29
		Weight	450 mm x 220 mm x 520 mm
			approx. 28 kg