R&S®ESW
EMI TEST RECEIVER

Specifications

Specifications
Version 13.00

ROHDE&SCHWARZ
Make ideas real

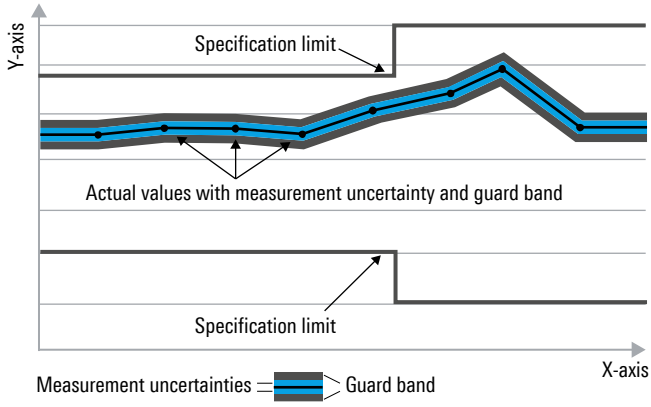
CONTENTS

Definitions

General
Product data applies under the following conditions:

- Three hours of storage at ambient temperature followed by 30 minutes of 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 <, ≤, >, ≥, ±, 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.



Non-traceable specifications with limits (n. trc.)
Represent product performance that is specified and tested as described under “Specifications with limits” above. However, product performance in this case cannot be warranted due to the lack of measuring equipment traceable to national metrology standards. In this case, measurements are referenced to standards used in the Rohde & Schwarz laboratories.

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”.

Non-traceable specifications with limits, typical data as well as nominal and measured values are not warranted by Rohde & Schwarz.

In line with the 3GPP standard, chip rates are specified in million chips per second (Mcps), whereas bit rates and symbol rates are specified in billion bit per second (Gbps), million bit per second (Mbps), thousand bit per second (kbps), million symbols per second (Msps) or thousand symbols per second (ksps), and sample rates are specified in million samples per second (Msample/s). Gbps, Mcps, Mbps, Msps, kbps, ksps and Msample/s are not SI units.

Specifications

Unless otherwise stated, the specifications below are valid for all operating modes. For dedicated specifications for time domain scan with TDS optimization mode “max speed” with one of the options R&S®ESW-B350/-B350R/-B1000/-B1000R, refer to section R&S®ESW-B350/-B350R/-B1000/-B1000R time domain scan options.

Frequency

Frequency range	R&S®ESW8	
	input 1, DC coupled	1 Hz to 8 GHz
	input 1, AC coupled	10 MHz to 8 GHz
	R&S®ESW26	
	input 1, DC coupled	1 Hz to 26.5 GHz
	input 1, AC coupled	10 MHz to 26.5 GHz
	R&S®ESW44	
	input 1, DC coupled	1 Hz to 44 GHz
	input 1, AC coupled	10 MHz to 44 GHz
	all models	
	input 2, DC coupled	1 Hz to 1 GHz
	input 2, AC coupled [1]	10 MHz to 1 GHz
Frequency resolution		0.01 Hz

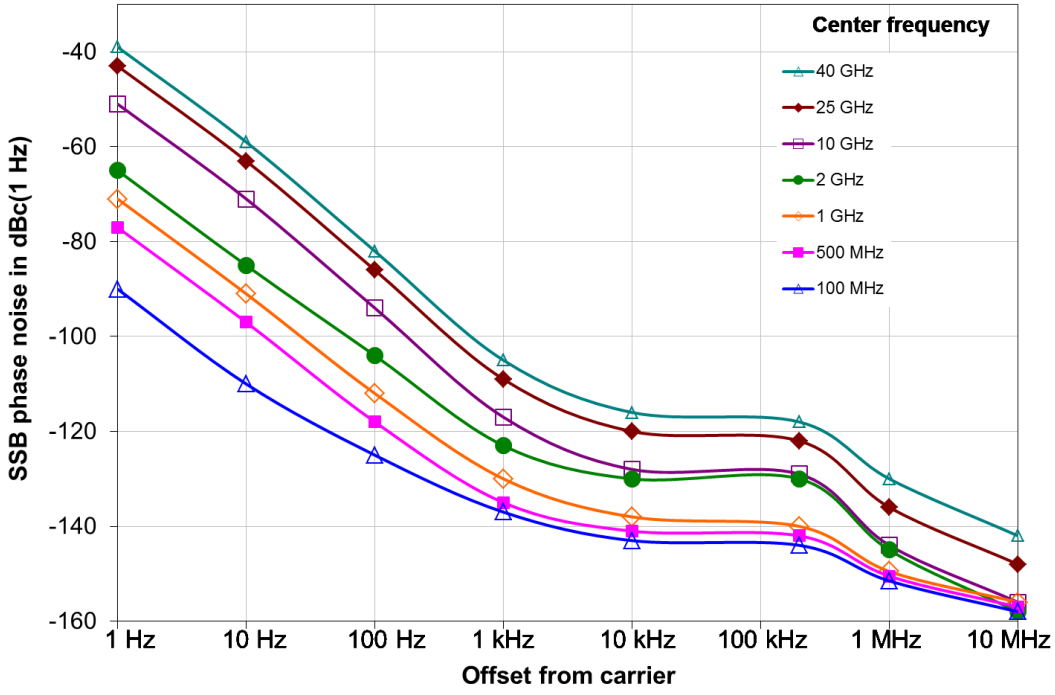
Reference frequency, internal		
Accuracy		±(time since last adjustment × aging rate + temperature drift + calibration accuracy)
Aging per year	standard	$\pm 1 \times 10^{-7}$
	with R&S®ESW-B4 OCXO precision frequency reference option	$\pm 3 \times 10^{-8}$
Temperature drift (0 °C to +50 °C)	standard	$\pm 1 \times 10^{-7}$
	with R&S®ESW-B4 OCXO precision frequency reference option	$\pm 1 \times 10^{-9}$
Achievable initial calibration accuracy	standard	$\pm 1 \times 10^{-8}$
	with R&S®ESW-B4 OCXO precision frequency reference option	$\pm 5 \times 10^{-9}$

Frequency readout (analyzer mode)		
Marker resolution		1 Hz
Uncertainty		±(marker frequency × reference accuracy + 10 % × resolution bandwidth + ½ (span / (sweep points – 1)) + 1 Hz)
Number of sweep (trace) points	default value	1001
	range	
	spectrum analyzer	101 to 100001
	EMI measurement	101 to 200001
Marker tuning frequency step size	marker step size = sweep points	span / (sweep points – 1)
	marker step size = standard	span / (default sweep points – 1)
Frequency counter resolution		0.001 Hz
Count accuracy		±(frequency × reference accuracy + ½ (last digit))
Display range for frequency axis		0 Hz, 10 Hz to max. frequency
Resolution		0.1 Hz
Max. span deviation		±0.1 %

[1] Only available with pulse limiter = off.

Receiver scan		
Scan		max. 10 subranges with different settings
Scan modes		normal, time domain
Measurement time	normal scan, per frequency	50 µs to 100 s
	time domain scan, per subrange	50 µs to 100 s
Number of trace points		up to 10 000 000
Frequency step size	normal scan	min. 1 Hz
	time domain scan	
	standard	0.25 × resolution bandwidth
	with R&S®ESW-B350/-B350R/ -B1000/-B1000R, TDS optimization: automatic/max speed	0.5 × resolution bandwidth

Spectral purity		
SSB phase noise	frequency = 1000 MHz, carrier offset	
	10 Hz, without R&S®ESW-B4 option	–80 dBc (1 Hz) (nom.)
	10 Hz, with R&S®ESW-B4 option	–90 dBc (1 Hz) (nom.)
	100 Hz	–106 dBc (1 Hz), typ. –112 dBc (1 Hz)
	1 kHz	< –125 dBc (1 Hz), typ. –130 dBc (1 Hz)
	10 kHz	< –134 dBc (1 Hz), typ. –138 dBc (1 Hz)
	100 kHz	< –136 dBc (1 Hz), typ. –140 dBc (1 Hz)
	1 MHz	< –145 dBc (1 Hz), typ. –149 dBc (1 Hz)
	10 MHz	–156 dBc (1 Hz) (nom.)
Residual FM	frequency = 1000 MHz, RBW = 1 kHz, sweep time = 100 ms	< 0.1 Hz (nom.)



Typical phase noise at different center frequencies (with the R&S®ESW-B4 option for offsets ≤ 10 Hz)

Sweep time

Sweep time range	span = 0 Hz	1 µs to 16000 s
	span ≥ 10 Hz	3 µs to 16000 s [2]
Sweep time accuracy	span = 0 Hz	±0.1 % (nom.)
	span ≥ 10 Hz	±3 % (nom.)

Preselection and preamplifier

Preselection		
State	receiver mode	always on
	analyzer mode	on/off (selectable)
Number of preselection filters		21
Preselection filters		
Bandwidths (–6 dB), nominal	1 Hz to 150 kHz	200 kHz, fixed lowpass filter
	150 kHz to 30 MHz	38 MHz, fixed bandpass filter
	2 MHz to 30 MHz, selectable	36 MHz, fixed bandpass filter
	8 MHz to 30 MHz, selectable [3]	30 MHz, fixed bandpass filter
	30 MHz to 125 MHz	134 MHz, fixed bandpass filter
	125 MHz to 205 MHz	141 MHz, fixed bandpass filter
	205 MHz to 285 MHz	146 MHz, fixed bandpass filter
	285 MHz to 365 MHz	142 MHz, fixed bandpass filter
	365 MHz to 445 MHz	156 MHz, fixed bandpass filter
	445 MHz to 525 MHz	136 MHz, fixed bandpass filter
	525 MHz to 605 MHz	126 MHz, fixed bandpass filter
	605 MHz to 685 MHz	141 MHz, fixed bandpass filter
	685 MHz to 765 MHz	131 MHz, fixed bandpass filter
	765 MHz to 845 MHz	128 MHz, fixed bandpass filter
	845 MHz to 925 MHz	132 MHz, fixed bandpass filter
	925 MHz to 1001 MHz	133 MHz, fixed bandpass filter
	1001 MHz to 1795 MHz	1044 MHz, fixed bandpass filter
	1795 MHz to 2895 MHz	1541 MHz, fixed bandpass filter
	2895 MHz to 4895 MHz	2452 MHz, fixed bandpass filter
	4895 MHz to 6800 MHz	fixed highpass filter
	6800 MHz to 8000 MHz	fixed highpass filter
	8 GHz to 44 GHz	YIG filter
Notch filters		
Reject band	selectable	2400 MHz to 2483 MHz
		5725 MHz to 5875 MHz
Reject attenuation		20 dB (nom.)
Preamplifier		
Range		1 kHz to 8 GHz
Gain		20 dB (nom.)
Location		in the signal path between preselection and 1st mixer, only available with preselection = on
Interaction		preamplifier and LNA (R&S®ESW-B24 option) operate alternatively, preamplifier = on means LNA = off and vice versa

[2] The selected sweep time is the net data acquisition time (without the extra time needed for hardware settling or FFT processing).

[3] Filter is only available for instruments starting from the following serial numbers: R&S®ESW8: 103055, R&S®ESW26: 103028, R&S®ESW44: 103048.

R&S®ESW-B24 low-noise amplifier (LNA)

Frequency range	R&S®ESW8	150 kHz to 8 GHz
	R&S®ESW26	150 kHz to 26.5 GHz
	R&S®ESW44	150 kHz to 44 GHz
Gain		30 dB (nom.)
Location		in the signal path between RF attenuator and preselection
Interaction		preamplifier and LNA operate alternatively, LNA = on means preamplifier = off and vice versa

IF and resolution bandwidths

IF filters, sweep filters and FFT filters		
Resolution bandwidths (–3 dB)	standard	1 Hz to 10 MHz in 1/2/3/5 sequence
	with R&S®ESW-B8E option	20 MHz, 30 MHz, 40 MHz additionally [4]
	with R&S®ESW-B8 option	20 MHz, 30 MHz, 40 MHz, 50 MHz, 80 MHz additionally [4]
Bandwidth uncertainty	RBW ≤ 10 MHz	< 3 %
	RBW > 10 MHz	< 3 % (nom.)
Shape factor 60 dB:3 dB	RBW ≤ 10 MHz	< 5
	RBW > 10 MHz	< 5 (nom.)

EMI filters		
Bandwidths (–6 dB)	standard	1 Hz, 10 Hz, 100 Hz, 200 Hz, 1 kHz, 9 kHz, 10 kHz, 100 kHz, 120 kHz, 1 MHz, 10 MHz
	with R&S®ESW-B8E option	20 MHz, 30 MHz, 40 MHz additionally [4]
	with R&S®ESW-B8 option	20 MHz, 30 MHz, 40 MHz, 50 MHz, 80 MHz additionally [4]
Bandwidth uncertainty	RBW ≤ 10 MHz	< 3 %
	RBW > 10 MHz	< 3 % (nom.)
Shape factor 60 dB:6 dB	RBW ≤ 10 MHz	< 4
	RBW > 10 MHz	< 4 (nom.)

Channel filters (analyzer mode)		
Bandwidths (–3 dB)	standard (RRC = root raised cosine)	100 Hz, 200 Hz, 300 Hz, 500 Hz
		1/1.5/2/2.4/2.7/3/3.4/4/4.5/5/6/8.5/9/10/ 12.5/14/15/16/18 (RRC)/20/21/ 24.3 (RRC)/25/30/50/100/150/192/200/ 300/500 kHz
		1/1.228/1.28 (RRC)/1.5/2/3/3.84 (RRC)/ 4.096 (RRC)/5/8/10 MHz
	with R&S®ESW-B8E option	20 MHz, 30 MHz, 40 MHz additionally [4]
	with R&S®ESW-B8 option	20 MHz, 30 MHz, 40 MHz, 50 MHz, 80 MHz additionally [4]
Bandwidth accuracy		< 2 % (nom.)
Shape factor 60 dB:3 dB		< 2 (nom.)

Video bandwidths (analyzer mode)	standard	1 Hz to 10 MHz in 1/2/3/5 sequence
	with R&S®ESW-B8E option	20 MHz, 30 MHz, 40 MHz additionally [5]
	with R&S®ESW-B8 option	20 MHz, 30 MHz, 40 MHz, 50 MHz, 80 MHz additionally [5]

[4] For f ≥ 8 GHz the bandwidth may be limited by the YIG preselector.

[5] For video bandwidth settings > 20 MHz, the video bandwidth filter is bypassed.

Level

Level display (analyzer mode)		
Display range		displayed noise floor up to +30 dBm
Logarithmic level axis		1 dB to 200 dB, in steps of 1/2/5
Linear level axis		10 % of reference level per level division, 10 divisions or logarithmic scaling
Number of traces		6
Trace detector		max. peak, min. peak, auto peak (normal), sample, RMS, average, quasi-peak, CISPR-average, RMS-average
Trace functions		clear/write, max. hold, min. hold, average, view
Setting range of reference level		–130 dBm to (–10 dBm + RF attenuation – preamplifier / LNA gain), in steps of 0.01 dB
Units of level axis	logarithmic level display	dBm, dBµV, dBmV, dBµA, dBpW
	linear level display	µV, mV, µA, mA, pW, nW

Level display (receiver mode)		
Level display	analog	bargraph display, separately for each detector
	digital	numeric; 0.01 dB resolution
Detectors	max. 4 selectable	max. peak, min. peak, RMS, average, quasi-peak, CISPR-average, RMS-average
Units of level axis		dBm, dBµV, dBmV, dBµA, dBpW, dBpT
RF spectrum		
Logarithmic level axis		10 dB to 200 dB, in steps of 10
Frequency axis		linear or logarithmic
Number of traces		6
Detectors	normal scan	max. peak, min. peak, RMS, average, quasi-peak, CISPR-average, RMS-average
	time domain scan	max. peak, min. peak, RMS, average, quasi-peak, CISPR-average, RMS-average

Amplitude probability display – CISPR APD measurement function		
Min. amplitude probability		10^{-7}
Max. acquisition time		120 s
Analysis bandwidth (–6 dB)		200 Hz, 9 kHz, 120 kHz, 1 MHz

APD multichannel measurement function (R&S®ESW-K58 option)		
Min. amplitude probability		10^{-7}
Max. acquisition time		120 s
Analysis bandwidth (–6 dB)		1 Hz ≤ analysis bandwidth ≤ 1 MHz
Max. number of analyzed channels	standard	
	analysis bandwidth = 1 MHz	21
	analysis bandwidth ≤ 300 kHz	67
	with R&S®ESW-B350/-B350R/-B1000/-B1000R option	
	analysis bandwidth = 1 MHz	51
	analysis bandwidth ≤ 200 kHz	255

Maximum input level		
DC voltage	AC coupled	50 V
	DC coupled	0 V
CW RF power	RF attenuation = 0 dB	
	preselection off [6], preamplifier off, LNA off [7]	20 dBm (= 0.1 W)
	preselection/preamplifier on or LNA on [7]	13 dBm (= 0.02 W)
	RF attenuation ≥ 10 dB	
	preselection off [6], preamplifier off, LNA off [7]	30 dBm (= 1 W)
	preselection on [8], preamplifier on or LNA on [7]	23 dBm (= 0.2 W)
Pulse spectral density	RF attenuation = 0 dB, preamplifier off, LNA off [7]	97 dB µV/MHz
Max. pulse voltage	RF attenuation ≥ 10 dB	
	input 1, input 2 with pulse limiter off	150 V
	input 2 with pulse limiter on	450 V
Response threshold of built-in pulse limiter	input 2, RF attenuation ≥ 10 dB, pulse limiter on	30 V (nom.)
Max. pulse energy, pulse duration τ = 10 µs	RF attenuation ≥ 10 dB	
	input 1, input 2 with pulse limiter off	1 mWs
	input 2 with pulse limiter on	20 mWs

Intermodulation		
1 dB compression of input mixer (two-tone)	RF attenuation = 0 dB, preselection off [6], preamplifier off, LNA off [7]	
	f_{in} ≤ 3 GHz	+15 dBm (nom.)
	3 GHz < f_{in} ≤ 8 GHz	+10 dBm (nom.)
	f_{in} > 8 GHz	+7 dBm (nom.)
	RF attenuation = 0 dB, preselection on [8] and preamplifier off, LNA off [7]	
	f_{in} ≤ 3 GHz	+10 dBm (nom.)
	3 GHz < f_{in} ≤ 8 GHz	+5 dBm (nom.)
	f_{in} > 8 GHz	+7 dBm (nom.)
	RF attenuation = 0 dB, preselection on [8], preamplifier on, LNA off [7]	
	f_{in} ≤ 3 GHz	–5 dBm (nom.)
	3 GHz < f_{in} ≤ 8 GHz	–10 dBm (nom.)
	f_{in} > 8 GHz	+7 dBm (nom.)
	RF attenuation = 0 dB, preselection on [8], preamplifier off, LNA on [7]	
	f_{in} ≤ 3 GHz	–18 dBm (nom.)
	3 GHz < f_{in} ≤ 8 GHz	–25 dBm (nom.)
	f_{in} > 8 GHz	–23 dBm (nom.)
	RF attenuation = 0 dB, preselection off [6], preamplifier off, LNA on [7]	
	f_{in} ≤ 3 GHz	–13 dBm (nom.)
	3 GHz < f_{in} ≤ 8 GHz	–20 dBm (nom.)
	f_{in} > 8 GHz	–23 dBm (nom.)

[6] Preselection off is only available in analyzer mode. In receiver mode the preselection is permanently on.

[7] With R&S®ESW-B24 option only.

[8] Default setting in receiver mode.

Third order intercept point (TOI)	RF attenuation = 0 dB, level = 2 × –15 dBm, Δf > 5 × RBW, preselection off [6], preamplifier off, LNA off [7]	
	R&S®ESW8, R&S®ESW26, R&S®ESW44	
	f_{in} < 10 MHz	28 dBm (nom.)
	10 MHz ≤ f_{in} < 1 GHz	> 20 dBm, typ. 25 dBm
	1 GHz ≤ f_{in} < 3 GHz	> 20 dBm, typ. 25 dBm
	3 GHz ≤ f_{in} < 8 GHz	> 17 dBm, typ. 20 dBm
	R&S®ESW26	
	8 GHz ≤ f_{in} < 10 GHz	> 14 dBm, typ. 17 dBm
	10 GHz ≤ f_{in} < 12 GHz	> 16 dBm, typ. 20 dBm
	12 GHz ≤ f_{in} < 17 GHz	> 18 dBm, typ. 23 dBm
	17 GHz ≤ f_{in} < 19 GHz	> 16 dBm, typ. 20 dBm
	19 GHz ≤ f_{in} ≤ 26.5 GHz	> 18 dBm, typ. 23 dBm
	R&S®ESW44	
	8 GHz ≤ f_{in} ≤ 13.6 GHz	> 8 dBm, typ. 11 dBm
	13.6 GHz ≤ f_{in} ≤ 40 GHz	> 10 dBm, typ. 15 dBm
	f_{in} > 40 GHz	12 dBm (nom.)
	RF attenuation = 0 dB, level = 2 × –20 dBm, Δf > 5 × RBW, preselection on [8], preamplifier off, LNA off [7]	
	R&S®ESW8, R&S®ESW26, R&S®ESW44	
	f_{in} < 10 MHz	20 dBm (nom.)
	10 MHz ≤ f_{in} < 1 GHz	> 15 dBm, typ. 20 dBm
	1 GHz ≤ f_{in} < 8 GHz	> 12 dBm, typ. 15 dBm
	R&S®ESW26	
	8 GHz ≤ f_{in} < 10 GHz	> 14 dBm, typ. 17 dBm
	10 GHz ≤ f_{in} < 12 GHz	> 16 dBm, typ. 20 dBm
	12 GHz ≤ f_{in} < 17 GHz	> 18 dBm, typ. 23 dBm
	17 GHz ≤ f_{in} < 19 GHz	> 16 dBm, typ. 20 dBm
	19 GHz ≤ f_{in} ≤ 26.5 GHz	> 18 dBm, typ. 23 dBm
	R&S®ESW44	
	8 GHz ≤ f_{in} ≤ 13.6 GHz	> 8 dBm, typ. 11 dBm
	13.6 GHz ≤ f_{in} ≤ 40 GHz	> 10 dBm, typ. 15 dBm
	f_{in} > 40 GHz	12 dBm (nom.)
	RF attenuation = 0 dB, level = 2 × –45 dBm, Δf > 5 × RBW, preselection on [8], preamplifier on, LNA off [7]	
	f_{in} < 30 MHz	–10 dBm (nom.)
	30 MHz ≤ f_{in} < 3 GHz	> –8 dBm
	3 GHz ≤ f_{in} < 8 GHz	> –10 dBm
	8 GHz ≤ f_{in} ≤ 44 GHz	–20 dBm (nom.)
	RF attenuation = 0 dB, level = 2 × –55 dBm, Δf > 5 × RBW, preselection on [8], preamplifier off, LNA on [7]	
	10 MHz ≤ f_{in} < 1 GHz	–15 dBm (nom.)
	1 GHz ≤ f_{in} < 8 GHz	–18 dBm (nom.)
	8 GHz ≤ f_{in} ≤ 26.5 GHz	–20 dBm (nom.)
	RF attenuation = 0 dB, level = 2 × –55 dBm, Δf > 5 × RBW, preselection off [6], preamplifier off, LNA on [7]	
	10 MHz ≤ f_{in} < 1 GHz	–10 dBm (nom.)
	1 GHz ≤ f_{in} < 8 GHz	–13 dBm (nom.)
	8 GHz ≤ f_{in} ≤ 44 GHz	–20 dBm (nom.)

Second harmonic intercept point (SHI)	RF attenuation = 0 dB, level = –5 dBm, preselection off [6], preamplifier off, LNA off [7]	
	R&S®ESW8, R&S®ESW26	
	1 MHz < f_{in} ≤ 350 MHz	> 50 dBm, typ. 62 dBm
	350 MHz < f_{in} ≤ 500 MHz	> 70 dBm, typ. 80 dBm
	500 MHz < f_{in} < 1.5 GHz	> 47 dBm, typ. 52 dBm
	1.5 GHz ≤ f_{in} ≤ 4 GHz	> 62 dBm, typ. 70 dBm
	4 GHz < f_{in} ≤ 13.5 GHz	65 dBm (nom.)
	R&S®ESW44	
	1 MHz < f_{in} ≤ 500 MHz	> 45 dBm, typ. 55 dBm
	500 MHz < f_{in} < 1.5 GHz	> 47 dBm, typ. 56 dBm
	1.5 GHz ≤ f_{in} ≤ 4 GHz	> 62 dBm, typ. 70 dBm
	4 GHz < f_{in} ≤ 22 GHz	65 dBm (nom.)
	RF attenuation = 0 dB, level = –10 dBm, preselection on [8], preamplifier off, LNA off [7]	
	1 MHz < f_{in} ≤ 15 MHz	> 50 dBm (nom.)
	15 MHz < f_{in} ≤ 65 MHz	> 50 dBm (nom.)
	65 MHz < f_{in} ≤ 4000 MHz	> 60 dBm (nom.)
	4 GHz < f_{in} ≤ 22 GHz	65 dBm (nom.)
	RF attenuation = 0 dB, level = –30 dBm, preselection on [8], preamplifier on, LNA off [7]	
	1 MHz < f_{in} ≤ 15 MHz	> 20 dBm (nom.)
	15 MHz < f_{in} ≤ 105 MHz	> 25 dBm (nom.)
	105 MHz < f_{in} ≤ 4000 MHz	> 40 dBm (nom.)
	4 GHz < f_{in} ≤ 22 GHz	10 dBm (nom.) [7]
	RF attenuation = 0 dB, level = –55 dBm, preselection on [8], preamplifier off, LNA on [7]	
	50 MHz < f_{in} ≤ 21.75 GHz	5 dBm (nom.)
	RF attenuation = 0 dB, level = –50 dBm, preselection off [6], preamplifier off, LNA on [7]	
	50 MHz < f_{in} ≤ 21.75 GHz	10 dBm (nom.)

Sensitivity

All noise level data in this section not marked as typical (typ.) or nominal (nom.) are specified values whose compliance is ensured by testing.

Displayed average noise level of instruments without R&S®ESW-B24 option (analyzer mode)		
Preselection off/on [6], preamplifier off	RF attenuation = 0 dB, termination = 50 Ω, normalized to 1 Hz RBW, trace average, average mode = log, sample detector, +5 °C to +40 °C	
	1 Hz ≤ f < 2 Hz	–80 dBm (nom.)
	2 Hz ≤ f < 10 Hz	–100 dBm, typ. –110 dBm
	10 Hz ≤ f ≤ 100 Hz	–110 dBm, typ. –120 dBm
	100 Hz < f ≤ 1 kHz	–120 dBm, typ. –130 dBm
	1 kHz < f < 9 kHz	–135 dBm, typ. –147 dBm
	RF attenuation = 0 dB, termination = 50 Ω, log. scaling, normalized to 1 Hz RBW, RBW = 1 kHz, VBW = 1 Hz, +5 °C to +40 °C	
	R&S®ESW8	
	9 kHz ≤ f ≤ 1 MHz	–145 dBm, typ. –150 dBm
	1 MHz < f ≤ 1 GHz	–150 dBm, typ. –154 dBm
	1 GHz < f < 3 GHz	–152 dBm, typ. –156 dBm
	3 GHz ≤ f ≤ 8 GHz	–152 dBm, typ. –156 dBm
	R&S®ESW26	
	9 kHz ≤ f ≤ 1 MHz	–145 dBm, typ. –150 dBm
	1 MHz < f ≤ 1 GHz	–149 dBm, typ. –154 dBm
	1 GHz < f < 3 GHz	–151 dBm, typ. –156 dBm
	3 GHz ≤ f < 8 GHz	–150 dBm, typ. –155 dBm
	8 GHz ≤ f < 13.6 GHz	–150 dBm, typ. –155 dBm
	13.6 GHz ≤ f < 18 GHz	–149 dBm, typ. –153 dBm
	18 GHz ≤ f < 25 GHz	–147 dBm, typ. –150 dBm
	25 GHz ≤ f ≤ 26.5 GHz	–143 dBm, typ. –146 dBm
	R&S®ESW44	
	9 kHz ≤ f ≤ 1 MHz	–145 dBm, typ. –150 dBm
	1 MHz < f ≤ 1 GHz	–149 dBm, typ. –154 dBm
	1 GHz < f < 3 GHz	–151 dBm, typ. –156 dBm
	3 GHz ≤ f < 8 GHz	–150 dBm, typ. –155 dBm
	8 GHz ≤ f < 13.6 GHz	–150 dBm, typ. –154 dBm
	13.6 GHz ≤ f < 18 GHz	–149 dBm, typ. –153 dBm
	18 GHz ≤ f < 25 GHz	–147 dBm, typ. –151 dBm
	25 GHz ≤ f ≤ 34 GHz	–143 dBm, typ. –147 dBm
	34 GHz < f ≤ 40 GHz	–140 dBm, typ. –144 dBm
	40 GHz < f ≤ 44 GHz	–138 dBm, typ. –142 dBm

Preselection on [8], preamplifier on	RF attenuation = 0 dB, termination = 50 Ω, normalized to 1 Hz RBW, trace average, average mode = log, sample detector, +5 °C to +40 °C	
	1 kHz < f < 9 kHz	–140 dBm, typ. –150 dBm
	RF attenuation = 0 dB, termination = 50 Ω, log. scaling, normalized to 1 Hz RBW, RBW = 1 kHz, VBW = 1 Hz, +5 °C to +40 °C	
	R&S®ESW8	
	9 kHz ≤ f ≤ 1 MHz	–155 dBm, typ. –160 dBm
	1 MHz < f ≤ 30 MHz	–162 dBm, typ. –165 dBm
	30 MHz < f < 2.5 GHz	–165 dBm, typ. –168 dBm
	2.5 GHz ≤ f < 4.8 GHz	–162 dBm, typ. –165 dBm
	4.8 GHz ≤ f ≤ 8 GHz	–160 dBm, typ. –163 dBm
	R&S®ESW26	
	9 kHz ≤ f ≤ 1 MHz	–155 dBm, typ. –160 dBm
	1 MHz < f ≤ 30 MHz	–162 dBm, typ. –165 dBm
	30 MHz < f < 2.5 GHz	–163 dBm, typ. –166 dBm
	2.5 GHz ≤ f < 4.8 GHz	–160 dBm, typ. –163 dBm
	4.8 GHz ≤ f < 8 GHz	–157 dBm, typ. –160 dBm
	8 GHz ≤ f < 13.6 GHz	–150 dBm, typ. –155 dBm
	13.6 GHz ≤ f < 18 GHz	–149 dBm, typ. –153 dBm
	18 GHz ≤ f < 25 GHz	–147 dBm, typ. –150 dBm
	25 GHz ≤ f ≤ 26.5 GHz	–143 dBm, typ. –146 dBm
	R&S®ESW44	
	9 kHz ≤ f ≤ 1 MHz	–155 dBm, typ. –160 dBm
	1 MHz < f ≤ 30 MHz	–162 dBm, typ. –165 dBm
	30 MHz < f < 2.5 GHz	–163 dBm, typ. –166 dBm
	2.5 GHz ≤ f < 4.8 GHz	–160 dBm, typ. –163 dBm
	4.8 GHz ≤ f < 8 GHz	–157 dBm, typ. –160 dBm
	8 GHz ≤ f < 13.6 GHz	–150 dBm, typ. –154 dBm
	13.6 GHz ≤ f < 18 GHz	–149 dBm, typ. –153 dBm
	18 GHz ≤ f < 25 GHz	–147 dBm, typ. –151 dBm
	25 GHz ≤ f ≤ 34 GHz	–143 dBm, typ. –147 dBm
	34 GHz < f ≤ 40 GHz	–140 dBm, typ. –144 dBm
	40 GHz < f ≤ 44 GHz	–138 dBm, typ. –142 dBm

Displayed average noise level of instruments with R&S®ESW-B24 option (analyzer mode)		
Preselection off/on [6], preamplifier off, LNA off	RF attenuation = 0 dB, termination = 50 Ω, normalized to 1 Hz RBW, trace average, average mode = log, sample detector, +5 °C to +40 °C	
	1 Hz ≤ f < 2 Hz	–80 dBm (nom.)
	2 Hz ≤ f < 10 Hz	–100 dBm, typ. –110 dBm
	10 Hz ≤ f ≤ 100 Hz	–110 dBm, typ. –120 dBm
	100 Hz < f ≤ 1 kHz	–120 dBm, typ. –130 dBm
	1 kHz < f < 9 kHz	–135 dBm, typ. –147 dBm
	RF attenuation = 0 dB, termination = 50 Ω, log. scaling, normalized to 1 Hz RBW, RBW = 1 kHz, VBW = 1 Hz, +5 °C to +40 °C	
	R&S®ESW8	
	9 kHz ≤ f ≤ 1 MHz	–145 dBm, typ. –150 dBm
	1 MHz < f ≤ 1 GHz	–150 dBm, typ. –154 dBm
	1 GHz < f < 3 GHz	–152 dBm, typ. –156 dBm
	3 GHz ≤ f ≤ 8 GHz	–152 dBm, typ. –156 dBm
	R&S®ESW26	
	9 kHz ≤ f ≤ 1 MHz	–145 dBm, typ. –150 dBm
	1 MHz < f ≤ 1 GHz	–149 dBm, typ. –154 dBm
	1 GHz < f < 3 GHz	–150 dBm, typ. –155 dBm
	3 GHz ≤ f < 8 GHz	–149 dBm, typ. –154 dBm
	8 GHz ≤ f < 13.6 GHz	–149 dBm, typ. –154 dBm
	13.6 GHz ≤ f < 18 GHz	–148 dBm, typ. –152 dBm
	18 GHz ≤ f < 25 GHz	–145 dBm, typ. –149 dBm
	25 GHz ≤ f ≤ 26.5 GHz	–141 dBm, typ. –145 dBm
	R&S®ESW44	
	9 kHz ≤ f ≤ 1 MHz	–145 dBm, typ. –150 dBm
	1 MHz < f ≤ 1 GHz	–149 dBm, typ. –154 dBm
	1 GHz < f < 3 GHz	–150 dBm, typ. –155 dBm
	3 GHz ≤ f < 8 GHz	–149 dBm, typ. –154 dBm
	8 GHz ≤ f < 13.6 GHz	–148 dBm, typ. –152 dBm
	13.6 GHz ≤ f < 18 GHz	–147 dBm, typ. –151 dBm
	18 GHz ≤ f < 25 GHz	–145 dBm, typ. –149 dBm
	25 GHz ≤ f ≤ 34 GHz	–140 dBm, typ. –144 dBm
	34 GHz < f ≤ 40 GHz	–137 dBm, typ. –141 dBm
	40 GHz < f ≤ 44 GHz	–135 dBm, typ. –140 dBm
Preselection on [8], preamplifier on, LNA off	RF attenuation = 0 dB, termination = 50 Ω, normalized to 1 Hz RBW, trace average, average mode = log, sample detector, +5 °C to +40 °C	
	1 kHz < f < 9 kHz	–140 dBm, typ. –150 dBm
	RF attenuation = 0 dB, termination = 50 Ω, log. scaling, normalized to 1 Hz RBW, RBW = 1 kHz, VBW = 1 Hz, +5 °C to +40 °C	
	R&S®ESW8	
	9 kHz ≤ f ≤ 1 MHz	–155 dBm, typ. –160 dBm
	1 MHz < f ≤ 30 MHz	–162 dBm, typ. –165 dBm
	30 MHz < f < 2.5 GHz	–165 dBm, typ. –168 dBm
	2.5 GHz ≤ f < 4.8 GHz	–162 dBm, typ. –165 dBm
	4.8 GHz ≤ f ≤ 8 GHz	–160 dBm, typ. –163 dBm
	R&S®ESW26	
	9 kHz ≤ f ≤ 1 MHz	–155 dBm, typ. –160 dBm
	1 MHz < f ≤ 30 MHz	–161 dBm, typ. –164 dBm
	30 MHz < f < 2.5 GHz	–162 dBm, typ. –165 dBm
	2.5 GHz ≤ f < 4.8 GHz	–158 dBm, typ. –161 dBm
	4.8 GHz ≤ f < 8 GHz	–155 dBm, typ. –158 dBm
	8 GHz ≤ f ≤ 13.6 GHz	–164 dBm, typ. –168 dBm
	13.6 GHz < f ≤ 22 GHz	–162 dBm, typ. –166 dBm
	22 GHz < f ≤ 26.5 GHz	–157 dBm, typ. –161 dBm
	R&S®ESW44	
	9 kHz ≤ f ≤ 1 MHz	–155 dBm, typ. –160 dBm
	1 MHz < f ≤ 30 MHz	–161 dBm, typ. –164 dBm
	30 MHz < f ≤ 2.5 GHz	–162 dBm, typ. –165 dBm
	2.5 GHz ≤ f < 4.8 GHz	–158 dBm, typ. –161 dBm
	4.8 GHz ≤ f < 8 GHz	–155 dBm, typ. –158 dBm
	8 GHz ≤ f ≤ 18 GHz	–162 dBm, typ. –167 dBm
	18 GHz < f ≤ 26.5 GHz	–161 dBm, typ. –166 dBm
	26.5 GHz < f ≤ 40 GHz	–160 dBm, typ. –164 dBm
	40 GHz < f ≤ 43 GHz	–157 dBm, typ. –162 dBm
	43 GHz < f ≤ 44 GHz	–146 dBm

Preselection off/on [6], preamplifier off, LNA on	RF attenuation = 0 dB, termination = 50 Ω, log. scaling, normalized to 1 Hz RBW, RBW = 1 kHz, VBW = 1 Hz, +5 °C to +40 °C	
	R&S®ESW8	
	150 kHz < f ≤ 1 MHz	–130 dBm
	1 MHz < f ≤ 5 MHz	–140 dBm
	5 MHz < f ≤ 50 MHz	–150 dBm
	50 MHz < f ≤ 150 MHz	–163 dBm, typ. –166 dBm
	150 MHz < f ≤ 8 GHz	–166 dBm, typ. –169 dBm
	R&S®ESW26	
	150 kHz < f ≤ 1 MHz	–130 dBm
	1 MHz < f ≤ 5 MHz	–140 dBm
	5 MHz < f ≤ 50 MHz	–150 dBm
	50 MHz < f ≤ 150 MHz	–163 dBm, typ. –166 dBm
	150 MHz < f ≤ 8 GHz	–166 dBm, typ. –169 dBm
	8 GHz < f ≤ 13.6 GHz	–164 dBm, typ. –168 dBm
	13.6 GHz < f ≤ 22 GHz	–162 dBm, typ. –166 dBm
	22 GHz < f ≤ 26.5 GHz	–157 dBm, typ. –161 dBm
	R&S®ESW44	
	150 kHz < f ≤ 1 MHz	–160 dBm, typ. –163 dBm
	1 MHz < f ≤ 3 GHz	–165 dBm, typ. –169 dBm
	3 GHz < f ≤ 8 GHz	–162 dBm, typ. –166 dBm
	8 GHz < f ≤ 18 GHz	–162 dBm, typ. –167 dBm
	18 GHz < f ≤ 26.5 GHz	–161 dBm, typ. –166 dBm
	26.5 GHz < f ≤ 40 GHz	–160 dBm, typ. –164 dBm
	40 GHz < f ≤ 43 GHz	–157 dBm, typ. –162 dBm
	43 GHz < f ≤ 44 GHz	–146 dBm

Noise indication of instruments without R&S®ESW-B24 option (receiver mode)		
Nominal, calculated from displayed average noise level (DANL) data		
Preamplifier = off	RF attenuation = 0 dB, termination = 50 Ω, average (AV) detector, +5 °C to +40 °C	
	all models	
	1 Hz ≤ f < 2 Hz, BW = 1 Hz	27 dBµV
	2 Hz ≤ f < 10 Hz, BW = 1 Hz	< 7 dBµV
	10 Hz ≤ f ≤ 100 Hz, BW = 10 Hz	< 7 dBµV
	100 Hz < f ≤ 1 kHz, BW = 100 Hz	< 7 dBµV
	1 kHz < f < 9 kHz, BW = 100 Hz	< –8 dBµV
	R&S®ESW8	
	9 kHz ≤ f < 150 kHz, BW = 200 Hz	< –15 dBµV
	150 kHz ≤ f ≤ 1 MHz, BW = 9 kHz	< 1 dBµV
	1 MHz ≤ f < 30 MHz, BW = 9 kHz	< –4 dBµV
	30 MHz ≤ f < 1 GHz, BW = 120 kHz	< 8 dBµV
	1 GHz ≤ f < 3 GHz, BW = 1 MHz	< 15 dBµV
	3 GHz ≤ f ≤ 8 GHz, BW = 1 MHz	< 15 dBµV
	R&S®ESW26	
	9 kHz ≤ f < 150 kHz, BW = 200 Hz	< –15 dBµV
	150 kHz ≤ f < 1 MHz, BW = 9 kHz	< 1 dBµV
	1 MHz ≤ f < 30 MHz, BW = 9 kHz	< –3 dBµV
	30 MHz ≤ f < 1 GHz, BW = 120 kHz	< 9 dBµV
	1 GHz ≤ f < 3 GHz, BW = 1 MHz	< 16 dBµV
	3 GHz ≤ f < 8 GHz, BW = 1 MHz	< 17 dBµV
	8 GHz ≤ f < 13.6 GHz, BW = 1 MHz	< 17 dBµV
	13.6 GHz ≤ f < 18 GHz, BW = 1 MHz	< 18 dBµV
	18 GHz ≤ f < 25 GHz, BW = 1 MHz	< 20 dBµV
	25 GHz ≤ f ≤ 26.5 GHz, BW = 1 MHz	< 24 dBµV
	R&S®ESW44	
	9 kHz ≤ f < 150 kHz, BW = 200 Hz	< –15 dBµV
	150 kHz ≤ f < 1 MHz, BW = 9 kHz	< 1 dBµV
	1 MHz ≤ f < 30 MHz, BW = 9 kHz	< –3 dBµV
	30 MHz ≤ f < 1 GHz, BW = 120 kHz	< 9 dBµV
	1 GHz ≤ f < 3 GHz, BW = 1 MHz	< 16 dBµV
	3 GHz ≤ f < 8 GHz, BW = 1 MHz	< 17 dBµV
	8 GHz ≤ f < 13.6 GHz, BW = 1 MHz	< 17 dBµV
	13.6 GHz ≤ f < 18 GHz, BW = 1 MHz	< 18 dBµV
	18 GHz ≤ f < 25 GHz, BW = 1 MHz	< 20 dBµV
	25 GHz ≤ f ≤ 34 GHz, BW = 1 MHz	< 24 dBµV
	34 GHz ≤ f < 40 GHz, BW = 1 MHz	< 27 dBµV
	40 GHz ≤ f ≤ 44 GHz, BW = 1 MHz	< 29 dBµV

Preamplifier = on	RF attenuation = 0 dB, termination = 50 Ω, average (AV) detector, +5 °C to +40 °C	
	all models	
	1 kHz ≤ f < 9 kHz, BW = 100 Hz	< –13 dBµV
	R&S®ESW8	
	9 kHz ≤ f < 150 kHz, BW = 200 Hz	< –25 dBµV
	150 kHz ≤ f ≤ 1 MHz, BW = 9 kHz	< –9 dBµV
	1 MHz ≤ f < 30 MHz, BW = 9 kHz	< –16 dBµV
	30 MHz ≤ f < 1 GHz, BW = 120 kHz	< –7 dBµV
	1 GHz ≤ f < 2.5 GHz, BW = 1 MHz	< 2 dBµV
	2.5 GHz ≤ f < 4.8 GHz, BW = 1 MHz	< 5 dBµV
	4.8 GHz ≤ f ≤ 8 GHz, BW = 1 MHz	< 7 dBµV
	R&S®ESW26	
	9 kHz ≤ f < 150 kHz, BW = 200 Hz	< –25 dBµV
	150 kHz ≤ f < 1 MHz, BW = 9 kHz	< –9 dBµV
	1 MHz ≤ f < 30 MHz, BW = 9 kHz	< –16 dBµV
	30 MHz ≤ f < 1 GHz, BW = 120 kHz	< –5 dBµV
	1 GHz ≤ f < 2.5 GHz, BW = 1 MHz	< 4 dBµV
	2.5 GHz ≤ f < 4.8 GHz, BW = 1 MHz	< 7 dBµV
	4.8 GHz ≤ f < 8 GHz, BW = 1 MHz	< 10 dBµV
	8 GHz ≤ f < 13.6 GHz, BW = 1 MHz	< 17 dBµV
	13.6 GHz ≤ f < 18 GHz, BW = 1 MHz	< 18 dBµV
	18 GHz ≤ f < 25 GHz, BW = 1 MHz	< 20 dBµV
	25 GHz ≤ f ≤ 26.5 GHz, BW = 1 MHz	< 24 dBµV
	R&S®ESW44	
	9 kHz ≤ f < 150 kHz, BW = 200 Hz	< –25 dBµV
	150 kHz ≤ f < 1 MHz, BW = 9 kHz	< –9 dBµV
	1 MHz ≤ f < 30 MHz, BW = 9 kHz	< –16 dBµV
	30 MHz ≤ f < 1 GHz, BW = 120 kHz	< –5 dBµV
	1 GHz ≤ f < 2.5 GHz, BW = 1 MHz	< 4 dBµV
	2.5 GHz ≤ f < 4.8 GHz, BW = 1 MHz	< 7 dBµV
	4.8 GHz ≤ f < 8 GHz, BW = 1 MHz	< 10 dBµV
	8 GHz ≤ f < 13.6 GHz, BW = 1 MHz	< 17 dBµV
	13.6 GHz ≤ f < 18 GHz, BW = 1 MHz	< 18 dBµV
	18 GHz ≤ f < 25 GHz, BW = 1 MHz	< 20 dBµV
	25 GHz ≤ f ≤ 34 GHz, BW = 1 MHz	< 24 dBµV
	34 GHz ≤ f < 40 GHz, BW = 1 MHz	< 27 dBµV
	40 GHz ≤ f ≤ 44 GHz, BW = 1 MHz	< 29 dBµV

Noise indication of instruments with R&S®ESW-B24 option (receiver mode)		
Nominal, calculated from DANL data		
Preamplifier = off, LNA = off	RF attenuation = 0 dB, termination = 50 Ω, average (AV) detector, +5 °C to +40 °C	
	all models	
	1 Hz ≤ f < 2 Hz, BW = 1 Hz	27 dBµV
	2 Hz ≤ f < 10 Hz, BW = 1 Hz	< 7 dBµV
	10 Hz ≤ f ≤ 100 Hz, BW = 10 Hz	< 7 dBµV
	100 Hz < f ≤ 1 kHz, BW = 100 Hz	< 7 dBµV
	1 kHz < f < 9 kHz, BW = 100 Hz	< –8 dBµV
	R&S®ESW8	
	9 kHz ≤ f < 150 kHz, BW = 200 Hz	< –15 dBµV
	150 kHz ≤ f ≤ 1 MHz, BW = 9 kHz	< 1 dBµV
	1 MHz ≤ f < 30 MHz, BW = 9 kHz	< –4 dBµV
	30 MHz ≤ f < 1 GHz, BW = 120 kHz	< 8 dBµV
	1 GHz ≤ f < 3 GHz, BW = 1 MHz	< 15 dBµV
	3 GHz ≤ f ≤ 8 GHz, BW = 1 MHz	< 15 dBµV
	R&S®ESW26	
	9 kHz ≤ f < 150 kHz, BW = 200 Hz	< –15 dBµV
	150 kHz ≤ f < 1 MHz, BW = 9 kHz	< 1 dBµV
	1 MHz ≤ f < 30 MHz, BW = 9 kHz	< –3 dBµV
	30 MHz ≤ f < 1 GHz, BW = 120 kHz	< 9 dBµV
	1 GHz ≤ f < 3 GHz, BW = 1 MHz	< 17 dBµV
	3 GHz ≤ f < 8 GHz, BW = 1 MHz	< 18 dBµV
	8 GHz ≤ f < 13.6 GHz, BW = 1 MHz	< 18 dBµV
	13.6 GHz ≤ f < 18 GHz, BW = 1 MHz	< 19 dBµV
	18 GHz ≤ f < 25 GHz, BW = 1 MHz	< 22 dBµV
	25 GHz ≤ f ≤ 26.5 GHz, BW = 1 MHz	< 26 dBµV
	R&S®ESW44	
	9 kHz ≤ f < 150 kHz, BW = 200 Hz	< –15 dBµV
	150 kHz ≤ f < 1 MHz, BW = 9 kHz	< 1 dBµV
	1 MHz ≤ f < 30 MHz, BW = 9 kHz	< –3 dBµV
	30 MHz ≤ f < 1 GHz, BW = 120 kHz	< 9 dBµV
	1 GHz ≤ f < 3 GHz, BW = 1 MHz	< 17 dBµV
	3 GHz ≤ f < 8 GHz, BW = 1 MHz	< 18 dBµV
	8 GHz ≤ f < 13.6 GHz, BW = 1 MHz	< 19 dBµV
	13.6 GHz ≤ f < 18 GHz, BW = 1 MHz	< 20 dBµV
	18 GHz ≤ f < 25 GHz, BW = 1 MHz	< 22 dBµV
	25 GHz ≤ f ≤ 34 GHz, BW = 1 MHz	< 27 dBµV
	34 GHz ≤ f < 40 GHz, BW = 1 MHz	< 30 dBµV
	40 GHz ≤ f ≤ 44 GHz, BW = 1 MHz	< 32 dBµV

Preamplifier = on, LNA = off	RF attenuation = 0 dB, termination = 50 Ω, average (AV) detector, +5 °C to +40 °C	
	all models	
	1 kHz ≤ f < 9 kHz, BW = 100 Hz	< –13 dBµV
	R&S®ESW8	
	9 kHz ≤ f < 150 kHz, BW = 200 Hz	< –25 dBµV
	150 kHz ≤ f ≤ 1 MHz, BW = 9 kHz	< –9 dBµV
	1 MHz ≤ f < 30 MHz, BW = 9 kHz	< –16 dBµV
	30 MHz ≤ f < 1 GHz, BW = 120 kHz	< –7 dBµV
	1 GHz ≤ f < 2.5 GHz, BW = 1 MHz	< 2 dBµV
	2.5 GHz ≤ f < 4.8 GHz, BW = 1 MHz	< 5 dBµV
	4.8 GHz ≤ f ≤ 8 GHz, BW = 1 MHz	< 7 dBµV
	R&S®ESW26	
	9 kHz ≤ f < 150 kHz, BW = 200 Hz	< –25 dBµV
	150 kHz ≤ f < 1 MHz, BW = 9 kHz	< –9 dBµV
	1 MHz ≤ f < 30 MHz, BW = 9 kHz	< –15 dBµV
	30 MHz ≤ f < 1 GHz, BW = 120 kHz	< –4 dBµV
	1 GHz ≤ f < 2.5 GHz, BW = 1 MHz	< 5 dBµV
	2.5 GHz ≤ f < 4.8 GHz, BW = 1 MHz	< 9 dBµV
	4.8 GHz ≤ f < 8 GHz, BW = 1 MHz	< 12 dBµV
	8 GHz ≤ f ≤ 13.6 GHz, BW = 1 MHz	< 3 dBµV
	13.6 GHz < f ≤ 22 GHz, BW = 1 MHz	< 5 dBµV
	22 GHz < f ≤ 26.5 GHz, BW = 1 MHz	< 10 dBµV
	R&S®ESW44	
	9 kHz ≤ f < 150 kHz, BW = 200 Hz	< –25 dBµV
	150 kHz ≤ f < 1 MHz, BW = 9 kHz	< –9 dBµV
	1 MHz ≤ f < 30 MHz, BW = 9 kHz	< –15 dBµV
	30 MHz ≤ f < 1 GHz, BW = 120 kHz	< –4 dBµV
	1 GHz ≤ f < 2.5 GHz, BW = 1 MHz	< 5 dBµV
	2.5 GHz ≤ f < 4.8 GHz, BW = 1 MHz	< 9 dBµV
	4.8 GHz ≤ f < 8 GHz, BW = 1 MHz	< 12 dBµV
	8 GHz ≤ f ≤ 18 GHz, BW = 1 MHz	< 5 dBµV
	18 GHz < f ≤ 26.5 GHz, BW = 1 MHz	< 6 dBµV
	26.5 GHz < f ≤ 40 GHz, BW = 1 MHz	< 7 dBµV
	40 GHz < f ≤ 43 GHz, BW = 1 MHz	< 10 dBµV
	43 GHz < f ≤ 44 GHz, BW = 1 MHz	< 21 dBµV

Preamplifier = off, LNA = on	RF attenuation = 0 dB, termination = 50 Ω, average (AV) detector, +5 °C to +40 °C	
	R&S®ESW8	
	150 kHz ≤ f ≤ 1 MHz, BW = 9 kHz	< 16 dBµV
	1 MHz < f ≤ 5 MHz, BW = 9 kHz	< 6 dBµV
	5 MHz < f < 30 MHz, BW = 9 kHz	< –4 dBµV
	30 MHz ≤ f ≤ 50 MHz, BW = 120 kHz	< 7 dBµV
	50 MHz < f ≤ 150 MHz, BW = 120 kHz	< –5 dBµV
	150 MHz < f < 1 GHz, BW = 120 kHz	< –8 dBµV
	1 GHz ≤ f ≤ 8 GHz, BW = 1 MHz	< 1 dBµV
	R&S®ESW26	
	150 kHz ≤ f ≤ 1 MHz, BW = 9 kHz	< 16 dBµV
	1 MHz < f ≤ 5 MHz, BW = 9 kHz	< 6 dBµV
	5 MHz < f < 30 MHz, BW = 9 kHz	< –4 dBµV
	30 MHz ≤ f ≤ 50 MHz, BW = 120 kHz	< 7 dBµV
	50 MHz < f ≤ 150 MHz, BW = 120 kHz	< –5 dBµV
	150 MHz < f < 1 GHz, BW = 120 kHz	< –8 dBµV
	1 GHz ≤ f ≤ 8 GHz, BW = 1 MHz	< 1 dBµV
	8 GHz < f ≤ 13.6 GHz, BW = 1 MHz	< 3 dBµV
	13.6 GHz < f ≤ 22 GHz, BW = 1 MHz	< 5 dBµV
	22 GHz < f ≤ 26.5 GHz, BW = 1 MHz	< 10 dBµV
	R&S®ESW44	
	150 kHz ≤ f ≤ 1 MHz, BW = 9 kHz	< –14 dBµV
	1 MHz < f < 30 MHz, BW = 9 kHz	< –19 dBµV
	30 MHz ≤ f < 1 GHz, BW = 120 kHz	< –7 dBµV
	1 GHz ≤ f ≤ 3 GHz, BW = 1 MHz	< 2 dBµV
	3 GHz < f ≤ 8 GHz, BW = 1 MHz	< 5 dBµV
	8 GHz < f ≤ 18 GHz, BW = 1 MHz	< 5 dBµV
	18 GHz < f ≤ 26.5 GHz, BW = 1 MHz	< 6 dBµV
	26.5 GHz < f ≤ 40 GHz, BW = 1 MHz	< 7 dBµV
	40 GHz < f ≤ 43 GHz, BW = 1 MHz	< 10 dBµV
	43 GHz < f ≤ 44 GHz, BW = 1 MHz	< 21 dBµV

Spurious responses

Spurious responses	mixer level ≤ –10 dBm [9], sweep optimization: auto or dynamic	
Image response	f_{in} – 2 × 8997 MHz (1st IF)	< –90 dBc
	f_{in} – 2 × 1317 MHz (2nd IF)	< –90 dBc
	f_{in} – 2 × 37 MHz (3rd IF)	< –90 dBc
	f_{in} = external interfering signal frequency	
Intermediate frequency response	f_{in} = 1st IF (8997 MHz)	< –90 dBc
	f_{in} = 2nd IF (1317 MHz)	< –90 dBc
	f_{in} = 3rd IF (37 MHz)	< –90 dBc
	f_{in} = external interfering signal frequency	
Residual spurious response	RF attenuation = 0 dB	
	f ≤ 1 MHz	< –90 dBm
	1 MHz < f ≤ 8900 MHz	< –110 dBm
	8900 MHz < f ≤ 26.5 GHz	< –100 dBm
	26.5 GHz < f ≤ 44 GHz	< –100 dBm
	f = receive frequency	
Local oscillator related spurious	f_{in} < 1 GHz	
	10 Hz ≤ offset from carrier < 200 Hz	< –90 dBc
	offset from carrier > 200 Hz	< –100 dBc
	f_{in} ≥ 1 GHz	
	10 Hz ≤ offset from carrier < 200 Hz	< –90 dBc + 20 log (f_{in}/GHz)
	offset from carrier > 200 Hz	< –100 dBc + 20 log (f_{in}/GHz)
Vibrational environmental stimuli	max. 0.21 g (RMS)	< –60 dBc + 20 log (f_{in}/GHz) (nom.)

[9] Mixer level = signal level – RF attenuation + preamplifier / LNA gain.

Level measurement uncertainty

Absolute level uncertainty at 64 MHz	RBW = 10 kHz, level = –10 dBm, reference level = –10 dBm, RF attenuation = 10 dB	
	preselection off [6], +20 °C to +30 °C	< 0.2 dB (σ = 0.07 dB)
	preselection on or off [6], +15 °C to +40 °C	< 0.35 dB (σ = 0.12 dB)
Frequency response, referenced to 64 MHz, preselection off [6]	RF attenuation = 10 dB, 20 dB, 30 dB, 40 dB, LNA off [7], +20 °C to +30 °C	
	1 Hz ≤ f < 2 Hz	< 2 dB (σ = 0.67 dB)
	2 Hz ≤ f < 9 kHz	< 1 dB (σ = 0.33 dB)
	9 kHz ≤ f < 10 MHz	< 0.45 dB (σ = 0.17 dB)
	10 MHz ≤ f < 3.6 GHz	< 0.3 dB (σ = 0.10 dB)
	3.6 GHz ≤ f ≤ 8 GHz	< 0.5 dB (σ = 0.17 dB)
	8 GHz < f < 22 GHz, span < 1 GHz	< 1.5 dB (σ = 0.50 dB)
	22 GHz ≤ f ≤ 26.5 GHz, span < 1 GHz	< 2 dB (σ = 0.67 dB)
	26.5 GHz < f ≤ 44 GHz, span < 1 GHz	< 2.5 dB (σ = 0.83 dB)
	any RF attenuation, LNA off [7], +15 °C to +40 °C	
	1 Hz ≤ f < 2 Hz	< 2 dB (σ = 0.67 dB)
	2 Hz ≤ f < 9 kHz	< 1 dB (σ = 0.33 dB)
	9 kHz ≤ f < 3.6 GHz	< 0.6 dB (σ = 0.20 dB)
	3.6 GHz ≤ f ≤ 8 GHz	< 0.8 dB (σ = 0.27 dB)
	8 GHz < f < 22 GHz, span < 1 GHz	< 2 dB (σ = 0.67 dB)
	22 GHz ≤ f ≤ 26.5 GHz, span < 1 GHz	< 2.5 dB (σ = 0.83 dB)
	26.5 GHz < f ≤ 44 GHz, span < 1 GHz	< 3 dB (σ = 1.0 dB)
	RF attenuation ≤ 20 dB, LNA on [7], +20 °C to +30 °C	
	150 kHz ≤ f < 10 MHz	< 1 dB
	10 MHz ≤ f < 3.6 GHz	< 0.6 dB (σ = 0.2 dB)
	3.6 GHz ≤ f ≤ 8 GHz	< 0.8 dB (σ = 0.27 dB)
	8 GHz < f < 22 GHz, span < 1 GHz	< 2 dB (σ = 0.67 dB)
	22 GHz ≤ f ≤ 26.5 GHz, span < 1 GHz	< 2.5 dB (σ = 0.83 dB)
	26.5 GHz < f ≤ 44 GHz, span < 1 GHz	< 2.8 dB (σ = 0.93 dB)
Frequency response, referenced to 64 MHz, preselection on [8]	RF attenuation = 10 dB, 20 dB, 30 dB, 40 dB, preamplifier and LNA off [7], +20 °C to +30 °C	
	1 Hz ≤ f < 2 Hz	< 2 dB (σ = 0.67 dB)
	2 Hz ≤ f < 9 kHz	< 1 dB (σ = 0.33 dB)
	9 kHz ≤ f < 10 MHz	< 0.65 dB (σ = 0.22 dB)
	10 MHz ≤ f < 3.6 GHz	< 0.5 dB (σ = 0.17 dB)
	3.6 GHz ≤ f ≤ 8 GHz	< 0.7 dB (σ = 0.23 dB)
	8 GHz < f < 22 GHz, span < 1 GHz	< 1.5 dB (σ = 0.50 dB)
	22 GHz ≤ f ≤ 26.5 GHz, span < 1 GHz	< 2 dB (σ = 0.67 dB)
	26.5 GHz < f ≤ 44 GHz, span < 1 GHz	< 2.5 dB (σ = 0.83 dB)
	any RF attenuation, preamplifier and LNA off [7], +15 °C to +40 °C	
	1 Hz ≤ f < 2 Hz	< 2 dB (σ = 0.67 dB)
	2 Hz ≤ f < 9 kHz	< 1 dB (σ = 0.33 dB)
	9 kHz ≤ f < 3.6 GHz	< 0.8 dB (σ = 0.27 dB)
	3.6 GHz ≤ f ≤ 8 GHz	< 1.2 dB (σ = 0.4 dB)
	8 GHz < f < 22 GHz, span < 1 GHz	< 2 dB (σ = 0.67 dB)
	22 GHz ≤ f ≤ 26.5 GHz, span < 1 GHz	< 2.5 dB (σ = 0.83 dB)
	26.5 GHz < f ≤ 44 GHz, span < 1 GHz	< 3 dB (σ = 1.0 dB)
	RF attenuation = 10 dB, 20 dB, 30 dB, 40 dB, preamplifier on, LNA off [7], +20 °C to +30 °C	
	1 kHz ≤ f < 10 MHz	< 1 dB (σ = 0.33 dB)
	10 MHz ≤ f < 3.6 GHz	< 0.8 dB (σ = 0.27 dB)
	3.6 GHz ≤ f ≤ 8 GHz	< 1.2 dB (σ = 0.4 dB)
	8 GHz < f < 13.6 GHz, span < 1 GHz	< 1.5 dB (σ = 0.50 dB)
	13.6 GHz ≤ f ≤ 26.5 GHz, span < 1 GHz	< 2 dB (σ = 0.67 dB)
	26.5 GHz < f ≤ 44 GHz, span < 1 GHz	< 2.8 dB (σ = 0.93 dB)
	RF attenuation ≤ 20 dB, preamplifier off, LNA on [7], +20 °C to +30 °C	
	150 kHz ≤ f < 10 MHz	< 1 dB (σ = 0.33 dB)
	10 MHz ≤ f < 3.6 GHz	< 0.8 dB (σ = 0.27 dB)
	3.6 GHz ≤ f ≤ 8 GHz	< 1.2 dB (σ = 0.4 dB)
	8 GHz < f < 13.6 GHz, span < 1 GHz	< 1.5 dB (σ = 0.50 dB)
	13.6 GHz ≤ f ≤ 26.5 GHz, span < 1 GHz	< 2 dB (σ = 0.67 dB)
	26.5 GHz < f ≤ 44 GHz, span < 1 GHz	< 2.8 dB (σ = 0.93 dB)

Attenuator switching uncertainty	f = 64 MHz, 0 dB to 70 dB, referenced to 10 dB attenuation	< 0.2 dB (σ = 0.07 dB)
Uncertainty of reference level setting	input mixer level ≤ –15 dBm	0 dB [10]
	input mixer level > –15 dBm	< 0.1 dB (nom.)
Bandwidth switching uncertainty	referenced to RBW = 10 kHz	< 0.1 dB (σ = 0.04 dB)

Nonlinearity of displayed level		
Logarithmic level display	S/N > 16 dB, 0 dB ≤ level ≤ –70 dB	< 0.1 dB (σ = 0.04 dB)
	S/N > 16 dB, –70 dB < level ≤ –90 dB	< 0.2 dB (σ = 0.08 dB)
Linear level display	S/N > 16 dB, 0 dB to –70 dB	< 5 % of reference level (nom.)

CISPR detectors		
Max. peak, quasi-peak, CISPR-average, RMS-average	receiver mode or analyzer mode with preselection on, span = 0 Hz	level measurement uncertainty in line with CISPR 16-1-1:2019

Total measurement uncertainty		
Preselection off [6]	signal level = 0 dB to –70 dB below reference level, S/N > 20 dB, sweep time = auto, RF attenuation = 10 dB, 20 dB, 30 dB, 40 dB, LNA off [7], span / RBW < 100, 95 % confidence level, +20 °C to +30 °C	
	9 kHz ≤ f ≤ 10 MHz	±0.37 dB
	10 MHz < f ≤ 3.6 GHz	±0.27 dB
	3.6 GHz < f ≤ 8 GHz	±0.37 dB
	8 GHz < f ≤ 22 GHz	±1 dB
	22 GHz < f ≤ 26.5 GHz	±1.33 dB
	26.5 GHz < f ≤ 44 GHz	±1.65 dB
Preselection on [8]	signal level = 0 dB to –70 dB below reference level, S/N > 20 dB, sweep time = auto, RF attenuation = 10 dB, 20 dB, 30 dB, 40 dB, preamplifier off, LNA off [7], span / RBW < 100, 95 % confidence level, +20 °C to +30 °C	
	9 kHz ≤ f ≤ 10 MHz	±0.51 dB
	10 MHz < f ≤ 3.6 GHz	±0.43 dB
	3.6 GHz < f ≤ 8 GHz	±0.54 dB
	8 GHz < f ≤ 22 GHz	±1 dB
	22 GHz < f ≤ 26.5 GHz	±1.33 dB
	26.5 GHz < f ≤ 44 GHz	±1.65 dB
	signal level = 0 dB to –70 dB below reference level, S/N > 20 dB, sweep time = auto, RF attenuation = 10 dB, 20 dB, preamplifier on or LNA on [7], span / RBW < 100, 95 % confidence level, +20 °C to +30 °C	
	150 kHz ≤ f ≤ 10 MHz	±0.71 dB
	10 MHz < f ≤ 3.6 GHz	±0.59 dB
	3.6 GHz < f ≤ 8 GHz	±0.83 dB
	8 GHz < f ≤ 13.6 GHz	±1 dB
	13.6 GHz < f ≤ 26.5 GHz	±1.33 dB
	26.5 GHz < f ≤ 44 GHz	±1.84 dB

[10] The reference level setting affects only the graphical representation of the measurement result on the display, not the measurement itself. The reference level setting causes no additional uncertainty in measurement results.

R&S®ESW-B350/-B350R/-B1000/-B1000R time domain scan options

Specifications in this section are valid for time domain scan with TDS optimization mode “max speed”, for instruments equipped with one of the following options: R&S®ESW-B350, R&S®ESW-B350R, R&S®ESW-B1000, R&S®ESW-B1000R.

Level

Third-order intercept point (TOI)	RF attenuation = 0 dB, level = 2 × –10 dBm, ∆f > 5 × RBW, preamplifier off	
	30 MHz ≤ f_{in} ≤ 1 GHz	18 dBm (nom.)
	RF attenuation = 0 dB, level = 2 × –25 dBm, ∆f > 5 × RBW, preamplifier on	
	30 MHz ≤ f_{in} ≤ 1 GHz	5 dBm (nom.)
	RF attenuation = 0 dB, level = 2 × –45 dBm, ∆f > 5 × RBW, LNA on [7]	
	30 MHz ≤ f_{in} ≤ 1 GHz	–15 dBm (nom.)
Second harmonic intercept point (SHI)	RF attenuation = 0 dB, level = –10 dBm, preamplifier off	
	15 MHz < f_{in} ≤ 110 MHz	45 dBm (nom.)
	110 MHz < f_{in} ≤ 500 MHz	55 dBm (nom.)
	RF attenuation = 0 dB, level = –30 dBm, preamplifier on	
	15 MHz < f_{in} ≤ 110 MHz	20 dBm (nom.)
	110 MHz < f_{in} ≤ 500 MHz	30 dBm (nom.)
	RF attenuation = 0 dB, level = –55 dBm, LNA on [7]	
	15 MHz < f_{in} ≤ 110 MHz	–6 dBm (nom.)
	110 MHz < f_{in} ≤ 500 MHz	6 dBm (nom.)

Sensitivity

All noise level data in this section not marked as typical (typ.) or nominal (nom.) are specified values whose compliance is ensured by testing.

Noise indication of instruments without R&S®ESW-B24 option (receiver mode)		
Preamplifier = off	RF attenuation = 0 dB, termination = 50 Ω, average (AV) detector, +5 °C to +40 °C	
	all models	
	30 MHz ≤ f < 1 GHz, BW = 120 kHz	< 9 dBµV
	R&S®ESW8	
	1 GHz ≤ f < 3 GHz, BW = 1 MHz	< 15 dBµV
	3 GHz ≤ f ≤ 8 GHz, BW = 1 MHz	< 15 dBµV
	R&S®ESW26, R&S®ESW44	
	1 GHz ≤ f < 3 GHz, BW = 1 MHz	< 16 dBµV
	3 GHz ≤ f < 8 GHz, BW = 1 MHz	< 17 dBµV
	f ≥ 8 GHz, BW = 1 MHz	see specifications of base unit
Preamplifier = on	RF attenuation = 0 dB, termination = 50 Ω, average (AV) detector, +5 °C to +40 °C	
	all models	
	30 MHz ≤ f < 1 GHz, BW = 120 kHz	< –2 dBµV
	R&S®ESW8	
	1 GHz ≤ f < 2.5 GHz, BW = 1 MHz	< 2 dBµV
	2.5 GHz ≤ f < 4.8 GHz, BW = 1 MHz	< 5 dBµV
	4.8 GHz ≤ f ≤ 8 GHz, BW = 1 MHz	< 7 dBµV
	R&S®ESW26, R&S®ESW44	
	1 GHz ≤ f < 2.5 GHz, BW = 1 MHz	< 4 dBµV
	2.5 GHz ≤ f < 4.8 GHz, BW = 1 MHz	< 7 dBµV
	4.8 GHz ≤ f < 8 GHz, BW = 1 MHz	< 10 dBµV
	f ≥ 8 GHz, BW = 1 MHz	see specifications of base unit
Noise indication of instruments with R&S®ESW-B24 option (receiver mode)		
Preamplifier = off, LNA = off	RF attenuation = 0 dB, termination = 50 Ω, average (AV) detector, +5 °C to +40 °C	
	all models	
	30 MHz ≤ f < 1 GHz, BW = 120 kHz	< 9 dBµV
	R&S®ESW8	
	1 GHz ≤ f < 3 GHz, BW = 1 MHz	< 15 dBµV
	3 GHz ≤ f ≤ 8 GHz, BW = 1 MHz	< 15 dBµV
	R&S®ESW26, R&S®ESW44	
	1 GHz ≤ f < 3 GHz, BW = 1 MHz	< 17 dBµV
	3 GHz ≤ f < 8 GHz, BW = 1 MHz	< 18 dBµV
	f ≥ 8 GHz, BW = 1 MHz	see specifications of base unit

Preamplifier = on, LNA = off	RF attenuation = 0 dB, termination = 50 Ω, average (AV) detector, +5 °C to +40 °C	
	all models	
	30 MHz ≤ f < 1 GHz, BW = 120 kHz	< –4 dBµV
	R&S®ESW8	
	1 GHz ≤ f < 2.5 GHz, BW = 1 MHz	< 2 dBµV
	2.5 GHz ≤ f < 4.8 GHz, BW = 1 MHz	< 5 dBµV
	4.8 GHz ≤ f ≤ 8 GHz, BW = 1 MHz	< 7 dBµV
	R&S®ESW26, R&S®ESW44	
	1 GHz ≤ f < 2.5 GHz, BW = 1 MHz	< 5 dBµV
	2.5 GHz ≤ f < 4.8 GHz, BW = 1 MHz	< 9 dBµV
	4.8 GHz ≤ f < 8 GHz, BW = 1 MHz	< 12 dBµV
	f ≥ 8 GHz, BW = 1 MHz	see specifications of base unit
Preamplifier = off, LNA = on	RF attenuation = 0 dB, termination = 50 Ω, average (AV) detector, +5 °C to +40 °C	
	all models	
	30 MHz ≤ f < 1 GHz, BW = 120 kHz	< –10 dBµV
	R&S®ESW8	
	1 GHz ≤ f ≤ 8 GHz, BW = 1 MHz	< 1 dBµV
	R&S®ESW26	
	1 GHz ≤ f ≤ 8 GHz, BW = 1 MHz	< 1 dBµV
	f ≥ 8 GHz, BW = 1 MHz	see specifications of base unit
	R&S®ESW44	
	1 GHz ≤ f ≤ 3 GHz, BW = 1 MHz	< 3 dBµV
	3 GHz < f ≤ 8 GHz, BW = 1 MHz	< 7 dBµV
	f ≥ 8 GHz, BW = 1 MHz	see specifications of base unit

Spurious responses

Residual spurious response	RF attenuation = 0 dB	
	30 MHz ≤ f ≤ 1 GHz	–103 dBm (nom.)
	375 MHz, 400 MHz	–90 dBm (nom.)
	750 MHz	–77 dBm (nom.)
	1 GHz < f ≤ 8 GHz	–90 dBm (nom.)
ADC related spurious	RF attenuation = 0 dB	
	30 MHz ≤ f ≤ 1 GHz, input level = –10 dBm	–70 dBc (nom.)

Level measurement uncertainty

Frequency response, referenced to 64 MHz	RF attenuation = 10 dB, 20 dB, 30 dB, 40 dB, preamplifier off, +20 °C to +30 °C	
	30 MHz ≤ f < 1 GHz	< 0.5 dB (σ = 0.17 dB)
	1 GHz ≤ f ≤ 8 GHz	< 0.7 dB (σ = 0.27 dB)
	RF attenuation = 10 dB, 20 dB, 30 dB, 40 dB, preamplifier on, +20 °C to +30 °C	
	30 MHz ≤ f < 1 GHz	< 0.8 dB (σ = 0.27 dB)
	1 GHz ≤ f ≤ 8 GHz	< 0.8 dB (σ = 0.27 dB)
	any RF attenuation, preamplifier on/off, +15 °C to +40 °C	
	30 MHz ≤ f < 1 GHz	< 0.8 dB (σ = 0.27 dB)
	1 GHz ≤ f ≤ 8 GHz	< 1.2 dB (σ = 0.4 dB)
	RF attenuation ≤ 20 dB, LNA on [7], +20 °C to +30 °C	
	30 MHz ≤ f < 1 GHz	< 0.8 dB (σ = 0.27 dB)
	1 GHz ≤ f ≤ 8 GHz	< 1.2 dB (σ = 0.4 dB)
Nonlinearity of displayed level, logarithmic level display at 128 MHz	S/N > 16 dB, 0 dB ≤ level ≤ –60 dB	< 0.1 dB (nom.)
CISPR detectors	max. peak, quasi-peak, CISPR-average, RMS-average	level measurement uncertainty in line with CISPR 16-1-1:2019, quasi-peak PRF ≥ 5 Hz

Total measurement uncertainty	signal level = 0 dB to –60 dB below reference level, S/N > 20 dB, RF attenuation = 10 dB, 20 dB, 30 dB, 40 dB, preamplifier off, LNA off [7], 95 % confidence level, +20 °C to +30 °C	
	30 MHz ≤ f < 1 GHz	±0.47 dB
	1 GHz ≤ f ≤ 8 GHz	±0.57 dB
	signal level = 0 dB to –60 dB below reference level, S/N > 20 dB, RF attenuation = 10 dB, 20 dB, preamplifier on, 95 % confidence level, +20 °C to +30 °C	
	30 MHz ≤ f < 1 GHz	±0.62 dB
	1 GHz ≤ f ≤ 8 GHz	±0.62 dB
	signal level = 0 dB to –60 dB below reference level, S/N > 20 dB, RF attenuation = 10 dB, 20 dB, LNA on [7], 95 % confidence level, +20 °C to +30 °C	
	30 MHz ≤ f < 1 GHz	±0.62 dB
	1 GHz ≤ f ≤ 8 GHz	±0.85 dB
	f > 8 GHz	see specifications of base unit

Time domain scan (TDS)

Maximum frequency segment processed in parallel		
TDS optimization: max speed, any detector, standard	RBW = 200 Hz	1.31 MHz
	f < 8 GHz	
	RBW = 9 kHz	60 MHz
	RBW = 120 kHz	49.2 MHz
	RBW = 1 MHz	51.2 MHz
	8 GHz ≤ f < 18.5 GHz	
	RBW ≥ 9 kHz	20 MHz
	f ≥ 18.5 GHz	
	RBW ≥ 9 kHz	30 MHz
TDS optimization: max speed, any detector, with R&S®ESW-B350/-B350R	RBW = 200 Hz	1.31 MHz
	30 MHz ≤ f < 8 GHz	
	RBW = 9 kHz	90 MHz
	RBW = 120 kHz, 1 MHz	350 MHz
	1 GHz ≤ f < 8 GHz	
	RBW = 9 kHz	90 MHz
	RBW = 120 kHz, 1 MHz	350 MHz
	8 GHz ≤ f < 18.5 GHz	
	RBW ≥ 9 kHz	20 MHz
	f ≥ 18.5 GHz	
	RBW ≥ 9 kHz	30 MHz
TDS optimization: max speed, any detector, with R&S®ESW-B1000/-B1000R	RBW = 200 Hz	1.31 MHz
	30 MHz ≤ f < 1000 MHz	
	RBW = 9 kHz	90 MHz
	RBW = 120 kHz	970 MHz
	RBW = 1 MHz	880 MHz
	1 GHz ≤ f < 8 GHz	
	RBW = 9 kHz	90 MHz
	RBW = 120 kHz, 1 MHz	450 MHz
	8 GHz ≤ f < 18.5 GHz	
	RBW ≥ 9 kHz	20 MHz
	f ≥ 18.5 GHz	
	RBW ≥ 9 kHz	30 MHz
TDS optimization: dynamic, any detector	RBW = 200 Hz	0.66 MHz
	RBW = 9 kHz	30 MHz
	RBW = 120 kHz	24.6 MHz
	RBW = 1 MHz	25.6 MHz
TDS optimization: automatic	CISPR detector off	see TDS optimization “max speed”
	CISPR detector on	
	RBW = 200 Hz, 9 kHz, 1 MHz	see TDS optimization “dynamic”
	RBW = 120 kHz, CISPR band B, C	see TDS optimization “dynamic”
	RBW = 120 kHz, CISPR band D, E	see TDS optimization “max speed”

Time domain scan compliance to CISPR 16-1-1		
TDS optimization mode	automatic [8]	fully compliant
	max speed	
	standard	compliant for pulses with a repetition frequency ≥ 10 Hz
	with R&S®ESW-B350/-B350R/ -B1000/-B1000R option	compliant for pulses with a repetition frequency ≥ 5 Hz
	dynamic	enhanced dynamic in CISPR band D for applications with requirements beyond CISPR 16-1-1

Measurement speed

TDS optimization	automatic	max speed
CISPR band B, 150 kHz to 30 MHz		
RBW = 9 kHz, measurement time = 100 ms, peak detector		
	110 ms (meas.)	
RBW = 9 kHz, measurement time = 1 s, quasi-peak and CISPR-average detector		
	2 s (meas.)	
CISPR band C/D, 30 MHz to 1000 MHz		
RBW = 120 kHz, measurement time = 10 ms, peak detector		
standard	380 ms (meas.)	
R&S®ESW-B350/-B350R option	49 ms (meas.)	
R&S®ESW-B1000/-B1000R option	18 ms (meas.)	
RBW = 120 kHz, measurement time = 1 s, quasi-peak and CISPR-average detector		
standard	50 s (meas.)	40 s (meas.)
R&S®ESW-B350/-B350R option	22 s (meas.)	5.2 s (meas.)
R&S®ESW-B1000/-B1000R option	18.5 s (meas.)	1.8 s (meas.)
RBW = 9 kHz, measurement time = 1 s, quasi-peak and CISPR-average detector		
standard	64 s (meas.)	40 s (meas.)
R&S®ESW-B350/-B350R/ -B1000/-B1000R option	64 s (meas.)	22.5 s (meas.)
RBW = 100 kHz, measurement time = 150 ms, peak detector		
standard	4.1 s (meas.)	
R&S®ESW-B350/-B350R option	468 ms (meas.)	
R&S®ESW-B1000/-B1000R option	155 ms (meas.)	
CISPR band E, 1 GHz to 6 GHz		
RBW = 120 kHz, measurement time = 1 s, peak and CISPR-average detector		
standard	293 s (meas.)	
R&S®ESW-B350/-B350R option	28 s (meas.)	
R&S®ESW-B1000/-B1000R option	26 s (meas.)	
CISPR band E, 1 GHz to 18 GHz		
RBW = 1 MHz, measurement time = 15 ms, peak detector		
standard	13.1 s (meas.)	
R&S®ESW-B350/-B350R/ -B1000/-B1000R option	11 s (meas.)	
18 GHz to 40 GHz		
RBW = 1 MHz, measurement time = 15 ms, peak detector		
	18 s (meas.)	

Trigger functions

Trigger		
Trigger source	analyzer mode	free run, video, external, IF power, RF power
	receiver mode	free run, video, external
Trigger offset	span ≥ 10 Hz	5 ns to 20 s
	span = 0 Hz	(–sweep time) to 20 s
Min. trigger offset resolution	span > 0 Hz	5 ns
	span = 0 Hz, trigger offset > 0	5 ns
	span = 0 Hz, trigger offset < 0	sweep time / number of sweep points
Max. deviation of trigger offset		5 ns
IF power trigger (analyzer mode)		
Sensitivity	min. signal power	–60 dBm + RF attenuation – LNA gain (nom.)
	max. signal power	–10 dBm + RF attenuation – LNA gain (nom.)
IF power trigger bandwidth	RBW > 500 kHz	20 MHz (nom.) [11]
	RBW ≤ 500 kHz, FFT	20 MHz (nom.)
	RBW ≤ 500 kHz, swept	6 MHz (nom.)
RF power trigger (analyzer mode)		
Sensitivity	min. signal power	–30 dBm + RF attenuation – LNA gain (nom.)
	max. signal power	+10 dBm + RF attenuation – LNA gain (nom.)
RF power trigger frequency range	f ≤ 8 GHz	8 GHz (nom.)
	f > 8 GHz	center frequency ± 25 MHz (nom.)
Gated sweep		
Gate source		video, external, IF power, RF power
Gate delay		5 ns to 20 s, min. resolution: 5 ns
Gate length		5 ns to 20 s, min. resolution: 5 ns
Max. deviation of gate length		±5 ns

Audio demodulator

Demodulation		
AF demodulation types		AM and FM
Audio output		loudspeaker and phone jack
Marker stop time in spectrum mode		100 ms to 60 s

[11] Sweep optimization = auto.

Inputs and outputs

RF input		
Impedance		50 Ω
Connector	R&S®ESW8	
	RF input 1, RF input 2	N female
	R&S®ESW26	
	RF input 1	APC 3.5 mm male (compatible with SMA)
	RF input 2	N female
	R&S®ESW44	
	RF input 1	2.92 mm male (compatible with SMA)
	RF input 2	N female
VSWR of R&S®ESW8	RF attenuation ≤ 4 dB	
	1 Hz ≤ f < 9 kHz, DC coupled	2.0 (nom.) [12]
	9 kHz ≤ f < 10 MHz, DC coupled	< 2.0
	10 MHz ≤ f ≤ 1 GHz	< 2.0
	1 GHz < f ≤ 8 GHz	< 3.0
	5 dB ≤ RF attenuation ≤ 9 dB	
	1 Hz ≤ f < 9 kHz, DC coupled	1.5 (nom.)
	9 kHz ≤ f < 10 MHz, DC coupled	< 1.5, typ. 1.20 [13]
	10 MHz ≤ f < 1 GHz	< 1.5, typ. 1.20 [13]
	1 GHz ≤ f < 3.6 GHz	< 1.5, typ. 1.31 [13]
	3.6 GHz ≤ f ≤ 8 GHz	< 2.0, typ. 1.51 [13]
	RF attenuation ≥ 10 dB	
	1 Hz ≤ f < 9 kHz, DC coupled	1.2 (nom.)
	9 kHz ≤ f < 10 MHz, DC coupled	< 1.2, typ. 1.09 [13]
	10 MHz ≤ f < 1 GHz	< 1.2, typ. 1.09 [13]
	1 GHz ≤ f < 3.6 GHz	< 1.5, typ. 1.19 [13]
	3.6 GHz ≤ f ≤ 8 GHz	< 2.0, typ. 1.42 [13]
VSWR of R&S®ESW26, R&S®ESW44	RF attenuation ≤ 4 dB	
	1 Hz ≤ f < 9 kHz, DC coupled	2.0 (nom.) [12]
	9 kHz ≤ f < 10 MHz, DC coupled	< 2.0
	10 MHz ≤ f ≤ 1 GHz	< 2.0
	1 GHz < f ≤ 40 GHz	< 3.0
	40 GHz < f ≤ 44 GHz	3.0 (nom.)
	5 dB ≤ RF attenuation ≤ 9 dB	
	1 Hz ≤ f < 9 kHz, DC coupled	1.5 (nom.)
	9 kHz ≤ f < 10 MHz, DC coupled	< 1.5, typ. 1.24 [13]
	10 MHz ≤ f ≤ 3.5 GHz	< 1.5, typ. 1.24 [13]
	3.5 GHz < f ≤ 8 GHz	< 1.8, typ. 1.26 [13]
	8 GHz < f ≤ 18 GHz	< 1.8, typ. 1.39 [13]
	18 GHz < f ≤ 26.5 GHz	< 2.0, typ. 1.43 [13]
	26.5 GHz < f ≤ 40 GHz	< 2.5, typ. 1.8 [13]
	40 GHz < f ≤ 44 GHz	2.0 (nom.)
	RF attenuation ≥ 10 dB	
	1 Hz ≤ f < 9 kHz, DC coupled	1.2 (nom.)
	9 kHz ≤ f < 10 MHz, DC coupled	< 1.2, typ. 1.12 [13]
	10 MHz ≤ f ≤ 3.5 GHz	< 1.2, typ. 1.12 [13]
	3.5 GHz < f ≤ 8 GHz	< 1.5, typ. 1.19 [13]
	8 GHz < f ≤ 18 GHz	< 1.5, typ. 1.25 [13]
	18 GHz < f ≤ 26.5 GHz	< 2.0, typ. 1.37 [13]
	26.5 GHz < f ≤ 40 GHz	< 2.5, typ. 1.7 [13]
	40 GHz < f ≤ 44 GHz	2.0 (nom.)
Setting range of attenuator		0 dB to 79 dB, in 1 dB steps [14]

[12] Preselection off.

[13] Typical VSWR performance: performance expected to be met in 95 % of the cases with a confidence level of 95 %, temperature +20 °C to +30 °C, input set to “DC coupling”. These values are not warranted and are subject to modification if a significant change in the statistical behavior of production instruments is observed.

[14] Mechanical RF attenuator: 5 dB steps; electronic IF attenuator: 1 dB steps.

Probe power supply		
Supply voltages, selectable	probe 1: 3-pin connector	+15 V DC, –12.6 V DC and ground, max. 150 mA (nom.)
	probe 2: 5-pin connector	±10 V DC and ground, max. 100 mA (nom.)

USB interface		
		7 ports, type A plug, version 2.0
		1 port, type B plug, version 2.0

AF output		
Connector		3.5 mm mini-jack
Output impedance		10 Ω (nom.)
Open-circuit voltage		up to 1.5 V, adjustable

External trigger/gate		
Number of ports		1 × input, 2 × input/output, selectable
Connector		BNC female
Trigger input voltage		0.5 V to 3.5 V (nom.)
Trigger output voltage		TTL-compatible, 0 V/5 V (nom.)
Impedance		10 kΩ (nom.)

Reference input: 1 MHz to 50 MHz		
Connector		BNC female
Impedance		50 Ω (nom.)
Input frequency range		1 MHz ≤ f_{in} ≤ 50 MHz, in 1 Hz steps
Required level		> 0 dBm

Reference input: 100 MHz/1 GHz		
Connector		SMA female
Impedance		50 Ω (nom.)
Input frequency range		100 MHz, 1 GHz
Required level		0 dBm to 10 dBm

Reference output: 10 MHz		
Connector		BNC female
Impedance		50 Ω (nom.)
Output frequency		10 MHz
Level		10 dBm (nom.)

Reference output: 1 MHz to 50 MHz		
Connector		BNC female
Impedance		50 Ω (nom.)
Output frequency	internal reference	not active
	external reference	same as reference input signal
Level		same as reference input signal

Reference output: 100 MHz		
Connector		SMA female
Impedance		50 Ω (nom.)
Output frequency		100 MHz
Level		6 dBm (nom.)

Reference output: 640 MHz		
Connector		SMA female
Impedance		50 Ω (nom.)
Output frequency		640 MHz
Level		16 dBm (nom.)

IF/video output		
Connector		BNC female, 50 Ω (nom.)
IF out		
Bandwidth		equal to RBW setting
IF frequency		(RBW / 2) to (240 MHz – RBW / 2)
Output level	center frequency > 10 MHz, span = 0 Hz or I/Q analyzer on, signal at reference level and center frequency	0 dBm (nom.)
Video out		
Bandwidth		equal to VBW setting
Output scaling	log. display scale	logarithmic
	lin. display scale	linear
Output level	center frequency > 10 MHz, span = 0 Hz, signal at reference level and center frequency	1 V at 50 Ω load (nom.)

IEC/IEEE bus control		interface in line with IEC 625-2 (IEEE-488.2)
Command set		SCPI 1997.0
Connector		24-pin Amphenol female
Interface functions		SH1, AH1, T6, L4, SR1, RL1, PP1, DC1, DT1, C0

LAN interface		10/100/1000BASE-T
Connector		RJ-45

External monitor		
Connectors		DVI-D, DisplayPort Rev 1.1

General data

Display		30.7 cm (12.1") WXGA color, multitouch screen
Resolution		1280 × 800 pixel (WXGA resolution)
Pixel failure rate		< 1 × 10^{-5}

Data storage		
Internal	standard	solid-state disk ≥ 128 Gbyte
External		supports USB 2.0 compatible memory devices

Temperature		
Temperature	operating temperature range	+5 °C to +50 °C [15]
	permissible temperature range	0 °C to +55 °C [15]
	storage temperature range	–40 °C to +70 °C
Climatic loading	without condensation	+40 °C at 90 % rel. humidity, in line with EN 60068-2-30

Altitude		
Max. operating altitude	above sea level	4600 m (approx. 15100 ft)

Mechanical resistance		
Vibration	sinusoidal	5 Hz to 55 Hz, displacement: 0.15 mm constant amplitude (1.8 g at 55 Hz); 55 Hz to 150 Hz, acceleration: 0.5 g constant, in line with EN 60068-2-6
	random	8 Hz to 500 Hz, acceleration 1.2 g (RMS), in line with EN 60068-2-64
Shock		40 g shock spectrum, in line with MIL-STD-810E, method no. 516.4, procedure I, MIL-PRF-28800F, class 3

EMC		• IEC/EN 61326-1 [16, 17] • CISPR 11/EN 55011 [16]

Recommended calibration interval		1 year

[15] With built-in R&S®ESW-B350/-B350R/-B1000/-B1000R option, the upper operating and permissible temperature with active time domain scan, TDS optimization: max speed, is limited to +40 °C.

[16] Emission limits for class B equipment apply.

[17] Immunity test requirement for industrial environment (EN 61326 table 2).

Power supply		
Input voltage range		100 V to 240 V (± 10 %)
Supply frequency		50 Hz to 60 Hz/400 Hz (± 5 %)
Maximum input current		7.3 A (100 V) to 4.6 A (240 V)
Power consumption	R&S®ESW8	
	without options	150 W
	with all options	390 W (meas.)
	R&S®ESW26	
	without options	175 W
	with all options	420 W (meas.)
	R&S®ESW44	
	without options	200 W
	with all options	440 W (meas.)
Safety		in line with: IEC 61010-1, EN 61010-1, UL 61010-1, CAN/CSA-C22.2 No. 61010-1
Test marks		VDE, $_{C}$CSA$_{US}$, CE, KCC

Dimensions and weight		
Dimensions (nom.)	W × H × D, including front handles and rear feet	462 mm × 240 mm × 504 mm (18.15 in × 9.44 in × 19.81 in)
Net weight, without options (nom.)	R&S®ESW8	20.6 kg (45.42 lb)
	R&S®ESW26	22.1 kg (48.72 lb)
	R&S®ESW44	25.2 kg (55.56 lb)

Options

R&S®ESW-B10 external generator control

Interface		
IEC/IEEE bus control		24-pin Amphenol female
Aux control		9-pin D-Sub female

Supported signal generators		R&S®SGS100A, R&S®SGT100A, R&S®SMA100A, R&S®SMA100B, R&S®SMB100A, R&S®SMB100B, R&S®SMBV100A, R&S®SMBV100B, R&S®SMC100A, R&S®SMCV100B, R&S®SME, R&S®SMF100A, R&S®SMG, R&S®SMGL, R&S®SMGU, R&S®SMH, R&S®SMHU, R&S®SMIQ, R&S®SMJ100A, R&S®SML, R&S®SMM100A, R&S®SMP, R&S®SMR, R&S®SMT, R&S®SMU200A, R&S®SMV03, R&S®SMW200A, R&S®SMX, R&S®SMY

R&S®ESW-B21 LO/IF connections for external mixers (not available for R&S®ESW8)

LO signal		
Frequency range		7.65 GHz to 17.45 GHz
Level	+20 °C to +30 °C	+15.5 dBm ± 1.5 dB
	+5 °C to +40 °C	+15.5 dBm ± 3 dB

IF input		
IF frequency	set signal analysis bandwidth	
	≤ 80 MHz, bandwidth-dependent	1310 MHz to 1330 MHz
Full-scale level	compression < 1 dB	
	2-port mixer (LO output/IF input, front panel)	–20 dBm (nom.)
	3-port mixer (IF input, front panel)	–20 dBm (nom.)
Level uncertainty at IF frequency	IF input level = reference level = –25 dBm, RBW = 30 kHz, mixer conversion loss set to 0 dB, 2-port mixer, LO output/IF input connector (front panel)	
	+20 °C to +30 °C	< 1 dB
	+5 °C to +40 °C	< 3 dB
	IF input level = reference level = –25 dBm, RBW = 30 kHz, mixer conversion loss set to 0 dB, 3-port mixer, IF input connector (front panel)	
	+20 °C to +30 °C	< 1 dB
	+5 °C to +40 °C	< 3 dB

Inputs and outputs		
LO output/IF input		SMA female, 50 Ω
IF input		SMA female, 50 Ω

R&S®ESW-K55 real-time measurement application

Span [18]		
Range		1 kHz to 80 MHz
Resolution		1 Hz

Frequency readout		
Number of sweep (trace) points		1001
Marker resolution		0.01 Hz
Uncertainty		±(marker frequency × reference uncertainty + 10 % × resolution bandwidth + ½ (span / (sweep points –1)) + 1 Hz)
Marker tuning frequency step size		span / 1000

Sweep time		
Range	real-time spectrum, real-time spectrogram, max. span	51.3 µs to 1.25 s [19]
Resolution		4.1 µs

Resolution bandwidths		
Range	Blackman Harris FFT window	0.3 Hz to 10 MHz, with respect to the supported span/RBW ratios
	Blackman Harris FFT window, with R&S®FSW-B8 or R&S®FSW-B8E option	10 MHz to 12.8 MHz, with respect to the supported span/RBW ratios
Span/RBW ratio with Blackman Harris FFT window		6.25 to 3200
Bandwidth uncertainty		< 3 % (nom.)

Level		
Minimum signal duration for 100 % probability of intercept with full amplitude accuracy [20]	span = 1 MHz	
	RBW = 312.5 Hz	13.1 ms
	RBW = 1.25 kHz	3.28 ms
	RBW = 5 kHz	820 µs
	RBW = 20 kHz	206 µs
	RBW = 160 kHz	27.3 µs
	span = 10 MHz	
	RBW = 3.125 kHz	1.34 ms
	RBW = 12.5 kHz	335 µs
	RBW = 50 kHz	83.6 µs
	RBW = 200 kHz	22.2 µs
	RBW = 1.6 MHz	17 µs
	span = 20 MHz	
	RBW = 6.25 kHz	683 µs
	RBW = 25 kHz	171 µs
	RBW = 100 kHz	42.7 µs
	RBW = 400 kHz	17 µs
	RBW = 3.2 MHz	17 µs
	span = 40 MHz	
	RBW = 12.5 kHz	191 µs
	RBW = 50 kHz	47,8 µs
	RBW = 200 kHz	17 µs
	RBW = 800 kHz	17 µs
	RBW = 6.4 MHz	17 µs
	span = 80 MHz	
	RBW = 25 kHz	191 µs
	RBW = 100 kHz	47.8 µs
	RBW = 400 kHz	17 µs
	RBW = 1.6 MHz	17 µs
	RBW = 12.8 MHz	17 µs

[18] Achievable span is determined by frequency settings and preselector limits.

[19] Time period during which individual FFTs contribute to the results of the selected trace detector.

[20] Events lasting shorter than the minimum signal duration specification will result in degraded level accuracy.

Result display types	with or without active frequency mask trigger, or in any combination	real-time spectrum, persistence spectrum, real-time spectrogram

Real-time spectrum		
Number of traces		4
Trace detector		max. peak, min. peak, average, sample
Trace functions		clear/write, max. hold, min. hold, view
Number of markers		16
Marker readout		frequency, level
Maximum sweep update rate [21]		10 000/s

Persistence spectrum		
Persistence bitmap resolution		1001 × 600 points
Persistence bitmap color depth		256 colors
Probability range covered by bitmap colors		selectable, 0 % to 100 %
Persistence duration		0 s to 8 s
Number of markers		16
Marker readout		frequency, level, hit probability
Number of real-time traces	in addition to persistence spectrum display	1
Real-time trace detector		max. peak, min. peak, sample, average
Real-time trace functions		clear/write, max. hold, min. hold

Spectrogram		
Result display		color-graded bitmap
Spectrogram bitmap color depth		240 colors
Dynamic range covered by bitmap colors		selectable, up to 200 dB (nom.)
History depth		max. 100 000 frames [22]
Recording mode		single trace, continuous, frame count
Trace detector		max. peak, min. peak, sample
Number of markers		16
Marker readout		frequency, time/frame number, level
Maximum sweep update rate [21]		10 000/s

Trigger source		free run, frequency mask, external

[21] Sweep update rate includes FFT overlap and trace detector processing.

[22] A frame is the measurement result displayed in one row of the spectrogram. It may consist of one or more traces, depending on the set sweep count. For example, a sweep count of 2 means that two traces will be combined to one row in the spectrogram using the set trace detector.

R&S®ESW-K55E, R&S®ESW-K55R real-time spectrogram

The R&S®ESW-K55E real-time spectrogram option requires the R&S®ESW-B350 or R&S®ESW-B1000 option.

The R&S®ESW-K55R real-time spectrogram option requires the R&S®ESW-B350R or R&S®ESW-B1000R option.

Span [18]		
Range	R&S®ESW-K55E	
	f < 30 MHz	1 kHz to 29.85 MHz
	with R&S®ESW-B350/-B1000 option	
	30 MHz ≤ f < 8 GHz	1 kHz to 170 MHz
	8 GHz ≤ f < 18 GHz	1 kHz to 20 MHz
	f ≥ 18 GHz	1 kHz to 30 MHz
	R&S®ESW-K55R	
	f < 30 MHz	1 kHz to 29.85 MHz
	with R&S®ESW-B350R option	
	30 MHz ≤ f < 8 GHz	1 kHz to 350 MHz
	8 GHz ≤ f < 18 GHz	1 kHz to 20 MHz
	f ≥ 18 GHz	1 kHz to 30 MHz
	with R&S®ESW-B1000R option	
	30 MHz ≤ f < 1 GHz	1 kHz to 970 MHz
	1 GHz ≤ f < 8 GHz	1 kHz to 450 MHz
	8 GHz ≤ f < 18 GHz	1 kHz to 20 MHz
	f ≥ 18 GHz	1 kHz to 30 MHz
Resolution		1 Hz

Measurement time		
Range		10 ms to 100 s

Resolution bandwidths		
Range		1 Hz to 1 MHz
Bandwidth uncertainty		< 3 % (nom.)
Maximum span [18]	with R&S®ESW-B350/-B350R/-B1000/-B1000R option	
	RBW < 9 kHz	13107 × RBW, max. 29.5 MHz
	RBW = 9 kHz	117 MHz
	RBW = 10 kHz	131 MHz
	with R&S®ESW-B350/-B1000 option	
	RBW > 10 kHz	170 MHz
	with R&S®ESW-B350R option	
	RBW = 30 kHz	280 MHz
	RBW > 30 kHz	350 MHz
	with R&S®ESW-B1000R option	
	RBW = 30 kHz	280 MHz
	RBW = 50 kHz	560 MHz
	RBW = 100 kHz, 120 kHz, 200 kHz	970 MHz
	RBW = 500 kHz, 1 MHz	880 MHz

Level		
Minimum signal duration for 100 % probability of intercept with full amplitude accuracy [20]	trace detector = max. peak	
	RBW = 100 Hz	22.5 ms
	RBW = 200 Hz	11.25 ms
	RBW = 300 Hz	7.5 ms
	RBW = 500 Hz	4.5 ms
	RBW = 1 kHz	2.25 ms
	RBW = 2 kHz	1.125 ms
	RBW = 3 kHz	750 µs
	RBW = 5 kHz	450 µs
	RBW = 9 kHz	250 µs
	RBW = 10 kHz	225 µs
	RBW = 30 kHz	75 µs
	RBW = 50 kHz	45 µs
	RBW = 100 kHz	22.5 µs
	RBW = 120 kHz	18.75 µs
	RBW = 200 kHz	11.25
	RBW = 500 kHz	4.5 µs
	RBW = 1 MHz	2.25 µs

Result display types		real-time spectrum, real-time spectrogram

Spectrum		
Number of traces		6
Trace detector	max. 4 selectable	max. peak, min. peak, RMS, average, quasi-peak, CISPR-average, RMS-average
Trace functions		clear/write, max. hold, min. hold, average
Number of markers		16
Marker readout		frequency, level
Spectrogram		
Result display		color-graded bitmap
Spectrogram bitmap color depth		240 colors
Dynamic range covered by bitmap colors		selectable, up to 200 dB (nom.)
History depth		max. 100 000 frames [22]
Trace detector		max. peak, min. peak, RMS, average, quasi-peak, CISPR-average, RMS-average
Number of markers		16
Marker readout		frequency, time/frame number, level

Trigger source		free run, external

R&S®ESW-K59 click rate analyzer

Click evaluation		in line with CISPR 14-1:2016 and CISPR 14-1:2020
Maximum test duration		4 h
Resolution bandwidth (RBW)		9 kHz
Measurement time		500 µs
4 frequencies processed in parallel	CISPR 14-1	150 kHz, 500 kHz, 1.4 MHz, 30 MHz
	DENAN-law	150 kHz, 550 kHz, 1.4 MHz, 30 MHz

R&S®ESW-K980 health and utilization monitoring service (HUMS)

Health and utilization monitoring service (HUMS) [23, 24]		
Interfaces	protocols and interfaces supported for data readout and display	• SNMP (v1, v2c, v3) • REST (JSON) • SCPI • device web
Services	information provided	• device information (model, serial number, BIOS, date, time, system, HUMS and software information) • user-defined information tags (e.g. for asset management) • equipment information (hardware, options, software, licenses) • system operating status • instrument security information • service related information (due dates etc.) • mass storage related information • instrument utilization data • device history (event log)

[23] For details, see application note: www.rohde-schwarz.com/appnote/GFM336

[24] For use with common available asset management tools.

Ordering information

Designation	Type	Order No.
EMI test receiver, 1 Hz to 8 GHz	R&S®ESW8	1328.4100.09
EMI test receiver, 1 Hz to 26.5 GHz	R&S®ESW26	1328.4100.27
EMI test receiver, 1 Hz to 44 GHz	R&S®ESW44	1328.4100.45
Accessories supplied		
Power cable, quick start guide, R&S®ESW26: adapter 3.5 mm APC3.5-compatible female/female, R&S®ESW44: adapter 2.92 mm female/female		

Options

Designation	Type	Order No.	Retrofittable	Remarks
OCXO precision frequency reference	R&S®ESW-B4	1328.5012.02	yes	user-retrofittable
Resolution bandwidths up to 40 MHz	R&S®ESW-B8E	1345.0167.02	yes	for R&S®ESW8, R&S®ESW26, R&S®ESW44, user-retrofittable
Resolution bandwidths up to 80 MHz (hardware option)	R&S®ESW-B8	1325.1474.26	no	for R&S®ESW8, R&S®ESW26
Resolution bandwidths up to 80 MHz (hardware option)	R&S®ESW-B8	1325.1474.02	no	for R&S®ESW44, export license required
External generator control	R&S®ESW-B10	1328.5006.02	yes	contact service center
Spare solid-state drive (removable hard drive)	R&S®ESW-B18	1328.4997.21	yes	user-retrofittable
LO/IF connections, for external mixers	R&S®ESW-B21	1331.6945.26	yes	for R&S®ESW26, contact service center [25]
LO/IF connections, for external mixers	R&S®ESW-B21	1331.6945.44	yes	for R&S®ESW44, contact service center [25]
Low-noise amplifier, 150 kHz to 8 GHz	R&S®ESW-B24	1328.4980.08	yes	for R&S®ESW8, contact service center
Low-noise amplifier, 150 kHz to 26.5 GHz	R&S®ESW-B24	1328.4980.26	yes	for R&S®ESW26, contact service center
Low-noise amplifier, 150 kHz to 44 GHz	R&S®ESW-B24	1328.4980.44	yes	for R&S®ESW44, no export license required, contact service center
USB mass memory write protection	R&S®FSW-B33	1313.3602.02	no	pre-installed in factory
350 MHz FFT bandwidth, real-time bandwidth: 170 MHz, (hardware option)	R&S®ESW-B350	1345.0438.02	yes	contact service center [26]
350 MHz FFT and real-time bandwidth, (hardware option)	R&S®ESW-B350R	1351.1184.02	yes	contact service center [26], export license required
970 MHz FFT bandwidth, real-time bandwidth: 170 MHz, (hardware option)	R&S®ESW-B1000	1345.0421.02	yes	contact service center [26]
970 MHz FFT and real-time bandwidth, (hardware option)	R&S®ESW-B1000R	1351.1178.02	yes	contact service center [26], export license required

[25] Includes two cables (length 1 m) for IF and LO ports

[26] For instruments starting from the following serial numbers: R&S®ESW8: 103055, R&S®ESW26: 103028, R&S®ESW44: 103048.

Firmware

Designation	Type	Order No.	Retrofittable	Remarks
AM/FM/PM modulation analysis	R&S®ESW-K7	1331.6216.02		
Security write protection of solid-state drive	R&S®ESW-K33	1328.4916.02		
80 MHz real-time measurement application	R&S®ESW-K55	1328.4968.02		no export license required, not available for instruments with R&S®ESW-B350, R&S®ESW-B350R, R&S®ESW-B1000, R&S®ESW-B1000R
Real-time spectrogram, span: up to 170 MHz	R&S®ESW-K55E	1351.1026.02		R&S®ESW-B350 or R&S®ESW-B1000 required
Real-time spectrogram span: up to 970 MHz	R&S®ESW-K55R	1351.1226.02		R&S®ESW-B350R or R&S®ESW-B1000R required
APD multichannel measurement function	R&S®ESW-K58	1345.0150.02		
Click rate analyzer, 4 channels, CISPR 14-1 compliant	R&S®ESW-K59	1351.1361.02		
Health and utilization monitoring service (HUMS)	R&S®ESW-K980	1345.0221.02		

Upgrades

Designation	Type	Order No.	Retrofittable	Remarks
350 MHz FFT bandwidth, real-time bandwidth: 170 MHz (hardware option)	R&S®ESW-U351	1351.0813.02	yes	contact service center [27]
350 MHz FFT and real-time bandwidth, (hardware option)	R&S®ESW-U351R	1351.1126.02	yes	contact service center [27], export license required
970 MHz FFT bandwidth, real-time bandwidth: 170 MHz (hardware option)	R&S®ESW-U1001	1351.0820.02	yes	contact service center [27]
970 MHz FFT and real-time bandwidth, (hardware option)	R&S®ESW-U1001R	1351.1110.02	yes	contact service center [27], export license required
970 MHz FFT bandwidth, real-time bandwidth: 170 MHz, upgrade to R&S®ESW-B1000	R&S®ESW-U1000	1351.0836.02	yes	user-retrofittable, R&S®ESW-B350 or R&S®ESW-U351 required
970 MHz FFT and real-time bandwidth, upgrade to R&S®ESW-B1000R	R&S®ESW-U1000R	1351.1103.02	yes	user-retrofittable, R&S®ESW-B350R or R&S®ESW-U351R required, export license required

[27] For instruments with the following serial numbers: R&S®ESW8: 103000 to 103054, R&S®ESW26: 103000 to 103027, R&S®ESW44: 103000 to 103047.

Recommended extras

Designation	Type	Order No.
Headphones		0708.9010.00
IEC/IEEE bus cable, length: 1 m	R&S®PCK	0292.2013.10
IEC/IEEE bus cable, length: 2 m	R&S®PCK	0292.2013.20
Front cover	R&S®ZZF-511	1174.8825.00
19" rack adapter	R&S®ZZA-KN5	1175.3040.00
Matching pads, 50 Ω/75 Ω		
L section, matching at both ends	R&S®RAM	0358.5414.02
Series resistor, 25 Ω, matching at one end (taken into account in instrument function RF INPUT 75 Ω)	R&S®RAZ	0358.5714.02
High-power attenuators		
100 W, 3/6/10/20/30 dB, 1 GHz	R&S®RBU100	1073.8495.xx (xx = 03/06/10/20/30)
50 W, 3/6/10/20/30 dB, 2 GHz	R&S®RBU50	1073.8695.xx (xx = 03/06/10/20/30)
50 W, 20 dB, 6 GHz	R&S®RDL50	1035.1700.52
RF adapters and cables		
Coaxial adapter, 2.92 mm (f) – 2.92 mm (f)		3588.8664.00
Coaxial adapter, 3.5 mm (f) – 3.5 mm (f), APC3.5-compatible		3587.7793.00
Coaxial adapter, 3.5 mm (m) – 3.5 mm (m), APC3.5-compatible		3689.9442.00
Coaxial adapter, N (f) – 3.5 mm (m), APC3.5-compatible		3587.7806.00
Coaxial adapter, N (f) – 3.5 mm (f), APC3.5-compatible		3587.7829.00
Coaxial cable, SMA (m) – SMA (m), length: 1 m		3586.9970.00
Connectors and cables		
Probe power connector, 3-pin		1065.9480.00
DC block		
DC block, 10 kHz to 18 GHz (type N)	R&S®FSE-Z4	1084.7443.03
External harmonic mixers (for R&S®ESW26 and R&S®ESW44 with R&S®ESW-B21 option)		
Harmonic mixer, 40 GHz to 60 GHz	RPG FS-Z60 [28]	1048.0171.02
Harmonic mixer, 50 GHz to 75 GHz	RPG FS-Z75 [28]	3638.2240.02
Harmonic mixer, 60 GHz to 90 GHz	RPG FS-Z90 [28]	3638.2270.02
Harmonic mixer, 75 GHz to 110 GHz	RPG FS-Z110 [28]	3638.2292.02
Harmonic mixer, 90 GHz to 140 GHz	RPG FS-Z140 [28]	3622.0708.02
Harmonic mixer, 110 GHz to 170 GHz	RPG FS-Z170 [28]	3622.0714.02
Harmonic mixer, 140 GHz to 220 GHz	RPG FS-Z220 [28]	3593.3250.02
Harmonic mixer, 220 GHz to 325 GHz	RPG FS-Z325 [28]	3593.3267.02
Waveguide to coaxial adapters		
Waveguide to coaxial adapter, WR10 to 1 mm (f)	WCA110	3626.1067.02
Waveguide to coaxial adapter, WR10 to 1 mm (m)	WCA110	3626.1067.03
Waveguide to coaxial adapter, WR12 to 1 mm (f)	WCA90	3626.1050.02
Waveguide to coaxial adapter, WR12 to 1 mm (m)	WCA90	3626.1050.03
Waveguide to coaxial adapter, WR15 to 1 mm (f)	WCA75	3626.1044.02
Waveguide to coaxial adapter, WR15 to 1 mm (m)	WCA75	3626.1044.03
Horn antennas		
Horn antenna, 110 GHz to 170 GHz	FH-SG-170	3629.2493.02
Horn antenna, 26 GHz to 40 GHz	FH-SG-40	3629.2393.02
Horn antenna, 50 GHz to 75 GHz	FH-SG-75	3629.2458.02
Horn antenna, 60 GHz to 90 GHz	FH-SG-90	3629.2464.02
Tools		
Torque wrench, for type N connectors, 1.5 Nm coupling torque (for R&S®ESW8)	R&S®ZN-ZTW	1328.8534.71
Torque wrench, for 3.5 mm/2.92 mm connectors, 0.9 Nm coupling torque (for R&S®ESW26, R&S®ESW44)	R&S®ZN-ZTW	1328.8534.35

[28] RPG is the abbreviation of Radiometer Physics GmbH, a Rohde & Schwarz company.

Warranty and service

Warranty		
Base unit		1 year
All other items		1 year
Service options		
	Service plans	**On demand**
Calibration	up to five years [29]	pay per calibration
Warranty and repair	up to five years [29]	standard price repair
Find out more about our service portfolio under: www.rohde-schwarz.com/service-support/service/overview/service-overview_229461.html		

[29] For extended periods, contact your Rohde & Schwarz sales office.

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