

R&S® ETH

Handheld TV Analyzer

Portable DVB-T/H signal analysis up to 3.6/8 GHz



75 Years of
Driving
Innovation


ROHDE & SCHWARZ

R&S®ETH Handheld TV Analyzer At a glance

The R&S®ETH handheld TV analyzer was specially designed for daily service and maintenance work on DVB-T/H gap-filler and low-power transmitters as well as nonvehicular coverage measurements. In addition, the universal capabilities of the R&S®ETH allow it to be used for repair and development of TV components.

The R&S®ETH handheld TV analyzer is a compact combination of a TV analyzer, spectrum analyzer and network analyzer. The functional diversity of the R&S®ETH makes it unnecessary to carry along other measuring equipment. Its frequency range extends up to 3.6 GHz or 8 GHz. The housing was specially designed for mobile use and is therefore rugged and splash-proof. Its large, daylight-friendly color display, low weight and replaceable lithium-ion battery enhance its portability. To improve its receive sensitivity and selectivity, the R&S®ETH can be equipped with internal preselection.

The core component of the R&S®ETH is an FPGA-based DVB-T/H demodulator that operates in realtime. It features maximum measuring performance and provides a demodulated MPEG-2 transport stream at the TS-ASI output. The readings are displayed on straightforward measurement screens and can be stored internally or on SD cards. The R&S®FSH4 View software that comes with the instrument allows measurement results to be displayed on a PC and makes it easy to transfer the data via the USB or LAN interface.

Main features

- Frequency range for DVB-T/H from 5 MHz to 3.6 GHz or 8 GHz
- Frequency range for spectrum analysis from 100 kHz to 3.6 GHz or 8 GHz
- TV, spectrum and network analyzer in a single box
- FPGA-based realtime DVB-T/H demodulator with TS-ASI output
- High measurement speed
- MER performance >40 dB
- Internal preselection (option)
- LAN and USB interface
- SCPI-compliant remote control
- Replaceable lithium-ion battery for two to three hours of operation
- 6.5" daylight-friendly color display
- Compact, rugged and splash-proof housing for portable outdoor use
- Low weight (approx. 3.3 kg)



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Major applications Benefits and key features



Applications

Service and maintenance of DVB-T/H gap-filler and low-power transmitters

- ▮ Precise analysis of signal quality and output power
- ▮ Fast and easy detection of impermissible spurious emissions

Nonvehicular coverage measurements

- ▮ Outdoor and indoor field strength measurement
- ▮ Determination of receive conditions under practical conditions

Advantages

Comprehensive analysis functions in one box

- ▮ Combination of TV, spectrum and network analyzer
- ▮ Consistent measurements

Detection of short-time interference

- ▮ Signal analysis and demodulation for DVB-T/H in realtime
- ▮ High measurement speed
- ▮ BER measurements
- ▮ MPEG-2 transport stream output (ASI)

Reliable measurement results

- ▮ Narrow measurement tolerances
- ▮ High MER performance
- ▮ Support of power sensors
- ▮ Frequency locking to GPS-based reference signal
- ▮ Frequency locking to external 10 MHz reference signal

Coverage measurements under real conditions

- ▮ Internal preselection with preamplifier (option)
- ▮ AGC
- ▮ Antenna factors taken into account
- ▮ Replaceable lithium-ion battery

Simple outdoor use

- ▮ Compact and rugged housing
- ▮ Splash-proof
- ▮ High-resolution, daylight-friendly 6.5" color display
- ▮ Low weight

Easy and fast documentation of measurement results

- ▮ Measurement values saved internally or on SD card
- ▮ Data exchange via LAN and USB interface

Reproducible measurement results due to user-specific instrument configuration

- ▮ R&S®FSH4 View PC software for configuring instrument settings, measurements, channel tables, etc., via LAN and USB interface
- ▮ Exchange of instrument configurations between multiple R&S®ETH analyzers using the R&S®FSH4 View software

Access via remote-control interfaces

- ▮ LAN interface for accessing up to five users via R&S®FSH4 View
- ▮ LAN and USB interface for reading out internally stored measurement values and SD card using R&S®FSH4 View
- ▮ Remote control via LAN and USB interface in accordance with SCPI standard

Specifications in brief

RF data		
Frequency range (TV receiver mode)	model .04, .14	5 MHz to 3.6 GHz
	model .08, .18	5 MHz to 8 GHz
Frequency range (spectrum analyzer mode)	model .04, .14	100 kHz to 3.6 GHz
	model .08, .18	100 kHz to 8 GHz
Frequency accuracy	internal oscillator	1 ppm/year
Phase noise	$\Delta f = 30 \text{ kHz}$, RF = 500 MHz	$\leq 100 \text{ dBc/Hz}$
IP3	RF = 500 MHz, RF attenuation = 0 dB, R&S®ETH-B203 = OFF R&S®ETH-B203 = ON	typ. 0 dBm typ. -10 dBm
Level uncertainty		typ. <0.5 dB
Tracking generator		
Frequency range	model .14	2 MHz to 3.6 GHz
	model .18	2 MHz to 8 GHz
Output level	model .14, .18	-50 dBm to 0 dBm
DVB-T/H analysis (R&S®ETH-K240 option)		
Channel bandwidth		5 MHz, 6 MHz, 7 MHz, 8 MHz
FFT modes		2k, 4k, 8k
QAM order		4QAM, 16QAM, 64QAM
QAM hierarchy		none, alpha = 1, 2, 4
Guard interval		1/4, 1/8, 1/16, 1/32
Code rates		1/2, 2/3, 3/4, 5/6, 7/8
Measurements		level, shoulder attenuation, carrier frequency offset, symbol rate offset, MER/EVM, bit error rate before Viterbi, bit error rate before Reed-Solomon, packet error ratio, packet errors, MPEG TS bit rate constellation diagram, TPS information
MER system performance	RF = 500 MHz, level = -30 dBm	$\geq 40 \text{ dB}$
Spectrum analysis		
Displayed average noise level (DANL)	RF = 500 MHz, RF attenuation = 0 dB, resolution bandwidth = 1 kHz, VBW = 1 Hz R&S®ETH-B203 = OFF R&S®ETH-B203 = ON	typ. -158 dBm typ. -165 dBm
Reference level		-80 dBm to +20 dBm
Resolution bandwidths		100 Hz to 3 MHz in 1/3 sequence
Video bandwidths		10 Hz to 3 MHz in 1/3 sequence
Sweep time	span >0 Hz	20 ms to 1000 s
	span = 0 Hz, resolution bandwidth = 3 MHz	117 μs to 100 s
I/Q demodulation bandwidth		10 MHz
Detectors		auto peak, max peak, min peak, sample, RMS
Trigger functions		free run, video, ext. pos. edge, ext. neg. edge
Interfaces		
RF input		N connector (female), 50 Ω
Tracking generator output		N connector (female), 50 Ω
10 MHz reference/ trigger input		BNC connector (female)
TS-ASI output		BNC connector (female), 75 Ω
Accessories control	1 x at top of instrument, 1 x at side	7-pole connector (female)
LAN interface		LAN (Ethernet 10/100BaseT)
USB interface		USB 1.1
Memory card		SD card

Specifications in brief

RF data		
General data		
Operating temperature range	with battery	0 °C to +45 °C
Power supply	AC, with external power supply	100 V AC to 240 V AC, 50 Hz/60 Hz, 700 mA
	external DC	15 V DC ± 10 %, 2 A
Battery (Li-ion)	Battery runtime in TV receiver mode	approx. two hours
	Battery runtime in spectrum analyzer mode	approx. three hours
Dimensions	H × W × D (without handle)	300 mm × 192 mm × 75 mm
Weight		3.3 kg

Ordering information

Designation	Type	Order No.
Handheld TV Analyzer, 100 kHz to 3.6 GHz	R&S®ETH	2114.1508.04
Handheld TV Analyzer, 100 kHz to 8 GHz	R&S®ETH	2114.1508.08
Handheld TV Analyzer, 100 kHz to 3.6 GHz, with tracking generator	R&S®ETH	2114.1508.14
Handheld TV Analyzer, 100 kHz to 8 GHz, with tracking generator	R&S®ETH	2114.1508.18
Equipment supplied with base unit		
Li-ion battery, plug-in power supply, LAN cable (2 m), USB cable, quick start guide, CD with R&S®FSH4 View control software and documentation		
Hardware options		
Preselection up to 3.6 GHz	R&S®ETH-B203	2114.1608.04
Preselection up to 8 GHz	R&S®ETH-B203	2114.1608.08
Software options		
DVB-T/H Firmware	R&S®ETH-K240	2114.1708.02
Remote Control for R&S®ETH	R&S®ETH-K40	2114.1814.02

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