EMI Test Receiver ESPC

(9) 150 kHz to 1 (2.5) GHz

EMC-compatible development and production

Photo 42092

Brief description

EMI Precertification Test Receiver ESPC has been derived from various Rohde & Schwarz full-compliance receiver models and thus opens up versatile applications in the field of EMI precompliance. It is a budget-priced solution for emission tests at all stages of development and production of electrical products. With a view to obtaining the "CE conformity mark", this test receiver will be used wherever EMI tests become necessary prior to acceptance testing in order to minimize the risks involved and the time taken for full-compliance tests.

Featuring built-in preselection, the ESPC is able to perform accurate interference measurements with pulse repetition frequencies (PRF) to as low as 10 Hz in line with CISPR 16-1.

The ESPC offers a compact and economical solution for

- development-accompanying EMI diagnostic measurements,
- pre- and post-qualification tests,
- production tests

Due to the increasing number and higher frequencies of mobile radio services, useful and interfering emissions up to 2.5 GHz have often to be investigated. The ESPC provides an optional frequency range extension up to 2.5 GHz which can also be retrofitted.

Main features

- Correct interference weighting to CISPR 16-1 down to 10-Hz pulse repetition frequency
- Integrated preselection
- For all commercial EMI standards such as CISPR, EN, ETS, FCC and ANSI C63.4, VCCI as well as VDE
- Parallel detectors for average, peak and quasi-peak reading
- Automatic overload detection
- Automatic level calibration
- Measurement of voltage, field strength, current and pulse spectral density with display of relevant units
- Automatic consideration of frequency-dependent transducer factors
- Easy to use thanks to built-in macro functions
- Power sourcing from internal or external battery
- EMI software under Windows™ supplied as standard

Operation

Users not specialized in EMI can also easily handle and carry out complete test runs. At the press of a button the ESPC starts as a stand-alone unit measurement of

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

A comprehensive test report can be output on a printer or plotter. The report contains comments and description, test receiver settings, graphs and final results.

Enhanced EMI measurement convenience through an external controller
The Windows™ Software ESPC-K1 supplied with the ESPC supports EMI measurements in line with commercial standards. The results are displayed as graphs and lists on the screen of a PC.

Specifications in brief

Frequency range		
Lower limit	150 kHz (optionally 9 kHz, ESPC-B2)	
Upper limit	1 GHz (optionally 2.5 GHz, ESPC-B3)	
Frequency setting	in 10 Hz, 100 Hz and 100 kHz steps or user-selectable	
Automatic scan	for RF analysis	
Display	8-digit LCD with backlighting, can be switched off	
Resolution	up to 1000 MHz: 10 Hz, from 1000 MHz: 100 Hz	
Frequency drift	<3 x 10^{-6}, after 30 min warmup	
RF input	Z_{in} = 50 Ω, N female	
VSWR, f_{in} <1 GHz	1.5 with ≥10 dB RF attenuation <2 with 0 dB RF attenuation	
RF attenuator	0 to 70 dB, 10-dB steps	
Preselection		
9 kHz to 1000 MHz	2 fixed-tuned, 6 tracking filters	
1000 to 2500 MHz	2 tracking filters	
Maximum input level (RF attenuation ≥10 dB)		
Sinewave AC voltage	130 dBµV (corresp. to 1 W)	
Max. pulse voltage	150 V	
Max. pulse energy (10 ms)	10 mWs	
Interference rejection, f <1000 MHz		
Image-frequency rejection, 1st and 2nd IF	70 dB	
IF rejection	70 dB	
IF bandwidths		
Nominal bandwidth	–3 dB	–6 dB
200 Hz[1)] (with option ESPC-B2)	180 Hz	200 Hz
10 kHz[1)]	7 kHz	9.5 kHz
120 kHz[1)]	90 kHz	120 kHz
Displayed noise floor, average		
9 kHz to 3 MHz, BW = 200 Hz	typ. +10 to –28 dBµV	
f >3 MHz, BW=200 Hz / 10 / 120 kHz	typ. –28 / –12 / –2 dBµV	
Voltage measurement range		
Lower limit (additional error caused by inherent noise <1 dB)		
Average indication (AV), f >3 MHz		
BW = 200 Hz / 10 / 120 kHz	typ. –24 / –8 / +2 dBµV	
Upper limits AV, PK, QP	130 dBµV (RF attenuation ≥10 dB)	
Level display		
Digital	in dBµV, dBµA, dBm, dB(µV/m), dB(µA/m), dBpW, 3-digit LCD, resolution 0.1 dB	
Analog	on moving-coil meter in operating range of IF detector with digital display of lower range limit	
Operating ranges	30 dB, 60 dB	
Overload indication	by level detectors in RF and IF signal path	
Detectors	average (AV), peak (PK), quasi-peak (QP); 2 detectors can be switched on simultaneously	
Measurement times	1 ms to 100 s (1 / 2 / 5 steps)	
Accuracy		
Average indication		
9 kHz to 1000 MHz	≤1.5 dB, typ. 1 dB	
1000 to 2500 MHz (optional)	typ. 1 dB	
Quasi-peak indication	to CISPR 16, ≥10 Hz pulse repetition frequency	
Demodulation modes	AM, FM, A0 (zero beat), internal loudspeaker, headphones connector	
Volume	adjustable with rotary knob	
Date, time of day	internal clock	

1 Tolerances to CISPR 16-1.

Internal memory	
Transducer	22 transducer factors with up to 50 reference values, nonvolatile, can be combined
Limit lines	22 limit lines with up to 50 reference values, nonvolatile
Instrument settings	9 complete setups, nonvolatile
Automatic modes	
Frequency scan	definable start and stop frequency and step size, max. 5 ranges with individual settings
Frequency lists	automatic measurement at max. 400 frequencies
RFI voltage measurements	automatic control of line-impedance stabilization networks, determination of maximum values in up to 400 subranges, checking for out-of-tolerance values
RFI power measurement	interactive mode with MDS absorbing clamps, determination of maximum values in up to 400 subranges, checking for out-of-tolerance values
RFI field-strength measurement	interactive mode with automatic antenna switchover, determination of maximum values in up to 400 subranges, checking for out-of-tolerance values

Connectors and interfaces

Remote control	IEC 625-2 (IEEE 488.2)
Plotter	via IEC / IEEE-bus interface
Printer	Centronics
Front-panel outputs	
Supply and coding connector for antennas etc	12-contact Tuchel connector
AF output	jack JK34, adjustable level
Rear-panel outputs	
IF 10.7 MHz	Z_{out} = 50 Ω, BNC connector
User port	25-contact Cannon connector for control of LISNs (phase switching) and antennas
Keyboard connector	5-contact connector for MF2 keyboard
Rear-panel inputs	
Reference input	BNC connector, 10 MHz, >1 V
External battery	3-contact connector
Required voltage	11 to 33 V (switch-on voltage >12 V)

General data

Power supply	
AC supply	100 / 120 / 240 V ±10%, 230 V +6 / –10%, 47 to 420 Hz (80 VA)
Battery (external)	11 to 33 V
Dimensions (W x H x D); weight	435 mm x 236 mm x 350 mm; 17 kg

Ordering information

EMI Test Receiver	ESPC	1082.8007.10
Accessories supplied	Windows™ Software ESPC-K1, power cable, connector for external battery, operating manual	
PC configuration required for Software ESPC-K1	IBM AT-compatible, 386 or higher	
Options		
Internal Battery with Automatic Charging	ESPC-B1	1082.9503.02
Frequency Extension 9 kHz to 150 kHz and IF bandwidth 200 Hz	ESPC-B2	1082.9555.02
Frequency Extension 1000 to 2500 MHz	ESPC-B3	1082.9603.02