

# 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.

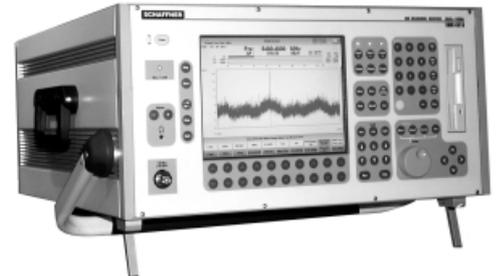
### Wide dynamic range

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 $\mu$ V can be measured accurately.

### Easy operation

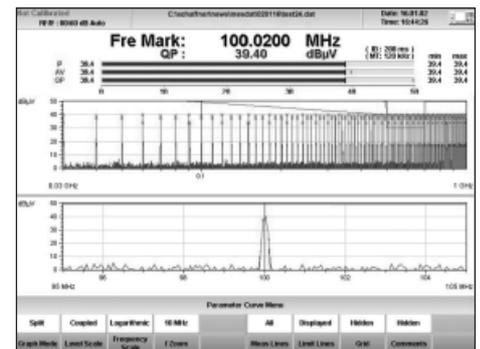
More softkeys in the larger colour TFT display allow direct access to the basic functions. With a low number of sub-menus and the "Back-Button", the paths through the user surface will be short. Predefined settings can be changed, saved and recalled to "Quick-Start" scans or sweeps.



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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

<b>Frequency range</b>	9 kHz - 18 GHz	range $\geq 7 \dots 18$ GHz	- 4 dB $\mu$ V, B = 9 kHz 16 dB $\mu$ V, B = 1 MHz
Resolution	100 Hz (1 kHz at IF-bandwidth 1MHz)		on TFT-Display, protects the receiver from overload in conjunction with program control for RF and IF-attention
Accuracy	$< 1 \times 10^{-6} \pm 1$ Hz	<b>Overload display</b>	> 90 dB; range 9 kHz - 30 MHz > 70 dB; range 30 - 1005 MHz > 60 dB; range 1005 - 2100 MHz > 50 dB; range 2.1 - 2.75 GHz > 70 dB; range 2.75 - 18 GHz
Frequency Tuning	via key-pad or tuning knob, step width programmable		> 90 dB; range 9 kHz - 30 MHz > 70 dB; range 30 MHz - 18 GHz < -10 dB $\mu$ V; range 9 kHz - 30 MHz < 0 dB $\mu$ V; range 30 MHz - 18 GHz
Display	8-digits, TFT-color display	<b>Interference immunity</b>	RF- spectrum analysis Marker-sweep Frequency-sweep Frequency tables-sweep Automatic frequency scan (pre/final) Time domain analysis
Tuning Indication	LED, combined with IF-bandwidth at BW $\leq 120$ kHz	Image frequency resistance	AM, FM, integral loudspeaker RS232, Centronics, Ethernet IEC-Bus (IEC625-2/IEEE 488-2) PS2-Keybaord, PS2-Mouse, USB, Userport, VGA connector Trigger input $U_A = U_E + \text{approx. } 10 \text{ dB at } 50 \Omega$ B(-3dB) : approx. 20 kHz (<30 MHz) B(-3dB) : approx. 2.5 MHz (>30 MHz) ca. 90 dB $\mu$ V at 50 $\Omega$ (to full scale)
<b>IF-bandwidth (- 6dB)</b>		IF frequency resistance	
according to CISPR16-1	200 Hz; range 9 kHz - 30 MHz 9 kHz ; range 50 kHz -18 GHz 120 kHz; range 30 MHz -18 GHz 1 MHz; range 30 MHz -18 GHz Z = 50 $\Omega$ , N - connector	Inherent reception points	
<b>RF-input</b>		<b>Operating modes</b>	
<b>VSWR</b>			
at > 10 dB RF-attenuation	< 1,2 ; range 9 kHz - 2.75 GHz < 1,5 ; range 2.75 - 7 GHz < 1,7 ; range 7 - 12 GHz < 2 ; range 12 -18 GHz < 2 ; range 9 kHz - 2.75 GHz	<b>Demodulation</b>	
at > 0 dB RF-attenuation		<b>Digital interfaces</b>	
<b>Input selectivity</b>			
9 kHz - 1005 MHz	4 switchable and 6 tracking filter		
1005 - 2750 MHz	2 tracking filters in series with switchable bandpass filters		
2.75 - 18 GHz			
<b>RF-attenuation</b>	tracking filter (4 stage bandpass)	<b>Analog Interfaces</b>	
9 kHz - 1005 MHz	0 - 95 dB, step 5 dB	IF1	
1005 - 2750 MHz	0 - 75 dB, step 5 dB	(IF-output 45 MHz)	
2.75 - 18 GHz	0 - 70 dB, step 10 dB	IF2	
<b>Level display</b>	TFT-color display 8.4" (600 x 800)	(IF-output 455 kHz / 10.7 MHz (switchable)	
digital	3 1/2-digits, resolution 0,1 dB units selectable	Video output	approx. 2 V at 10 k $\Omega$ (to full scale)
analogue	bargraph, adjustable range 5 - 60 dB	Envelope demodulator	
<b>Detection Modes</b>		10 MHz Ref. frequency	
range 9kHz - 2750 MHz	Peak / QP / AV (LD, LN)	Input	50 mV to 2 V at 50 $\Omega$
range 2.75 - 18 GHz	Peak / AV	Output	approx. 100 mV (sine) at 50 $\Omega$
Measure time	100 $\mu$ s - 100 s	Output	
<b>Voltage measurement</b>		Headphones / loudspeaker	$\geq 8 \Omega$ , approx. 400 mW
<b>range</b>		<b>Power supply</b>	Safety class I to VDE 0411 (IEC 85 - 264 V <sub>ac</sub> ; 47 - 440 Hz
CW-Signal	-26 - +137 dB $\mu$ V (depend on IF-bandwidth and frequency range)	Wide range mains supply	approx. 110 VA
Pulse signal	-20 - +137 dB $\mu$ V (depend on CISPR-frequency range)	Power consumption	100 - 375 V <sub>dc</sub>
according to CISPR 16-1		external DC supply	(11 - 33 V <sub>dc</sub> : optional, with external DC / DC-converter)
Pulsrate 100 / 25 Hz (range 9 kHz - 1005 MHz)		Supply for accessories	$\pm 15V / 200 \text{ mA}$ $+ 5V / 200 \text{ mA}$
<b>Measurement accuracy</b>			
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	<b>General data</b>	as per EN 61326-1 1997 and EN 61326/A1 1998 0 ° - 45 ° C -20 ° - 60 ° C 95 % / 30 ° C IP 30 Ea 18-300-9/3 DIN IEC 68-2-27 Eb 6-150-3000/3 DIN IEC 68-2-29 450 mm x 220 mm x 520 mm approx. 28 kg
Pulse shaped voltage level calibration	Harmonic generator up to 2750 MHz	EMC-safety requirements	
<b>Noise display</b>		Operating temperature (non condensing)	
(average / typical values)		Storage temperature range	
range < 30 MHz	- 34 dB $\mu$ V, B = 200 Hz - 17 dB $\mu$ V, B = 9 kHz	Max. relative humidity	
range $\geq 30$ - 2750 MHz		Protection grade	
		Shock examination	
		Shock sequence test	
		Dimensions (W x H x D)	
		Weight	
range $\geq 2.75$ - 7GHz	- 14 dB $\mu$ V, B = 9 kHz - 3 dB $\mu$ V, B =120 kHz 6 dB $\mu$ V, B = 1 MHz - 12 dB $\mu$ V, B = 9 kHz 8 dB $\mu$ V, B = 1 MHz		