

# EMI Test Receiver ESCS30

9 kHz to 2.75 GHz

Compact EMI test receiver conforming to all standards

## Brief description

EMI Test Receiver ESCS30 is used for measuring electromagnetic emissions in line with all commercial standards and combines three types of instruments in one:

- a portable, manually tunable test receiver with built-in battery,
- an automatic test receiver which as a stand-alone unit performs measurements and reports the results,
- a system-compatible test receiver with IEC/IEEE-bus interface and EMI software packages running under Windows™.

The number of measurements required to ensure electromagnetic compatibility is continuously increasing and is governed by laws in many countries. Thanks to the built-in intelligence of EMI Test Receiver ESCS30, the time required for measurements is reduced considerably. This specialist for EMI measurements supplies the results fast and highly accurately in line with the standards from CISPR, CENELEC, ETSI, FCC, VCCI and VDE.

### Complete tests at a keystroke

Using the SPECTRUM OVERVIEW function and the peak detector, the critical ranges of the spectrum can be determined. With the aid of data reduction routines the final measurement is then made accurately at the critical frequencies using quasi-peak and average detectors.



Foto 42987-1

This concept saves valuable measurement time which would otherwise be wasted for ranges with low emission levels.

At a single keystroke the ESCS30 measures as a stand-alone unit

- RFI voltage,
- RFI power,
- RFI field strength.

## Main features

- Correct weighting to CISPR 16-1 and VDE 0876
- Integrated preselector
- Level measurement range –38 to +137 dB $\mu$ V
- For all commercial EMI standards such as CISPR, EN, ETS, FCC, ANSI C63.4, VCC, VCCI and VDE
- Automatic overload detection
- User port for control of LISNs
- Ease of use through internal macro functions
- Internal and external battery operation

### High-grade RF circuit design

- High measurement accuracy
- Fast synthesizer with high frequency resolution

- Wide dynamic range
- CISPR filters with constant group delay
- Parallel detectors for peak, quasi-peak and average indication; all detectors can be switched on simultaneously
- Tracking generator for attenuation and gain measurements; eg for checking test cables (9 kHz to 2750 MHz; option ESCS-B5)

### Powerful firmware functions

- Macros for automatic and interactive test routines
- Frequency scan over up to 400 user-selectable channels
- Automatic level calibration
- Automatic consideration of frequency-dependent transducer factors
- Nonvolatile storage of all important parameters
- Frequency scan modes
  - Spectrum overview: with fixed attenuation and step size with maximum speed
  - Scan: with automatic attenuation setting and selectable step size
  - Channel: on up to 400 preset frequencies

## Optimum result display for every application

- 16.5 cm (6.5") TFT colour LCD for display of interference spectra including limit lines
- Clear digital level indication with 0.1 dB resolution on separate level display
- Quasi-analog display of results in form of bargraphs
- Time domain analysis (oscilloscope mode)

- Measurement of pulse width and amplitude with a display range from 5 ms to 1 h, zooming up to maximum resolution
- With a resolution of 100  $\mu$ s, the time domain analysis satisfies the requirements of CISPR16-1 regarding the accuracy of pulse duration measurements
- Triggering: internally by level setting using the display line or externally with TTL levels

- IF spectrum analysis with 10 MHz display range for visual check of the spectrum (option ESCS-B4)

## Full storage and logging of results

- Built-in 3½" disk drive
- Storage of test results and test reports as HP-GL file
- Output of results as lists and diagrams including limit lines and user-definable labelling

## Specifications in brief

<b>Frequency range</b> Frequency setting	9 kHz to 2750 MHz in 10 Hz, 100 Hz, 100 kHz steps; or user-selectable
Resolution	up to 1000 MHz: 10 Hz from 1000 MHz: 100 Hz
Frequency drift	<1 x 10 <sup>-6</sup> (after 30 min warmup) <5 x 10 <sup>-7</sup> (with option ESCS-B6)
<b>RF input</b> VSWR, f <1000 MHz f >1000 MHz	50 $\Omega$ , N female <1.2 with >10 dB RF attenuation typ. 1.5 with >10 dB RF attenuation
RF attenuator	0 to 60 dB, 5 dB steps
Preamplifier	gain 10 dB nominal
Maximum input level (RF attenuation >10 dB)	
DC voltage	7 V
Sinewave AC voltage	137 dB $\mu$ V (1 W)
Max. pulse voltage (10 $\mu$ s)	150 V
Max. pulse energy (20 $\mu$ s)	10 mWs
Preselector	
9 kHz to 1000 MHz	2 fixed-tuned filters, 6 tracking filters
1000 to 2750 MHz	2 tracking filters

**IF bandwidths** 200 Hz/9 kHz/120 kHz/1 MHz

<b>Displayed noise level (average)</b> Range	Bandwidth	Preamplifier off	on
9 kHz to 30 MHz	200 Hz	<-25 dB $\mu$ V, typ. -28 dB $\mu$ V	<-34 dB $\mu$ V, typ. -38 dB $\mu$ V
50 to 30 MHz	9 kHz	<-12 dB $\mu$ V	<-18 dB $\mu$ V
30 to 1000 MHz	120 kHz	<+1 dB $\mu$ V, typ. -1 dB $\mu$ V	<-4 dB $\mu$ V, typ. -7 dB $\mu$ V
1000 to 2750 MHz	120 kHz	<+5 dB $\mu$ V	<0 dB $\mu$ V
<b>Dynamic range</b> Noise figure		typ. 5 dB (<30 MHz, preamplifier on)	typ. 9 dB (>30 MHz, preamplifier on)
Intercept point d3		typ. 10 dB (preamplifier off)	

<b>Level display</b> digital	in dB $\mu$ V, dB $\mu$ A, dBm, dB $\mu$ V/m, dB $\mu$ A/m, dBpW, dBpT
Display analog	3½-digit LCD, resolution 0.1 dB on analog meter in operating range of IF detector with digital display of lower range limit
Bargraph display Operating range	horizontal bar; resolution 0.1 dB 60 dB
Overdrive indication Detectors	for RF and IF signal path AV, PK, QP, can be switched on simul- taneously
Measuring times in overview mode	1 ms to 100 s (1/2/5 steps) 50 $\mu$ s to 1 s (1/2/5 steps)

**Measurement accuracy**  
Average indication for S/N >16 dB  
9 kHz to 1000 MHz <1.0 dB (typ. 0.5 dB)

1000 to 2750 MHz  
Quasi-peak indication

**RF spectrum analysis**  
X axis (frequency)  
Y axis (level)

Marker, traces  
Display modes

**Time domain analysis**  
Display range (sweep time)  
Minimum resolution (X axis)  
Level display range (Y axis)

**IF spectrum analysis (option ESCS-B4)**

Display range 10 kHz to 10 MHz, 1/2/5 steps  
IF input attenuation 0/20 dB (selectable)  
Resolution 1/3/10 kHz  
Sweep time 50 ms to 10 s, 1/2/5 steps  
Level display range 80 dB

**Demodulation modes**  
Loudspeaker  
Date, time of day

**General data**

Rated temperature range 0 to +50°C  
Storage temperature range -20 to +60°C  
Power supply  
AC supply 100/120/230/240 V  $\pm$ 10%,  
47 to 420 Hz (60 VA),  
safety class I to VDE 0411 (IEC348)  
Battery (external) 11 to 33 V: 2.5 A/24 V, 4.7 A/12 V  
Battery (internal, options -B1, -B2) 13.2 V, Ni-MH  
Operating time with options  
ESCS-B1 and 3 x ESCS-B2 4 h  
Dimensions (W x H x D) 435 mm x 236 mm x 350 mm  
Weight 18.4 kg  
with ESCS-B1 and 3 x ESCS-B2 22.9 kg

## Ordering information

**EMI Test Receiver** ESCS30 1102.4500.30

**Options**

Battery Controller Ni-MH and battery support (without battery packs) ESCS-B1 1102.6490.02  
Battery Pack Ni-MH (max. 3 packs can be inserted, option ESCS-B1 required) ESCS-B2 1102.6690.02  
IF Spectrum Analysis ESCS-B4 1102.6890.02  
Tracking Generator  
9 kHz to 2750 MHz ESCS-B5 1102.7097.02  
OCXO Reference Oscillator ESCS-B6 1102.9397.02  
RMS Detector ESCS-B9 1102.7897.02