

Version
02.00August
2003

Portable SAT/TV/FM Test Receiver R&S® EFL 100

Measurement features for analog TV, digital TV and FM radio in a single unit

- ◆ Easily portable due to compact, robust design and integrated battery
- ◆ User-friendly interface for fast measurements
- ◆ Built-in printer for documentation of measurement results and spectrum
- ◆ On-screen TV picture
- ◆ Control signals for LNBs of satellite antennas

**ROHDE & SCHWARZ**

Description

A cost-efficient, mobile solution for installing, checking and maintaining transmitters, antennas and signal distribution equipment is needed. The Test Receiver R&S EFL100 from Rohde & Schwarz meets all requirements. In many cases, the R&S EFL100 is also the ideal complement to a high-end TV test receiver used for more in-depth signal analysis.

Depending on the specific requirements, users can choose between three models. With the fully equipped model 04 of the R&S EFL100, detailed quality measurements of DVB-C, DVB-S and DVB-T signals can be carried out along with level measurements of analog and digital TV, FM radio and satellite reception signals.

The R&S EFL100 comes with a built-in battery. The battery is rechargeable via the integrated power supply unit (110 V AC to 240 V AC).

Four different detectors for peak, average, maximum and minimum values are available for level measurements of analog and digital signals. Correction values are determined by the level calibration of the R&S EFL100 and stored in a memory. This allows precise level measurements to be performed with the R&S EFL100.

The R&S EFL100 has been developed for the standards B/G, D/K, I, L, M, N, M Korea, M Japan and NICAM. The video signal can be processed and reproduced in line with the colour TV standards PAL, SECAM and NTSC.

The front-panel display provides a bargraph that helps the user to locate transmitters. In addition, a level-dependent acoustic tracking signal simplifies antenna alignment without requiring a look at the screen.

The LNB (low-noise block) supply voltage is 10 V DC to 20 V DC for max. 500 mA in increments of 0.1 V DC. For control of the receiving system, the 22 kHz signal as well as the commands for DiSEqC 2.0, UFO μ -DiSEqC or V-SEC can be produced.

Level values, frequencies and the entire frequency spectrum can be printed out via the integrated dot-matrix printer.



Constellation diagram of a QAM64 signal

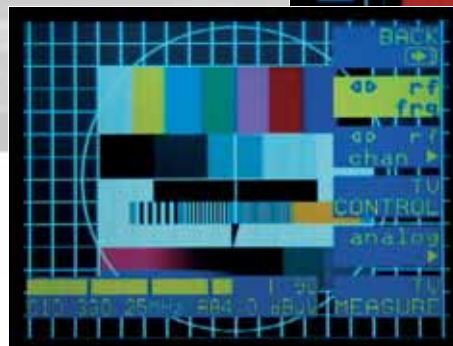


OFDM parameters

Constellation diagram of an OFDM signal (16QAM)



RF spectrum of an analog TV signal



On-screen TV picture

Specifications of base unit

Frequency range	SAT – analog, digital TV DVB-T FM IF – analog, digital RP	920 MHz to 2150 MHz 44.75 MHz to 867.20 MHz 178 MHz to 227 MHz / 474 MHz to 858 MHz 88 MHz to 108 MHz (45.75 MHz to 867.20 MHz) 38.9 MHz 4 MHz to 80 MHz
Channel plan	TV	standard B, 7 MHz standard D/G/I/K, 8 MHz standard M, 6 MHz
Frequency setting	SAT – analog, digital TV/FM RP	in 0.125 MHz steps in 50 kHz steps in 50 kHz steps
Test error/level	SAT – analog, digital TV/FM RP	max. ± 2 dB max. ± 2 dB max. ± 2 dB
Slope	TV (BT/TT)	≤ 1.5 dB except S41 (461.25 MHz) ≤ 4 dB C70 (863.25 MHz) ≤ 2.5 dB
RF input		coaxial BNC 75 Ω
RF input attenuation		0 dB to -60 dB in 4 dB steps
RF level range	SAT/TV/FM IF/RP	30 dB μ V to 130 dB μ V 70 dB μ V to 130 dB μ V / 30 dB μ V to 130 dB μ V
Level measurement bandwidth	SAT – analog, digital TV – analog, digital FM RP RP DVB	8 MHz 1 MHz 200 kHz 1 MHz 1 MHz / 200 kHz (depending on system rate setting)
Measurement detector	SAT – analog TV – analog FM DVB-C/S/T RP analog RP digital	mean value display peak value display mean value display mean value display (corrected) peak value display mean value display (corrected)
Return loss	TV SAT – analog, digital	≥ 10 dB (typ. 15 dB) ≥ 8 dB
Audio IF bandwidth	SAT TV FM	130 kHz / 280 kHz 200 kHz 200 kHz
Audio de-emphasis	SAT TV/FM	50 μ s / DNR 75 μ s / J17 50 μ s
Audio carrier measurement and demodulation	SAT	FM audio processing 4.99 MHz to 9.01 MHz in 10 kHz steps
	TV	standard B/G TT1 = 5.5 MHz, TT2 = 5.74 MHz standard D/K TT1 = 6.5 MHz, TT2 = 6.26 MHz standard I TT1 = 6 MHz standard M/M _{Korea} TT1 = 4.5 MHz, TT2 = 4.72 MHz standard L AM = 6.5 MHz, NICAM = 5.85 MHz standard B/G NICAM = 5.85 MHz standard I NICAM = 6.552 MHz
	FM	FM audio processing 45 MHz to 867 MHz
NICAM audio BER	TV	0 to 1.5×10^{-2}
Video output	SAT	1 V pp / 75 Ω $\leq \pm 3$ dB
	TV	1 V pp / 75 Ω $\leq \pm 1$ dB
LNB supply voltage	SAT	0.10 V to 20 V, max. 500 mA
LNB control	SAT	22 kHz, DiSEqC, simple DiSEqC, tone burst, V-SEC, UFO μ -DiSEqC
SAT analog measurements	LNB current	0 mA to 500 mA ± 10 mA
	LNB voltage	0 V to 30 V DC ± 100 mV
	C/N	0 dB to 35 dB ± 2 dB
	S/N	35 dB to 50 dB ± 2 dB (weighted)
	cross-polarization	0 dB to 30 dB ± 2 dB

TV analog measurements	remote feed current	0 mA to 500 mA \pm 10 mA
	remote feed voltage	0 V to 30 V DC \pm 100 mV
	S/N	35 dB to 47 dB \pm 2 dB (weighted)
DVB-S measurements (QPSK)	MER	up to 12 dB
	BER	1×10^{-2} to 1×10^{-8} (0), before Viterbi
DVB-C measurements (QAM64, QAM128)	MER	up to 32 dB at QAM64
	BER	1×10^{-2} to 1×10^{-8} (0) at QAM64 (BER better than 1×10^{-8} for level $>$ 57 dB μ V), before Reed-Solomon
DVB-T measurements (2k/8k mode)	MER	up to 32 dB
	BER	5×10^{-2} to 1×10^{-8} (0), before Viterbi and Reed-Solomon
Display		5.5" TFT screen 320 x 240 pixel pixel error max. \leq 6 with a distance of \geq 6.5 mm \varnothing
Remote control interface		RS-232-C (25-pin connector, female)
Power supply		
Mains operation		100 V AC to 250 V AC / 50 Hz to 400 Hz
Battery operation		lead battery 12 V DC / 3.5 Ah
Power consumption DCP _{max}		50 W
Power consumption ACP _{max}		62 W
Dimensions (W x H x D)		275 mm x 130 mm x 350 mm
Safety standards		CE symbol protection class I VDE EN 61010
Operating temperature range		+5 °C to +45 °C
Storage temperature range		-20 °C to +70 °C
Weight		approx. 7 kg

RP = return path; BT = vision carrier; TT1, TT2 = sound carrier 1, 2

**Measuring
Amplifier with
FM Filter
R&S EFL 100-Z3**



Specifications of Options EFL100-Z3 and EFL100-Z4

Pre-amplifier for level increase with weak DVB-T signals. Suppression of FM range when special channels S02 and S03 are measured in broadband communication systems (109 MHz to 125 MHz).

	R&S EFL100-Z3	R&S EFL100-Z4
Frequency range	109 MHz to 1 GHz	40 MHz to 1 GHz
Gain		19 dB
Measurement uncertainty		\pm 1,5 dB
Noise figure		$<$ 3 dB
Stopband attenuation	at 87 MHz: 35 dB \pm 3 dB at 95 MHz: 22 dB \pm 3 dB	—
Supply voltage		10 V to 20 V via RF output
Connectors		BNC male/female

All models at a glance

	R&S EFL100 model 02	R&S EFL100 model 03	R&S EFL100 model 04
Equipment	Basic model, analog	Model 02 + QAM/QPSK	Model 03 + DVB-T
Analog TV/ FM basic module	✓	✓	✓
QPSK/QAM module		✓	✓
DVB-T module			✓
MPEG-2 decoder module		✓	✓
Return path module		✓	✓
MPEG-2 TS parallel output		✓	✓
SCART connector	✓	✓	✓
Modem connector	✓	✓	✓
Earphone connector	✓	✓	✓
12 V DC input		✓	✓
Features			
Signal level min./max.	✓	✓	✓
S/N measurement (video)	✓	✓	✓
NICAM audio	✓	✓	✓
Spectrum representation via monitor and printer	✓	✓	✓
Scope function	✓	✓	✓
DVB carrier level	✓	✓	✓
BER		✓	✓
MER		✓	✓
Constellation diagram		✓	✓
Analog TV program on screen	✓	✓	✓
DVB program on screen (free TV)		✓	✓
Memory for 100 settings	✓	✓	✓
Teletext	✓	✓	✓
Date and time	✓	✓	✓



Ordering information

Portable SAT/TV/FM Test Receiver ANALOG	R&S EFL100	2111.2055.02
Portable SAT/TV/FM Test Receiver ANALOG, DVB-C, DVB-S, MPEG-2, RETURN PATH	R&S EFL100	2111.2055.03
Portable SAT/TV/FM Test Receiver ANALOG, DVB-C, DVB-S, DVB-T, MPEG-2, RETURN PATH	R&S EFL100	2111.2055.04

Options

Measuring Amplifier with FM Filter	R&S EFL100-Z3	2111.2132.02
Measuring Amplifier	R&S EFL100-Z4	2111.2149.22

Recommended extras

Leather Bag	R&S EFL100-Z1	2111.2103.00
Antiglare Device	R&S EFL100-Z2	2111.2110.00

