

EMI Measuring Receivers 9kHz - 2.75GHz

SCR3501 / 3502

- Fully CISPR16-1 compliant
- Portable and lightweight
- Battery operation provides complete ground isolation
- Time Domain Analysis

The SCR3500 series of EMI measuring receivers is a further development based on the successful, compact and portable SCR3100 receiver series for making compliant measurements to CISPR 16 and VDE 0876 standards.

Two fully synthesised receivers cover one of the widest frequency ranges available; the SCR3501, from 9kHz to 1GHz, and the SCR3502, 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 SCR3501, the later SCR3502 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 SCR3502 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

SCR3500 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 -20 to 130dBV 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.

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Technical Specifications

SCR3501 / 3502

<p>Frequency Range SCR3501 (3511*) SCR3502 (3512*) Frequency tuning</p> <p>Display Resolution Accuracy Tuning Indication</p> <p>RF Input VSWR at RF attenuation ≥ 10dB at RF attenuation < 10dB Input Selectivity SCR3501 SCR3502 as SCR3501 plus</p>	<p>9kHz - 1GHz 9kHz - 2.75GHz via key-board, tuning knob and step keys, step width programmable 8-digits, LCD Display 100Hz $\leq 2 \times 10^{-6} \pm 1$Hz LED, combined with IF bandwidth</p> <p>Z = 50Ω, N-connector < 1.2 for 9kHz - 2000MHz < 1.5 for 2000 - 2750MHz < 2 for 9kHz - 2000MHz 4 switchable and 6 tuned filters 1005 - 2750MHz / 2 tracking filters in series with 2 switchable bandpasses</p> <p>50V 3.5V</p> <p>120dBμV 130dBμV</p> <p>Limited by spectral impulse density 150V</p> <p>110dBμV per MHz 100dBμV per MHz 90dBμV per MHz</p>	<p>SCR3502 as SCR3501 plus Overdriving indication</p> <p>RF Shielding SCR3501 Voltage displayed at a fieldstrength of 10V/m at RF attenuation 0dB for ($f \neq f_{10}$) SCR3502</p> <p>Intermediate Frequencies 1st IF 2nd IF 3rd IF</p> <p>IF Bandwidths (-6dB) SCR3501 according to CISPR 16-1</p> <p>SCR3502 as above plus</p> <p>Noise Indication (average)</p> <p>Voltage Measuring Range Lower limit (additional error, caused by internal noise ≤ 1dB) Self receiving frequencies SCR3501 (equivalent Voltage) SCR3502</p>	<p>> 70dB in the range 1005MHz - 2750MHz on LCD display, protects the receiver against overdriving together with program control of RF and IF attenuation</p> <p>< -10dBμV in the range 9kHz - 30MHz < 0dBμV in the range 30MHz - 1GHz < 10dBμV in the range 1005MHz - 2.75GHz</p> <p>408 or 886MHz 45MHz 455kHz</p> <p>200Hz in the range 9kHz - 29.999MHz 9kHz in the range 50kHz - 1005MHz 120kHz in the range 30MHz - 1005MHz 9kHz in the range 50kHz - 2750MHz 120kHz in the range 30MHz - 2750MHz</p> <p>typical -34dBμV at BW = 200Hz typical -14dBμV at BW = 9kHz typical -2dBμV at BW = 120kHz</p> <p>average indication < -20dBμV at BW = 200Hz < -6dBμV at BW = 9kHz < 6dBμV at BW = 120kHz</p> <p>130dBμV < -10dBμV in the range 9kHz - 30MHz < 0dBμV in the range 30kHz - 1005MHz as above plus < 0dBμV in the range 1005MHz - 2750MHz</p>	<p>Measuring Value Indication</p> <p>Digital</p> <p>Analogue</p> <p>Detection Modes</p> <p>Measuring Accuracy Sinusoidal voltage</p> <p>Impulse shaped voltage Level calibration</p> <p>Demodulation Modes</p> <p>Internal storage capabilities</p> <p>Memory card</p> <p>Time / date</p> <p>Digital Interfaces</p> <p>Trigger Input</p>	<p>on LCD display 320 x 240 pixel display area 96mm x 72mm CFL - backlit 3 1/2 digits, resolution 0.1dB, in dBμV, dBm, V, dBμV/m, dBμA/m, dBpW</p> <p>bargraph and moving coil instrument 5 to 60dB, pre-settable in 5dB steps</p> <p>Average, Peak, Quasi-Peak, with parallel indication of up to 3 detection modes and selectable measuring times between 5ms - 100s</p> <p>≤ 2dB ≤ 1.5dB in temperature range 15 - 35°C fol. CISPR 16-1 via internal harmonics generator up to 2750MHz</p> <p>AM / FM, internal loudspeaker</p> <p>80 complete device presets 80 limit line pairs and 80 correction factor curves with 150 segments each 80 frequency tables with 1000 values each storage of measuring data, data and software exchange, PC/MCIA-type, 68 pole interface internal clock, buffered with internal accumulator</p> <p>serial remote control and printer control</p> <p>HP PCL 5, HPG remote control foll. IEEE 488-2 / IEC 625-2 SH1, AH1, T5, L4, SR1, RL1, PP1, DC1, DT1, C0, E2</p> <p>For external start of measurement runs (to be activated by optional software)</p>	<p>Analogue in / outputs IF1 45MHz output IF2 455kHz output</p> <p>Video Output</p> <p>10MHz reference frequency input Headphone / speaker output</p> <p>Power Supply Internal rechargeable battery Operating time External battery</p> <p>Mains supply</p> <p>Supply for accessories</p> <p>General Data EMC safety requirements Operating temperature range (non-condensing) Storage temperature range Max. relative humidity Protection grade Shock examination Shock sequence test Dimensions (W x H x D)</p> <p>Weight</p>	<p>Input voltage + approx. 10dB $Z_{in} = 50\Omega$ BW_{dB} approx 20kHz ($f_{10} = 9$kHz - 30MHz) BW_{dB} approx 2.5MHz ($f_{10} = 30$MHz - 2.75GHz) approx. 90dBμV at 50Ω in relation to fsd. BW_{dB} acc. to IF - bandwidth approx. 2V at 10kΩ, rel. to fsd. (envelope demodulated) 50mV - 2V at 50Ω 3.5mm jack, $\geq 8\Omega$, approx. 400mW</p> <p>12V / 4.5Ah 3 - 4 hours 11, 8 - 14.5V via 6-pole connector 18 - 36V with optional converter separate table power supply unit, 110 / 230V AC $\pm 10\%$, 47 - 440Hz with automatic charging of built in accumulator protected class II / VDE 0411 (IEC 348)</p> <p>11.8 - 14.5V / 100mA via 6 pin round connector $-12V \pm 5\%$ / 100mA</p> <p>as per EN 50081-1 / 1992 and EN 50082-2 / 1994 0 - 50°C without battery 0 - 40°C with battery -20 - +60°C without battery 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 340mm x 177mm x 301mm, excl. carrying handle approx. 14/16kg, incl. internal battery</p>
<p>(* SCR3511 and 3512 same as 3501 and 3502 but with 19" rack-mount case)</p>							
<p>ProfLine 6000 transducers and accessories For detailed hardware specifications, see individual data sheets, available on request</p>							

Manual or Automatic

SCR3501 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 Prof.Line packages are available for most common test applications.

Self Contained Testing

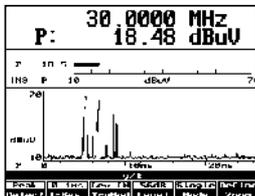
In manual mode, the receivers can be configured from the front panel to create semi-automatic tests. The instruments are simple to operate being menu guided and having a key related help function. Powerful firmware allows numerous storage functions for device presetting, measured data, frequency spectrum and tables, limit lines, transducer correction factors and direct data generation.

CES Software

Operated by the flexible CES9985 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, CES9985 can fully integrate all parts of the system for simple but accurate testing.

Time Domain Analysis

An oscillograph style of display of demodulated signals allows the analysis of click-disturbances down to a resolution of 100µs. Timebase and Level-amplitude are adjustable. Marker and Zoom functions make measurements simple.

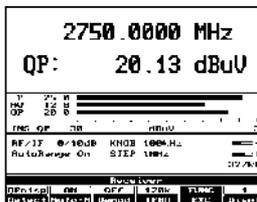
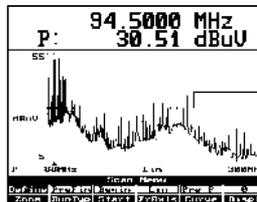


Prestored Test Set-ups

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.

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.



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