

R&S® ETC

Compact TV Analyzer

Specifications



3 year warranty

CONTENTS

Definitions	3
Specifications.....	4
TV analyzer	4
Frequency	4
Level.....	4
RF preselection (R&S®ETC-K1 option)	5
DVB-T/DVB-H analysis (R&S®ETC-K140 option).....	6
ISDB-T analysis (R&S®ETC-K160 option).....	8
DVB-T2 analysis (R&S®ETC-K240 option, requires R&S®ETC-B300).....	10
Amplitude/phase/group delay measurement (R&S®ETC-K180 option).....	12
MPEG decoder board (R&S®ETC-B280 option, requires at least one digital TV standard R&S®ETC-K140, R&S®ETC-K160 or R&S®ETC-K240).....	13
Spectrum analysis	14
Frequency	14
Sweep time.....	14
Bandwidths.....	14
Level.....	15
Trigger functions.....	16
Scalar network analysis (R&S®ETC-K10 option).....	17
Inputs and outputs.....	18
General data	19
Accessories.....	20
R&S®FSH-Z14 directional power sensor.....	20
R&S®FSH-Z44 directional power sensor.....	22
R&S®HA-Z240 GPS receiver	24
Ordering information	25

Definitions

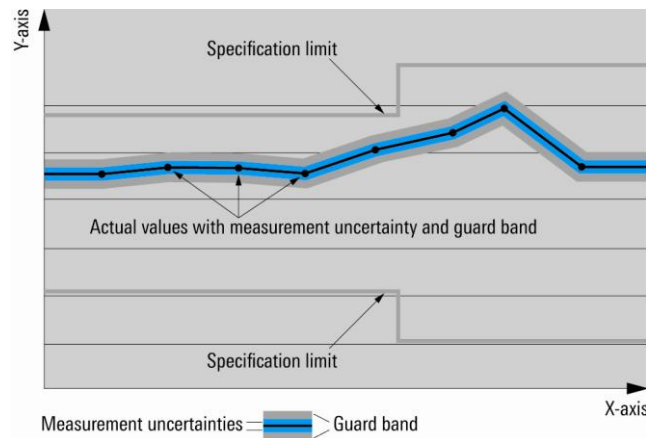
General

Product data applies under the following conditions:

- Three hours storage at ambient temperature followed by 30 minutes warm-up operation
- Specified environmental conditions met
- Recommended calibration interval adhered to
- All internal automatic adjustments performed, if applicable

Specifications with limits

Represent warranted product performance by means of a range of values for the specified parameter. These specifications are marked with limiting symbols such as $<$, \leq , $>$, \geq , \pm , or descriptions such as maximum, limit of, minimum. Compliance is ensured by testing or is derived from the design. Test limits are narrowed by guard bands to take into account measurement uncertainties, drift and aging, if applicable.



Specifications without limits

Represent warranted product performance for the specified parameter. These specifications are not specially marked and represent values with no or negligible deviations from the given value (e.g. dimensions or resolution of a setting parameter). Compliance is ensured by design.

Typical data (typ.)

Characterizes product performance by means of representative information for the given parameter. When marked with $<$, $>$ or as a range, it represents the performance met by approximately 80 % of the instruments at production time. Otherwise, it represents the mean value.

Nominal values (nom.)

Characterize product performance by means of a representative value for the given parameter (e.g. nominal impedance). In contrast to typical data, a statistical evaluation does not take place and the parameter is not tested during production.

Measured values (meas.)

Characterize expected product performance by means of measurement results gained from individual samples.

Uncertainties

Represent limits of measurement uncertainty for a given measurand. Uncertainty is defined with a coverage factor of 2 and has been calculated in line with the rules of the Guide to the Expression of Uncertainty in Measurement (GUM), taking into account environmental conditions, aging, wear and tear.

Device settings and GUI parameters are designated with the format "parameter: value".

Typical data as well as nominal and measured values are not warranted by Rohde & Schwarz.

Specifications

TV analyzer

Frequency

Frequency range	model .04	4.5 MHz to 3.6 GHz
	model .08	4.5 MHz to 8 GHz
Resolution		1 Hz
Reference frequency, internal		
Aging per year		1×10^{-6}
Temperature drift	0 °C to +30 °C	1×10^{-6}
	+30 °C to +50 °C	3×10^{-6}
Achievable initial calibration accuracy		5×10^{-7}
Total reference uncertainty	0 °C to +30 °C	(time since last adjustment × aging rate) + temperature drift + calibration accuracy
Reference frequency, with R&S®HA-Z240 option		
Frequency uncertainty	GPS on, ≥ 1 minute after satellite lock	2.5×10^{-8}
	up to 30 minutes after losing satellite lock	5×10^{-8}
Spectral purity of SSB phase noise		
Carrier offset	RF = 500 MHz	
	30 kHz	< -98 dBc (1 Hz), -102 dBc (1 Hz) (typ.)
	100 kHz	< -100 dBc (1 Hz), -106 dBc (1 Hz) (typ.)
	1 MHz	< -125 dBc (1 Hz), -131 dBc (1 Hz) (typ.)

Level

Noise figure	RF attenuation = 0 dB, RF preselection = off	
	10 MHz to 2.5 GHz	< 28 dB
	2.5 GHz to 3 GHz	< 28 dB
	3 GHz to 4 GHz	< 34 dB
	4 GHz to 7 GHz	< 32 dB
	7 GHz to 8 GHz	< 43 dB
	RF = 500 MHz	18 dB (typ.)
	RF attenuation = 0 dB, RF preselection = on ¹	
	10 MHz to 500 MHz	< 17 dB
	500 MHz to 3.6 GHz	< 19 dB
	3.6 GHz to 7 GHz	< 23 dB
	7 GHz to 8 GHz	< 30 dB
	RF = 500 MHz	11 dB (typ.)
Third-order intermodulation (TOI) (nominal values)	RF attenuation = 5 dB, RF preselection = off	
	50 MHz to 2 GHz	12 dBm
	2 GHz to 8 GHz	15 dBm
	RF attenuation = 5 dB, RF preselection = on ¹	
	50 MHz to 200 MHz	-3 dBm
	200 MHz to 3.6 GHz	0 dBm
	3.6 GHz to 8 GHz	+3 dBm
Second-order intermodulation (SOI) (nominal values)	RF = 500 MHz, RF attenuation = 5 dB	
	RF preselection = off	45 dBm
	RF preselection = on ¹	55 dBm

¹ R&S®ETC-K1 option required.

Immunity to interference (nominal values)		
Image frequencies, referenced to signal level	$f_{in} - 2 \times 20.8$ MHz	-63 dB
	$f_{in} - 2 \times 829.8$ MHz	-80 dB
	$f_{in} - 2 \times 4874.8$ MHz	-90 dB
Intermediate frequencies, referenced to signal level	20.8 MHz	-60 dB
	829.8 MHz, 4874.8 MHz, 8919.8 MHz	-80 dB
Other interfering signals, referenced to signal level	signal level – RF attenuation < -30 dBm, RF preselection = off	
	10.4 MHz	-60 dB
	2437.4 MHz	-60 dB
	signal level – RF attenuation < -30 dBm, RF preselection = off, RF ≤ 3.6 GHz	
	spurious at $f_{in} - 2437.4$ MHz	-80 dB
	signal level – RF attenuation < -40 dBm, RF preselection = off, RF ≥ 3.6 GHz	
Spurious response, inherent	4459.9 MHz	-40 dB
	input matched to 50 Ω, without input signal, RF attenuation = 0 dB	
	RF preselection = off	< -90 dBm
	RF preselection = on ¹	< -100 dBm
Maximum rated input level (nominal values)		
DC voltage		80 V
RF power		27 dBm (= 0.5 W)
CW RF power		30 dBm (= 1 W)
Peak RF power	duration < 3 s	33 dBm (= 2 W)
Max. pulse voltage		100 V
Max. pulse energy	pulse width = 10 μs	10 mWs

RF preselection (R&S®ETC-K1 option)

Lower 3 dB cut-off frequency	RF up to 80 MHz	500 kHz
	80 MHz to 200 MHz	RF - 15 MHz
	0.2 GHz to 1.5 GHz	0.9 × RF
	1.5 GHz to 3.6 GHz	1.3 GHz
	3.6 GHz to 8 GHz	3.2 GHz
Upper 3 dB cut-off frequency	RF up to 80 MHz	80 MHz
	80 MHz to 200 MHz	RF + 15 MHz
	0.2 GHz to 1.5 GHz	1.1 × RF
	1.5 GHz to 3.6 GHz	3.7 GHz
	3.6 GHz to 8 GHz	8 GHz

DVB-T/DVB-H analysis (R&S®ETC-K140 option)

Level

Quasi-error-free input level	RF = 500 MHz, RF attenuation = 0 dB, BER before RS < 2.0×10^{-4} , 64QAM nonhierarchical modulation, guard interval = 1/32, code rate = 3/4	
	RF preselection = off	< -64 dBm, -69 dBm to +10 dBm (typ.)
	RF preselection = on ¹	< -72 dBm, -75 dBm to +10 dBm (typ.)

Bandwidths

OFDM signal bandwidth range	1 MHz to 8 MHz
Resolution	0.1 Hz
Predefined channel filter bandwidths	5/6/7/8 MHz
Channel filter shape factor 80 dB:0.1 dB	≤ 1.09 (nom.)

Demodulation

Standard	terrestrial TV in line with ETSI EN 300744	DVB-T, DVB-H
FFT mode	automatic detection	2k, 4k, 8k
QAM order	automatic detection	4QAM, 16QAM, 64QAM
QAM hierarchy	automatic detection	none, $\alpha = 1, 2, 4$
Guard interval	automatic detection	1/4, 1/8, 1/16, 1/32
Code rate	automatic detection	1/2, 2/3, 3/4, 5/6, 7/8
Interleaver mode	automatic detection	native, in-depth
Inherent modulation error ratio (MER)	RF attenuation = 0 dB, 64QAM nonhierarchical modulation, 8k FFT, guard interval = 1/32, slow channel adaptation	
	level = -30 dBm, RF preselection = off	
	RF = 50 MHz to 862 MHz	> 40 dB
	RF = 500 MHz	45 dB (typ.)
	level = -45 dBm, RF preselection = on ²	
	RF = 50 MHz to 862 MHz	> 38 dB
	RF = 500 MHz	44 dB (typ.)

Measurements

Measurement parameter list	signal level, crest factor, carrier frequency offset, symbol rate offset, modulation error ratio (MER RMS), modulation error ratio (MER peak), error vector magnitude (EVM RMS), error vector magnitude (EVM peak), bit error ratio before Viterbi decoder, bit error ratio before Reed-Solomon decoder, packet error ratio, packet errors per second, MPEG transport stream rate		
Transmission parameter signaling (TPS)	FFT, guard interval, QAM, hierarchy, code rate, cell ID, TPS reserved (frames 1 to 4), interleaver mode, MPE FEC, time slicing, length indicator		
Constellation diagram	QAM order	4QAM, 16QAM, 64QAM	
	QAM hierarchy	none, $\alpha = 1, 2, 4$	
Echo pattern (channel impulse response)	level range	50 dB	
	time range, extended span off	$T_{\text{symbol}}/3$	
	time range, extended span on	T_{symbol}	
	span units	μs, km, miles	
	marker level resolution	0.1 dB	
	marker type	relative level, absolute level	
	marker functions	set to peak, set to next peak, center = marker	
	echo pattern peak list	13 highest peaks with relative and absolute level and time or distance	
	MER(k) (modulation error ratio versus OFDM carriers)	MER range	10/20/50 dB
		carrier range	all modulated OFDM carriers
marker position units		carrier number, relative frequency, absolute frequency	
marker MER resolution		0.1 dB	
marker functions		set to peak, set to next peak	
trace detectors		RMS, auto peak, min. peak, max. peak	
TV spectrum	lower and upper shoulder attenuation in line with ETSI TR 101290		
	in-channel amplitude frequency response, peak-to-peak		
	carrier to noise		
	occupied bandwidth		
Spectrum emission mask	spectrum emission test against emission mask		

² R&S®ETC-K1 option required.

Measurement uncertainty		
Signal level	95 % confidence level, +20 °C to +30 °C, C/N > 16 dB, RF attenuation = auto	
	10 MHz to 3.6 GHz	< 1 dB, 0.5 dB (typ.)
	3.6 GHz to 8 GHz	< 1.5 dB, 1 dB (typ.)
Crest factor		< 0.5 dB (typ.)
Carrier frequency offset		RF x reference uncertainty
Symbol rate offset		reference uncertainty
MPEG TS bitrate		MPEG TS bit rate x reference uncertainty
Modulation error ratio (MER)	RF = 500 MHz, 64QAM, slow channel adaptation	
	20 dB to 30 dB	< 1.0 dB (typ.)
	30 dB to 35 dB	< 1.5 dB (typ.)
	35 dB to 40 dB	< 2.0 dB (typ.)
Error vector magnitude (EVM)	RF = 500 MHz, 64QAM, slow channel adaptation, referenced to measured value	
	0.65 % to 1.2 %	< 25 %
	1.2 % to 2 %	< 20 %
	2 % to 7 %	< 12 %
BER before Viterbi decoder	1.0×10^{-3} to 0.1×10^{-15} , 0.0	$0.1 \times 10^{-\text{exponent}}$
BER before Reed-Solomon decoder	1.0×10^{-3} to 0.1×10^{-15} , 0.0	$0.1 \times 10^{-\text{exponent}}$
Packet error ratio	1.0×10^{-1} to 0.1×10^{-12} , 0.0	$0.1 \times 10^{-\text{exponent}}$
Echo pattern peak level	within guard interval	< 0.5 dB (typ.)

ISDB-T analysis (R&S®ETC-K160 option)

Level

Quasi-error-free input level (nominal values)	RF = 500 MHz, RF attenuation = 0 dB, BER before RS < 2.0×10^{-4} , 64QAM modulation, guard interval = 1/32, code rate = 3/4	
	RF preselection = off	< -64 dBm, -69 dBm to +10 dBm (typ.)
	RF preselection = on ²	< -72 dBm, -75 dBm to +10 dBm (typ.)

Bandwidth

Channel filter bandwidth	6 MHz
Channel filter shape factor 75 dB:0.12 dB	≤ 1.10 (nom.)

Demodulation

Standard	terrestrial TV in line with ARIB STD-B31	ISDB-T
ISDB-T mode	automatic detection	mode 1 (2k), mode 2 (4k), mode 3 (8k)
Modulation	automatic detection	DQPSK, QPSK, 16QAM, 64QAM
Layer	automatic detection	A, B, C
Partial reception	automatic detection	
Segments per layer	automatic detection	13 in total (layer A + layer B + layer C)
Guard interval	automatic detection	1/4, 1/8, 1/16, 1/32
Code rate (all layers)	automatic detection	1/2, 2/3, 3/4, 5/6, 7/8
Interleaver mode	mode 1 (2k FFT)	0, 4, 8, 16
	mode 2 (4k FFT)	0, 2, 4, 8
	mode 3 (8k FFT)	0, 1, 2, 4
Inherent modulation error ratio (MER total, RMS)	RF attenuation = 0 dB, 64QAM modulation, 8k FFT, guard interval = 1/32, slow channel adaptation	
	level = -30 dBm, RF preselection = off	
	RF = 50 MHz to 862 MHz	> 40 dB
	RF = 500 MHz	45 dB (typ.)
	level = -45 dBm, RF preselection = on ²	
	RF = 50 MHz to 862 MHz	> 38 dB
	RF = 500 MHz	44 dB (typ.)

Measurements

Measurement parameter list	signal level, crest factor, RF offset, symbol rate offset, total modulation error ratio (MER total, RMS), total modulation error ratio (MER total, peak), modulation error ratio of each layer (MER layer, RMS), modulation error ratio of TMCC (MER TMCC, RMS), modulation error ratio of AC (MER AC, RMS), sideband position, bit error ratio before Viterbi decoder, bit error ratio before Reed-Solomon decoder, bit error ratio after Reed-Solomon decoder, packet errors per second, MPEG transport stream rate	
Transmission and multiplexing configuration control (TMCC)	ISDB-T mode, parameter switching indicator, emergency alarm broadcasting, partial reception, phase shift correction, reserved bits, modulation, code rate, time interleaving, number of segments	
Constellation diagram	QAM order	DQPSK, QPSK, 16QAM, 64QAM
Echo pattern (channel impulse response)	level range	50 dB
	time range, extended span off	$T_{\text{symbol}}/3$
	time range, extended span on	T_{symbol}
	span units	μs, km, miles
	marker level resolution	0.1 dB
	marker type	relative level, absolute level
	marker functions	set to peak, set to next peak, center = marker
	echo pattern peak list	12 highest peaks with relative and absolute level and time or distance
MER(k) (modulation error ratio versus OFDM carriers)	MER range	10/20/50 dB
	carrier range	all modulated OFDM carriers
	marker position units	carrier number, relative frequency, absolute frequency
	marker MER resolution	0.1 dB
	marker functions	set to peak, set to next peak
TV spectrum	trace detectors	RMS, auto peak, min. peak, max. peak
	lower and upper shoulder attenuation in line with ETSI TR 101290	
	in-channel amplitude frequency response, peak-to-peak	
Spectrum emission mask	carrier to noise	
	occupied bandwidth	
Spectrum emission mask	spectrum emission test against emission mask	

Measurement uncertainty		
Signal level	95 % confidence level, +20 °C to +30 °C, C/N > 16 dB, RF attenuation = auto	
	10 MHz to 3.6 GHz	< 1 dB, 0.5 dB (typ.)
	3.6 GHz to 8 GHz	< 1.5 dB, 1 dB (typ.)
Crest factor		< 0.5 dB (typ.)
RF offset		RF x reference uncertainty
Symbol rate offset		reference uncertainty
MPEG TS bitrate		MPEG TS bit rate x reference uncertainty
Modulation error ratio	RF = 500 MHz, slow channel adaptation	
	20 dB to 30 dB	< 1.0 dB (typ.)
	30 dB to 35 dB	< 1.5 dB (typ.)
	35 dB to 40 dB	< 2.0 dB (typ.)
BER before Viterbi decoder	1.0×10^{-3} to 0.1×10^{-15} , 0.0	$0.1 \times 10^{-\text{exponent}}$
BER before Reed-Solomon decoder	1.0×10^{-3} to 0.1×10^{-15} , 0.0	$0.1 \times 10^{-\text{exponent}}$
BER after Reed-Solomon decoder	1.0×10^{-3} to 0.1×10^{-15} , 0.0	$0.1 \times 10^{-\text{exponent}}$
Echo pattern peak level	within guard interval	< 0.5 dB (typ.)

DVB-T2 analysis (R&S®ETC-K240 option, requires R&S®ETC-B300)

Level

Quasi-error-free input level	RF = 500 MHz, RF attenuation = 0 dB, BER before BCH < 1.0×10^{-7} , 32k extended FFT, 64QAM modulation, guard interval = 1/128, code rate = 3/5	
	RF preselection = off	< -64 dBm, -69 dBm to +10 dBm (typ.)
	RF preselection = on ³	< -72 dBm, -75 dBm to +10 dBm (typ.)

Bandwidths

OFDM signal bandwidth range		1.7/5/6/7/8 MHz
Resolution		0.1 Hz
Predefined channel filter bandwidths		1.7/5/6/7/8 MHz
Channel filter shape factor	50 dB:0.035 dB	≤ 1.11
	50 dB:0.16 dB	≤ 1.08

Demodulation

Standard	terrestrial TV in line with ETSI EN 302755 version 1.3.1: DVB-T2 base, DVB-T2 base lite, DVB-T2 lite	manual selection: T2 lite and T2 base automatic detection: T2 base, T2 base lite
FFT mode	automatic detection	1k, 2k, 4k, 8k, 16k, 32k normal or extended carrier mode
Pilot pattern	automatic detection	PP1, PP2, PP3, PP4, PP5, PP6, PP7, PP8 (PP8 for measurements at the transmitter site only)
QAM order	automatic detection	4QAM, 16QAM, 64QAM, 256QAM normal or rotated constellation
Guard interval	automatic detection	1/4, 19/128, 1/8, 19/256, 1/16, 1/32, 1/128
PLP code rate	automatic detection for single PLP	1/2, 3/5, 2/3, 3/4, 4/5, 5/6 for DVB-T2 base 1/2, 3/5, 2/3, 3/4, 1/3, 2/5 for DVB-T2 lite
FEC type		LDPC + BCH
Time interleaver type		in line with standard: single or multi
OFDM signal bandwidth range		1.7/5/6/7/8 MHz
Inherent modulation error ratio (MER)	RF attenuation = 0 dB, 256QAM modulation, 32k extended FFT, guard interval = 1/128, slow channel adaptation	
	level = -30 dBm, RF preselection = off	
	RF = 50 MHz to 862 MHz	> 40 dB
	RF = 500 MHz	44 dB (typ.)
	level = -45 dBm, RF preselection = on ³	
RF = 50 MHz to 862 MHz	> 38 dB	
RF = 500 MHz	43 dB (typ.)	

Measurements

Measurement parameter list	signal level, crest factor, carrier frequency offset, symbol rate offset, modulation error ratio (MER L1-RMS), modulation error ratio (MER L1-peak), modulation error ratio (MER PLP-RMS), modulation error ratio (MER PLP-peak), error vector magnitude (EVM PLP-RMS), error vector magnitude (EVM PLP-peak), LDPC iterations, bit error ratio before LDPC/BCH, BBFrame, TS packet error ratio	
Signaling info (L1 presignaling, PLP parameter and auxiliary L1 post info)	L1 presignaling info	T2 version, transmission system, guard interval, pilot pattern, bandwidth extension, number of data symbols per T2 frame, number of T2 frames per superframe, PAPR, system ID, cell ID, network ID, S1 bits, S2 bits, CRC32, L1 post constellation, L1 post code rate, L1 post FEC type, L1 post extension, L1 post size, L1 post info size, L1 repetition, type of TX input streams, TX ID availability, regeneration flag, number of frequencies, current RF index, reserved

³ R&S®ETC-K1 option required.

	PLP parameter info	number of PLP, group ID, PLP ID, PLP type, PLP constellation, PLP rotation, PLP FEC type, PLP code rate, PLP payload type, time interleave type, time interleave length, number of maximum blocks, PLP mode, static flag, static padding flag, fixed freq flag, first RF index, inband signaling A, inband signaling B, reserved_1, first frame index, frame interval
	auxiliary L1-post info	subslices/frame, aux config RFU, FEF type (binary), FEF length, FEF interval, RF_IDX, aux streams type, aux streams private conf(hex)
Constellation diagram	QAM order	constellation of selected PLP, selectable number of I/Q cells
Echo pattern (channel impulse response)	level range	50 dB
	span units	µs, km, miles
	marker level resolution	0.1 dB
	marker type	relative level, absolute level
	marker functions	set to peak, set to next peak, center = marker
	echo pattern peak list	13 highest peaks with relative and absolute level and time or distance
MER(k) (modulation error ratio versus OFDM carriers)	MER range	10/20/50 dB
	carrier range	all modulated OFDM carriers
	marker position units	carrier number, relative frequency, absolute frequency
	marker MER resolution	0.1 dB
	marker functions	set to peak, set to next peak
	trace detectors	RMS, auto peak, min. peak, max. peak
TV spectrum	lower and upper shoulder attenuation in line with ETSI TR 101290	
	in-channel amplitude frequency response, peak-to-peak	
	carrier to noise	
	occupied bandwidth	
Spectrum emission mask	spectrum emission test against emission mask	

Measurement uncertainty		
Signal level	95 % confidence level, +20 °C to +30 °C, C/N > 16 dB, RF attenuation = auto	
	10 MHz to 3.6 GHz	< 1 dB, 0.5 dB (typ.)
	3.6 GHz to 8 GHz	< 1.5 dB, 1 dB (typ.)
Crest factor		< 0.5 dB (typ.)
Carrier frequency offset		RF x reference uncertainty
Symbol rate offset		reference uncertainty
MPEG TS bitrate		MPEG TS bit rate x reference uncertainty
Modulation error ratio (MER)	RF = 500 MHz, 64QAM, slow channel adaptation	
	20 dB to 30 dB	< 1.0 dB (typ.)
	30 dB to 35 dB	< 1.5 dB (typ.)
	35 dB to 40 dB	< 2.0 dB (typ.)
Error vector magnitude (EVM)	RF = 500 MHz, 64QAM, slow channel adaptation, referenced to measured value	
	0.65 % to 1.2 %	< 25 %
	1.2 % to 2 %	< 20 %
	2 % to 7 %	< 12 %
BER before LDPC or BCH	1.0×10^{-3} to 0.1×10^{-15} , 0.0	$0.1 \times 10^{-\text{exponent}}$
BB frame error ratio	1.0×10^{-1} to 0.1×10^{-12} , 0.0	$0.1 \times 10^{-\text{exponent}}$
TS packet error ratio	1.0×10^{-1} to 0.1×10^{-12} , 0.0	$0.1 \times 10^{-\text{exponent}}$

Amplitude/phase/group delay measurement (R&S®ETC-K180 option)

Amplitude measurement		
Magnitude	range of display	±5/10/25/50 dB, 100 % linear, selectable
	resolution (peak-to-peak value)	0.1 dB
	marker level resolution	0.1 dB
	marker type	carrier number, relative frequency, absolute frequency
	marker functions	set to peak, set to next peak
Accuracy	RF preselection = off, 5 dB attenuation	< ±0.3 dB (typ.)
Phase measurement		
Magnitude	range of display	±5/10/25/45/90/180°, selectable
	resolution (peak-to-peak value)	0.1°
	marker level resolution	0.1°
	marker type	carrier number, relative frequency, absolute frequency
	marker functions	set to peak, set to next peak
Accuracy	RF preselection = off	< ±0.5° (typ.)
Group delay measurement		
Magnitude	range of display	±25/50/100/250 ns, ±0.5/1.0/2.5/5/10/25/50 µs selectable
	resolution (peak-to-peak value)	0.01 ns/0.01 µs Note: Unit is autoselected depending on the measured result.
	marker level resolution	0.01 ns/0.01 µs
	marker type	carrier number, relative frequency, absolute frequency
	marker functions	set to peak, set to next peak
Accuracy	RF preselection = off	< ±10 ns (typ.)
Amplitude/phase/group delay measurement		
Trace detectors		RMS, auto peak
Trace functions		view, clear/write, average, blank

MPEG decoder board (R&S®ETC-B280 option, requires at least one digital TV standard R&S®ETC-K140, R&S®ETC-K160 or R&S®ETC-K240)

Broadcasting standard		DVB-T/DVB-H DVB-T2 ISDB-T
MPEG analysis	displayed parameter	network ID, video/audio PID, service ID, video format, video size, video frame rate, audio format, audio language, audio sampling rate
Supported video format for decoding		MPEG-2, H.264
Supported audio format for decoding		MPEG-1, MPEG-2

Spectrum analysis

Frequency

Frequency range	model .04	100 kHz to 3.6 GHz
	model .08	100 kHz to 8 GHz
Resolution		1 Hz
Reference frequency, internal		
Aging per year		1×10^{-6}
Temperature drift	0 °C to +30 °C	1×10^{-6}
	+30 °C to +50 °C	3×10^{-6}
Achievable initial calibration accuracy		5×10^{-7}
Total reference uncertainty	0 °C to +30 °C	(time since last adjustment × aging rate) + temperature drift + calibration accuracy
Reference frequency, with R&S®HA-Z240 option		
Frequency uncertainty	GPS on, ≥ 1 minute after satellite lock	2.5×10^{-8}
	up to 30 minutes after losing satellite lock	5×10^{-8}
Frequency readout		
Marker resolution		0.1 Hz
Uncertainty		$\pm(\text{marker frequency} \times \text{reference uncertainty} + 10 \% \times \text{resolution bandwidth} + \frac{1}{2} (\text{span} / (\text{sweep points} - 1)) + 1 \text{ Hz})$
Number of sweep (trace) points	default value	631
Marker tuning frequency step size		span/630
Frequency counter resolution		0.1 Hz
Frequency counter uncertainty	S/N > 25 dB	$\pm(\text{frequency} \times \text{reference uncertainty} + \frac{1}{2} (\text{last digit}))$
	with R&S®HAZ240 option	
	GPS on, ≥ 1 minute after satellite lock	2.5×10^{-8}
	up to 30 minutes after losing satellite lock	5×10^{-8}
Frequency span		0 Hz, 10 Hz to 3.6/8 GHz
Frequency span uncertainty		1 % (nom.)
Spectral purity of SSB phase noise		
Carrier offset	RF = 500 MHz	
	30 kHz	< -98 dBc (1 Hz), -102 dBc (1 Hz) (typ.)
	100 kHz	< -100 dBc (1 Hz), -106 dBc (1 Hz) (typ.)
	1 MHz	< -125 dBc (1 Hz), -131 dBc (1 Hz) (typ.)

Sweep time

Sweep time	span = 0 Hz	200 μs to 100 s
	10 Hz ≤ span ≤ 600 MHz	20 ms to 1000 s
	span > 600 MHz	20 ms × span/600 MHz to 1000 s
Uncertainty	span = 0 Hz	1 % (nom.)
	span ≥ 10 Hz	3 % (nom.)

Bandwidths

Resolution bandwidths		
Range	-3 dB bandwidth	100 Hz to 3 MHz in 1, 3 sequence
Bandwidth accuracy	100 Hz ≤ RBW ≤ 300 kHz	< 5 % (nom.)
	RBW > 300 kHz	< 10 % (nom.)
Selectivity 60 dB:3 dB		< 5 (nom.) (Gaussian type filters)
Video filters		
Range	-3 dB bandwidth	10 Hz to 3 MHz in 1, 3 sequence
RF preselection (R&S®ETC-K1 option)		
Lower 3 dB cut-off frequency	RF up to 80 MHz	500 kHz
	80 MHz to 200 MHz	RF - 15 MHz
	0.2 GHz to 1.5 GHz	0.9 × RF
	1.5 GHz to 3.6 GHz	1.3 GHz
	3.6 GHz to 8 GHz	3.2 GHz
Upper 3 dB cut-off frequency	RF up to 80 MHz	80 MHz
	80 MHz to 200 MHz	RF + 15 MHz
	0.2 GHz to 1.5 GHz	1.1 × RF
	1.5 GHz to 3.6 GHz	3.7 GHz
	3.6 GHz to 8 GHz	8 GHz

Level

Display range		displayed noise floor to +20 dBm
Maximum rated input level (nominal values)		
DC voltage		80 V
RF power		27 dBm (= 0.5 W)
CW RF power		30 dBm (= 1 W)
Peak RF power	duration < 3 s	33 dBm (= 2 W)
Max. pulse voltage		100 V
Max. pulse energy	pulse width = 10 μ s	10 mWs
Intermodulation		
Third-order intermodulation (TOI) (nominal values)	intermodulation-free dynamic range, signal level 2 x -15 dBm, RF attenuation = 5 dB, RF preselection = off	
	50 MHz to 2 GHz	54 dBc (TOI +12 dBm)
	2 GHz to 8 GHz	60 dBc (TOI +15 dBm)
	intermodulation-free dynamic range, signal level 2 x -30 dBm, RF attenuation = 5 dB, RF preselection = on ⁴	
	50 MHz to 200 MHz	54 dBc (TOI -3 dBm)
	200 MHz to 3.6 GHz	60 dBc (TOI 0 dBm)
Second-order intermodulation (SOI) (nominal values)	signal level 2 x -30 dBm (250.0 MHz and 250.1 MHz), RF attenuation = 5 dB, RF preselection = off	
	500 MHz	45 dBm
	signal level 2 x -30 dBm (250.0 MHz and 250.1 MHz), RF attenuation = 5 dB, RF preselection = on ⁴	
	500 MHz	55 dBm
Displayed average noise level	RF attenuation = 0 dB, termination = 50 Ω , RBW = 1 kHz, VBW = 10 Hz, sample detector, trace average 10, log scaling, tracking generator off, normalized to 1 Hz RF preselection = off	
	100 kHz to 1 MHz	< -125 dBm, -129 dBm (typ.)
	1 MHz to 10 MHz	< -148 dBm, -153 dBm (typ.)
	10 MHz to 2.5 GHz	< -151 dBm, -157 dBm (typ.)
	2.5 GHz to 3 GHz	< -148 dBm, -154 dBm (typ.)
	3 GHz to 4 GHz	< -144 dBm, -150 dBm (typ.)
	4 GHz to 7 GHz	< -145 dBm, -151 dBm (typ.)
	7 GHz to 8 GHz	< -133 dBm, -137 dBm (typ.)
	RF preselection = on ⁴	
	1 MHz to 10 MHz	< -154 dBm, -160 dBm (typ.)
	10 MHz to 500 MHz	< -160 dBm, -165 dBm (typ.)
	500 MHz to 3.6 GHz	< -158 dBm, -163 dBm (typ.)
	3.6 GHz to 7 GHz	< -154 dBm, -160 dBm (typ.)
7 GHz to 8 GHz	< -146 dBm, -151 dBm (typ.)	
Immunity to interference (nominal values)		
Image frequencies	$f_{in} - 2 \times 21.4$ MHz	-63 dBc
	$f_{in} - 2 \times 830.4$ MHz	-80 dBc
	$f_{in} - 2 \times 4875.4$ MHz	-90 dBc
Intermediate frequencies	21.4 MHz	-60 dBc
	830.4 MHz, 4875.4 MHz, 8920.4 MHz	-80 dBc
Spurious response, inherent	input matched to 50 Ω , without input signal, RBW \leq 30 kHz, RF attenuation = 0 dB	
	RF preselection = off	< -90 dBm
	RF preselection = on ⁴	< -100 dBm
Other interfering signals	signal level - RF attenuation < -30 dBm, RF preselection = off	
	10.7 MHz	-60 dBc
	2437.7 MHz	-60 dBc
	signal level - RF attenuation < -30 dBm, RF preselection = off, RF \leq 3.6 GHz	
	spurious at $f_{in} - 2437.7$ MHz	-80 dBc
	signal level - RF attenuation < -40 dBm, RF preselection = off, RF \geq 3.6 GHz	
4460.2 MHz	-40 dBc	

⁴ R&S®ETC-K1 option required.

Spurious response, related to local oscillators	$f_{in} \leq 3.6$ GHz	
	$\Delta f < 300$ kHz	-60 dBc
	$\Delta f \geq 300$ kHz	< -60 dBc
	$f_{in} > 3.6$ GHz	
	$\Delta f < 300$ kHz	-54 dBc
	$\Delta f \geq 300$ kHz	< -54 dBc
Level display		
Logarithmic level axis		1/2/5/10/20/50/100/120/150 dB, 10 divisions
Linear level axis		0 % to 100 %, 10 divisions
Number of traces		2
Trace detectors		max. peak, min. peak, auto peak, sample, RMS
Trace functions		clear/write, max. hold, min. hold, average, view
Setting range of reference level		-80 dBm to +20 dBm
Units of level axis		dBm, dBmV, dB μ V, V, W
Level measurement uncertainty		
Total measurement uncertainty	95 % confidence level, +20 °C to +30 °C, S/N > 16 dB, 0 dB to -50 dB below reference level, RF attenuation = auto, RF preselection = off	
	10 MHz < f \leq 3.6 GHz	< 1 dB, 0.5 dB (typ.)
	3.6 GHz < f \leq 8 GHz	< 1.5 dB, 1 dB (typ.)
Absolute level uncertainty at 100 MHz	+20 °C to +30 °C	< 0.5 dB
Frequency response (+20 °C to +30 °C)	1 MHz \leq f \leq 10 MHz	< 1.5 dB (nom.)
	10 MHz \leq f \leq 3.6 GHz	< 1 dB
	3.6 GHz < f \leq 8 GHz	< 1.5 dB
Attenuator uncertainty		< 0.3 dB
Uncertainty of reference level setting		< 0.1 dB (nom.)
Display nonlinearity	S/N > 16 dB, 0 dB to -50 dB, logarithmic level display	< 0.2 dB
Bandwidth switching uncertainty	reference: RBW = 10 kHz	< 0.1 dB (nom.)

Trigger functions

Trigger		
Trigger source		free run, video, external
External trigger level threshold	low \rightarrow high transition	
	high \rightarrow low transition	

Scalar network analysis (R&S®ETC-K10 option)

Frequency range	model .04	100 kHz to 3.6 GHz
	model .08	100 kHz to 8 GHz
Resolution		1 Hz
Data points		631
Tracking generator output power	tracking generator attenuation = 0 dB	0 dBm (nom.)
Tracking generator attenuator		0 dB to 40 dB in 1 dB steps
Transmission measurement		
Magnitude	range	1/2/5/10/20/50/100/120/150 dB, 100 % linear, selectable
	resolution	0.01 dB
Dynamic range for transmission measurements	RF attenuation = 10 dB, tracking generator attenuation = 10 dB, RBW = 1 kHz, RF preselection = off	
	100 kHz ≤ f < 6 GHz	> 70 dB (nom.)
	6 GHz ≤ f < 8 GHz	> 60 dB (nom.)
Reflection measurement		
with external R&S®FSH-Z3 or R&S®FSH-Z2 VSWR bridge		
Return loss	range	1/2/5/10/20/50/100/120/150 dB, 100 % linear, selectable
	resolution	0.01 dB
VSWR	range	1 to 1.1/1.5/2/6/11/21/71
Reflection coefficient	range	1 mp to 1000 mp in 1, 2, 5 steps
Directivity of R&S®FSH-Z3	30 MHz to 3 GHz	28 dB
	3 GHz to 6 GHz	25 dB
Return loss at R&S®FSH-Z3 test port	50 MHz to 6 GHz	22 dB
Directivity of R&S®FSH-Z2	10 MHz to 1 GHz	30 dB
	1 GHz to 3 GHz	25 dB
Return loss at R&S®FSH-Z2 test port	10 MHz to 3 GHz	20 dB

Inputs and outputs

RF input		
Impedance		50 Ω
Connector		N female
VSWR (nominal values)	RF input attenuation ≥ 10 dB	
	20 MHz $< f \leq 1.5$ GHz	< 1.5 (typ.)
	1.5 GHz $< f \leq 6$ GHz	< 2 (typ.)
	6 GHz $< f \leq 8$ GHz	< 3 (typ.)
RF input attenuator	RF preselection off	0 dB to 40 dB in 5 dB steps
	RF preselection on ⁵	0 dB to 50 dB in 5 dB steps
Tracking generator output (available with R&S[®]ETC-K10)		
Frequency range	model .04	100 kHz to 3.6 GHz
	model .08	100 kHz to 8 GHz
Connector		N female, 50 Ω
VSWR (nominal values)	100 kHz $\leq f \leq 3$ GHz	< 1.5 (typ.)
	3 MHz $\leq f \leq 6$ GHz	< 2 (typ.)
Tracking generator attenuator		0 dB to 40 dB in 1 dB steps
Maximum rated reverse power (tracking generator output)		
DC voltage		50 V
CW RF power		+20 dBm (= 0.1 W)
Max. pulse voltage		50 V
Max. pulse energy (10 μ s)		1 mWs
External reference input, external trigger input		
Connector		BNC female, 50 Ω
Mode	selectable	external reference, external trigger
External reference	required level	0 dBm
	frequency	10 MHz
External trigger threshold	low \rightarrow high transition	2.4 V
	high \rightarrow low transition	0.7 V
TS ASI output		
	available in following TV analyzer measurement modes: measurement list, constellation diagram, echo pattern, MER(k)	
Connector		BNC female, 50 Ω
Output impedance		75 Ω
Output level, peak-to-peak	on 75 Ω load	0.8 V
Data rate		270 Mbit/s
Accessories interface		
Connector		7-contact female (type Binder 712)
Accessories supported		see accessories
AUX interface		
Connector		7-contact female (type Binder 712)
LAN interface		
		10/100BASE-T, RJ-45
USB interface		
	rear panel	USB device, type B
USB interface		
	front panel	USB host, type A
1 PPS input		
	connector	BNC female, rear
	input impedance	high impedance
	input level	TTL
Headphones		
	front panel	3.5 mm mini jack

⁵ R&S[®]ETC-K1 option required.

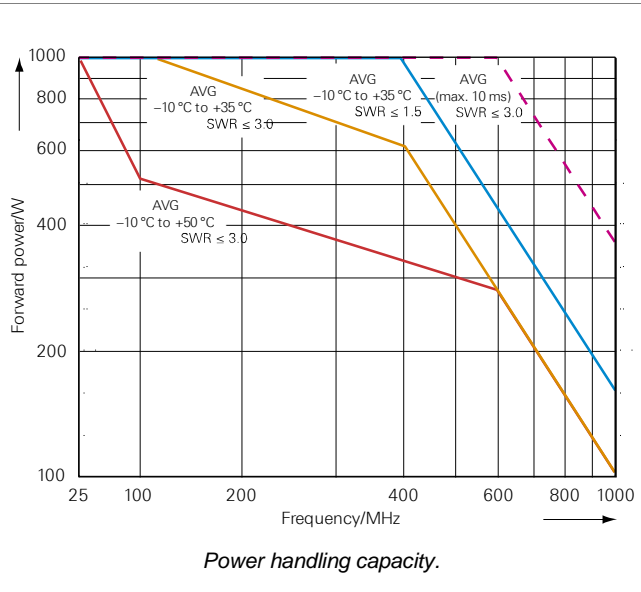
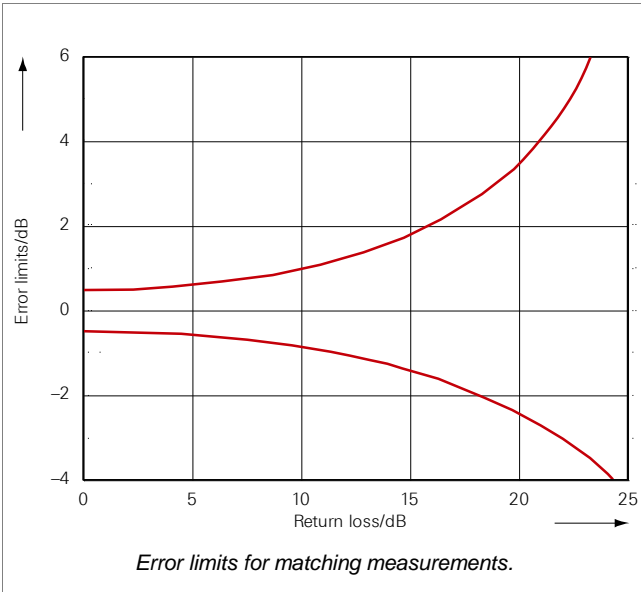
General data

Operating languages		English, Russian, Spanish, Italian, Portuguese, Japanese
Remote control		
Command set		SCPI 1997.0
LAN interface		10/100BASE-T, RJ-45
USB	rear panel	USB device, type B
Display		
Type		14.5 cm (5.7 in) LCD TFT color
Resolution		640 × 480 pixel
Audio		
Speaker		internal
Mass memory		
Mass memory		flash memory (internal) SD card (internal, 8 Gbyte) USB memory stick (not supplied), support up to 16 Gbyte (FAT32)
Data storage	internal 8 Gbyte SD card or USB memory stick	> 256 instrument settings and traces > 40000 instrument settings and traces
Temperature		
	operating temperature range	+5 °C to +40 °C
	permissible temperature range	0 °C to +50 °C
	storage temperature range	-40 °C to +70 °C
Climatic loading		
	relative humidity	+25 °C/+40 °C at 95 % relative humidity IEC 60068-2-30
Mechanical resistance		
Vibration	sinusoidal random	IEC 60068-2-6 IEC 60068-2-64
Shock		40 g shock spectrum, in line with MIL-STD-810E, method 516.4, procedure 1, IEC 60068-2-27
Power supply		
AC power supply	input specifications	100 V to 240 V AC, 50 Hz to 60 Hz, 400 Hz, 150 VA
Input current	AC	0.9 to 0.3 A
Power consumption		85 VA (typ.), max. 140 VA with all options
Power consumption (based on AC input 230 V, 50 Hz)		
	TV analyzer mode	
	with ISDB-T	21.2 W
	with ISDB-T and R&S®ETC-B280 option	31.3 W
	with DVB-T/DVB-H	22.5 W
	with DVB-T/DVB-H and R&S®ETC-B280 option	32.7 W
	with DVB-T2	32.0 W
	with DVB-T2 and R&S®ETC-B280 option	42.2 W
	spectrum analyzer mode	
		15.0 W
	with R&S®ETC-B280 option	23.8 W
Safety		
		IEC 61010-1, EN 61010-1, UL 61010-1, CSA C22.2 No. 61010-1
Test mark		
VDE, GS, CSA, KC		
EMC		
		in line with European EMC Directive 2004/108/EC, including IEC/EN 61326 class A (emission), CISPR 11/EN 55011/group 1 class A (emission), IEC/EN 61326 table A.1 (immunity, industrial)
Dimensions	W × H × D	233 mm × 158 mm × 350 mm (9.2 in × 6.2 in × 13.8 in)
Weight		4.8 kg (10.6 lb)
Recommended calibration interval		1 year

Accessories

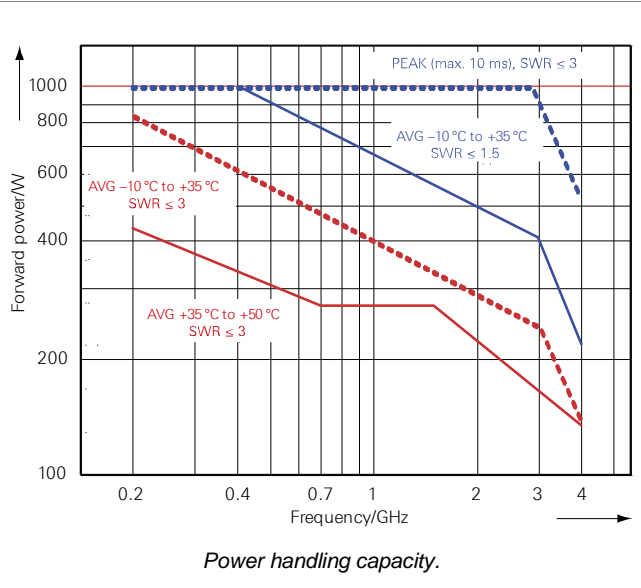
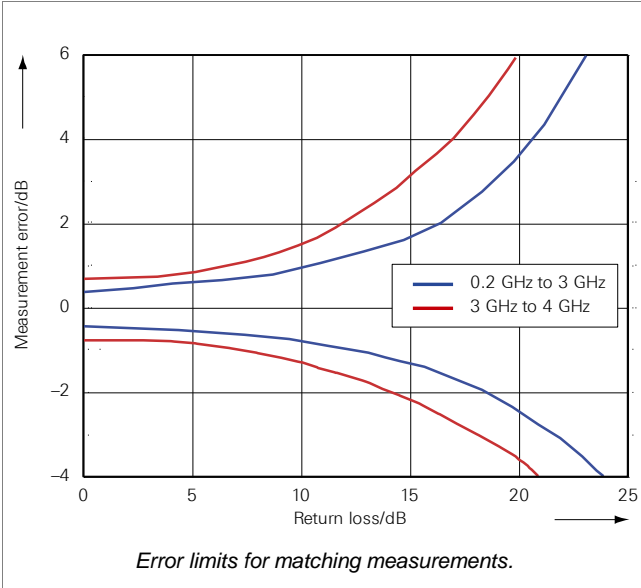
R&S®FSH-Z14 directional power sensor

Frequency range		25 MHz to 1 GHz
Power measurement range		30 mW to 300 W
VSWR referenced to 50 Ω		< 1.06
Power handling capacity	depending on temperature and matching	100 W to 1000 W
Insertion loss		< 0.06 dB
Directivity		> 30 dB
Average power		
Power measurement range	CF: ratio of peak envelope power to average power	
	CW, FM, PM, FSK, GMSK	30 mW to 300 W
	other modulated signals	30 mW to 300 W/CF
Measurement uncertainty		
25 MHz to 40 MHz	sine signal	4.0 % of measured value (0.17 dB)
40 MHz to 1 GHz	+18 °C to +28 °C, no zero offset	3.2 % of measured value (0.14 dB)
Zero offset	after zeroing	±4 mW
Range of typical measurement error with modulation	FM, PM, FSK, GMSK	0 % of measured value (0 dB)
	AM (80 %)	±3 % of measured value (±0.13 dB)
	2 CW carriers with identical power	±2 % of measured value (±0.09 dB)
Temperature coefficient	25 MHz to 40 MHz	0.40 %/K (0.017 dB/K)
	40 MHz to 1 GHz	0.25 %/K (0.011 dB/K)
Max. peak envelope power		
Power measurement range		
Video bandwidth	4 kHz	0.4 W to 300 W
	200 kHz	1 W to 300 W
	600 kHz	2 W to 300 W
Measurement uncertainty	same as for average power plus effect of peak hold circuit	+18 °C to +28 °C
Error limits of peak hold circuit for burst signals	duty cycle ≥ 0.1 and repetition rate ≥ 100/s	
	video bandwidth = 4 kHz	±(3 % of measured value + 0.05 W) starting from a burst width of 200 μs
	video bandwidth = 200 kHz	±(3 % of measured value + 0.20 W) starting from a burst width of 4 μs
	video bandwidth = 600 kHz	±(7 % of measured value + 0.40 W) starting from a burst width of 2 μs
	20/s ≤ repetition rate < 100/s 0.001 ≤ duty cycle < 0.1	plus ±(1.6 % of measured value + 0.15 W) plus ±0.10 W
Temperature coefficient	25 MHz to 40 MHz	0.50 %/K (0.022 dB/K)
	40 MHz to 1 GHz	0.35 %/K (0.015 dB/K)
Load matching		
Matching measurement range		
Return loss		0 dB to 23 dB
VSWR		> 1.15
Minimum forward power	specs met from 0.4 W	0.06 W
General data		
Dimensions	W × H × D	120 mm × 95 mm × 39 mm (5.9 in × 3.74 in × 1.53 in)
	connecting cable length	1.5 m (59 in)
Weight		0.65 kg (1.43 lb)



R&S®FSH-Z44 directional power sensor

Frequency range		200 MHz to 4 GHz
Power measurement range		30 mW to 300 W
VSWR referenced to 50 Ω	200 MHz to 3 GHz	< 1.07
	3 GHz to 4 GHz	< 1.12
Power handling capacity	depending on temperature and matching	120 W to 1000 W
Insertion loss	200 MHz to 1.5 GHz	< 0.06 dB
	1.5 GHz to 4 GHz	< 0.09 dB
Directivity	200 MHz to 3 GHz	> 30 dB
	3 GHz to 4 GHz	> 26 dB
Average power		
Power measurement range	CF: ratio of peak envelope power to average power	
	CW, FM, PM, FSK, GMSK	30 mW to 300 W
	other modulated signals	30 mW to 300 W/CF
Measurement uncertainty	sine signal, +18 °C to +28 °C, no zero offset	
	200 MHz to 300 MHz	4.0 % of measured value (0.17 dB)
	300 MHz to 4 GHz	3.2 % of measured value (0.14 dB)
Zero offset	after zeroing	±4 mW
Range of typical measurement error with modulation	FM, PM, FSK, GMSK	0 % of measured value (0 dB)
	AM (80 %)	±3 % of measured value (±0.13 dB)
	two CW carriers with identical power	±2 % of measured value (±0.09 dB)
	π/4-DQPSK	±2 % of measured value (±0.09 dB)
Temperature coefficient	200 MHz to 300 MHz	0.40 %/K (0.017 dB/K)
	300 MHz to 4 GHz	0.25 %/K (0.011 dB/K)
Max. peak envelope power		
Power measurement range	modulated carriers	
	video bandwidth = 4 kHz	0.4 W to 300 W
	video bandwidth = 200 kHz	1 W to 300 W
	video bandwidth = 4 MHz	2 W to 300 W
Measurement uncertainty	+18 °C to +28 °C	same as for average power plus effect of peak hold circuit
Error limits of peak hold circuit for burst signals	duty cycle ≥ 0.1 and repetition rate ≥ 100/s	
	video bandwidth = 4 kHz	±(3 % of measured value + 0.05 W) starting from a burst width of 100 μs
	video bandwidth = 200 kHz	±(3 % of measured value + 0.20 W) starting from a burst width of 4 μs
	video bandwidth = 4 MHz	±(7 % of measured value + 0.40 W) starting from a burst width of 1 μs
	20/s ≤ repetition rate < 100/s	plus ±(1.6 % of measured value + 0.15 W)
	0.001 ≤ duty cycle < 0.1	plus ±0.10 W
	burst width ≥ 0.5 μs	plus ±5 % of measured value
	burst width ≥ 0.2 μs	plus ±10 % of measured value
Temperature coefficient	200 MHz to 300 MHz	0.50 %/K (0.022 dB/K)
	300 MHz to 4 GHz	0.35 %/K (0.015 dB/K)
Load matching		
Matching measurement range		
Return loss	200 MHz to 3 GHz	0 dB to +23 dB
VSWR	3 GHz to 4 GHz	0 dB to +20 dB
VSWR	200 MHz to 3 GHz	> 1.15
	3 GHz to 4 GHz	> 1.22
Minimum forward power	specs met from 0.2 W	0.03 W
General data		
Dimensions	W × H × D	120 mm × 95 mm × 39 mm (5.9 in × 3.74 in × 1.53 in)
	connecting cable length	1.5 m (59 in)
Weight		0.65 kg (1.43 lb)



R&S® HA-Z240 GPS receiver

GPS location indication		latitude, longitude
Frequency counter uncertainty	GPS on, ≥ 1 minute after satellite lock	2.5×10^{-8}
	up to 30 minutes after losing satellite lock	5×10^{-8}
Operating temperature range		$-20\text{ }^{\circ}\text{C}$ to $+55\text{ }^{\circ}\text{C}$
Storage temperature range		$-40\text{ }^{\circ}\text{C}$ to $+70\text{ }^{\circ}\text{C}$
Climatic loading	GPS receiver module	IEC 60529 IPX7 level
Dimensions	$\varnothing \times H$	61 mm \times 19.5 mm (2.4 in \times 0.8 in)
Weight		200 g (0.4 lb)
Cable length		5 m (16.4 ft)
Connector		7-contact male (type Binder 712)
Power consumption		0.45 W
Test marks		FCC, CE

Ordering information

Designation	Type	Order No.
Base unit		
Compact TV Analyzer, up to 3.6 GHz	R&S®ETC	2116.5000.04
Compact TV Analyzer, up to 8 GHz	R&S®ETC	2116.5000.08
Accessories supplied		
USB cable, quick reference guide and CD-ROM with R&S®ETCView PC software and documentation		
Hardware option		
FPGA Extension Board	R&S®ETC-B300	2116.5230.02
MPEG Decoder Board (requires at least one digital TV standard R&S®ETC-K140, R&S®ETC-K160 or R&S®ETC-K240)	R&S®ETC-B280	2116.5252.02
Software options		
RF Preselection, up to 3.6 GHz	R&S®ETC-K1	2116.5098.02
RF Preselection, up to 8 GHz	R&S®ETC-K1	2116.5181.02
Tracking Generator with Scalar Network Analysis, up to 3.6 GHz	R&S®ETC-K10	2116.5169.02
Tracking Generator with Scalar Network Analysis, up to 8 GHz	R&S®ETC-K10	2116.5175.02
Phase and Group Delay Measurement (requires at least one TV standard)	R&S®ETC-K180	2116.5130.02
DVB-T/DVB-H Analysis	R&S®ETC-K140	2116.5100.02
ISDB-T Analysis	R&S®ETC-K160	2116.5117.02
DVB-T2 Analysis (requires R&S®ETC-B300)	R&S®ETC-K240	2116.5123.02
Software application tools for DVB-T2, DVB-T and ISDB-T		
Broadcast Drive Test	R&S®ETC-K930	2116.5146.02
Automatic Transmitter Measurement, TXCheck	R&S®ETC-K940	2116.5152.02
External accessories		
GPS Receiver	R&S®HA-Z240	1309.6700.03
Directional Power Sensor, 25 MHz to 1 GHz	R&S®FSH-Z14	1120.6001.02
Directional Power Sensor, 200 MHz to 4 GHz	R&S®FSH-Z44	1165.2305.02
Wideband Power Sensor, 50 MHz to 18 GHz, 100 mW	R&S®NRP-Z81	1137.9009.02
Soft Carrying Bag	R&S®RTM-Z3	1305.0289.02
R&S®ETC Hard Case	R&S®ETC-Z1	2116.5300.00

Warranty		
Base unit		3 years
All other items		1 year
Options		
Extended Warranty, one year	R&S®WE1	Please contact your local Rohde & Schwarz sales office.
Extended Warranty, two years	R&S®WE2	
Extended Warranty with Calibration Coverage, one year	R&S®CW1	
Extended Warranty with Calibration Coverage, two years	R&S®CW2	

Extended warranty with a term of one and two years (WE1 and WE2)

Repairs carried out during the contract term are free of charge ⁶. Necessary calibration and adjustments carried out during repairs are also covered.

Extended warranty with calibration coverage (CW1 and CW2)

Enhance your extended warranty by adding calibration coverage at a package price. This package ensures that your Rohde & Schwarz product is regularly calibrated, inspected and maintained during the term of the contract. It includes all repairs ⁶ and calibration at the recommended intervals as well as any calibration carried out during repairs or option upgrades.

For product brochure, see PD 3606.6970.12 and www.rohde-schwarz.com

⁶ Excluding defects caused by incorrect operation or handling and force majeure. Wear-and-tear parts are not included.

Service that adds value

- | Worldwide
- | Local and personalized
- | Customized and flexible
- | Uncompromising quality
- | Long-term dependability

About Rohde & Schwarz

The Rohde & Schwarz electronics group offers innovative solutions in the following business fields: test and measurement, broadcast and media, secure communications, cybersecurity, radiomonitoring and radiolocation. Founded more than 80 years ago, this independent company has an extensive sales and service network and is present in more than 70 countries. The electronics group is among the world market leaders in its established business fields. The company is headquartered in Munich, Germany. It also has regional headquarters in Singapore and Columbia, Maryland, USA, to manage its operations in these regions.

Sustainable product design

- | Environmental compatibility and eco-footprint
- | Energy efficiency and low emissions
- | Longevity and optimized total cost of ownership

Certified Quality Management
ISO 9001

Certified Environmental Management
ISO 14001

Rohde & Schwarz GmbH & Co. KG

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R&S®ETC Compact TV Analyzer

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