EMI Measuring Receivers 9kHz - 2.75GHz

SCR 3501 / 3502

- **Fully CISPR16-1 compliant**
- **Two models; 9kHz - 1GHz and 9kHz - 2.75GHz**
- **Battery operation provides complete ground isolation**
- **Time Domain Analysis**

The SCR 3500 series of EMI measuring receivers is a further development based on the successful, compact and portable SCR 3100 receiver series for a compact and portable solution for making compliant measurements to CISPR 16 and VDE 0876 standards.

Two fully synthesised receivers cover one of the widest frequency ranges available. The SCR 3501 from 9kHz to 1GHz and the SCR 3502 from 9kHz - 2.75GHz.

Testing above 1GHz?
With the relentless increase in products' internal clock frequencies and the growing use of the frequency spectrum above 1GHz for communication, the need to measure and investigate these higher frequencies with receiver accuracy is rapidly increasing. Based on the SCR 3501, the later SCR 3502 has identical features up to 1GHz but extends the operating frequency range through to 2.75GHz. With two pre-selected bands covering the frequency range from 1 to 2.75GHz, the SCR 3502 is ideal for measuring the fundamental output from mobile phones and microwave ovens as well as other spurious emissions.

Both receivers are designed with built-in tracked pre-selection which ensures that, unlike many lower cost less selective devices, they can meet the stringent pulse handling performance demanded by the CISPR 16 instrumentation standard and, hence, the measurement accuracy for all forms of interference.

For Analogue Information
A front panel moving coil meter provides fast moving trend data together with a display bargraph for slower moving data.

Internal Memory
SCR 3500 receivers have the built-in capability to store up to 80 device presettings, 80 limit lines and 80 transducer factors together with 80 frequency tables containing up to 1000 measurement values each.

Wide Dynamic Range
Radio noise measurements encounter large and complex waveforms. Each SCR receiver can handle and measure signals from -26 to 130dBµV by using manual or auto-ranging attenuators.

Powerful External Memory
In addition to its internal storage capabilities, both SCR receivers are supplied with a removable PCMCIA memory card that can greatly expand the storage of measurement data and device settings.

Laboratory or Field
The SCR receivers are equally at home in the field or test laboratory. Weighing only 14(16)kg with their internal batteries and having a life of 3 - 4 hours, the receivers are ideal for field investigation and surveys. With some EMC measurements, such as shielding effectiveness testing, the isolation resulting from an independent power source can be invaluable.

Manual or Automatic
The SCR 3501 and 3502 receivers can be used in stand-alone manual mode or as the heart of a fully automatic test system controlled by one of three digital interfaces: IEEE 488, RS 232 or an optical serial bi-directional link. A number of preconfigured ProfLine packages are available for most common test applications.

Self Contained Testing
In manual mode, the receivers can be configured from the front panel to create semi-automatic tests. The instruments are 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.

Software
Operated by the flexible Schaffner's emission test software this receiver can form the core of a fully compliant CISPR16 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.

Time Domain Analysis
The oscillographical display of the demodulated signal allowed to analyse click-disturbances with 100µs resolution. Timebase and Level-range are adjustable. Marker and Zoom functions simplify the use.
Prestored test set-ups make the operating procedure and the practical use easier and safer. Test set-ups can be easily created and changed by the user. More intuitive mode of operation via display with presetting operation modes. Additional software to use for external Windows based computers allows more comfortable display of the test results and print of the test report.

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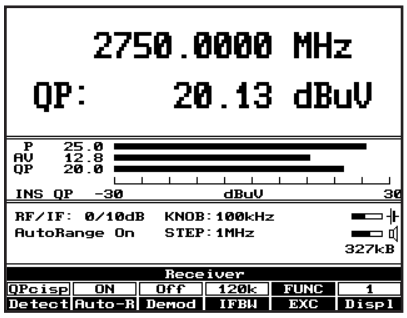
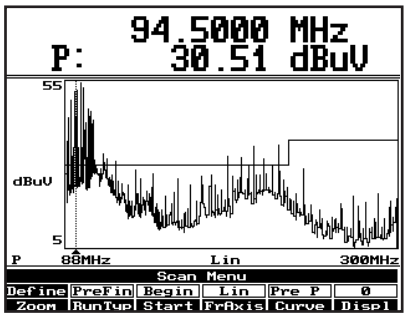
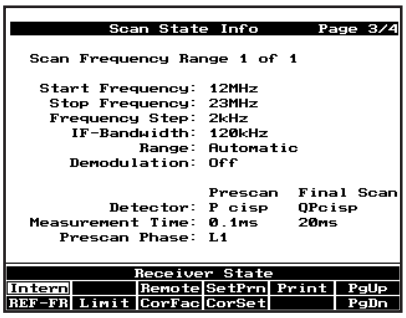
Choice of Data Representation
The large clear LCD display can be set to show various modes and data representations including: full range spectrum, zoomed spectrum with frequency cursor, or frequency and level of measured signal with 3 detectors (Quasi Peak, Peak and Average) displayed simultaneously. For monitoring signal drift, a 'time versus level' mode is available. Preset limit lines can be stored and recalled as required.







Technical Specifications — SCR 3501 / 3502

Frequency Range

SCR 3501 (3511*)	9kHz - 1GHz
SCR 3502 (3512*)	9kHz - 2.75GHz
Frequency tuning	via key-board, tuning knob and step keys, step width programmable
Display	8-digits, LCD Display
Resolution	100Hz
Accuracy	≤2 x 10^{-6} ± 1Hz
Tuning Indication	LED, combined with IF bandwidth

RF Input

VSWR at RF attenuation ≥10dB	Z = 50Ω, N-connector <1.2 for 9kHz - 1700MHz <1.5 for 2000 - 2750MHz
at RF attenuation <10dB	< 2 for 9kHz - 2750MHz
Input Selectivity SCR 3501	4 switchable and 6 tuned filters
SCR 3502 as SCR 3501 plus	1005 - 2750MHz / 2 tracking filters in series with 2 switchable bandpasses

Maximum DC voltage	
RF attenuation = 0dB	50V
RF attenuation > 0dB	3.5V
Maximum sinusoidal voltage	
RF attenuation = 0dB	120dBµV
RF attenuation > 0dB	130dBµV
Maximum impulse voltage (10µs)	
RF attenuation < 10dB	Limited by spectral impulse density
RF attenuation ≥ 10dB	150V
Spectral impulse density	
Band A	110dBµV per MHz
Band B	100dBµV per MHz
Band C and D	90dBµV per MHz

UKAS Calibration option

Susceptibility

SCR 3501	
Image rejection ratio	>90dB in the range 9kHz - 29.999MHz >70dB in the range 30MHz - 1005MHz >60dB in the range 1005MHz - 2100Mhz >50dB in the range > 2100MHz
IF rejection factor	>90dB in the range 9kHz - 29.999MHz >60dB in the range 30MHz - 1005MHz
SCR 3502 as SCR 3501 plus	>70dB in the range 1005MHz - 2750MHz
Overdriving indication	on LCD display, protects the receiver against overdriving together with program control of RF and IF attenuation

Power Supply

Internal rechargeable battery	12V / 4.5Ah	
Operating time	3 - 4 hours	
External battery	11, 8 - 14.5V via 6-pole connector 18 - 36V with optional converter	
Mains supply	separate table power supply unit, 110 / 230V AC ± 10%, 47 - 440Hz with automatic charging of built in accumulator Protected Class 2 / VDE 0411 (IEC 348)	
Supply for accessories	11.8 - 14.5V / 100mA -12V± 5% / 100mA	via 6 pin round connector

General Data

EMC safety requirements	as per EN 50081-1 / 1992 and EN 50082-2 / 1994
Operating temperature range (non-condensing)	0 - 50°C without battery 0 - 40°C with battery
Storage temperature range	-20 - +60°C without battery
Max. relative humidity	95% / 30°C
Protection grade	IP 30
Shock examination	Ea 18-300-9/3 DIN IEC 68-2-27
Shock sequence test	Eb 6-150-3000/3 DIN IEC 68-2-29
Dimensions (W x H x D)	340mm x 177mm x 301mm, excl. carrying handle
Weight	approx. 14/16kg, incl. internal battery

*(*SCR 3511 and 3512 same as 3501 and 3502 but with 19" rack-mount case)*