

# EMI Test Receiver ESI

**ESI7: 20 Hz to 7 GHz**

**ESI26: 20 Hz to 26.5 GHz**

**ESI40: 20 Hz to 40 GHz**

**EMI test receiver and spectrum analyzer all in one**

ESI40 (photo 43176)



## Brief description

EMI Test Receivers ESI are based on the worldwide successful Spectrum Analyzer Family FSE (page 152) and combine the versatility and speed of spectrum analyzer measurements with the required top-class specifications of EMI measurements. These test receivers feature in particular

- high sensitivity
- wide dynamic range
- high overload capability
- high measurement accuracy
- fast prescan measurements

### Measurements to current standards

- Correct interference measurements to CISPR 16-1 and VDE 0876
- Measurements to all commercial and military standards such as CISPR, VDE, ANSI, FCC, EN, VCCI, MIL-STD, VG, DEF-STAN, BS, DO 160, GAM EG 13

Thanks to the integrated measurement and analysis functions, measurements to relevant industrial and military standards are facilitated and carried out reliably and quickly. EMI Test Receivers ESI contain all the detectors required by the relevant standards

and satisfy the exacting requirements of CISPR 16-1 and VDE 0876 standards up to 1 GHz and above without any restrictions.

### EMI measurements – innovative and convincing

Interference measurements with weighting to CISPR place extremely high demands on test receivers. Integrated preselection filters which can be switched into circuit in analyzer mode feature high overload immunity and ensure reliable protection even against broadband signals with high levels. A low-noise preamplifier (20 dB) can optionally be switched between the preselector and 1st mixer to achieve sufficient sensitivity at low signal levels or to improve the S/N ratio. Depending on the frequency range, sensitivity can thus be improved by up to 6 dB.

### Documentation

The EMI test receivers support a wide variety of commercial monochrome and colour printers for output of the measurement results in form of screenshots. Comprehensive test reports can be generated with the aid of the Rohde & Schwarz EMI Software ES-K1.

### Use in automatic test systems

Fast processing of results makes ESI ideal for use in automatic test systems. The IEC/IEEE-bus command set (IEC 625-2/IEEE488) is conforming to SCPI (1994.0).

With an internal computer kernel and a second commercial IEC/IEEE-bus card, ESI can be used as a controller for complete test systems. EMI Software ES-K1 (with numerous drivers for external accessories such as mast, turntable, etc) is an ideal tool for this purpose.

### Low overall costs

In the design of the ESI models, special emphasis was placed on keeping operating costs to a minimum:

- Temperature-controlled fans
- Calibration interval up to 2 years
- Built-in calibration routines
- Numerous selftest routines
- Modular design allowing easy replacement of faulty modules

# Specifications in brief

<b>Frequency</b>			Sampling rate	50 ns (20 MHz A/D converter)
Frequency range			Sweep trigger	free run, single, line, video, gated, delayed, external
Input 1	ESI7	20 Hz to 7 GHz	Zero span	additionally pretrigger, posttrigger, trigger delay
	ESI26	20 Hz to 26.5 GHz		
	ESI40	20 Hz to 40 GHz		
Input 2		20 Hz to 1 GHz		
Frequency resolution		0.01 Hz	<b>Resolution bandwidths</b>	3 dB bandwidth
Internal reference frequency			Shape factor 60:3 dB	1 Hz to 10 MHz, in 1/2/3/5 steps
Total frequency drift (per year)		$2.5 \times 10^{-7}$	< 1 kHz	< 6
Preamplifier (9 kHz to 7 GHz)		can be switched between preselector and 1st mixer, gain 20 dB	1 kHz to 2 MHz	< 12
			> 2 MHz	< 7
			Video bandwidths	1 Hz to 10 MHz, in 1/2/3/5 steps
<b>Level</b>			<b>FFT filter</b>	
Level display range		noise floor to 137 dBmV	Resolution bandwidths (RBW)	3 dB bandwidths
Maximum input level			Shape factor 60:3 dB, nom.	1 Hz to 1 kHz, in 1/2/3/5 steps
Input 1 (20 Hz to max. frequency)			Display range of frequency axis	2.5
RF attenuation $\geq 10$ dB,			Min. span	25 x RBW
DC voltage 0 V			Max. span	100000 x RBW
CW RF power		137 dB $\mu$ V (= 1 W)	<b>Level display</b>	
Max. pulse voltage		150 V (ESI7)	Display of measurement result	500 x 400 pixels (per diagram), max. 2 diagrams with independent settings
		50 V (ESI26, 40)	Log level display range	10 to 200 dB in 10 dB steps
Max. pulse energy (10 $\mu$ s)		1 mWVs (ESI7)	Lin level display range	10% of reference level per division (10 divisions) or logarithmic scaling
		0.5 mWVs (ESI26, 40)	Traces	max. 4 per diagram (max. 2 per diagram with display of 2 diagrams); quasi-analog display of all results
Input 2 (20 Hz to 1 GHz)			Trace detectors	max peak, min peak, auto peak (normal), sample, rms, average
RF attenuation $\geq 10$ dB			Trace functions	clear/write, max/min hold, average
CW RF power		137 dB $\mu$ V (= 1 W)	Max. dynamic range(1 Hz BW)	
Max. pulse voltage		1500 V (ESI7)	Displayed noise floor to 1 dB compression	162 dB (ESI26, ESI40: 160 dB)
		150 V (ESI26, 40)	Max. intermodulation-free range	
Max. pulse energy (10 $\mu$ s)		100 mWVs (ESI7)	150 MHz to 7/26.5 GHz (nominal)	115 dB (ESI26, ESI40: 112 dB)
		10 mWVs (ESI26, 40)	<b>General data</b>	
1 dB compression of input mixer (0 dB RF attenuation)			Display	9.5" LC TFT colour display, VGA
w/o preselector, w/o preamplifier		+10 dBm nominal	Mass memory	3 1/2" FDD, 1.44 Mbyte, hard disk
Level measurement accuracy			Rated temperature range	+5 to +40°C
(0 to -50 dB, S/N >15 dB, receiver mode or span/RBW <100)			Limit temperature range	+0 to +50°C
<1 GHz		<1.0 dB (ESI7/26/40)	Storage temperature range	-40 to +70°C
1 to 7 GHz		<1.5 dB (ESI7/26/40)	Power supply	100/120/230/240 V $\pm 10\%$ , 47 to 440 Hz (195 to 230 VA)
7 to 18 GHz		<2.5 dB (ESI26/40)		
18 to 26.5 GHz		<3.0 dB <sup>1)</sup> (ESI26/40)		
26.5 to 40 GHz		<3.5 dB <sup>1)</sup> (ESI40)		
<b>Audio demodulation</b>			Dimensions (W x H x D)	435 mm x 236 mm x 570 mm
Modulation modes		AM and FM	Weight	25.1 to 27 kg (depending on model)
Audio output		loudspeaker and phones output		
<b>Receiver mode</b>				
Frequency display		numeric display	<b>Ordering information</b>	
Resolution		0.1 Hz		
Frequency sweep		scan with max. 10 subranges with different settings	<b>EMI Test Receiver</b>	
Measurement time per frequency		100 $\mu$ s to 1000 s	20 Hz to 7 GHz	ESI 7 1088.7490.07
IF bandwidths (6 dB bandwidths)		10, 100, 200 Hz,	20 Hz to 26.5 GHz	ESI26 1088.7490.26
		1, 9, 10, 100, 120 kHz,	20 Hz to 40 GHz	ESI40 1088.7490.40
		1 MHz, 10 MHz		
<b>Level display</b>			<b>Options</b>	
digital		numeric, 0.1 dB resolution	Tracking Generator 9 kHz to 7 GHz	FSE-B10 1066.4769.02
analog		bargraph display, for each detector separately	Tracking Generator 9 kHz to 7 GHz with I/Q Modulator	FSE-B11 1066.4917.02
<b>Spectrum</b>			Switchable Attenuator	
Level axis		10 to 200 dB in 10 dB steps	for Tracking Generator 0 to 70 dB	FSE-B12 1066.5065.02
Frequency axis		user-defined, linear or logarithmic	External Mixer Output	FSE-B21 1084.7243.02
Units of level display		dB $\mu$ V, dB $\mu$ A, dBm, dBpW, dBpT, dB ( $\mu$ V/m) or dB ( $\mu$ A/m)	TV Demodulator, line and frame trigger, standards B/G, D/K, I, L, M	FSE-B3 1073.5244.02
			Vector Signal Analyzer	FSE-B7 1066.4317.02
<b>Analyzer mode</b>			<b>Extras</b>	
Frequency display		with marker	EMI Software for R&S EMI Test	
Resolution		0.1 Hz to 10 kHz (dependent on span)	Receivers and accessories	ES-K1 1026.6790.02
Frequency counter		measures marker frequency	Driver for EMI Software ES-K1 for ESI	ES-K16 1108.0288.02
Resolution		0.1 Hz to 10 kHz (selectable)		
Display range for frequency axis		0 Hz, 10 Hz to full span		
Sweep time				
Display range				
0 Hz (zero span)		1 $\mu$ s to 16000 s, 5% steps		
$\geq 10$ Hz		5 ms to 1000 s, $\leq 10\%$ steps		
Picture refresh rate (span $\leq 7$ GHz)		>20 updates/s with 1 trace		
		>15 updates/s with 2 traces		

1) For RF frequencies > 7 GHz: error after calling peaking function. For sweep time < 10 ms/GHz: additional error 1.5 dB.