Data sheet

Version 02.00

August 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).

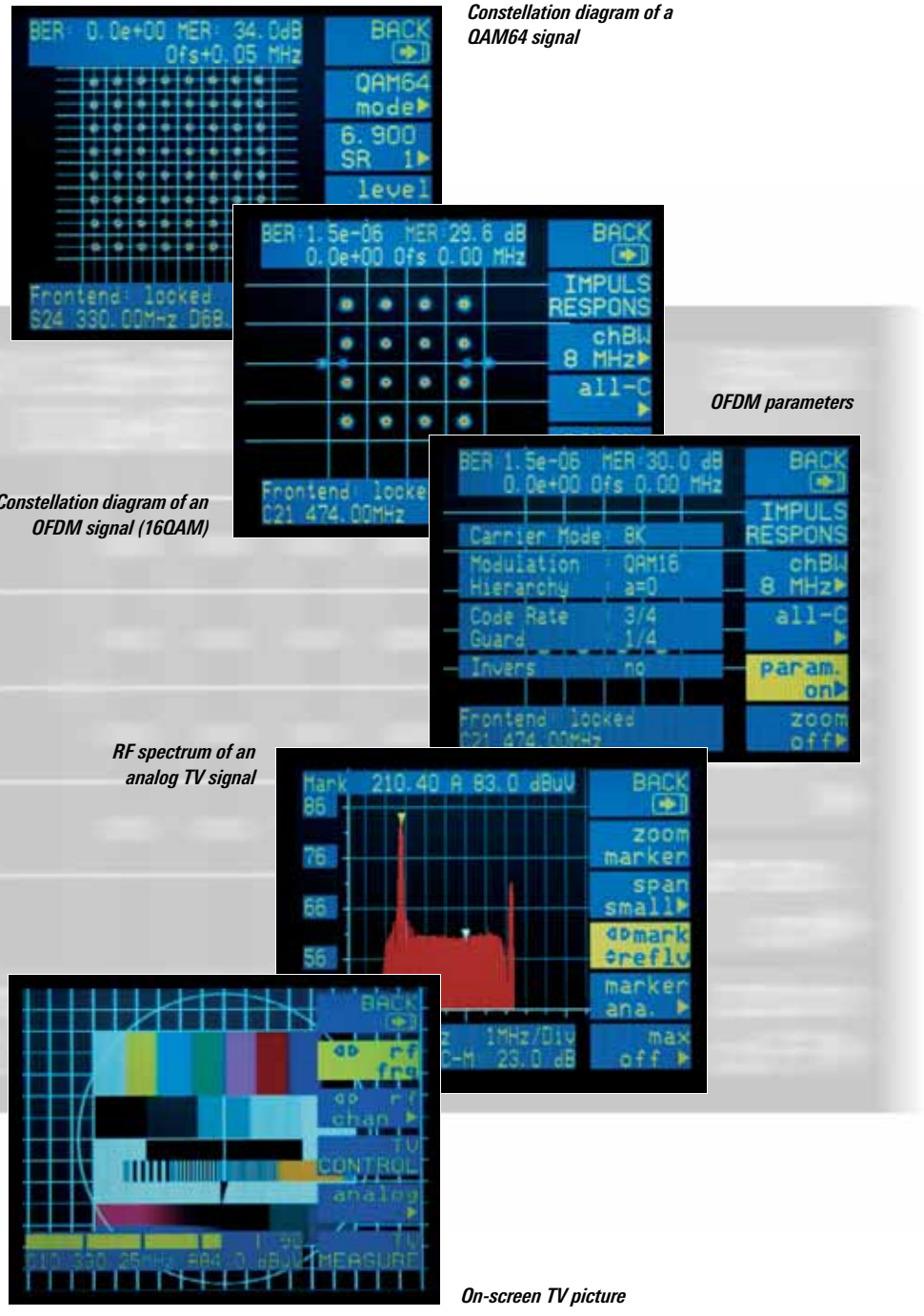
Four different detectors for peak, average, maximum and minimum values are available for level measurements of analog and digital signals. Correction values are determined by the level calibration of the R&S EFL100 and stored in a memory. This allows precise level measurements to be performed with the 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, UFOμ-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 dBµV to 130 dBµV 70 dBµV to 130 dBµV / 30 dBµV to 130 dBµV
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 µs / DNR 75 µs / J17 50 µs
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 x 10^{-2}
Video output	SAT	1 V pp / 75 Ω ≤±3 dB
	TV	1 V pp / 75 Ω ≤±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, UFOµ-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 ±10 mA
	remote feed voltage	0 V to 30 V DC ±100 mV
	S/N	35 dB to 47 dB ±2 dB (weighted)
DVB-S measurements (QPSK)	MER	up to 12 dB
	BER	1 x 10^{-2} to 1 x 10^{-8} (0), before Viterbi
DVB-C measurements (QAM64, QAM128)	MER	up to 32 dB at QAM64
	BER	1 x 10^{-2} to 1 x 10^{-8} (0) at QAM64 (BER better than 1 x 10^{-8} for level >57 dBµV), before Reed-Solomon
DVB-T measurements (2k/8k mode)	MER	up to 32 dB
	BER	5 x 10^{-2} to 1 x 10^{-8} (0), before Viterbi and Reed-Solomon
Display		5.5" TFT screen 320 x 240 pixel pixel error max. ≤6 with a distance of ≥6.5 mm ∅
Remote control interface		RS-232-C (25-pin connector, female)
Power supply Mains operation Battery operation Power consumption DCP_{max} Power consumption ACP_{max}		 100 V AC to 250 V AC / 50 Hz to 400 Hz lead battery 12 V DC / 3.5 Ah 50 W 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

Preamplifier for level increase with weak DVB-T signals. Suppression of FM range when special channels S02 und 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	±1,5 dB	
Noise figure	<3 dB	
Stopband attenuation	at 87 MHz: 35 dB ± 3 dB at 95 MHz: 22 dB ± 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	✓	✓	✓

Certified Quality System ISO 9001 DQS REG. NO 1954 QM

Certified Environmental System ISO 14001 DQS REG. NO 1954 UM

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

Printed in Germany (Pe we)

PD 0758.0551.32 · Portable SAT/TV/FM Test Receiver R&S®EFL100 · Version 02.00 · August 2003 · Data without tolerance limits is not binding · Subject to change

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