FSW
SIGNAL AND SPECTRUM ANALYZER

Specifications

Specifications
Version 17.00

ROHDE&SCHWARZ
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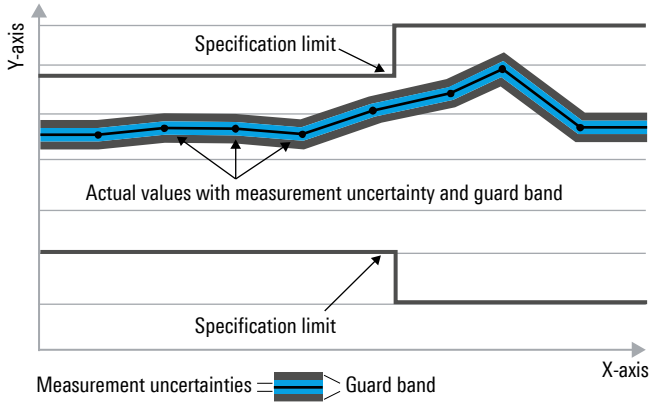
Definitions

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

Frequency

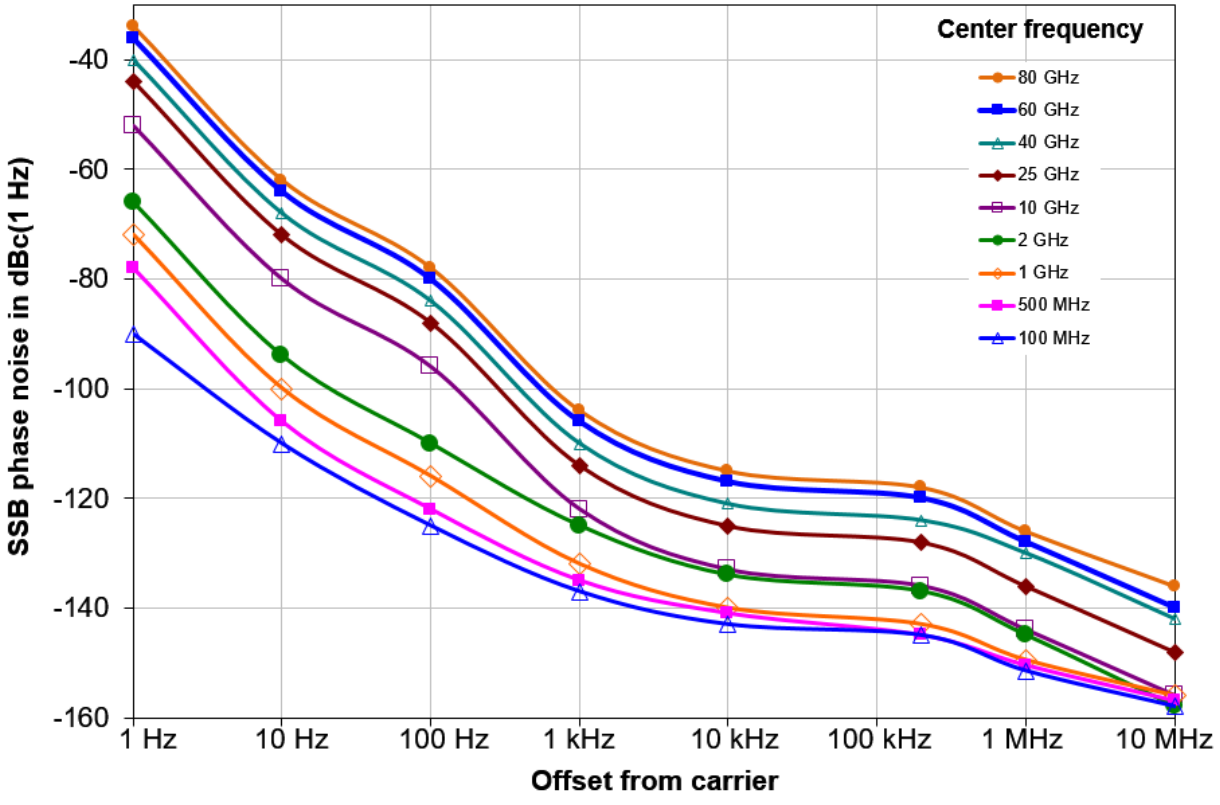
Frequency range	R&S®FSW8	
	DC coupled	2 Hz to 8 GHz
	AC coupled	10 MHz to 8 GHz
	R&S®FSW13	
	DC coupled	2 Hz to 13.6 GHz
	AC coupled	10 MHz to 13.6 GHz
	R&S®FSW26	
	DC coupled	2 Hz to 26.5 GHz
	AC coupled	10 MHz to 26.5 GHz
	R&S®FSW43	
	DC coupled	2 Hz to 43.5 GHz
	AC coupled	10 MHz to 43.5 GHz
	R&S®FSW50	
	DC coupled	2 Hz to 50 GHz
	AC coupled	10 MHz to 50 GHz
	R&S®FSW67	
	DC coupled	2 Hz to 67 GHz
	AC coupled	10 MHz to 67 GHz
	R&S®FSW85 [1]	
	RF1 input	
	standard	
	DC coupled	2 Hz to 85 GHz
	AC coupled	10 MHz to 85 GHz
	with R&S®FSW-B90G option, YIG preselector = off	
	DC coupled	2 Hz to 90 GHz
	AC coupled	10 MHz to 90 GHz
	RF2 input	
	DC coupled	2 Hz to 67 GHz
	AC coupled	10 MHz to 67 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®FSW-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®FSW-B4 OCXO precision frequency reference option	$\pm 1 \times 10^{-9}$
Achievable initial calibration accuracy	standard	$\pm 1 \times 10^{-8}$
	with R&S®FSW-B4 OCXO precision frequency reference option	$\pm 5 \times 10^{-9}$

Frequency readout		
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	101 to 100001
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
Maximum span deviation		±0.1 %

[1] For R&S®FSW85 all subsequent specifications apply to both RF1 input and RF2 input, unless otherwise stated.

Spectral purity		
SSB phase noise	frequency = 1000 MHz, carrier offset	
	10 Hz, without R&S®FSW-B4 option	–80 dBc (1 Hz), typ. –90 dBc (1 Hz)
	10 Hz, with R&S®FSW-B4 option	–95 dBc (1 Hz), typ. –100 dBc (1 Hz)
	100 Hz	–112 dBc (1 Hz), typ. –116 dBc (1 Hz)
	1 kHz	< –127 dBc (1 Hz), typ. –132 dBc (1 Hz)
	10 kHz	< –136 dBc (1 Hz), typ. –140 dBc (1 Hz)
	100 kHz	< –139 dBc (1 Hz), typ. –143 dBc (1 Hz)
	1 MHz	< –145 dBc (1 Hz), typ. –149 dBc (1 Hz)
	10 MHz	–156 dBc (1 Hz) (nom.)
	frequency = 10 GHz, carrier offset	
	10 Hz, with R&S®FSW-B4 option	–75 dBc (1 Hz) (nom.)
	100 Hz	–92 dBc (1 Hz) (nom.)
	1 kHz	–118 dBc (1 Hz) (nom.)
	10 kHz	–130 dBc (1 Hz) (nom.)
	100 kHz	–133 dBc (1 Hz) (nom.)
	1 MHz	–140 dBc (1 Hz) (nom.)
	10 MHz	–150 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®FSW-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, sweep points ≤ 10001	±0.1 % (nom.)
	span ≥ 10 Hz	±3 % (nom.)

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

Resolution bandwidths

Sweep filters and FFT filters		
Resolution bandwidths (–3 dB)		1 Hz to 10 MHz in 1/2/3/5 sequence, 3.9 kHz, 6.25 kHz, 51 kHz, 150 kHz, 250 kHz, 400 kHz, 450 kHz, 6 MHz, 8 MHz additionally
	with R&S®FSW-B8E option	20 MHz, 28 MHz, 30 MHz, 40 MHz additionally
	with R&S®FSW-B8 option	20 MHz, 28 MHz, 30 MHz, 40 MHz, 50 MHz, 80 MHz additionally
Bandwidth uncertainty		< 3 % (nom.)
Shape factor 60 dB:3 dB		< 5 (nom.)

Channel filters		
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)/5/10 MHz
	with R&S®FSW-B8E option	20 MHz, 28 MHz, 40 MHz additionally
	with R&S®FSW-B8 option	20 MHz, 28 MHz, 40 MHz, 80 MHz additionally
Bandwidth accuracy		±2 % (nom.)
Shape factor 60 dB:3 dB		< 2 (nom.)

EMI filters (with R&S®FSW-K54 only)		
Bandwidths (–6 dB)		10 Hz, 100 Hz, 200 Hz, 1 kHz, 9 kHz, 10 kHz, 100 kHz, 120 kHz, 1 MHz
Bandwidth uncertainty		< 3 % (nom.)
Shape factor 60 dB:6 dB		< 4 (nom.)

Video bandwidths	standard	1 Hz to 10 MHz in 1/2/3/5 sequence
	with R&S®FSW-B8 option	20 MHz, 50 MHz, 80 MHz additionally [3]

Maximum signal analysis bandwidth	equalized	
	standard	28 MHz (nom.) [4, 5]
	with R&S®FSW-B40 option	40 MHz (nom.) [5]
	with R&S®FSW-B80 option	80 MHz (nom.) [5]
	with R&S®FSW-B160 option	160 MHz (nom.) [5]
	with R&S®FSW-B320 option	320 MHz (nom.) [5]
	with R&S®FSW-B512/-B512R option	512 MHz (nom.) [5]
	with R&S®FSW-B1200 option	1200 MHz (nom.) [6]
	with R&S®FSW-B2001/-B800R option	2000 MHz (nom.) [6]
	with R&S®FSW-B4001 option	4400 MHz (nom.) [6]
	with R&S®FSW-B6001 option	6400 MHz (nom.) [6]
	with R&S®FSW-B8001 option	8312 MHz (nom.) [6]

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

[4] For instruments with serial numbers below R&S®FSW8: 101619, R&S®FSW13: 101533, R&S®FSW26: 102669, R&S®FSW43: 102176, R&S®FSW50: 101651, R&S®FSW67: 101698, R&S®FSW85: 101730 the standard maximum signal analysis bandwidth is 10 MHz and can be extended to 28 MHz with the R&S®FSW-B28 option.

[5] YIG preselector off for f ≥ 8 GHz.

[6] YIG preselector off for f ≥ 12 GHz.

Level

Level display		
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
	with R&S®FSW-K54	quasi-peak, RMS average, CISPR average additionally
Trace functions		clear/write, max. hold, min. hold, average, view
Setting range of reference level		–130 dBm to (–10 dBm + RF attenuation – RF preamplifier 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

Maximum input level		
DC voltage	AC coupled	
	R&S®FSW8 to R&S®FSW67	50 V
	R&S®FSW85	25 V
	DC coupled	0 V
CW RF power	RF attenuation = 0 dB	20 dBm (= 0.1 W)
	RF attenuation ≥ 10 dB	
	without R&S®FSW-B25 option or with R&S®FSW-B25 option installed and mechanical attenuation ≥ 10 dB	30 dBm (= 1 W)
Pulse spectral density	RF attenuation = 0 dB, RF preamplifier off	97 dB µV/MHz
Maximum pulse voltage	without R&S®FSW-B25 option or electronic attenuation off	
	RF attenuation ≥ 10 dB	150 V
	with R&S®FSW-B25 option installed, electronic attenuation on	
	mechanical attenuation = 0 dB	25 V
	mechanical attenuation ≥ 10 dB	75 V
Maximum pulse energy, pulse duration τ = 10 µs	without R&S®FSW-B25 option or electronic attenuation off	
	RF attenuation ≥ 10 dB	1 mWs
	with R&S®FSW-B25 option installed, electronic attenuation on	
	mechanical attenuation ≥ 10 dB	1 mWs

Intermodulation		
1 dB compression of input mixer (two-tone)	RF attenuation = 0 dB, RF preamplifier off	
	$f_{in} \leq 3$ GHz	+15 dBm (nom.)
	3 GHz < $f_{in} \leq 8$ GHz	+10 dBm (nom.)
	$f_{in} > 8$ GHz	+7 dBm (nom.)
	with R&S®FSW-B24 option, RF attenuation = 0 dB, RF preamplifier on	
	$f_{in} \leq 3$ GHz	–13 dBm (nom.)
	3 GHz < $f_{in} \leq 8$ GHz	–20 dBm (nom.)
	$f_{in} > 8$ GHz	–23 dBm (nom.)

Third-order intercept point (TOI)	R&S®FSW8, R&S®FSW13, R&S®FSW26, R&S®FSW43, R&S®FSW50, R&S®FSW67, RF attenuation = 0 dB, level = –15 dBm (both), Δf > 5 × RBW, RF preamplifier off	
	f_{in} < 10 MHz	28 dBm (nom.)
	10 MHz ≤ f_{in} < 1 GHz	> 25 dBm, typ. 30 dBm
	1 GHz ≤ f_{in} < 3 GHz	> 20 dBm, typ. 25 dBm [7]
	3 GHz ≤ f_{in} < 8 GHz	> 17 dBm, typ. 20 dBm
	R&S®FSW85, RF attenuation = 0 dB, level = –15 dBm (both), Δf > 5 × RBW, RF preamplifier off	
	f_{in} < 100 MHz	22 dBm (nom.)
	100 MHz ≤ f_{in} < 1 GHz	> 22 dBm, typ. 30 dBm
	1 GHz ≤ f_{in} < 3 GHz	> 20 dBm, typ. 25 dBm [7]
	3 GHz ≤ f_{in} < 8 GHz	> 17 dBm, typ. 20 dBm
	R&S®FSW13, R&S®FSW26, RF attenuation = 0 dB, level = –15 dBm (both), Δf > 5 × RBW, YIG preselector on, RF preamplifier off	
	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®FSW43, R&S®FSW50, RF attenuation = 0 dB, level = –20 dBm (both), Δf > 5 × RBW, YIG preselector on, RF preamplifier off	
	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.)
	R&S®FSW67, R&S®FSW85, RF attenuation = 0 dB, level = –20 dBm (both), Δf > 5 × RBW, YIG preselector on, RF preamplifier off	
	8 GHz ≤ f_{in} < 13.6 GHz	> 11 dBm, typ. 16 dBm
	13.6 GHz ≤ f_{in} ≤ 40 GHz	> 10 dBm, typ. 15 dBm
	f_{in} > 40 GHz	12 dBm (nom.)
	R&S®FSW8, R&S®FSW13, R&S®FSW26 with R&S®FSW-B24 option, RF attenuation = 0 dB, level = –50 dBm (both), Δf > 5 × RBW, YIG preselector on, RF preamplifier on	
	10 MHz ≤ f_{in} < 1 GHz	–10 dBm (nom.)
	1 GHz ≤ f_{in} < 8 GHz	–13 dBm (nom.)
	8 GHz ≤ f_{in} ≤ 26.5 GHz	–15 dBm (nom.)
	R&S®FSW43, R&S®FSW50, R&S®FSW67 with R&S®FSW-B24 option, RF attenuation = 0 dB, level = –55 dBm (both), Δf > 5 × RBW, YIG preselector on, RF preamplifier on	
	10 MHz ≤ f_{in} < 1 GHz	–5 dBm (nom.)
	1 GHz ≤ f_{in} ≤ 4 GHz	–10 dBm (nom.)
	f_{in} > 4 GHz	–20 dBm (nom.)
Second-harmonic intercept point (SHI)	R&S®FSW8, R&S®FSW13, R&S®FSW26, RF attenuation = 0 dB, level = –5 dBm, YIG preselector on, RF preamplifier off	
	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 [8]	> 47 dBm, typ. 52 dBm
	500 MHz < f_{in} < 1.5 GHz [9]	> 62 dBm, typ. 70 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®FSW43, R&S®FSW50, R&S®FSW67, R&S®FSW85, RF attenuation = 0 dB, level = –5 dBm, YIG preselector on, RF preamplifier off	
	1 MHz < f_{in} ≤ 500 MHz	> 45 dBm, typ. 55 dBm [10]
	500 MHz < f_{in} < 1.5 GHz [8]	> 47 dBm, typ. 56 dBm
	500 MHz < f_{in} < 1.5 GHz [9]	> 52 dBm, typ. 60 dBm
	1.5 GHz ≤ f_{in} ≤ 4 GHz	> 62 dBm, typ. 70 dBm
	4 GHz < f_{in} ≤ 42.5 GHz	65 dBm (nom.)
	R&S®FSW8, R&S®FSW13, R&S®FSW26, R&S®FSW43, R&S®FSW50, R&S®FSW67, with R&S®FSW-B24 option, RF attenuation = 0 dB, level = –50 dBm, YIG preselector on, RF preamplifier on	
	50 MHz < f_{in} ≤ 21.75 GHz	10 dBm (nom.)

[7] With R&S®FSW-B13 highpass filter option, highpass off. With highpass on, the TOI degrades by 5 dB (nom.).

[8] Without R&S®FSW-B13 highpass filter option or highpass off.

[9] With R&S®FSW-B13 highpass filter option, highpass on.

[10] For 1 MHz < f_{in} ≤ 100 MHz the following limit applies for R&S®FSW85: > 42 dBm, typ. 47 dBm.

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 the R&S®FSW8		
RF 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	
	2 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, without R&S®FSW-B25 electronic attenuator option	
	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 [8]	–152 dBm, typ. –156 dBm
	1 GHz < f < 3 GHz [9]	–155 dBm, typ. –160 dBm
	3 GHz ≤ f ≤ 8 GHz	–152 dBm, typ. –156 dBm
	add 1 dB to the above values if the R&S®FSW-B25 option is installed	
RF preamplifier = 30 dB	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, with R&S®FSW-B24 option, without R&S®FSW-B25 electronic attenuator option	
	10 MHz < f ≤ 50 MHz	–154 dBm (nom.)
	50 MHz < f ≤ 150 MHz	–163 dBm, typ. –166 dBm
	150 MHz < f ≤ 8 GHz	–166 dBm, typ. –169 dBm
	add 1 dB to the above values if the R&S®FSW-B25 option is installed	
Improvement with noise cancellation	for noise-like signals	13 dB (nom.)

Displayed average noise level of the R&S®FSW13, R&S®FSW26, without R&S®FSW-B24 option		
	RF attenuation = 0 dB, termination = 50 Ω, normalized to 1 Hz RBW, trace average, average mode = log, sample detector, +5 °C to +40 °C	
	2 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, f ≥ 8 GHz: YIG preselector on, without R&S®FSW-B25 electronic attenuator option	
	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 [8]	–151 dBm, typ. –156 dBm
	1 GHz < f < 3 GHz [9]	–154 dBm, typ. –159 dBm
	3 GHz ≤ f < 8 GHz	–151 dBm, typ. –156 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
	add 1 dB to the above values for frequencies < 8 GHz, 2 dB for frequencies ≥ 8 GHz, if R&S®FSW-B25 option is installed, add 2 dB to the above values for frequencies < 8 GHz, if the R&S®FSW-B1200/ -B2001/-B800R option is installed	
	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, YIG preselector off, without R&S®FSW-B25 electronic attenuator option	
	8 GHz ≤ f < 13.6 GHz	–150 dBm, typ. –155 dBm
	13.6 GHz ≤ f < 25 GHz	–149 dBm, typ. –153 dBm
	25 GHz ≤ f < 26.5 GHz	–147 dBm, typ. –150 dBm
	add 2 dB to the above values if the R&S®FSW-B25 option is installed	
Improvement with noise cancellation	for noise-like signals	13 dB (nom.)

Displayed average noise level of the R&S®FSW13, R&S®FSW26, with R&S®FSW-B24 option		
RF 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	
	2 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, f ≥ 8 GHz: YIG preselector on, without R&S®FSW-B25 electronic attenuator option	
	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 [8]	–151 dBm, typ. –156 dBm
	1 GHz < f < 3 GHz [9]	–154 dBm, typ. –159 dBm
	3 GHz ≤ f < 8 GHz	–151 dBm, typ. –156 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
	add 1 dB to the above values for frequencies < 8 GHz, 2 dB for frequencies ≥ 8 GHz, if R&S®FSW-B25 option is installed, add 2 dB to the above values for frequencies < 8 GHz, if the R&S®FSW-B1200/ -B2001/-B800R option is installed	
	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, YIG preselector off, without R&S®FSW-B25 electronic attenuator option	
	8 GHz ≤ f < 13.6 GHz	–149 dBm, typ. –154 dBm
	13.6 GHz ≤ f < 25 GHz	–148 dBm, typ. –152 dBm
	25 GHz ≤ f < 26.5 GHz	–145 dBm, typ. –149 dBm
	add 2 dB to the above values if the R&S®FSW-B25 option is installed	
RF preamplifier = 30 dB	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, YIG preselector on, without R&S®FSW-B25 electronic attenuator option	
	10 MHz < f ≤ 50 MHz	–154 dBm (nom.)
	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
	add 1 dB to the above values for frequencies < 8 GHz, 2 dB for frequencies ≥ 8 GHz, if R&S®FSW-B25 option is installed	
Improvement with noise cancellation	for noise-like signals	13 dB (nom.)

Displayed average noise level of the R&S®FSW43 without R&S®FSW-B24 option		
	RF attenuation = 0 dB, termination = 50 Ω, normalized to 1 Hz RBW, trace average, average mode = log, sample detector, +5 °C to +40 °C	
	2 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, f ≥ 8 GHz: YIG preselector on	
	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 [8]	–151 dBm, typ. –156 dBm
	1 GHz < f < 3 GHz [9]	–154 dBm, typ. –159 dBm
	3 GHz ≤ f < 8 GHz	–151 dBm, typ. –156 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 ≤ 43.5 GHz	–138 dBm, typ. –142 dBm
	add 2 dB to the above values for frequencies < 8 GHz, if the R&S®FSW-B1200/ -B2001/-B800R/-B4001/-B6001/-B8001 option is installed	
	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, YIG preselector off	
	8 GHz ≤ f < 13.6 GHz	–152 dBm, typ. –157 dBm
	13.6 GHz ≤ f < 18 GHz	–151 dBm, typ. –156 dBm
	18 GHz ≤ f < 25 GHz	–149 dBm, typ. –154 dBm
	25 GHz ≤ f ≤ 34 GHz	–147 dBm, typ. –151 dBm
	34 GHz < f ≤ 40 GHz	–144 dBm, typ. –148 dBm
	40 GHz < f ≤ 43.5 GHz	–142 dBm, typ. –146 dBm
Improvement with noise cancellation	for noise-like signals	13 dB (nom.)

Displayed average noise level of the R&S®FSW43 with R&S®FSW-B24 option		
RF 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	
	2 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, f ≥ 8 GHz: YIG preselector on	
	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 [8]	–150 dBm, typ. –155 dBm
	1 GHz < f < 3 GHz [9]	–153 dBm, typ. –158 dBm
	3 GHz ≤ f < 8 GHz	–150 dBm, typ. –155 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 ≤ 43.5 GHz	–135 dBm, typ. –140 dBm
	add 2 dB to the above values for frequencies < 8 GHz, if the R&S®FSW-B1200/ -B2001/-B800R/-B4001/-B6001/-B8001 option is installed	
	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, YIG preselector off	
	8 GHz ≤ f < 13.6 GHz	–150 dBm, typ. –155 dBm
	13.6 GHz ≤ f < 18 GHz	–149 dBm, typ. –154 dBm
	18 GHz ≤ f < 25 GHz	–147 dBm, typ. –152 dBm
	25 GHz ≤ f ≤ 34 GHz	–144 dBm, typ. –149 dBm
	34 GHz < f ≤ 40 GHz	–141 dBm, typ. –145 dBm
	40 GHz < f ≤ 43.5 GHz	–139 dBm, typ. –144 dBm
RF preamplifier = 30 dB	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, YIG preselector on	
	100 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 ≤ 43.5 GHz	–157 dBm, typ. –162 dBm
	add 1 dB to the above values for frequencies < 8 GHz, if the R&S®FSW-B1200/ -B2001/-B800R/-B4001/-B6001/-B8001 option is installed	
Improvement with noise cancellation	for noise-like signals	13 dB (nom.)

Displayed average noise level of the R&S®FSW50 without R&S®FSW-B24 option		
	RF attenuation = 0 dB, termination = 50 Ω, normalized to 1 Hz RBW, trace average, average mode = log, sample detector, +5 °C to +40 °C	
	2 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, f ≥ 8 GHz: YIG preselector on	
	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 [8]	–151 dBm, typ. –156 dBm
	1 GHz < f < 3 GHz [9]	–154 dBm, typ. –159 dBm
	3 GHz ≤ f < 8 GHz	–151 dBm, typ. –156 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 ≤ 43.5 GHz	–138 dBm, typ. –142 dBm
	43.5 GHz < f ≤ 47 GHz	–136 dBm, typ. –140 dBm
	47 GHz < f ≤ 49 GHz	–134 dBm, typ. –138 dBm
	49 GHz < f ≤ 50 GHz	–132 dBm, typ. –136 dBm
	add 2 dB to the above values for frequencies < 8 GHz, if the R&S®FSW-B1200/ -B2001/-B800R/-B4001/-B6001/-B8001 option is installed	
	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, YIG preselector off	
	8 GHz ≤ f < 13.6 GHz	–152 dBm, typ. –157 dBm
	13.6 GHz ≤ f < 18 GHz	–151 dBm, typ. –156 dBm
	18 GHz ≤ f < 25 GHz	–149 dBm, typ. –154 dBm
	25 GHz ≤ f ≤ 34 GHz	–147 dBm, typ. –151 dBm
	34 GHz < f ≤ 40 GHz	–144 dBm, typ. –148 dBm
	40 GHz < f ≤ 43.5 GHz	–142 dBm, typ. –146 dBm
	43.5 GHz < f ≤ 47 GHz	–140 dBm, typ. –144 dBm
	47 GHz < f ≤ 49 GHz	–138 dBm, typ. –142 dBm
	49 GHz < f ≤ 50 GHz	–136 dBm, typ. –140 dBm
Improvement with noise cancellation	for noise-like signals	13 dB (nom.)

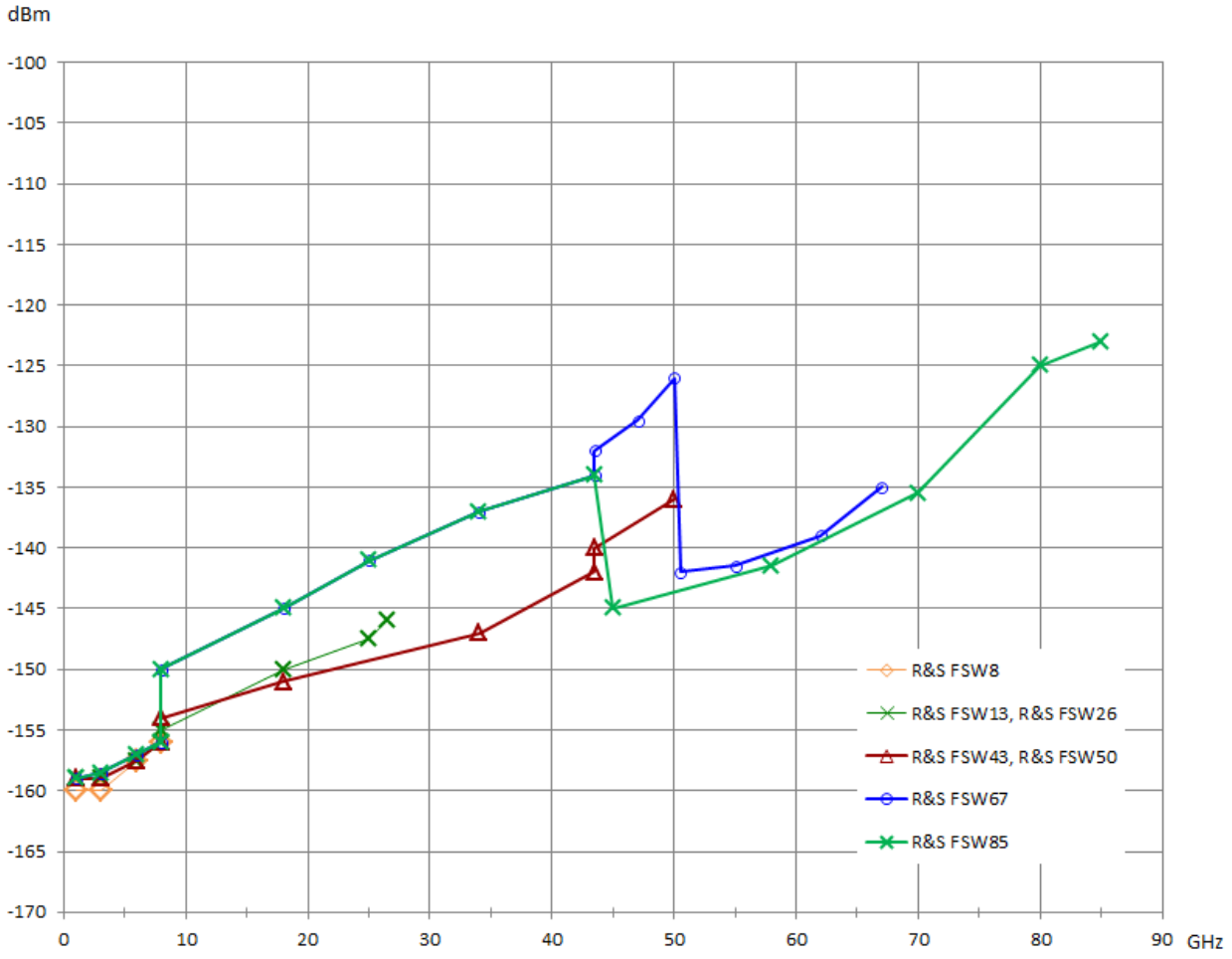
Displayed average noise level of the R&S®FSW50 with R&S®FSW-B24 option		
RF preamplifier off	RF attenuation = 0 dB, termination = 50 Ω, normalized to 1 Hz RBW, trace average, average mode = log, sample detector, +5 °C to +40 °C	
	2 Hz ≤ f ≤ 100 Hz	–110 dBm
	100 Hz < f ≤ 1 kHz	–120 dBm
	1 kHz < f < 9 kHz	–135 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, f ≥ 8 GHz: YIG preselector on	
	9 kHz ≤ f ≤ 1 MHz	–145 dBm
	1 MHz < f ≤ 1 GHz	–149 dBm
	1 GHz < f < 3 GHz [8]	–150 dBm
	1 GHz < f < 3 GHz [9]	–153 dBm
	3 GHz ≤ f < 8 GHz	–150 dBm
	8 GHz ≤ f < 13.6 GHz	–148 dBm
	13.6 GHz ≤ f < 18 GHz	–147 dBm
	18 GHz ≤ f < 25 GHz	–145 dBm
	25 GHz ≤ f ≤ 34 GHz	–140 dBm
	34 GHz < f ≤ 40 GHz	–137 dBm
	40 GHz < f ≤ 43.5 GHz	–135 dBm
	43.5 GHz < f ≤ 47 GHz	–133 dBm
	47 GHz < f ≤ 49 GHz	–131 dBm
	49 GHz < f ≤ 50 GHz	–129 dBm
	add 2 dB to the above values for frequencies < 8 GHz, if the R&S®FSW-B1200/ -B2001/-B800R/-B4001/-B6001/-B8001 option is installed	
	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, YIG preselector off	
	8 GHz ≤ f < 13.6 GHz	–150 dBm
	13.6 GHz ≤ f < 18 GHz	–149 dBm
	18 GHz ≤ f < 25 GHz	–147 dBm
	25 GHz ≤ f ≤ 34 GHz	–144 dBm
	34 GHz < f ≤ 40 GHz	–141 dBm
	40 GHz < f ≤ 43.5 GHz	–139 dBm
	43.5 GHz < f ≤ 47 GHz	–137 dBm
	47 GHz < f ≤ 49 GHz	–135 dBm
	49 GHz < f ≤ 50 GHz	–133 dBm
RF preamplifier = 30 dB	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, YIG preselector on	
	100 kHz < f ≤ 1 MHz	–160 dBm
	1 MHz < f ≤ 3 GHz	–165 dBm
	3 GHz < f ≤ 8 GHz	–162 dBm
	8 GHz < f ≤ 18 GHz	–162 dBm
	18 GHz < f ≤ 26.5 GHz	–161 dBm
	26.5 GHz < f ≤ 40 GHz	–160 dBm
	R&S®FSW-B24 option, model .49	
	40 GHz < f ≤ 43 GHz	–157 dBm
	43 GHz < f ≤ 50 GHz	–149 dBm
	R&S®FSW-B24 option, model .51	
	40 GHz < f ≤ 43.5 GHz	–157 dBm
	43.5 GHz < f ≤ 47 GHz	–155 dBm
	47 GHz < f ≤ 50 GHz	–153 dBm
	add 1 dB to the above values for frequencies < 8 GHz, if the R&S®FSW-B1200/ -B2001/-B800R/-B4001/-B6001/-B8001 option is installed	
Improvement with noise cancellation	for noise-like signals	
	R&S®FSW-B24 option, model .49	
	100 kHz < f ≤ 43 GHz	13 dB (nom.)
	43 GHz < f ≤ 50 GHz	0 dB (nom.)
	R&S®FSW-B24 option, model .51	
	100 kHz < f ≤ 50 GHz	13 dB (nom.)

Displayed average noise level of the R&S®FSW67 without R&S®FSW-B24 option		
	RF attenuation = 0 dB, termination = 50 Ω, normalized to 1 Hz RBW, trace average, average mode = log, sample detector, +5 °C to +40 °C	
	2 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, f ≥ 8 GHz: YIG preselector on	
	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 [8]	–151 dBm, typ. –156 dBm
	1 GHz < f < 3 GHz [9]	–154 dBm, typ. –159 dBm
	3 GHz ≤ f < 8 GHz	–151 dBm, typ. –156 dBm
	8 GHz ≤ f < 13.6 GHz	–146 dBm, typ. –150 dBm
	13.6 GHz ≤ f < 18 GHz	–144 dBm, typ. –148 dBm
	18 GHz ≤ f < 23 GHz	–141 dBm, typ. –145 dBm
	23 GHz ≤ f < 30 GHz	–137 dBm, typ. –141 dBm
	30 GHz ≤ f ≤ 34 GHz	–135 dBm, typ. –139 dBm
	34 GHz < f ≤ 43.5 GHz	–131 dBm, typ. –135 dBm
	43.5 GHz < f ≤ 47 GHz	–127 dBm, typ. –131 dBm
	47 GHz < f ≤ 49 GHz	–124 dBm, typ. –128 dBm
	49 GHz < f ≤ 50 GHz	–122 dBm, typ. –126 dBm
	50 GHz < f ≤ 55 GHz	–141 dBm, typ. –143 dBm
	55 GHz < f ≤ 62 GHz	–137 dBm, typ. –139 dBm
	62 GHz < f ≤ 67 GHz	–133 dBm, typ. –135 dBm
	add 2 dB to the above values for frequencies < 8 GHz, if the R&S®FSW-B1200/ -B2001/-B800R/-B4001/-B6001/-B8001 option is installed	
	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, YIG preselector off	
	8 GHz ≤ f < 13.6 GHz	–148 dBm, typ. –152 dBm
	13.6 GHz ≤ f < 18 GHz	–146 dBm, typ. –150 dBm
	18 GHz ≤ f < 23 GHz	–143 dBm, typ. –147 dBm
	23 GHz ≤ f < 30 GHz	–139 dBm, typ. –142 dBm
	30 GHz ≤ f ≤ 34 GHz	–137 dBm, typ. –140 dBm
	34 GHz < f ≤ 43.5 GHz	–133 dBm, typ. –136 dBm
	43.5 GHz < f ≤ 47 GHz	–129 dBm, typ. –132 dBm
	47 GHz < f ≤ 49 GHz	–126 dBm, typ. –129 dBm
	49 GHz < f ≤ 50 GHz	–125 dBm, typ. –128 dBm
	50 GHz < f ≤ 55 GHz	–141 dBm, typ. –142 dBm
	55 GHz < f ≤ 62 GHz	–137 dBm, typ. –139 dBm
	62 GHz < f ≤ 67 GHz	–133 dBm, typ. –135 dBm
Improvement with noise cancellation	for noise-like signals	
	2 Hz < f ≤ 43 GHz	13 dB (nom.)
	43 GHz < f ≤ 67 GHz	8 dB (nom.)

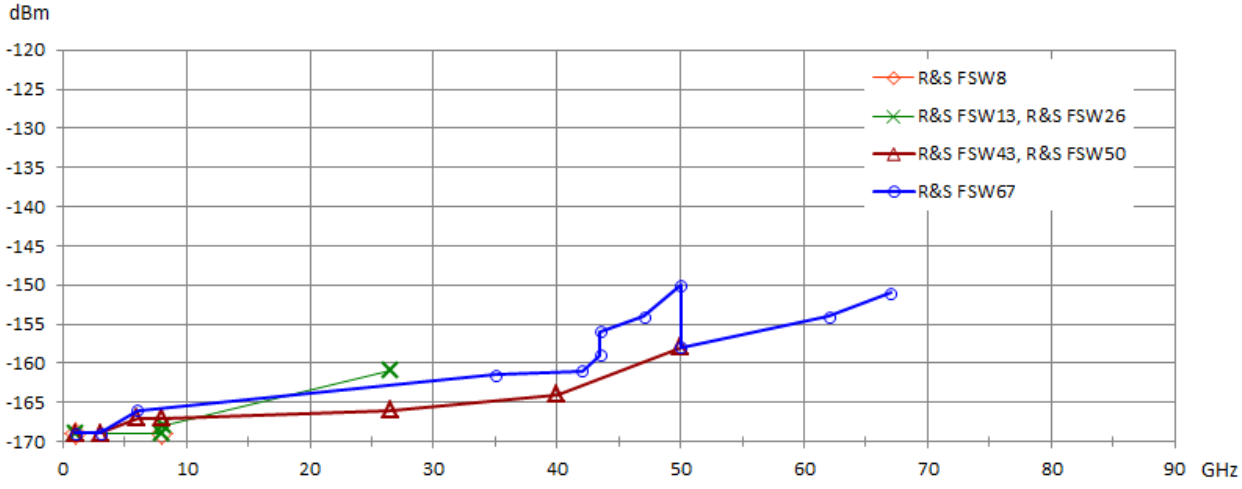
Displayed average noise level of the R&S®FSW67 with R&S®FSW-B24 option		
RF preamplifier off	RF attenuation = 0 dB, termination = 50 Ω, normalized to 1 Hz RBW, trace average, average mode = log, sample detector, +5 °C to +40 °C	
	2 Hz ≤ f ≤ 100 Hz	–110 dBm
	100 Hz < f ≤ 1 kHz	–120 dBm
	1 kHz < f < 9 kHz	–135 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, f ≥ 8 GHz: YIG preselector on	
	9 kHz ≤ f ≤ 1 MHz	–145 dBm
	1 MHz < f ≤ 1 GHz	–149 dBm
	1 GHz < f < 3 GHz [8]	–150 dBm
	1 GHz < f < 3 GHz [9]	–153 dBm
	3 GHz ≤ f < 8 GHz	–150 dBm
	8 GHz ≤ f < 13.6 GHz	–144 dBm
	13.6 GHz ≤ f < 18 GHz	–142 dBm
	18 GHz ≤ f < 23 GHz	–139 dBm
	23 GHz ≤ f < 30 GHz	–135 dBm
	30 GHz ≤ f ≤ 34 GHz	–132 dBm
	34 GHz < f ≤ 43.5 GHz	–128 dBm
	43.5 GHz < f ≤ 47 GHz	–124 dBm
	47 GHz < f ≤ 49 GHz	–121 dBm
	49 GHz < f ≤ 50 GHz	–119 dBm
	50 GHz < f ≤ 55 GHz	–138 dBm
	55 GHz < f ≤ 62 GHz	–134 dBm
	62 GHz < f ≤ 67 GHz	–130 dBm
	add 2 dB to the above values for frequencies < 8 GHz, if the R&S®FSW-B1200/ -B2001/-B800R/-B4001/-B6001/-B8001 option is installed	
	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, YIG preselector off	
	8 GHz ≤ f < 13.6 GHz	–146 dBm
	13.6 GHz ≤ f < 18 GHz	–144 dBm
	18 GHz ≤ f < 23 GHz	–141 dBm
	23 GHz ≤ f < 30 GHz	–137 dBm
	30 GHz ≤ f ≤ 34 GHz	–134 dBm
	34 GHz < f ≤ 43.5 GHz	–130 dBm
	43.5 GHz < f ≤ 47 GHz	–126 dBm
	47 GHz < f ≤ 49 GHz	–123 dBm
	49 GHz < f ≤ 50 GHz	–122 dBm
	50 GHz < f ≤ 55 GHz	–138 dBm
	55 GHz < f ≤ 62 GHz	–134 dBm
	62 GHz < f ≤ 67 GHz	–130 dBm

RF preamplifier = 30 dB	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, YIG preselector on	
	100 kHz < f ≤ 1 MHz	–160 dBm
	1 MHz < f ≤ 3 GHz	–165 dBm
	3 GHz < f ≤ 8 GHz	–162 dBm
	8 GHz < f ≤ 18 GHz	–161 dBm
	18 GHz < f ≤ 26.5 GHz	–160 dBm
	26.5 GHz < f ≤ 35 GHz	–159 dBm
	35 GHz < f ≤ 42 GHz	–157 dBm
	R&S®FSW-B24 option, model .66	
	42 GHz < f ≤ 43 GHz	–150 dBm
	43 GHz < f ≤ 47 GHz	–146 dBm
	47 GHz < f ≤ 50 GHz	–144 dBm
	50 GHz < f ≤ 54 GHz	–148 dBm
	54 GHz < f ≤ 56 GHz	–146 dBm
	56 GHz < f ≤ 62 GHz	–144 dBm
	62 GHz < f ≤ 65 GHz	–142 dBm
	65 GHz < f ≤ 67 GHz	–140 dBm
	R&S®FSW-B24 option, model .67	
	42 GHz < f ≤ 47 GHz	–150 dBm
	47 GHz < f ≤ 50 GHz	–146 dBm
	50 GHz < f ≤ 52 GHz	–154 dBm
	52 GHz < f ≤ 54 GHz	–152 dBm
	54 GHz < f ≤ 62 GHz	–150 dBm
	62 GHz < f ≤ 67 GHz	–147 dBm
	add 2 dB to the above values for frequencies < 8 GHz, if the R&S®FSW-B1200/ -B2001/-B800R/-B4001/-B6001/-B8001 option is installed	
Improvement with noise cancellation	for noise-like signals	
	R&S®FSW-B24 option, model .66	
	100 kHz < f ≤ 43 GHz	13 dB (nom.)
	43 GHz < f ≤ 67 GHz	0 dB (nom.)
	R&S®FSW-B24 option, model .67	
	100 kHz < f ≤ 67 GHz	13 dB (nom.)

Displayed average noise level of the R&S®FSW85		
	RF input 1, RF attenuation = 0 dB, termination = 50 Ω, normalized to 1 Hz RBW, trace average, average mode = log, sample detector, +5 °C to +40 °C	
	2 Hz ≤ f ≤ 100 Hz	–105 dBm, typ. –115 dBm
	100 Hz < f ≤ 1 kHz	–110 dBm, typ. –120 dBm
	1 kHz < f < 9 kHz	–125 dBm, typ. –137 dBm
	RF input 1, 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, f ≥ 8 GHz: YIG preselector on	
	9 kHz ≤ f ≤ 1 MHz	–135 dBm, typ. –140 dBm
	1 MHz < f ≤ 1 GHz	–145 dBm, typ. –150 dBm
	1 GHz < f < 3 GHz [8]	–151 dBm, typ. –156 dBm
	1 GHz < f < 3 GHz [9]	–154 dBm, typ. –159 dBm
	3 GHz ≤ f < 8 GHz	–151 dBm, typ. –156 dBm
	8 GHz ≤ f < 13.6 GHz	–146 dBm, typ. –150 dBm
	13.6 GHz ≤ f < 18 GHz	–144 dBm, typ. –148 dBm
	18 GHz ≤ f < 23 GHz	–141 dBm, typ. –145 dBm
	23 GHz ≤ f < 30 GHz	–137 dBm, typ. –141 dBm
	30 GHz ≤ f ≤ 34 GHz	–135 dBm, typ. –139 dBm
	34 GHz < f ≤ 44 GHz	–129 dBm, typ. –133 dBm
	44 GHz < f ≤ 58 GHz	–137 dBm, typ. –141 dBm
	58 GHz < f ≤ 70 GHz	–132 dBm, typ. –136 dBm
	70 GHz < f ≤ 75 GHz	–127 dBm, typ. –130 dBm
	75 GHz < f ≤ 80 GHz	–122 dBm, typ. –125 dBm
	80 GHz < f ≤ 85 GHz	–120 dBm, typ. –123 dBm
	add 2 dB to the above values for frequencies < 8 GHz, if the R&S®FSW-B1200/ -B2001/-B800R/-B4001/-B6001/-B8001 option is installed	
	RF input 1, 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, YIG preselector off, R&S®FSW-B90G option for f > 85 GHz	
	8 GHz ≤ f < 13.6 GHz	–148 dBm
	13.6 GHz ≤ f < 18 GHz	–146 dBm
	18 GHz ≤ f < 23 GHz	–143 dBm
	23 GHz ≤ f < 30 GHz	–139 dBm
	30 GHz ≤ f ≤ 34 GHz	–137 dBm
	34 GHz < f ≤ 44 GHz	–131 dBm
	44 GHz < f ≤ 58 GHz	–147 dBm
	58 GHz < f ≤ 70 GHz	–143 dBm
	70 GHz < f ≤ 78 GHz	–135 dBm
	78 GHz < f ≤ 85 GHz	–130 dBm
	85 GHz < f ≤ 88 GHz	–125 dBm
	88 GHz < f ≤ 90 GHz	–120 dBm
	RF input 2, 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	
	add 1 dB to the above values for frequencies > 44 GHz	
Improvement with noise cancellation	for noise-like signals	
	f ≤ 43 GHz	13 dB (nom.)
	f > 43 GHz	
	YIG preselector on	13 dB (nom.)
	YIG preselector off	0 dB (nom.)



Typical displayed average noise level of the FSW models for f > 1 GHz without R&S®FSW-B24 RF preamplifier option



Typical displayed average noise level of the FSW models for f > 1 GHz with R&S®FSW-B24 [11] RF preamplifier option, preamplifier gain = 30 dB

[11] For frequencies > 43 GHz, the curve shown for the R&S®FSW50 applies to the R&S®FSW-B24 option model .51, the curve shown for the R&S®FSW67 applies to the R&S®FSW-B24 option model .67.

Spurious responses

Spurious responses	YIG preselector on for f ≥ 8 GHz, mixer level ≤ –10 dBm [12], sweep type: auto, 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 ≤ 85 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	
	f ≤ 50 GHz	< –100 dBc + 20 log (f_{in}/GHz)
	f > 50 GHz, RBW ≤ 10 kHz	< –100 dBc + 20 log (f_{in}/GHz)
	f > 50 GHz, RBW > 10 kHz	< –80 dBc + 20 log (f_{in}/GHz)
	f = receive frequency	
Vibrational environmental stimuli	max. 0.21 g RMS	< –60 dBc + 20 log (f_{in}/GHz) (nom.)

[12] Mixer level = signal level – RF attenuation + preamplifier gain.

Level measurement uncertainty

Absolute level uncertainty at 64 MHz	RBW = 10 kHz, level = –10 dBm, reference level = –10 dBm, RF attenuation = 10 dB	
	without R&S®FSW-B25 option or electronic attenuator off	< 0.2 dB (σ = 0.07 dB)
	with R&S®FSW-B25 option, electronic attenuator on	< 0.4 dB (σ = 0.14 dB)
Frequency response, referenced to 64 MHz, YIG preselector on	RF attenuation = 10/20/30/40 dB, RF preamplifier off, +20 °C to +30 °C, electronic attenuator off	
	2 Hz ≤ f < 9 kHz	< 1 dB (nom.)
	9 kHz ≤ f < 10 MHz	< 0.45 dB (σ = 0.17 dB)
	10 MHz ≤ f < 3.6 GHz [13]	< 0.3 dB (σ = 0.10 dB)
	10 MHz ≤ f < 3.6 GHz [14]	< 0.5 dB (σ = 0.17 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 ≤ 50 GHz, span < 1 GHz	< 2.5 dB (σ = 0.83 dB)
	50 GHz < f ≤ 67 GHz, span < 1 GHz	< 3.0 dB (σ = 1.0 dB)
	67 GHz < f ≤ 85 GHz, span < 1 GHz	< 3.5 dB (σ = 1.17 dB)
	any RF attenuation or electronic attenuator on, +15 °C to +40 °C	
	2 Hz ≤ f < 9 kHz	< 1 dB (nom.)
	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 ≤ 50 GHz, span < 1 GHz	< 3 dB (σ = 1.0 dB)
	50 GHz < f ≤ 67 GHz, span < 1 GHz	< 3.5 dB (σ = 1.17 dB)
	67 GHz < f ≤ 85 GHz, span < 1 GHz	< 4.0 dB (σ = 1.33 dB)
	RF attenuation ≤ 20 dB, RF preamplifier on, +20 °C to +30 °C	
	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 ≤ 50 GHz, span < 1 GHz	< 3 dB (σ = 1.0 dB)
	50 GHz < f ≤ 67 GHz, span < 1 GHz	< 3.5 dB (σ = 1.17 dB)
Frequency response, referenced to 64 MHz, YIG preselector off (requires R&S®FSW-B90G option for f > 85 GHz)	RF attenuation = 10/20/30/40 dB, RF preamplifier off, +20 °C to +30 °C, electronic attenuator off	
	f < 8 GHz	same values as with preselector on
	8 GHz ≤ f < 22 GHz	< 1.5 dB (σ = 0.5 dB)
	22 GHz ≤ f ≤ 26.5 GHz	< 2 dB (σ = 0.6 dB)
	26.5 GHz < f ≤ 67 GHz, span < 1 GHz	< 2.5 dB (σ = 0.83 dB)
	67 GHz < f ≤ 90 GHz, span < 1 GHz	< 3 dB (σ = 1.0 dB)
	any RF attenuation or electronic attenuator on, +15 °C to +40 °C	
	f < 8 GHz	same values as with preselector on
	8 GHz ≤ f < 22 GHz	< 2 dB (σ = 0.6 dB)
	22 GHz ≤ f ≤ 26.5 GHz	< 2.5 dB (σ = 0.75 dB)
	26.5 GHz < f ≤ 67 GHz, span < 1 GHz	< 3 dB (σ = 1.0 dB)
	67 GHz < f ≤ 90 GHz, span < 1 GHz	< 3.5 dB (σ = 1.17 dB)
	RF attenuation ≤ 20 dB, RF preamplifier on, +20 °C to +30 °C	
	f < 8 GHz	same values as with preselector on
	8 GHz ≤ f < 22 GHz	< 2 dB (σ = 0.6 dB)
	22 GHz ≤ f ≤ 26.5 GHz	< 2.5 dB (σ = 0.75 dB)
	26.5 GHz < f ≤ 67 GHz, span < 1 GHz	< 3 dB (σ = 1.0 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 [15]
	input mixer level > –15 dBm	< 0.1 dB (nom.)
Bandwidth switching uncertainty	referenced to RBW = 10 kHz	< 0.1 dB (σ = 0.04 dB) [16]

[13] With R&S®FSW8, R&S®FSW13, R&S®FSW26, R&S®FSW43, R&S®FSW50, R&S®FSW67.

[14] With R&S®FSW85.

[15] 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.

[16] Nominal values for RBW = 3.9 kHz and RBW = 6.25 kHz.

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.)

Total measurement uncertainty		
YIG preselector on	signal level = 0 dB to –70 dB below reference level, S/N > 20 dB, sweep time = auto, RF attenuation = 10/20/30/40 dB, RF preamplifier off, electronic attenuator off, 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	±1.4 dB
	22 GHz < f ≤ 26.5 GHz	±1.7 dB
	26.5 GHz < f ≤ 50 GHz	±2.5 dB
	50 GHz < f ≤ 67 GHz	±2.8 dB
	67 GHz < f ≤ 85 GHz	±3.1 dB
YIG preselector off (requires R&S®FSW-B90G option for f > 85 GHz)	signal level = 0 dB to –70 dB below reference level, S/N > 20 dB, sweep time = auto, RF attenuation = 10/20/30/40 dB, RF preamplifier off, electronic attenuator off, span/RBW < 100, 95 % confidence level, +20 °C to +30 °C	
	8 GHz ≤ f ≤ 22 GHz	±1.0 dB
	22 GHz < f ≤ 26.5 GHz	±1.2 dB
	26.5 GHz < f ≤ 67 GHz	±1.7 dB
	67 GHz < f ≤ 90 GHz	±2.0 dB

Adjacent channel power dynamic range

Adjacent channel leakage ratio (ACLR)	3GPP WCDMA, single carrier, 1 DPCH, carrier frequency = 2 GHz	
	noise cancellation off [17]	
	1st adjacent channel	–76 dB (nom.)
	2nd adjacent channel	–82 dB (nom.)
	noise cancellation on	
	1st adjacent channel	–88 dB (nom.)
	2nd adjacent channel	–90 dB (nom.)

Optimum mixer level	3GPP WCDMA, single carrier, 1 DPCH, carrier frequency = 2 GHz	
	noise cancellation off	
	1st adjacent channel	–5 dBm (nom.)
	2nd adjacent channel	0 dBm (nom.)
	noise cancellation on	
	1st adjacent channel	–12 dBm (nom.)
	2nd adjacent channel	–5 dBm (nom.)

Measurement speed [18]

Local measurement and display update rate	1001 sweep points	1.25 ms (800/s) (meas.)
Remote measurement, 1000 sweep averages [19]	1001 sweep points	1.0 ms (1000/s) (meas.)
Remote measurement and LAN transfer [19]		5 ms (200/s) (meas.)
Marker peak search [19]		1.7 ms (meas.)
Center frequency tune and transfer [19]	f ≤ 8 GHz	15 ms (meas.)
	f > 8 GHz	65 ms (meas.)

[17] Noise cancellation off represents the raw performance of the FSW without numeric compensation for its inherent noise.

[18] Sweep points set to 1001 points (= default), sweep optimization set to “speed”.

[19] Measured with PC equipped with Intel Core i7 CPU 2.8 GHz and Gbit LAN interface.

Trigger functions

Trigger		
Trigger source	spectrum analysis	free run, video, external, IF power, RF power, periodic time
	I/Q analyzer or modulation analysis	I/Q trigger additionally [20]
Trigger offset	span ≥ 10 Hz	5 ns to 20 s
	span = 0 Hz	(–sweep time) to 20 s
Minimum 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
Maximum deviation of trigger offset		5 ns
IF power trigger		
Sensitivity	min. signal power	
	spectrum analysis	–60 dBm + RF attenuation – RF preamplifier gain (nom.)
	I/Q analyzer or modulation analysis	
	set analysis bandwidth ≤ 80 MHz	–60 dBm + RF attenuation – RF preamplifier gain (nom.)
	set analysis bandwidth > 80 MHz	–30 dBm + RF attenuation – RF preamplifier gain (nom.)
	max. signal power	–10 dBm + RF attenuation – RF preamplifier gain (nom.)
IF power trigger bandwidth	RBW > 500 kHz	20 MHz (nom.) [21]
	RBW ≤ 500 kHz, FFT	20 MHz (nom.)
	RBW ≤ 500 kHz, swept	6 MHz (nom.)
RF power trigger		
Sensitivity	min. signal power	–30 dBm + RF attenuation – RF preamplifier gain (nom.)
	max. signal power	+10 dBm + RF attenuation – RF preamplifier gain (nom.)
RF power trigger frequency range	f ≤ 8 GHz	8 GHz (nom.)
	f > 8 GHz	center frequency ± 250 MHz (nom.) [22]
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
Maximum 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

[20] Not available for analysis bandwidth > 160 MHz if the R&S®FSW-B320 option is installed.

[21] Sweep optimization = auto.

[22] YIG preselector off for f ≥ 8 GHz.

I/Q data

The specifications in this section apply to the base unit and the R&S®FSW-B40/-B80/-B160/-B320/-B512/-B512R/-B1200/-B2001/-B800R/-B4001/-B6001/-B8001 options.

Record length	standard	
	with R&S®FSW-B40/-B80/-B160/-B512/-B512R options	max. 440 Msample I and Q
	with R&S®FSW-B320 option	max. 195 Msample I and Q
	with R&S®FSW-B1200/-B2001/-B800R options	max. 220 Msample I and Q
	with R&S®FSW-B4001/-B6001/-B8001 options	max. 1039 Msample I and Q
	R&S®FSW-B106 option (requires R&S®FSW-B160/-B320 options)	
	160 MHz analysis bandwidth	max. 1320 Msample I and Q
	320 MHz analysis bandwidth	max. 600 Msample I and Q
	R&S®FSW-B108 option (requires R&S®FSW-B1200/-B2001/-B800R options)	
	512 MHz analysis bandwidth	max. 1800 Msample I and Q
	1000 MHz analysis bandwidth	max. 900 Msample I and Q
	1200 MHz analysis bandwidth	max. 630 Msample I and Q
	2000 MHz analysis bandwidth	max. 900 Msample I and Q
	R&S®FSW-B124 option (requires R&S®FSW-B4001/-B6001/-B8001 options)	
	80 MHz analysis bandwidth	max. 440 Msample I and Q
	512 MHz analysis bandwidth	max. 5600 Msample I and Q
	4400 MHz, 6400 MHz, 8312 MHz analysis bandwidth	max. 6440 Msample I and Q
Word length of I/Q samples	sampling rate ≤ 100 MHz and number of samples ≤ 300 Msample	24 bit
	without R&S®FSW-B4001/-B6001/-B8001 options	
	sampling rate > 100 MHz or number of samples > 300 Msample	18 bit
	with R&S®FSW-B4001/-B6001/-B8001 options	
	sampling rate ≤ 100 MHz and number of samples > 300 Msample	18 bit
	100 MHz < sampling rate < 5.32 GHz	18 bit
	sampling rate ≥ 5.32 GHz	16 bit

Sampling rate	standard, with R&S®FSW-B40/-B80 options	100 Hz to 200 MHz
	with R&S®FSW-B160/-B320 options	100 Hz to 1 GHz
	with R&S®FSW-B512/-B512R options	100 Hz to 1.2 GHz
	with R&S®FSW-B1200 options	100 Hz to 2.4 GHz
	with R&S®FSW-B2001/-B800R options	100 Hz to 2.4 GHz
	with R&S®FSW-B4001/-B6001/-B8001 options	100 Hz to 10.64 GHz
Maximum signal analysis bandwidth (equalized)	standard [4]	28 MHz (nom.) [22]
	with R&S®FSW-B40 option	40 MHz (nom.) [22]
	with R&S®FSW-B80 option	80 MHz (nom.) [22]
	with R&S®FSW-B160 option	160 MHz (nom.) [22]
	with R&S®FSW-B320 option	320 MHz (nom.) [22]
	with R&S®FSW-B512/-B512R option	512 MHz (nom.) [22]
	with R&S®FSW-B1200 option	1200 MHz (nom.) [23]
	with R&S®FSW-B2001/-B800R option	2000 MHz (nom.) [23]
	with R&S®FSW-B4001 option	4400 MHz (nom.) [23]
	with R&S®FSW-B6001 option	6400 MHz (nom.) [23, 24]
	with R&S®FSW-B8001 option	8312 MHz (nom.) [23, 24]

[23] YIG preselector off for f ≥ 12 GHz.

[24] Only available for f ≥ 18 GHz.

Signal analysis bandwidth ≤ 80 MHz		
Amplitude flatness	(1.25 × signal analysis BW) ≤ f_{center} < 8 GHz	±0.3 dB (nom.) [25]
	f_{center} ≥ 8 GHz, YIG preselector off	±0.5 dB (nom.)
Deviation from linear phase	(1.25 × signal analysis BW) ≤ f_{center} < 8 GHz	±1° (nom.)
	f_{center} ≥ 8 GHz, YIG preselector off	±2° (nom.)
Nonlinearity of displayed level		see section “Level measurement uncertainty – Nonlinearity of displayed level”
Level measurement uncertainty		see “Total measurement uncertainty – YIG preselector off”
Third-order intermodulation distortion		see “Third-order intercept point (TOI)”
ADC related spurious response	mixer level = –30 dBm [26]	
	analysis bandwidth < 17 MHz	–100 dBc (nom.)
	17 MHz ≤ analysis bandwidth < 80 MHz	–80 dBc (nom.)
Other spurious responses		see section “Spurious responses”

Signal analysis bandwidth 80 MHz to 160 MHz [27]		
Amplitude flatness	RF attenuation = 10/20/30/40 dB, RF preamplifier off, electronic attenuator off, YIG preselector off for f ≥ 8 GHz	
	150 MHz ≤ f_{center} < 4 GHz	±0.5 dB (nom.)
	4 GHz ≤ f_{center} < 8 GHz	±0.7 dB (nom.)
	8 GHz ≤ f_{center} < 26.5 GHz	±1 dB (nom.)
	26.5 GHz ≤ f_{center} ≤ 67 GHz	±2 dB (nom.)
	67 GHz < f_{center} ≤ 85 GHz/90 GHz [28]	±2.5 dB (nom.)
Deviation from linear phase	RF attenuation = 10/20/30/40 dB, RF preamplifier off, electronic attenuator off, YIG preselector off for f ≥ 8 GHz	
	150 MHz ≤ f_{center} < 4 GHz	±1° (nom.)
	4 GHz ≤ f_{center} < 8 GHz	±2° (nom.)
	8 GHz ≤ f_{center} <43.5 GHz	±1.5° (nom.)
	43.5 GHz ≤ f_{center} ≤ 67 GHz	±2° (nom.)
	67 GHz < f_{center} ≤ 85 GHz/90 GHz [28]	±8° (nom.)
Nonlinearity of displayed level	0 dB to –70 dB	< 0.15 dB (nom.)
Level measurement uncertainty at center frequency		add 0.2 dB (nom.) to the values in “Total measurement uncertainty – YIG preselector off”
Third-order intermodulation distortion	reference level = signal level + 6 dB	
	150 MHz ≤ f_{center} < 8 GHz: two –20 dBm tones at input mixer within analysis bandwidth [26], f_{center} ≥ 8 GHz: two –30 dBm tones at input mixer within analysis bandwidth [26]	–75 dBc (nom.)
Residual spurious response	RF attenuation 0 dB, f_{center} ≥ 150 MHz	–90 dBm (nom.)
ADC related spurious response	single tone within analysis bandwidth, mixer level = –10 dBm [26], reference level = signal level, f_{center} ≥ 150 MHz	–78 dBc (nom.)
Other spurious responses		see section “Spurious responses”

[25] For R&S®FSW67 and R&S®FSW85: 100 MHz ≤ f_{center} < 8 GHz.

[26] Level of a tone at the input mixer (also abbreviated as mixer level) = signal level – RF attenuation + preamplifier gain.

[27] The specifications for 80 MHz to 160 MHz analysis bandwidth in this section apply to the following options: R&S®FSW-B160, R&S®FSW-B320.

[28] f_{center} > 85 GHz requires R&S®FSW-B90G option.

Signal analysis bandwidth ≤ 96 MHz within R&S®FSW-K193 DOCSIS 3.1 OFDM upstream option [29]		
Amplitude flatness	RF attenuation = 10/20/30/40 dB, RF preamplifier off, electronic attenuator off	
	5 MHz ≤ f ≤ 204 MHz	±0.6 dB (nom.)
Deviation from linear phase	RF attenuation = 10/20/30/40 dB, RF preamplifier off, electronic attenuator off	
	5 MHz ≤ f ≤ 204 MHz	±2° (nom.)
Nonlinearity of displayed level	0 dB to –70 dB	< 0.15 dB (nom.)
Level measurement uncertainty at center frequency		add 0.2 dB (nom.) to the values in "Total measurement uncertainty – YIG preselector off"
Third-order intermodulation distortion	reference level = signal level + 6 dB	
	5 MHz ≤ f ≤ 204 MHz: two –20 dBm tones at input mixer within analysis bandwidth [26]	–75 dBc (nom.)
Residual spurious response	RF attentuation 0 dB, 5 MHz ≤ f ≤ 204 MHz	–90 dBm (nom.)
ADC related spurious response	single tone within analysis bandwidth, mixer level = –10 dBm [26], reference level = signal level, 5 MHz ≤ f ≤ 204 MHz	–78 dBc (nom.)
Other spurious responses		see section "Spurious responses"

Signal analysis bandwidth 160 MHz to 320 MHz [30]		
Amplitude flatness	RF attenuation = 10/20/30/40 dB, RF preamplifier off, electronic attenuator off, YIG preselector off for f ≥ 8 GHz	
	200 MHz ≤ f_{center} < 4 GHz	±0.7 dB (nom.)
	4 GHz ≤ f_{center} < 7 GHz	±1.2 dB (nom.)
	7 GHz ≤ f_{center} < 8 GHz [31]	±1.4 dB (nom.)
	8 GHz ≤ f_{center} < 22 GHz	±1.6 dB (nom.)
	22 GHz ≤ f_{center} ≤ 43.5 GHz	±2 dB (nom.)
	43.5 GHz < f_{center} ≤ 67 GHz	±2.5 dB (nom.)
	67 GHz < f_{center} ≤ 85 GHz/90 GHz [28]	±2.5 dB (nom.)
Deviation from linear phase	RF attenuation = 10/20/30/40 dB, RF preamplifier off, electronic attenuator off, YIG preselector off for f ≥ 8 GHz	
	200 MHz ≤ f_{center} < 4 GHz	±2.5° (nom.)
	4 GHz ≤ f_{center} < 8 GHz [31]	±4° (nom.)
	8 GHz ≤ f_{center} < 43.5 GHz	±2.5° (nom.)
	43.5 GHz ≤ f_{center} ≤ 67 GHz	±4° (nom.)
	67 GHz < f_{center} ≤ 85 GHz/90 GHz [28]	±8° (nom.)
Nonlinearity of displayed level	0 dB to –70 dB	< 0.15 dB (nom.)
Level measurement uncertainty at center frequency		add 0.2 dB (nom.) to the values in "Total measurement uncertainty – YIG preselector off"
Third-order intermodulation distortion	reference level = signal level + 6 dB	
	200 MHz ≤ f_{center} < 8 GHz: two –20 dBm tones at input mixer within analysis bandwidth [26], f_{center} ≥ 8 GHz: two –30 dBm tones at input mixer within analysis bandwidth [26]	–75 dBc (nom.)
Residual spurious response	RF attenuation 0 dB, f_{center} ≥ 200 MHz	–90 dBm (nom.)
ADC related spurious response	single tone within analysis bandwidth, mixer level = –10 dBm [26], reference level = signal level	
	200 MHz ≤ f_{center} ≤ 460 MHz	–70 dBc (nom.)
	f_{center} > 460 MHz	–72 dBc (nom.)
Other spurious responses		see section "Spurious responses"

[29] The specifications in this section apply in combination with the R&S®FSW-B320 option or R&S®FSW-B512 option.

[30] The specifications for 160 MHz to 320 MHz analysis bandwidth in this section apply to the R&S®FSW-B320 option.

[31] To obtain the set analysis bandwidth, (f_{center} + ½ analysis bandwidth) ≤ 8 GHz must be met.

Signal analysis bandwidth 80 MHz to 512 MHz with R&S®FSW-B512 option or R&S®FSW-B512R option		
Amplitude flatness	RF attenuation = 10/20/30/40 dB, RF preamplifier off, electronic attenuator off, YIG preselector off for f ≥ 8 GHz	
	analysis bandwidth ≤ 160 MHz	
	150 MHz ≤ f_{center} < 4 GHz	±0.4 dB (nom.)
	4 GHz ≤ f_{center} ≤ 8 GHz	±0.6 dB (nom.)
	analysis bandwidth ≤ 500 MHz	
	260 MHz ≤ f_{center} < 4 GHz	±0.5 dB (nom.)
	4 GHz ≤ f_{center} ≤ 8 GHz [31]	±0.7 dB (nom.)
	analysis bandwidth ≤ 512 MHz	
	460 MHz ≤ f_{center} < 4 GHz	±0.5 dB (nom.)
	4 GHz ≤ f_{center} ≤ 8 GHz [31]	±0.7 dB (nom.)
	any analysis bandwidth	
	8 GHz < f_{center} ≤ 26.5 GHz	±1.0 dB (nom.)
	26.5 GHz< f_{center} ≤ 43.5 GHz	±1.5 dB (nom.)
	43.5 GHz < f_{center} ≤ 67 GHz	±2 dB (nom.)
	67 GHz < f_{center} ≤ 85 GHz/90 GHz [28]	±2.5 dB (nom.)
Deviation from linear phase	RF attenuation = 10/20/30/40 dB, RF preamplifier off, electronic attenuator off, YIG preselector off for f ≥ 8 GHz	
	analysis bandwidth ≤ 160 MHz	
	150 MHz ≤ f_{center} < 4 GHz	±1° (nom.)
	4 GHz ≤ f_{center} ≤ 8 GHz	±2° (nom.)
	8 GHz < f_{center} ≤ 43.5 GHz	±1.5° (nom.)
	43.5 GHz < f_{center} ≤ 67 GHz	±2° (nom.)
	67 GHz < f_{center} ≤ 85 GHz/90 GHz [28]	±8° (nom.)
	analysis bandwidth ≤ 500 MHz	
	260 MHz ≤ f_{center} < 4 GHz	±1.5° (nom.)
	4 GHz ≤ f_{center} ≤ 8 GHz	±2° (nom.)
	8 GHz < f_{center} ≤ 43.5 GHz	±3° (nom.)
	43.5 GHz < f_{center} ≤ 67 GHz	±5° (nom.)
	67 GHz < f_{center} ≤ 85 GHz/90 GHz [28]	±8° (nom.)
	analysis bandwidth ≤ 512 MHz	
	460 MHz ≤ f_{center} < 4 GHz	±1.5° (nom.)
	4 GHz ≤ f_{center} ≤ 8 GHz	±2° (nom.)
	8 GHz < f_{center} ≤ 43.5 GHz	±3° (nom.)
	43.5 GHz < f_{center} ≤ 67 GHz	±5° (nom.)
	67 GHz < f_{center} ≤ 85 GHz/90 GHz [28]	±8° (nom.)
Nonlinearity of displayed level	0 dB to –70 dB	< 0.15 dB (nom.)
Level measurement uncertainty at center frequency		add 0.2 dB (nom.) to the values in "Total measurement uncertainty – YIG preselector off"
Third-order intermodulation distortion	reference level = signal level + 6 dB	
	f_{center} ≤ 8 GHz: two –20 dBm tones at input mixer within analysis bandwidth [26]	–70 dBc (nom.)
	f_{center} > 8 GHz: two –25 dBm tones at input mixer within analysis bandwidth [26], YIG preselector off	
Residual spurious response	RF attenuation 0 dB, analysis bandwidth ≤ 160 MHz and f_{center} ≥ 150 MHz, or analysis bandwidth ≤ 512 MHz and f_{center} ≥ 650 MHz, YIG preselector off for f ≥ 8 GHz	–90 dBm (nom.)
ADC related spurious response	single tone at center frequency single tone within analysis bandwidth, mixer level = –15 dBm [26], reference level = signal level, analysis bandwidth ≤ 160 MHz and f_{center} ≥ 150 MHz, or analysis bandwidth ≤ 512 MHz and f_{center} ≥ 260 MHz, YIG preselector off for f ≥ 8 GHz	–78 dBc (nom.) –70 dBc (nom.)
Other spurious responses		see section "Spurious responses"

Signal analysis bandwidth 80 MHz to 1200 MHz with R&S®FSW-B1200 option and 80 MHz to 2000 MHz with R&S®FSW-B2001/-B800R option (options available for all models except R&S®FSW8, R&S®FSW13)		
The specifications in this section apply to the following conditions: YIG preselector off for f ≥ 12 GHz, +20 °C to +30 °C.		
Frequency range (center frequency)	analysis bandwidth = 1200 MHz	650 MHz to maximum receiving frequency – 600 MHz
	analysis bandwidth = 2000 MHz	1050 MHz to maximum receiving frequency – 1000 MHz
Amplitude flatness	RF attenuation = 10/20/30/40 dB, RF preamplifier off, electronic attenuator off	
	analysis bandwidth ≤ 1200 MHz	
	650 MHz [32] ≤ f_{center} < 8 GHz	±1.0 dB, (σ = 0.33 dB)
	8 GHz ≤ f_{center} < 22 GHz	±1.2 dB, (σ = 0.40 dB)
	22 GHz ≤ f_{center} ≤ 26.5 GHz	±1.4 dB, (σ = 0.47 dB)
	26.5 GHz < f_{center} ≤ 42.9 GHz	±1.6 dB, (σ = 0.53 dB)
	42.9 GHz < f_{center} ≤ 50 GHz	±1.7 dB, (σ = 0.57 dB)
	50 GHz < f_{center} ≤ 67 GHz	±2.0 dB, (σ = 0.67 dB)
	67 GHz < f_{center} ≤ 85 GHz/90 GHz [28]	±2.5 dB, (σ = 0.83 dB)
	analysis bandwidth ≤ 2000 MHz	
	1050 MHz [32] ≤ f_{center} < 4 GHz	±1.0 dB, (σ = 0.33 dB)
	4 GHz ≤ f_{center} < 42.5 GHz	±2.0 dB, (σ = 0.67 dB)
	42.5 GHz < f_{center} ≤ 66.5 GHz	±2.5 dB, (σ = 0.83 dB)
	66.5 GHz < f_{center} ≤ 85 GHz/90 GHz [33]	±3.0 dB, (σ = 1.0 dB)
Deviation from linear phase	RF attenuation = 10/20/30/40 dB, RF preamplifier off, electronic attenuator off	
	analysis bandwidth ≤ 160 MHz	
	150 MHz [32] ≤ f_{center} < 4 GHz	±1° (nom.)
	4 GHz ≤ f_{center} ≤ 8 GHz	±2° (nom.)
	8 GHz < f_{center} ≤ 43.5 GHz	±1.5° (nom.)
	43.5 GHz < f_{center} ≤ 67 GHz	±2° (nom.)
	67 GHz < f_{center} ≤ 85 GHz	±8° (nom.)
	analysis bandwidth ≤ 500 MHz	
	260 MHz [32] ≤ f_{center} < 4 GHz	±1.5° (nom.)
	4 GHz ≤ f_{center} ≤ 8 GHz	±2° (nom.)
	8 GHz < f_{center} ≤ 43.5 GHz	±3° (nom.)
	43.5 GHz < f_{center} ≤ 67 GHz	±5° (nom.)
	67 GHz < f_{center} ≤ 85 GHz	±8° (nom.)
	analysis bandwidth ≤ 512 MHz	
	460 MHz [32] ≤ f_{center} < 4 GHz	±1.5° (nom.)
	4 GHz ≤ f_{center} ≤ 8 GHz	±2° (nom.)
	8 GHz < f_{center} ≤ 43.5 GHz	±3° (nom.)
	43.5 GHz < f_{center} ≤ 67 GHz	±5° (nom.)
	67 GHz < f_{center} ≤ 85 GHz	±8° (nom.)
	analysis bandwidth ≤ 1200 MHz	
	650 MHz [32] ≤ f_{center} < 4 GHz	±2.5° (nom.)
	4 GHz ≤ f_{center} < 13 GHz	±5° (nom.)
	13 GHz ≤ f_{center} ≤ 37 GHz	±3.5° (nom.)
	37 GHz < f_{center} ≤ 40 GHz	±4° (nom.)
	40.0 GHz < f_{center} ≤ 42.9 GHz	±6° (nom.)
	42.9 GHz < f_{center} ≤ 85 GHz	±7° (nom.)
	analysis bandwidth ≤ 2000 MHz	
	1050 MHz [32] ≤ f_{center} < 4 GHz	±3° (nom.)
	4 GHz ≤ f_{center} < 13 GHz	±7° (nom.)
	13 GHz ≤ f_{center} ≤ 37 GHz	±5° (nom.)
	37 GHz < f_{center} ≤ 40 GHz	±6° (nom.)
	40.0 GHz < f_{center} ≤ 42.5 GHz	±8° (nom.)
	42.5 GHz < f_{center} ≤ 85 GHz	±10° (nom.)

[32] For R&S®FSW85 instruments the specification starts at 1 GHz center frequency for analysis bandwidths ≤ 1200 MHz and at 1.5 GHz center frequency for analysis bandwidths > 1200 MHz.

[33] f_{center} > 66.5 GHz requires R&S®FSW85. f_{center} > 85 GHz requires R&S®FSW-B90G option.

Nonlinearity of displayed level	0 dB to –70 dB	< 0.15 dB (nom.)
Level measurement uncertainty at center frequency		add 0.2 dB (nom.) to the values in “Total measurement uncertainty – YIG preselector off”
Third-order intermodulation distortion	reference level = signal level + 6 dB	
	f_{center} ≤ 8 GHz: two –20 dBm tones at input mixer within analysis bandwidth [26], f_{center} > 8 GHz: two –25 dBm tones at input mixer within analysis bandwidth [26], YIG preselector off	–70 dBc (nom.)
Residual spurious response	RF attenuation = 0 dB	
	analysis bandwidth ≤ 160 MHz	
	f_{center} ≥ 150 MHz	–90 dBm (nom.)
	analysis bandwidth ≤ 512 MHz	
	f_{center} ≥ 650 MHz	–90 dBm (nom.)
	analysis bandwidth ≤ 1200 MHz	
	700 MHz ≤ f_{center} < 8.1 GHz	–80 dBm (nom.)
	8.1 GHz ≤ f_{center} < 9.4 GHz	–60 dBm (nom.)
	9.4 GHz ≤ f_{center} ≤ 12 GHz	–80 dBm (nom.)
	12 GHz < f_{center} ≤ 30 GHz	–90 dBm (nom.)
	30 GHz < f_{center}	–80 dBm (nom.)
	analysis bandwidth ≤ 2000 MHz	
	1100 MHz ≤ f_{center} < 7.75 GHz	–80 dBm (nom.)
	7.75 GHz ≤ f_{center} < 9.8 GHz	–55 dBm (nom.)
	9.8 GHz ≤ f_{center} ≤ 12 GHz	–80 dBm (nom.)
	12 GHz < f_{center} ≤ 30 GHz	–90 dBm (nom.)
	30 GHz < f_{center}	–80 dBm (nom.)
ADC related spurious response	single tone within analysis bandwidth, mixer level = –20 dBm [26], reference level = signal level	
	analysis bandwidth < 200 MHz	–80 dBc (nom.)
	200 MHz ≤ analysis bandwidth ≤ 512 MHz	–75 dBc (nom.)
	512 MHz < analysis bandwidth ≤ 1200 MHz	–65 dBc (nom.)
	1200 MHz < analysis bandwidth ≤ 2000 MHz	–60 dBc (nom.)
Other spurious responses		see section “Spurious responses”

Signal analysis bandwidth 80 MHz to 4.4 GHz with R&S®FSW-B4001 option, 80 MHz to 6.4 GHz with R&S®FSW-B6001 option and 80 MHz to 8.312 GHz with R&S®FSW-B8001 option (option available only for R&S®FSW43, R&S®FSW50, R&S®FSW67 and R&S®FSW85)		
The specifications in this section apply to the following conditions: YIG preselector off, +20 °C to +30 °C.		
Frequency range (center frequency)	analysis bandwidth = 4.4 GHz	
	R&S®FSW43	2.2 GHz to 41.5 GHz
	R&S®FSW50	2.2 GHz to 50.1 GHz
	R&S®FSW67	2.2 GHz to 68 GHz
	R&S®FSW85	2.2 GHz to 84 GHz
	R&S®FSW85 with R&S®FSW-B90G option	2.2 GHz to 86 GHz
	analysis bandwidth = 6.4 GHz	
	R&S®FSW43	18 GHz to 40.5 GHz
	R&S®FSW50	18 GHz to 49.1 GHz
	R&S®FSW67	18 GHz to 57 GHz
	R&S®FSW85	18 GHz to 83 GHz
	R&S®FSW85 with R&S®FSW-B90G option	18 GHz to 86 GHz
	analysis bandwidth = 8.312 GHz	
	R&S®FSW43	18.5 GHz to 39.5 GHz
	R&S®FSW50	18.5 GHz to 48.1 GHz
	R&S®FSW67	18.5 GHz to 57 GHz
	R&S®FSW85	18.5 GHz to 82 GHz
	R&S®FSW85 with R&S®FSW-B90G option	18.5 GHz to 85.8 GHz
Amplitude flatness	RF attenuation = 10/20/30/40 dB, RF preamplifier off, electronic attenuator off	
	analysis bandwidth ≤ 8312 MHz	
	2100 MHz ≤ f_{center} < 5 GHz	±1.5 dB, (σ = 0.50 dB)
	5 GHz ≤ f_{center} ≤ 43.5 GHz	±2.5 dB, (σ = 0.83 dB)
	43.5 GHz < f_{center} ≤ max. center frequency [34]	±3.0 dB, (σ = 1.00 dB)
Deviation from linear phase	RF attenuation = 10/20/30/40 dB, RF preamplifier off, electronic attenuator off	
	analysis bandwidth ≤ 4000 MHz	
	3 GHz ≤ f_{center} < 15 GHz	±8° (nom.)
	15 GHz ≤ f_{center} ≤ 37 GHz	±6° (nom.)
	37 GHz < f_{center} ≤ 40 GHz	±8° (nom.)
	40 GHz < f_{center} ≤ max. center frequency [34]	±8° (nom.)
	analysis bandwidth ≤ 6000 MHz	add ±1° (nom.) to the values for analysis bandwidth ≤ 4000 MHz
	analysis bandwidth ≤ 8000 MHz	add ±2° (nom.) to the values for analysis bandwidth ≤ 4000 MHz
Nonlinearity of displayed level	0 dB to –70 dB	< 0.15 dB (nom.)
Level measurement uncertainty at center frequency		add 0.5 dB (nom.) to the values in "Total measurement uncertainty – YIG preselector off" [34]
Third-order intermodulation distortion	reference level = signal level + 6 dB	
	f_{center} ≤ 8 GHz: two –20 dBm tones at input mixer within analysis bandwidth [26], f_{center} > 8 GHz: two –25 dBm tones at input mixer within analysis bandwidth [26], YIG preselector off	–70 dBc (nom.)
Residual spurious response	RF attenuation = 0 dB, mixer level ≤ –20 dBm [26]	
	analysis bandwidth ≤ 80 MHz	
	f_{center} ≥ 50 MHz	–90 dBm (nom.)
	80 MHz < analysis bandwidth ≤ 2000 MHz	
	1100 MHz ≤ f_{center} < 43 GHz	–80 dBm (nom.)
	43 GHz ≤ f_{center} ≤ max. center frequency	–75 dBm (nom.)
	2000 MHz < analysis bandwidth ≤ 8312 MHz	
	4.2 GHz ≤ f_{center} < 36.6 GHz	–65 dBm (nom.)
	36.6 GHz ≤ f_{center} < 38.2 GHz	–55 dBm (nom.)
	38.2 GHz ≤ f_{center} ≤ max. center frequency	–60 dBm (nom.)

[34] For R&S®FSW85 the maximum specified frequency is 83 GHz.

ADC related spurious response	single tone at center frequency, mixer level = –20 dBm [26, 35] reference level = signal level	
	analysis bandwidth ≤ 1200 MHz	–65 dBc (nom.)
	1200 MHz < analysis bandwidth ≤ 2000 MHz	–60 dBc (nom.)
	2000 MHz < analysis bandwidth ≤ 8312 MHz	–50 dBc (nom.)
Other spurious responses		see section “Spurious responses”

[35] Mixer level = –35 dBm for bandwidth > 2000 MHz and 18 GHz < center frequency < 24 GHz.

Inputs and outputs

RF input		
Impedance		50 Ω
Connector	R&S®FSW8, R&S®FSW13	N female
	R&S®FSW26	APC 3.5 mm male (compatible with SMA)
	R&S®FSW43	2.92 mm male (compatible with SMA)
	R&S®FSW50, R&S®FSW67	1.85 mm male (compatible with 2.4 mm)
	R&S®FSW85, RF1 input	1.00 mm male
	R&S®FSW85, RF2 input	1.85 mm male (compatible with 2.4 mm)
VSWR of R&S®FSW8	RF attenuation ≤ 4 dB	
	10 MHz ≤ f ≤ 8 GHz	typ. 1.87 [36]
	5 dB ≤ RF attenuation ≤ 9 dB	
	10 MHz ≤ f < 1 GHz	< 1.5, typ. 1.20 [36]
	10 MHz ≤ f < 3.6 GHz	< 1.5, typ. 1.31 [36]
	3.6 GHz ≤ f ≤ 8 GHz	< 2.0, typ. 1.51 [36]
	RF attenuation ≥ 10 dB	
	10 MHz ≤ f < 1 GHz	< 1.2, typ. 1.09 [36]
	1 GHz ≤ f < 3.6 GHz	< 1.5, typ. 1.19 [36]
	3.6 GHz ≤ f ≤ 8 GHz	< 2.0, typ. 1.42 [36]
VSWR of R&S®FSW13	RF attenuation ≤ 4 dB	
	10 MHz ≤ f ≤ 13.6 GHz	typ. 1.87 [36]
	5 dB ≤ RF attenuation ≤ 9 dB	
	10 MHz ≤ f < 3.6 GHz	< 1.5, typ. 1.25 [36]
	3.6 GHz ≤ f ≤ 13.6 GHz	< 2.0, typ. 1.29 [36]
	RF attenuation ≥ 10 dB	
	10 MHz ≤ f < 1 GHz	< 1.2, typ. 1.10 [36]
	1 GHz ≤ f < 3.6 GHz	< 1.5, typ. 1.14 [36]
	3.6 GHz ≤ f ≤ 13.6 GHz	< 2.0, typ. 1.22 [36]
VSWR of R&S®FSW26, R&S®FSW43, R&S®FSW50, R&S®FSW67, R&S®FSW85	RF attenuation ≤ 4 dB	
	10 MHz ≤ f ≤ 26.5 GHz	typ. 1.87 [36, 37]
	26.5 GHz < f ≤ 40 GHz	typ. 2.0 [36]
	40 GHz < f ≤ 70 GHz	2.0 (nom.)
	70 GHz < f ≤ 85 GHz/90 GHz [28]	2.4 (nom.)
	5 dB ≤ RF attenuation ≤ 9 dB	
	10 MHz ≤ f ≤ 3.5 GHz	< 1.5, typ. 1.24 [36, 37]
	3.5 GHz < f ≤ 8 GHz	< 1.8, typ. 1.26 [36]
	8 GHz < f ≤ 18 GHz	< 1.8, typ. 1.39 [36]
	18 GHz < f ≤ 26.5 GHz	< 2.0, typ. 1.43 [36]
	26.5 GHz < f ≤ 40 GHz	< 2.5, typ. 1.8 [36]
	40 GHz < f ≤ 70 GHz	2.0 (nom.)
	70 GHz < f ≤ 85 GHz/90 GHz [28]	2.4 (nom.)
	RF attenuation ≥ 10 dB	
	10 MHz ≤ f ≤ 3.5 GHz	< 1.2, typ. 1.12 [36, 37]
	3.5 GHz < f ≤ 8 GHz	< 1.5, typ. 1.19 [36]
	8 GHz < f ≤ 18 GHz	< 1.5, typ. 1.25 [36]
	18 GHz < f ≤ 26.5 GHz	< 2.0, typ. 1.37 [36]
	26.5 GHz < f ≤ 40 GHz	< 2.5, typ. 1.7 [36]
	40 GHz < f ≤ 70 GHz	2.0 (nom.)
	70 GHz < f ≤ 85 GHz/90 GHz [28]	2.4 (nom.)
	R&S®FSW85, input coupling AC, RF attenuation ≥ 10 dB	
	50 MHz ≤ f ≤ 3.5 GHz	< 1.5, typ. 1.19 [36]
	R&S®FSW85 RF input 2	
	add 0.2 to the above values (nom.)	
Setting range of attenuator		0 dB to 79 dB, in 1 dB steps [38, 39]

[36] 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.

[37] R&S®FSW85: specification applies to input coupling DC.

[38] R&S®FSW8 to R&S®FSW67: Mechanical RF attenuator: 5 dB steps. Electronic IF attenuator: 1 dB steps.

[39] R&S®FSW85: Mechanical RF attenuator: 10 dB steps. Electronic IF attenuator: 1 dB steps.

Probe power supply		
Supply voltages		+15 V DC, –12.6 V DC and ground, max. 150 mA (nom.)

Noise source control		
Connector		BNC female
Output voltage		0 V/28 V, switchable, max. 100 mA (nom.)

Power sensor/noise source control		
Connector		7-pin LEMOSA female for R&S®FS-SNSxx smart noise sources and R&S®NRP-Zxx power sensors
Noise source control output voltage		0 V/28 V, switchable, max. 100 mA (nom.)

USB interface		7 ports, type A plug, version 2.0
	with R&S®FSW-B112 option	1 port, type B plug, version 2.0, for remote instrument control

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.)

IF wide output (with R&S®FSW-B160/B320/-B512/-B512R option only)		
Connector	R&S®FSW-B160 or R&S®FSW-B320	BNC female, 50 Ω (nom.)
	R&S®FSW-B512	SMA female, 50 Ω (nom.)
IF frequency	center frequency ≥ 200 MHz	50 MHz to 550 MHz (nom.)
Maximum bandwidth (6 dB)	YIG preselector off	500 MHz
Output level	RF attenuation = auto, reference level ≥ –15 dBm, signal level = reference level	–20 dBm (nom.)
Aux port		
Connector		9-pin D-Sub male
Output		TTL-compatible, 0 V/5 V (nom.), max. 15 mA (nom.)
Input		TTL-compatible, max. 5 V (nom.)

IF output 2 GHz (R&S®FSW26, R&S®FSW43, R&S®FSW50, R&S®FSW67 and R&S®FSW85 only)		
Connector		SMA female, 50 Ω (nom.)
RF frequency range	span = 0 Hz	8 GHz to the maximum frequency of the instrument model
IF frequency	center	2 GHz

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

Synchronization input		
Connector		HDMI

Synchronization output		
Connector		HDMI

General data

Display		30.7 cm (12.1") WXGA color touchscreen
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 [40]
	permissible temperature range	0 °C to +55 °C [40]
	storage temperature range	–40 °C to +70 °C
Climatic loading		+40 °C at 90 % rel. humidity, in line with EN 60068-2-30, without condensation

Altitude		
Maximum operating altitude	above sea level	4600 m (approx. 15100 feet)

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 [41, 42] • IEC/EN 61326-2-1 • EN 55011 [41] • IEC/EN 61000-3-2 • IEC/EN 61000-3-3

Recommended calibration interval		1 year

[40] With built-in R&S®FSW-B512R option, the upper operating and permissible temperature with active real-time analysis is limited to +45 °C.
With built-in R&S®FSW-B800R option, the upper operating and permissible temperature with active real-time analysis is limited to +40 °C.

[41] Emission limits for class A equipment apply.

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

Power supply		
AC input voltage range		100 V to 240 V
AC supply frequency		50 Hz to 60 Hz/400 Hz
Maximum input current		7.3 A (100 V) to 4.6 A (240 V)
Power consumption	R&S®FSW8	150 W without options, 250 W with all options (meas.) [43]
	R&S®FSW13, R&S®FSW26	175 W without options, 275 W with all options (meas.) [43]
	R&S®FSW43, R&S®FSW50	200 W without options, 300 W with all options (meas.) [43]
	R&S®FSW67	220 W without options, 320 W with all options (meas.) [43]
	R&S®FSW85	230 W without options, 330 W with all options (meas.) [43]
Safety		in line with IEC 61010-1, EN 61010-1, UL 61010-1, CAN/CSA-C22.2 No. 61010-1
Test marks		CE, $_{C}$CSA$_{US}$, KCC

Dimensions and weight		
Dimensions (nom.) (W × H × D, including front handles and rear feet)	R&S®FSW8 to R&S®FSW67	462 mm × 240 mm × 504 mm (18.15 in × 9.44 in × 19.81 in)
	R&S®FSW85	462 mm × 240 mm × 610 mm (18.15 in × 9.44 in × 24.01 in)
Net weight without options (nom.)	R&S®FSW8	20.2 kg (44.5 lb)
	R&S®FSW13, R&S®FSW26	21.5 kg (47.4 lb)
	R&S®FSW43, R&S®FSW50	22.4 kg (49.4 lb)
	R&S®FSW67	23.7 kg (52.2 lb)
	R&S®FSW85	27.9 kg (61.5 lb)

[43] All options except R&S®FSW-B512R/-B1200/-B2001/-B800R.
For R&S®FSW-B512R add 130 W to the power consumption.
For R&S®FSW-B1200/-B2001/-B800R/-B4001/-B6001/-B8001 add 200 W to the power consumption.

Options

R&S®FSW-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®FSW-B13 highpass filters

Frequency		
Frequency range	filter 1	1 GHz to 1.75 GHz
	filter 2	1.75 GHz to 3 GHz

Stopband attenuation		
500 MHz to 875 MHz	filter 1	> 20 dB (nom.)
875 MHz to 1.5 GHz	filter 2	> 20 dB (nom.)

Other specifications		
Level measurement uncertainty		see base unit specification
Displayed average noise level		
Intermodulation		
Measurement uncertainty		

R&S®FSW-B17 digital baseband interface

I/Q data IN		
Interface		LVDS
	connector	26-pin female MDR (Mini D Ribbon)
Transfer protocol		R&S®Digital I/Q Interface [44]
User data	sample rate	100 sample/s to 200 Msample/s (nom.)
	resolution	18 bit for I and 18 bit for Q
	general purpose signals	2 bit

I/Q data OUT		
Interface		LVDS
	connector	26-pin female MDR (Mini D Ribbon)
Transfer protocol		R&S®Digital I/Q Interface [44]
User data	sample rate	100 sample/s to 200 Msample/s (nom.)
	resolution	18 bit for I and 18 bit for Q
Maximum I/Q bandwidth	standard	28 MHz
	with R&S®FSW-B40 option	40 MHz
	with R&S®FSW-B80 option	80 MHz
	with R&S®FSW-B160/-B320/-B512/ -B512R/-B1200/-B2001/-B800R option	160 MHz

[44] R&S®Digital I/Q Interface is a Rohde & Schwarz company standard for the transmission of digital I/Q data. It is supported by a wide range of instruments (signal generators, signal analyzers and communications testers).

R&S®FSW-B517 DIG IQ 40G streaming out interface (not available with R&S®FSW-B4001/-B6001/-B8001 option)

Interface	direction	I/Q data OUT
	connector	QSFP+
	transfer data rate	40 Gbps
Output channel		16 bit, 600 Msample/s
User data	sample rate	100.1 Msample/s to 600 Msample/s (nom.)
	resolution	16 bit for I and 16 bit for Q
Minimum I/Q bandwidth		80 MHz
Maximum I/Q bandwidth	with R&S®FSW-B512/-B512R/-B1200/ -B2001/-B800R option	512 MHz

R&S®FSW-B1017 DIG IQ 40G streaming out interface (max. 1 GHz bandwidth) (available with R&S®FSW-B1200/-B2001/-B800R option)

Interface	direction	I/Q data OUT
	connector	QSFP+
	transfer data rate	40 Gbps
Output channel	I/Q bandwidth 80 MHz to 512 MHz	see R&S®FSW-B517
	I/Q bandwidth 1000 MHz	12 bit, 1200 Msample/s
User data	sample rate	see R&S®FSW-B517; 1200 Msample/s additionally (nom.)
	resolution	
	I/Q bandwidth 80 MHz to 512 MHz	see R&S®FSW-B517
	I/Q bandwidth 1000 MHz	12 bit for I and 12 bit for Q
I/Q bandwidth		see R&S®FSW-B517; 1000 MHz additionally

R&S®FSW-B21 LO/IF connections for external mixers (not available for R&S®FSW8, R&S®FSW13)

LO signal		
Frequency range		7.65 GHz to 17.45 GHz
Output level		+13 dBm to 17 dBm (nom.)
Accuracy of set LO level	+20 °C to +30 °C	±1.5 dB
	+5 °C to +40 °C	±3 dB

IF input		
IF frequency	set signal analysis bandwidth	
	≤ 80 MHz, bandwidth-dependent	1310 MHz to 1330 MHz
	80 MHz to 160 MHz/320 MHz with R&S®FSW-B160/-B320	1530 MHz
	80 MHz to 512 MHz with R&S®FSW-B512/-B512R/-B1200/ -B2001/-B800R	1580 MHz
	> 512 MHz with R&S®FSW-B1200/-B2001/-B800R	3290 MHz
	> 80 MHz with R&S®FSW-B4001	2660 MHz
	> 80 MHz with R&S®FSW-B6001/-B8001	
	analysis bandwidth ≤ 4.4 GHz	2660 MHz
	analysis bandwidth > 4.4 GHz	9933 MHz
Full-scale level	compression < 1 dB	
	2-port mixer (LO output/IF input, front panel) [45]	–20 dBm (nom.)
	3-port mixer (IF input, front panel)	–20 dBm (nom.)

[45] 2-port mixers are not supported by the R&S®FSW-B800R/-B1200/-B2001/-B4001/-B6001/-B8001 options.

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) [45]	
	+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®FSW-B24 RF preamplifier

Frequency		
Frequency range	R&S®FSW8	100 kHz to 8 GHz
	R&S®FSW13	100 kHz to 13.6 GHz
	R&S®FSW26	100 kHz to 26.5 GHz
	R&S®FSW43	100 kHz to 43.5 GHz
	R&S®FSW50	100 kHz to 50 GHz
	R&S®FSW67	100 kHz to 67 GHz

Setting range		
RF preamplifier gain		15 dB/30 dB (nom.) (selectable) [46]

Other specifications		
Level measurement uncertainty		see base unit specification
Displayed average noise level		
Intermodulation		
Measurement uncertainty		

R&S®FSW-B25 electronic attenuator

Frequency		
Frequency range	R&S®FSW8	10 MHz to 8 GHz
	R&S®FSW13, R&S®FSW26	10 MHz to 13.6 GHz

Setting range		0 dB to 30 dB, in 1 dB steps [47]

Level measurement uncertainty		see base unit specification

Displayed average noise level	electronic attenuator on	specification of base unit degrades by 3 dB + 0.25 dB × f / 1 GHz (nom.)

Intermodulation		
Third-order intercept point (TOI)	electronic attenuator off or electronic attenuator on and RF attenuation = 0 dB	see base unit specification
	electronic attenuator on, RF attenuation = 30 dB	
	10 MHz to 500 MHz	30 dBm (nom.)
	500 MHz to 13.6 GHz	40 dBm (nom.)

[46] 15 dB gain is only available for R&S®FSW8, R&S®FSW13, R&S®FSW26 and instruments starting from the following serial numbers: R&S®FSW43: 102163, R&S®FSW50: 101663, R&S®FSW67: 101715.

[47] Electronic RF attenuator: 5 dB steps.
Electronic IF attenuator: 1 dB steps.

R&S®FSW-B71 analog baseband inputs, R&S®FSW-B71E 80 MHz analysis bandwidth for analog baseband inputs

Frequency		
Frequency range (equalized)	R&S®FSW-B71	
	I only, Q only	DC to 40 MHz
	I + jQ	–40 MHz to +40 MHz
	R&S®FSW-B71E	
	I only, Q only	DC to 80 MHz
	I + jQ	–80 MHz to +80 MHz

Spectral purity		
Phase noise	offset 1 kHz	–134 dBc (1 Hz) (nom.)
	offset 10 kHz	–138 dBc (1 Hz) (nom.)
	offset ≥ 100 kHz	–144 dBc (1 Hz) (nom.)

Inputs		
Connectors	I and Q	BNC female, 50 Ω (nom.)
	$\overline{I}$ and $\overline{Q}$ [48]	BNC female, 50 Ω (nom.)
Maximum safe input voltage	any input, sum of DC + AC	±4 V
Input voltage range (full scale)	peak voltage	±2 V, ±1 V, ±0.5 V, ±0.25 V
Maximum common mode input range		–3 V to +3 V
Input impedance	single-ended	50 Ω (nom.)
	differential	100 Ω (nom.)
	common mode at DC	20 kΩ (nom.)
Input return loss	0 Hz to 40 MHz	–35 dB (nom.)
	40 MHz to 80 MHz (R&S®FSW-B71E only)	–30 dB (nom.)

Amplitude		
Absolute amplitude accuracy	f_{input} = 1 MHz, input voltage = full scale – 6 dB	±0.15 dB
Amplitude linearity	0 dB to –80 dB relative to full scale	±0.1 dB (nom.)
Frequency response		
Amplitude	relative to 1 MHz	
	0 Hz to 40 MHz	±0.15 dB
	40 MHz to 80 MHz (R&S®FSW-B71E only)	±0.25 dB
Deviation from linear phase	0 Hz to 40 MHz	±1° (nom.)
	40 MHz to 80 MHz (R&S®FSW-B71E only)	±2° (nom.)
Channel match (I/Q imbalance)		
Amplitude match accuracy	0 Hz to 20 MHz	±0.06 dB (2σ)
	20 MHz to 40 MHz	±0.1 dB (2σ)
	40 MHz to 80 MHz (R&S®FSW-B71E only)	±0.15 dB (2σ)
Phase match accuracy	0 Hz to 20 MHz	±0.3° (nom.)
	20 MHz to 40 MHz	±0.6° (nom.)
	40 MHz to 80 MHz (R&S®FSW-B71E only)	±1° (nom.)

[48] Not available for the R&S®FSW85.

Dynamic range		
Crosstalk		–80 dB (nom.)
Signal-to-noise ratio	any input range, relative to full scale	145 dBc (1 Hz) (nom.)
Displayed average noise level (RMS)	2 MHz to 80 MHz	
	range	
	±2 V peak	–130 dBm (1 Hz) (72 nV (√ 1 Hz)) (nom.)
	±1 V peak	–136 dBm (1 Hz) (36 nV (√ 1 Hz)) (nom.)
	±0.5 V peak	–142 dBm (1 Hz) (18 nV (√ 1 Hz)) (nom.)
	±0.25 V peak	–148 dBm (1 Hz) (9 nV (√ 1 Hz)) (nom.)
Residual DC (I/Q offset)	relative to full scale	–54 dB (nom.)
Residual response	range ± 0.25 V peak	–90 dBm (nom.)
Spurious response	with full scale input signal	
	0 Hz to 40 MHz	–75 dBc (nom.)
	40 MHz to 80 MHz (R&S®FSW-B71E only)	–70 dBc (nom.)
Third-order intermodulation distortion	two CW signals, voltage = full scale – 6 dB (each signal)	
	0 Hz to 40 MHz	–80 dBc (nom.)
	40 MHz to 80 MHz (R&S®FSW-B71E only)	
	differential	–80 dBc (nom.)
	single-ended	–74 dBc (nom.)

Probes		
Probes supported on connectors I and Q	active single-ended probes	R&S®RT-ZS10E
		R&S®RT-ZS10
		R&S®RT-ZS20
		R&S®RT-ZS30
		R&S®RT-ZS60
	active differential probes	R&S®RT-ZD20
		R&S®RT-ZD30
		R&S®RT-ZD40
RF measurements using probes [49]		
Supported connector	input source RF set to baseband input I	I
Maximum input frequency		5 GHz [50]
Frequency response	see probe specification for frequency response of probe	add the probe frequency response to the FSW frequency response specified in section “Total measurement uncertainty”

R&S®FSW-B2071 oscilloscope baseband inputs (available for all FSW models)

The specifications in this section apply to I/Q data recorded using the R&S®FSW-B2071 option. An R&S®RTO1044, R&S®RTO2044 or R&S®RTO 2064 with R&S®RTO-B4 option is required to obtain the specified performance. For ordering information, see section “Oscilloscopes supported by R&S®FSW-B2071 option”.

Frequency range	dependent on R&S®RTO model	
	R&S®RTO 1044/2044	
	I + jQ	–4 GHz to +4 GHz
	I only	DC to 4 GHz
	R&S®RTO 2064	
	I + jQ	–6 GHz to +6 GHz
	I only	DC to 6 GHz

[49] Feature not available for R&S®FSW67 and R&S®FSW85.

[50] Maximum frequency supported by the connector. To identify the maximum achievable input frequency when using a probe, the probe specification must be taken into account.

Record length [51]	sampling rate 2.5 GHz, R&S®RTO 1044 with R&S®RTO-B104 option	
	I + jQ, differential	max. 100 Msample [52]
	I + jQ, single ended	max. 200 Msample [52]
	I only	max. 200 Msample [52]
	sampling rate 2.5 GHz, R&S®RTO 2044/2064 with R&S®RTO-B110 option	
	I + jQ, differential	max. 250 Msample [52]
	I + jQ, single ended	max. 500 Msample [52]
	I only	max. 500 Msample [52]
Sampling rate	setting range	10 kHz to 20 GHz
	default for 2 GHz analysis bandwidth	2.5 GHz
Signal analysis bandwidth	dependent on R&S®RTO model and I/Q mode	
	R&S®RTO 1044/2044, R&S®RTO6 with R&S®RTO6-B94 option	8 kHz to 8 GHz
	R&S®RTO 2064, R&S®RTO6 with R&S®RTO6-B96 option	8 kHz to 12 GHz
Amplitude	see datasheet R&S®RTO	
Dynamic range	see datasheet R&S®RTO	

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

Health and utilization monitoring service (HUMS) [53, 54]		
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)

[51] The maximum record length with the R&S®FSW-B2071 option depends on the R&S®RTO memory configuration and the number of active R&S®RTO channels.
The following equation indicates the relation between record length, R&S®RTO memory size and set FSW sampling rate for 1 active channel:
Record length (rounded to Msample) = (R&S®RTO memory size per channel in Msample) × FSW sample rate/R&S®RTO sample rate.
Divide the values by two with R&S®RTO-B104 or R&S®RTO-B110 for differential mode. For other memory option configurations divide the value by two when using differential mode or I/Q single ended mode.
The sample rate for the R&S®RTO will be set to 10 GHz in differential mode and 20 GHz for all other modes.
At 2 GHz analysis bandwidth the FSW default sample rate is 2.5 GHz.

[52] Rounded to Msample.

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

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

Ordering information

Designation	Type	Order No.
Signal and spectrum analyzer, 2 Hz to 8 GHz	R&S®FSW8	1331.5003.08
Signal and spectrum analyzer, 2 Hz to 13.6 GHz	R&S®FSW13	1331.5003.13
Signal and spectrum analyzer, 2 Hz to 26.5 GHz	R&S®FSW26	1331.5003.26
Signal and spectrum analyzer, 2 Hz to 43.5 GHz	R&S®FSW43	1331.5003.43
Signal and spectrum analyzer, 2 Hz to 50 GHz	R&S®FSW50	1331.5003.50
Signal and spectrum analyzer, 2 Hz to 67 GHz	R&S®FSW67	1331.5003.67
Signal and spectrum analyzer, 2 Hz to 85 GHz [55]	R&S®FSW85	1331.5003.85
Accessories supplied		
Power cable, quick start guide R&S®FSW26: adapter 3.5 mm (APC3.5-compatible) female/female R&S®FSW43: adapter 2.92 mm female/female R&S®FSW50 and R&S®FSW67: adapter 1.85 mm female/female R&S®FSW85: adapter 1.0 mm female/female, torque wrench for 1.0 mm connectors with 0.23 Nm coupling torque, adapter 1.85 mm female/female		

Options for FSW with order no. 1331.5003.xx

Designation	Type	Order No.	Retro-fittable	Remarks
OCXO precision frequency reference	R&S®FSW-B4	1313.0703.02	yes	user-retrofittable
Resolution bandwidth up to 40 MHz	R&S®FSW-B8E	1338.6911.02	yes	for R&S®FSW8/13/26/43/50/67/85; the signal analysis bandwidth is defined by the R&S®FSW-B40/-B80/-B160/-B320/-B512/-B512R/-B1200/-B2001/-B800R/-B4001/-B6001/-B8001 options, not by the R&S®FSW-B8E option; user-retrofittable [56]
Resolution bandwidth up to 80 MHz	R&S®FSW-B8	1313.2464.26	yes	for R&S®FSW8/13/26; the signal analysis bandwidth is defined by the R&S®FSW-B40/-B80/-B160/-B320/-B512/-B512R/-B1200/-B2001/-B800R/-B4001/-B6001/-B8001 options, not by the R&S®FSW-B8 option; contact service center
Resolution bandwidth up to 80 MHz	R&S®FSW-B8	1313.2464.02	yes	for R&S®FSW43/50/67/85; the signal analysis bandwidth is defined by the R&S®FSW-B40/-B80/-B160/-B320/-B512/-B512R/-B1200/-B2001/-B800R/-B4001/-B6001/-B8001 options, not by the R&S®FSW-B8 option; contact service center; export license required
External generator control	R&S®FSW-B10	1313.1622.02	yes	contact service center
Highpass filter for harmonic measurements	R&S®FSW-B13	1313.0761.02	yes	user-retrofittable
Digital baseband Interface	R&S®FSW-B17	1313.0784.02	yes	user-retrofittable
Spare solid state drive (removable hard drive)	R&S®FSW-B18	1313.0790.21	yes	user-retrofittable
LO/IF connections for external mixers	R&S®FSW-B21	1313.1100.28	yes	for R&S®FSW26/43/50/67; contact service center [57]
LO/IF connections for external mixers	R&S®FSW-B21	1313.1100.86	yes	for R&S®FSW85; contact service center [57]

[55] Frequency range for R&S®FSW85 with R&S®FSW-B90G option: 2 Hz to 90 GHz (YIG preselector off).

[56] For instruments starting from the following serial numbers: R&S®FSW8: 101342, R&S®FSW13: 101344, R&S®FSW26: 101664, R&S®FSW43: 101450, R&S®FSW50: 101322, R&S®FSW67: 101409, R&S®FSW85: 101573.

[57] Includes two cables (length: 1 m) for IF and LO ports.

Designation	Type	Order No.	Retro-fittable	Remarks
RF preamplifier, 100 kHz to 13.6 GHz	R&S®FSW-B24	1313.0832.13	yes	for R&S®FSW8/13; contact service center
RF preamplifier, 100 kHz to 26.5 GHz	R&S®FSW-B24	1313.0832.26	yes	for R&S®FSW26; contact service center
RF preamplifier, 100 kHz to 43.5 GHz	R&S®FSW-B24	1313.0832.43	yes	for R&S®FSW43; contact service center
RF preamplifier, 100 kHz to 50 GHz	R&S®FSW-B24	1313.0832.49	yes	for R&S®FSW50; contact service center
RF preamplifier, 100 kHz to 50 GHz	R&S®FSW-B24	1313.0832.51	yes	for R&S®FSW50; contact service center
RF preamplifier, 100 kHz to 67 GHz	R&S®FSW-B24	1313.0832.66	yes	for R&S®FSW67; contact service center
RF preamplifier, 100 kHz to 67 GHz	R&S®FSW-B24	1313.0832.67	yes	for R&S®FSW67; contact service center
Electronic attenuator, 1 dB steps	R&S®FSW-B25	1313.0990.02	yes	for R&S®FSW8/13/26; contact service center
USB mass memory write protection	R&S®FSW-B33	1313.3602.02	no	pre-installed in factory
40 MHz analysis bandwidth	R&S®FSW-B40	1313.0861.02	yes	user-retrofittable
80 MHz analysis bandwidth	R&S®FSW-B80	1313.0878.02	yes	user-retrofittable
160 MHz analysis bandwidth	R&S®FSW-B160	1325.4850.14	yes	contact service center
320 MHz analysis bandwidth	R&S®FSW-B320	1325.4867.14	yes	includes 200 MHz IF filter; contact service center
512 MHz analysis bandwidth	R&S®FSW-B512	1331.7106.14	yes	includes 200 MHz IF filter; contact service center
1.2 GHz analysis bandwidth	R&S®FSW-B1200	1331.6400.14	yes	for R&S®FSW26/43/50/67/85 ex-factory and for later upgrade of FSW instruments without analysis bandwidth option; for later upgrade of FSW instruments with analysis bandwidth option use R&S®FSW-U1200; contact service center
2 GHz analysis bandwidth	R&S®FSW-B2001	1331.6916.14	yes	for R&S®FSW26/43/50/67/85 ex-factory and for later upgrade of FSW instruments without analysis bandwidth option; for later upgrade of FSW instruments with R&S®FSW-B1200 option use R&S®FSW-U2001; contact service center
4.4 GHz analysis bandwidth	R&S®FSW-B4001	1338.5215.14	yes	for R&S®FSW43/50/67/85 ex-factory and for later upgrade of FSW instruments without analysis bandwidth option; for later upgrade of FSW instruments with R&S®FSW-B80/-B160/-B320/-B512 option use R&S®FSW-U4001; for FSW instruments with R&S®FSW-B1200/-B2001 option use R&S®FSW-U4002; contact service center [58]
6.4 GHz analysis bandwidth	R&S®FSW-B6001	1338.5221.14	yes	for R&S®FSW43/50/67/85 ex-factory and for later upgrade of FSW instruments without analysis bandwidth option; for later upgrade of FSW instruments with R&S®FSW-B80/-B160/-B320/-B512 option use R&S®FSW-U4001 and -U6001; for FSW instruments with R&S®FSW-B1200/-B2001 option use R&S®FSW-U4002 and -U6001; not available in combination with contact service center [58]

[58] The option is only retrofittable for instruments starting from the following serial numbers: R&S®FSW43: 101587, R&S®FSW50: 101420, R&S®FSW67: 101540, R&S®FSW85: 101650.

Designation	Type	Order No.	Retro-fittable	Remarks
8.312 GHz analysis bandwidth	R&S®FSW-B8001	1338.5238.14	yes	for R&S®FSW43/50/67/85 ex-factory and for later upgrade of FSW instruments without analysis bandwidth option; for later upgrade of FSW instruments with R&S®FSW-B80/-B160/-B320/-B512 option use R&S®FSW-U4001, -U6001 and -U8001; for FSW instruments with R&S®FSW-B1200/-B2001 option use R&S®FSW-U4002, -U6001 and -U8001; contact service center [58]
Analog baseband inputs, 40 MHz analysis bandwidth	R&S®FSW-B71	1313.1651.13	yes	for R&S®FSW8/13; contact service center
Analog baseband inputs, 40 MHz analysis bandwidth	R&S®FSW-B71	1313.1651.26	yes	for R&S®FSW26/43/50; contact service center
Analog baseband inputs, 40 MHz analysis bandwidth	R&S®FSW-B71	1313.1651.67	yes	for R&S®FSW67; contact service center
Analog baseband inputs, 40 MHz analysis bandwidth	R&S®FSW-B71	1313.1651.86	yes	for R&S®FSW85; contact service center
80 MHz analysis bandwidth for analog baseband inputs	R&S®FSW-B71E	1313.6547.02	yes	R&S®FSW-B71 required; user-retrofittable
Oscilloscope baseband inputs	R&S®FSW-B2071	1331.8302.02	yes	user-retrofittable
Real-time spectrum analyzer 512 MHz, POI ≤ 15 µs	R&S®FSW-B512R	1331.7106.16	yes	contact service center includes 512 MHz analysis bandwidth and 200 MHz IF filter
Real-time spectrum analyzer 800 MHz, POI ≤ 15 µs	R&S®FSW-B800R	1331.6400.16	yes	for R&S®FSW26/43/50/67/85; contact service center includes 2000 MHz analysis bandwidth; export license required
Frequency extension 90 GHz	R&S®FSW-B90G	1331.7693.02	no	for R&S®FSW85 only; without preselection for f > 85 GHz
I/Q memory extension 6 GB	R&S®FSW-B106	1331.6451.02	yes	R&S®FSW-B160/-U160/-B320 required; user-retrofittable
I/Q memory extension 8 GB	R&S®FSW-B108	1331.6751.02	yes	R&S®FSW-B1200/-U1200/-B2001/-U2001/ -B800R required; user-retrofittable
I/Q memory extension 24 GB	R&S®FSW-B124	1338.5273.02	yes	R&S®FSW-B4001/-U4001/-B6001/-U6001/ -B8001/-U8001 required; user-retrofittable
USB instrument remote control, type B plug	R&S®FSW-B112	1353.3290.02	yes	
DIG IQ 40G streaming out interface	R&S®FSW-B517	1331.6980.02	yes	R&S®FSW-B512/-U512/-B1200/-U1200/-B2001/-U2001/-B800R required; user-retrofittable
DIG IQ 40G streaming out interface, max. 1 GHz bandwidth	R&S®FSW-B1017	1350.7008.02	yes	R&S®FSW-B1200/-U1200/-B2001/-U2001/-B800R required; user-retrofittable
Floating license smart card, with USB adapter	R&S®FSW-FL	1345.1940.02		

Firmware

Designation	Type	Order No.	Retro-fittable	Remarks
Pulse measurements	R&S®FSW-K6	1313.1322.02		
Time side lobe measurements	R&S®FSW-K6S	1325.3738.02		R&S®FSW-K6 option required
AM/FM/PM modulation analysis	R&S®FSW-K7	1313.1339.02		
Bluetooth® BR/EDR/LE measurements [59]	R&S®FSW-K8	1313.1351.02		
Bluetooth® 6.0 channel sounding [59]	R&S®FSW-K8E	1353.3284.02		R&S®FSW-K8 option required.
GSM/EDGE/EDGE evolution/ VAMOS measurements [59]	R&S®FSW-K10	1313.1368.02		
VOR/ILS measurements	R&S®FSW-K15	1331.4388.02		contact service center
Multicarrier group delay measurements	R&S®FSW-K17	1313.4150.02		
Frequency subspan measurements for multi carrier group delay measurements	R&S®FSW-K17S	1338.5896.02		R&S®FSW-K17 option and one of the R&S®FSW-B512/-B512R/ -B1200/-B2001/-B800R/-B4001/ -B6001/-B8001 options required
Amplifier measurements	R&S®FSW-K18	1325.2170.02		
Direct DPD measurements	R&S®FSW-K18D	1331.6845.02		R&S®FSW-K18 option required
Frequency response measurements	R&S®FSW-K18F	1338.7230.02		R&S®FSW-K18 option required
Memory polynomial DPD	R&S®FSW-K18M	1345.1470.02		R&S®FSW-K18 and R&S®FSW-K18D options required
Noise power ratio measurements	R&S®FSW-K19	1331.8283.02		
Noise figure measurements [59]	R&S®FSW-K30	1313.1380.02		
Security write protection of solid-state drive	R&S®FSW-K33	1322.7936.02		
Phase noise measurements [59]	R&S®FSW-K40	1313.1397.02		
Spurious measurements	R&S®FSW-K50	1325.2893.02		
EMI measurements	R&S®FSW-K54	1313.1400.02		
CISPR calibration for R&S®FSW-K54	R&S®FSW-K54CAL	1331.5932.02		in line with ISO 17025 and ISO 9000; R&S®FSW-K54 option required
Transient measurement application	R&S®FSW-K60	1313.7495.02		
Transient hop measurement	R&S®FSW-K60H	1322.9916.02		R&S®FSW-K60 option required
Transient chirp measurement	R&S®FSW-K60C	1322.9745.02		R&S®FSW-K60 option required
Transient phase noise measurement	R&S®FSW-K60P	1353.2413.02		R&S®FSW-K60 option required
Vector signal analysis [59]	R&S®FSW-K70	1313.1416.02		
Multi-modulation analysis [59]	R&S®FSW-K70M	1338.4177.02		R&S®FSW-K70 option required
BER PRBS measurements [59]	R&S®FSW-K70P	1338.3893.02		R&S®FSW-K70 option required
3GPP FDD (WCDMA) BS measurements (incl. HSDPA and HSDPA+) [59]	R&S®FSW-K72	1313.1422.02		
3GPP FDD (WCDMA) MS measurements (incl. HSUPA and HSUPA+) [59]	R&S®FSW-K73	1313.1439.02		
TD-SCDMA BS measurements	R&S®FSW-K76	1313.1445.02		
TD-SCDMA UE measurements	R&S®FSW-K77	1313.1451.02		
CDMA2000 BS measurements	R&S®FSW-K82	1313.1468.02		
CDMA2000 MS measurements	R&S®FSW-K83	1313.1474.02		
1xEV-DO BS measurements	R&S®FSW-K84	1313.1480.02		
1xEV-DO MS measurements	R&S®FSW-K85	1313.1497.02		
WLAN 802.11a/b/g measurements [59]	R&S®FSW-K91	1313.1500.02		to support signal analysis bandwidths > 10 MHz, one of the R&S®FSW-B40/-B80/-B160/ -B320/-B512/-B512R/-B1200/ -B2001/-B800R/-B4001/-B6001/ -B8001 options required
WLAN 802.11n measurements [59]	R&S®FSW-K91N	1313.1516.02		R&S®FSW-K91 required; to support signal analysis bandwidths > 10 MHz, one of the R&S®FSW-B40/-B80/-B160/ -B320/-B512/-B512R/-B1200/ -B2001/-B800R/-B4001/-B6001/ -B8001 options required
WLAN 802.11ac measurements [59]	R&S®FSW-K91AC	1313.4209.02		
WLAN 802.11ax measurements [59]	R&S®FSW-K91AX	1331.6345.02		
WLAN 802.11be measurements [59]	R&S®FSW-K91BE	1350.6730.02		
WLAN 802.11p measurements [59]	R&S®FSW-K91P	1321.5646.02		
WLAN 802.11bn measurements [59]	R&S®FSW-K91BN	1353.4374.02		R&S®FSW-K91 and R&S®FSW-K91BE required

[59] Also available as floating license. Order number is xxxx.xxxx.51 instead of xxxx.xxxx.02 and requires R&S®FSW-FL hardware option.

Designation	Type	Order No.	Retro-fittable	Remarks
WLAN 802.11ad measurements [59]	R&S®FSW-K95	1313.1639.02		R&S®FSW-B2001/-B800R/ -B4001/-B6001/-B8001 option required
OFDM signal analysis	R&S®FSW-K96	1313.1539.02		
WLAN 802.11ay measurements [59]	R&S®FSW-K97	1338.4902.02		R&S®FSW-B2001/-B800R/ -B4001/-B6001/-B8001 option required
EUTRA/LTE FDD BS measurements [59]	R&S®FSW-K100	1313.1545.02		to support signal analysis bandwidths > 10 MHz, one of the R&S®FSW-B40/-B80/ -B160/-B320/-B512/-B512R/ -B1200/-B2001/-B800R/-B4001/ -B6001/-B8001 options required
EUTRA/LTE FDD UE measurements [59]	R&S®FSW-K101	1313.1551.02		
EUTRA/LTE BS MIMO measurements [59]	R&S®FSW-K102	1313.1568.02		R&S®FSW-K100 or R&S®FSW-K104 option required to support signal analysis bandwidths > 10 MHz, one of the R&S®FSW-B40/-B80/ -B160/-B320/-B512/-B512R/ -B1200/-B2001/-B800R/-B4001/ -B6001/-B8001 options required
EUTRA/LTE-Advanced uplink measurements [59]	R&S®FSW-K103	1313.2478.02		R&S®FSW-K101 or R&S®FSW-K105 option required to support signal analysis bandwidths > 10 MHz, one of the R&S®FSW-B40/-B80/ -B160/-B320/-B512/-B512R/ -B1200/-B2001/-B800R/-B4001/ -B6001/-B8001 options required
EUTRA/LTE TDD BS measurements [59]	R&S®FSW-K104	1313.1574.02		to support signal analysis bandwidths > 10 MHz, one of the R&S®FSW-B40/-B80/ -B160/-B320/-B512/-B512R/ -B1200/-B2001/-B800R/-B4001/ -B6001/-B8001 options required
EUTRA/LTE TDD uplink measurements [59]	R&S®FSW-K105	1313.1580.02		
EUTRA/LTE NB-IoT downlink measurements [59]	R&S®FSW-K106	1331.6351.02		
VERIZON 5GTF DL	R&S®FSW-K118	1331.7370.02		one of the R&S®FSW-B160/ -B320/-B512/-B512R/-B1200/ -B2001/-B800R/-B4001/-B6001/ -B8001 options required
VERIZON 5GTF UL	R&S®FSW-K119	1331.8060.02		
5G NR Rel. 15 downlink measurements [59]	R&S®FSW-K144	1338.3606.02		
5G NR Rel. 15 uplink measurements [59]	R&S®FSW-K145	1338.3612.02		
5G NR combined ACLR/SEM/EVM measurements [59]	R&S®FSW-K147	1338.6486.02		R&S®FSW-K144 or R&S®FSW-K145 option required
5G NR multi-CC combined ACLR/SEM/EVM measurements [59]	R&S®FSW-K147C	1351.1355.02		R&S®FSW-K147 option required
5G NR Rel. 16 extension for uplink/downlink [59]	R&S®FSW-K148	1350.6624.02		R&S®FSW-K144 or R&S®FSW-K145 option required
HRP UWB measurements [59]	R&S®FSW-K149	1350.6930.02		R&S®FSW-B1200/-B2001/ -B800R/-B4001/-B6001/-B8001 options required
5G NR Rel. 17 extension for uplink/downlink	R&S®FSW-K171	1350.7108.02		R&S®FSW-K144/-145 and R&S®FSW-K148 options required
5G NR ORAN measurements	R&S®FSW-K175	1353.2642.02		R&S®FSW-K144/-145 options required
5G NR Beyond 5G measurements extension for uplink/downlink [59]	R&S®FSW-K184	1353.4151.02		R&S®FSW-K144/-145 options required
DOCSIS 3.1 OFDM downstream	R&S®FSW-K192	1325.4138.02		one of the R&S®FSW-B320/ -B512 options required
DOCSIS 3.1 OFDMA upstream	R&S®FSW-K193	1325.4144.02		
OneWeb reverse link measurements	R&S®FSW-K201	1331.7387.02		one of the R&S®FSW-B40/-B80/ -B160/-B320/-B512//-B512R/ -B1200/-B2001/-B800R/-B4001/ -B6001/-B8001 options required

Designation	Type	Order No.	Retro-fittable	Remarks
160 MHz real-time measurement application, POI ≤ 15 µs	R&S®FSW-K161R	1338.2700.02		one of the R&S®FSW-B160/ -B320 options required; not available for R&S®FSW-B512/-B512R/ -B1200/-B2001/-B800R/-B4001/ -B6001/-B8001 options
512 MHz real-time measurement application, POI > 15 µs	R&S®FSW-K512RE	1338.4731.02		R&S®FSW-B512 required; not available for R&S®FSW-B160/-B320/-B512R/ -B1200/-B2001/-B800R/-B4001/ -B6001/-B8001 options
User-defined frequency correction by SnP file [59]	R&S®FSW-K544	1338.2716.02		corrects frequency response (amplitude and phase) of measurement setup
Custom digital baseband connection	R&S®FSW-K552	1338.4554.02		R&S®FSW-B517 or R&S®FSW-K1017 option required
External frontend control	R&S®FSW-K553	1350.6118.02		
I/Q noise cancellation	R&S®FSW-K575	1353.2894.02		supports the following modes: I/Q analyzer, R&S®FSW-K91, R&S®FSW-K144 and R&S®FSW-K145
800 MHz real-time measurement application, POI > 15 µs	R&S®FSW-K800RE	1338.7801.02		one of the R&S®FSW-B1200/ -B2001 options required; not available for R&S®FSW-B160/-B320/-B512/ -B512R/-B800R/-B4001/-B6001/ -B8001 options
Health and utilization monitoring service (HUMS)	R&S®FSW-K980	1350.6718.02		
Local VSE enabler	R&S®FSW-VSE	1345.2253.02		With R&S®FSW-VSE installed on FSW the corresponding R&S®FSW-Kxx options will be enabled on R&S®VSE.

PC software

R&S®VSE vector signal explorer software, for ordering information see specifications (PD 3607.1371.22).

Upgrades

Designation	Type	Order No.	Retro-fittable	Remarks
Upgrade kit for enhanced dynamic range preamplifier [60]	R&S®FSW-B24U	1350.7443.xx	yes	contact service center; for R&S®FSW43/50/67
Analysis bandwidth upgrade from 28 MHz to 40 MHz	R&S®FSW-U40	1313.5205.02	yes	user-retrofittable;
Analysis bandwidth upgrade from 40 MHz to 80 MHz	R&S®FSW-U80	1313.5211.02	yes	user-retrofittable; R&S®FSW-B40 or R&S®FSW-U40 required
Analysis bandwidth upgrade from 80 MHz to 160 MHz	R&S®FSW-U160	1325.5357.14	yes	contact service center; R&S®FSW-B80 or R&S®FSW-U80 required
Analysis bandwidth upgrade from 160 MHz to 320 MHz	R&S®FSW-U320	1313.7189.02	yes	user-retrofittable; R&S®FSW-B160/-U160 required
Analysis bandwidth upgrade from 80 MHz to 512 MHz	R&S®FSW-U512	1321.6320.24	yes	contact service center; R&S®FSW-B80 or R&S®FSW-U80 required; excludes R&S®FSW-B160/ -U160/-B320
Analysis bandwidth upgrade from 80 MHz, 160 MHz, 320 MHz, 512 MHz to 1.2 GHz	R&S®FSW-U1200	1331.7006.14	yes	contact service center; for R&S®FSW26/43/50/67/85; R&S®FSW-B80 or R&S®FSW-B160/-U160 or R&S®FSW-B320/-U320 or R&S®FSW-B512/-U512 required. Not available for instruments with R&S®FSW-B512R, R&S®FSW-U512R
Analysis bandwidth upgrade from 1.2 GHz to 2 GHz	R&S®FSW-U2001	1331.7070.02	yes	R&S®FSW-B1200 or R&S®FSW-U1200 required; user-retrofittable, calibration recommended to verify specifications
Upgrade Real-time spectrum analyzer 512 MHz POI ≤ 15 µs	R&S®FSW-U512R	1321.6320.26	yes	contact service center; includes 512 MHz analysis bandwidth; R&S®FSW-B80 or R&S®FSW-U80 required;
Analysis bandwidth upgrade from 80 MHz, 160 MHz, 320 MHz, 512 MHz to 4.4 GHz	R&S®FSW-U4001	1338.5244.43	yes	contact service center [58] for R&S®FSW43/50/67/85; R&S®FSW-B80 or R&S®FSW-B160/-U160 or R&S®FSW-B320/-U320 or R&S®FSW-B512/-U512 required. Not available for instruments with R&S®FSW-B512R, R&S®FSW-U512R
Analysis bandwidth upgrade from 1.2 GHz, 2 GHz to 4.4 GHz	R&S®FSW-U4002	1338.6192.43	yes	contact service center [58] for R&S®FSW43/50/67/85; R&S®FSW-B1200/-U1200 or R&S®FSW-B2001/-U2001 required. Not available for instruments with R&S®FSW-B512R, R&S®FSW-U512R

[60] Upgrade for enhanced dynamic range preamplifier. Only available for instruments with the R&S®FSW-B24 option. Retrofittable in Rohde & Schwarz service center. For instruments starting from the following serial numbers R&S®FSW43: 102224, R&S®FSW50: 101676, R&S®FSW67: 101721 the enhanced dynamic range preamplifier is included in the R&S®FSW-B24 option.

Designation	Type	Order No.	Retro-fittable	Remarks
Analysis bandwidth upgrade from 4.4 GHz to 6.4 GHz	R&S®FSW-U6001	1338.5250.02	yes	for R&S®FSW43/50/67/85; R&S®FSW-B4001/-U4001/ -U4002 required; user-retrofittable, calibration recommended to verify specifications
Analysis bandwidth upgrade from 6.4 GHz to 8.312 GHz	R&S®FSW-U8001	1338.5267.02	yes	for R&S®FSW43/50/67/85; R&S®FSW-B6001/-U6001 required; user-retrofittable, calibration recommended to verify specifications

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
19" rack adapter	R&S®ZZA-KN5	1175.3040.00
Noise sources		
Smart noise sources for noise figure and gain measurement up to 110 GHz (requires R&S®FSW-K30)	R&S®FS-SNS18/26/40/ 55/67/90/110	1338.8008.xx (xx = 18/26/40/55/67/90/11)
Matching pads, 50/75 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, 6/10/20/30 dB, 2 GHz	R&S®RBU50	1073.8695.xx (xx = 06/10/20/30)
50 W, 20 dB, 6 GHz	R&S®RDL50	1035.1700.52
RF adapters and cables		
Coaxial adapter, 1.00 mm (f) – 1.00 mm (f)		3592.8694.00
Coaxial adapter, 1.00 mm (f) – 1.85 mm (f)		3628.4734.02
Coaxial adapter, 1.85 mm (f) – 1.85 mm (f)		3588.9654.00
Coaxial semi-rigid cable, 1.85 mm (m) – 1.85 mm (m), length: 90 mm, U shape		1325.1251.00
Coaxial adapter, 1.85 mm (f) – 2.92 mm (f)		3628.4728.02
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		3689.9442.00
Coaxial adapter, 3.5 mm (m) – 3.5 mm (m), APC3.5-compatible		3587.7770.00
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
DUT positioner for R&S®FSW85	R&S®FS-Z124	1338.4783.02
Connectors and cables		
Probe power connector, 3-pin		1065.9480.00
Type N adapter for R&S®RT-Zxx oscilloscope probes	R&S®RT-ZA9	1417.0909.02
Type 3.5 mm adapter for R&S®RT-Zxx oscilloscope probes	R&S®RT-ZA51	1803.5365.02
Cable for connecting digital baseband interfaces of Rohde & Schwarz instruments (accessory for R&S®FSW-B17)	R&S®SMU-Z6	1415.0201.02
Cable for connecting high speed digital baseband interfaces of Rohde & Schwarz instruments (accessory for R&S®FSW-B517)	R&S®DIGIQ-HS	3641.2948.03
DC block		
DC block, 10 kHz to 18 GHz (type N)	R&S®FSE-Z4	1084.7443.03

Designation	Type	Order No.
External harmonic mixers (for R&S®FSW26, R&S®FSW43, R&S®FSW50, R&S®FSW67 and R&S®FSW85 with R&S®FSW-B21 option)		
Harmonic mixer, 40 GHz to 60 GHz	RPG FS-Z60 [61]	1048.0171.02
Harmonic mixer, 50 GHz to 75 GHz	RPG FS-Z75 [61]	3638.2240.02
Harmonic mixer, 60 GHz to 90 GHz	RPG FS-Z90 [61]	3638.2270.02
Harmonic mixer, 75 GHz to 110 GHz	RPG FS-Z110 [61]	3638.2292.02
Harmonic mixer, 90 GHz to 140 GHz	RPG FS-Z140 [61]	3622.0708.02
Harmonic mixer, 110 GHz to 170 GHz	RPG FS-Z170 [61]	3622.0714.02
Harmonic mixer, 140 GHz to 220 GHz	RPG FS-Z220 [61]	3593.3250.02
Harmonic mixer, 220 GHz to 325 GHz	RPG FS-Z325 [61]	3593.3267.02
Frequency converter		
Downconverter, 220 GHz to 330 GHz	R&S®FC330SR	1444.6310.02
Waveguide to coaxial adapters		
Waveguide to coaxial adapter, WR10 – 1 mm (f)	WCA110	3626.1067.02
Waveguide to coaxial adapter, WR10 – 1 mm (m)	WCA110	3626.1067.03
Waveguide to coaxial adapter, WR12 – 1 mm (m)	WCA90	3626.1050.03
Waveguide to coaxial adapter, WR15 – 1 mm (f)	WCA75	3626.1044.02
Waveguide to coaxial adapter, WR15 – 1 mm (m)	WCA75	3626.1044.03
Waveguide to coaxial adapter, WR12 – 1 mm (f)	WCA90	3626.1050.02
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®FSW8/13)	R&S®ZN-ZTW	1328.8534.71
Torque wrench for 3.5/2.92/2.4/1.85 mm connectors, 0.9 Nm coupling torque (for R&S®FSW26/43/50/67)	R&S®ZN-ZTW	1328.8534.35
Torque wrench for 1.0 mm connectors, 0.23 Nm coupling torque (for R&S®FSW85)	R&S®ZN-ZTW	1328.8534.11

External frontends supported by R&S®FSW-K553 option

Designation	Type	Order No.
External frontend from 24 GHz to 44 GHz	R&S®FE44S	1338.7001.02
External frontend from 36 GHz to 50 GHz	R&S®FE50DTR	1347.4099.02
External frontend from 70 GHz to 110 GHz	R&S®FE110SR	1348.4840.02
External frontend from 110 GHz to 170 GHz	R&S®FE170SR	1347.9090.02

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

Power sensors supported [62]

Designation	Type	Order No.
Universal power sensors		
10 MHz to 8 GHz, 1 nW to 100 mW, 2-path	R&S®NRP-Z211	1417.0409.02
10 MHz to 8 GHz, 200 pW to 200 mW	R&S®NRP-Z11 [63]	1138.3004.02
10 MHz to 18 GHz, 1 nW to 100 mW, 2-path	R&S®NRP-Z221	1417.0309.02
10 MHz to 18 GHz, 200 pW to 200 mW	R&S®NRP-Z21 [63]	1137.6000.02
10 MHz to 18 GHz, 2 nW to 2 W	R&S®NRP-Z22 [63]	1137.7506.02
10 MHz to 18 GHz, 20 nW to 15 W	R&S®NRP-Z23 [63]	1137.8002.02
10 MHz to 18 GHz, 60 nW to 30 W	R&S®NRP-Z24 [63]	1137.8502.02
Power sensor modules with power splitter		
DC to 18 GHz, 4 µW to 400 mW	R&S®NRP-Z27	1169.4102.02
DC to 26.5 GHz, 4 µW to 400 mW	R&S®NRP-Z37	1169.3206.02
Thermal power sensors [64]		
0 Hz to 18 GHz, 300 nW to 100 mW	R&S®NRP18T	1424.6115.02
0 Hz to 18 GHz, 300 nW to 100 mW, LAN version	R&S®NRP18TN	1424.6121.02
0 Hz to 33 GHz, 300 nW to 100 mW	R&S®NRP33T	1424.6138.02
0 Hz to 33 GHz, 300 nW to 100 mW, LAN version	R&S®NRP33TN	1424.6144.02
0 Hz to 40 GHz, 300 nW to 100 mW	R&S®NRP40T	1424.6150.02
0 Hz to 40 GHz, 300 nW to 100 mW, LAN version	R&S®NRP40TN	1424.6167.02
0 Hz to 50 GHz, 300 nW to 100 mW	R&S®NRP50T	1424.6173.02
0 Hz to 50 GHz, 300 nW to 100 mW, LAN version	R&S®NRP50TN	1424.6180.02
0 Hz to 67 GHz, 300 nW to 100 mW	R&S®NRP67T	1424.6196.02
0 Hz to 67 GHz, 300 nW to 100 mW, LAN version	R&S®NRP67TN	1424.6209.02
0 Hz to 90 GHz, 300 nW to 100 mW	R&S®NRP90T	1424.6473.02
0 Hz to 90 GHz, 300 nW to 100 mW, LAN version	R&S®NRP90TN	1424.6480.02
0 Hz to 110 GHz, 300 nW to 100 mW	R&S®NRP110T	1424.6215.02
Thermal waveguide power sensors		
50 GHz to 75 GHz, 300 nW to 100 mW	R&S®NRP75TWG	1700.2529.02
60 GHz to 90 GHz, 300 nW to 100 mW	R&S®NRP90TWG	1700.2312.02
75 GHz to 110 GHz, 300 nW to 100 mW	R&S®NRP110TWG	1173.8709.02
90 GHz to 140 GHz, 300 nW to 100 mW	R&S®NRP140TWG	1440.5190.02
110 GHz to 170 GHz, 300 nW to 100 mW	R&S®NRP170TWG	1700.3754.02
Average power sensors [64]		
8 kHz to 6 GHz, 100 pW to 200 mW	R&S®NRP6A	1424.6796.02
8 kHz to 6 GHz, 100 pW to 200 mW, LAN version	R&S®NRP6AN	1424.6809.02
9 kHz to 6 GHz, 100 pW to 200 mW	R&S®NRP-Z91 [63]	1168.8004.02
8 kHz to 18 GHz, 100 pW to 200 mW	R&S®NRP18A	1424.6815.02
8 kHz to 18 GHz, 100 pW to 200 mW, LAN version	R&S®NRP18AN	1424.6821.02
Three path diode power sensors [64]		
100 pW to 200 mW, 10 MHz to 8 GHz	R&S®NRP8S	1419.0006.02
100 pW to 200 mW, 10 MHz to 8 GHz, LAN version	R&S®NRP8SN	1419.0012.02
100 pW to 200 mW, 10 MHz to 18 GHz	R&S®NRP18S	1419.0029.02
100 pW to 200 mW, 10 MHz to 18 GHz, LAN version	R&S®NRP18SN	1419.0035.02
1 nW to 2 W, 10 MHz to 18 GHz	R&S®NRP18S-10	1424.6721.02
10 nW to 15 W, 10 MHz to 18 GHz	R&S®NRP18S-20	1424.6738.02
30 nW to 30 W, 10 MHz to 18 GHz	R&S®NRP18S-25	1424.6744.02
100 pW to 200 mW, 10 MHz to 33 GHz	R&S®NRP33S	1419.0064.02
100 pW to 200 mW, 10 MHz to 33 GHz, LAN version	R&S®NRP33SN	1419.0070.02
100 pW to 200 mW, 10 MHz to 33 GHz, LAN version, TVAC-compliant	R&S®NRP33SN-V	1419.0129.02
100 pW to 100 mW, 50 MHz to 40 GHz	R&S®NRP40S	1419.0041.02
100 pW to 100 mW, 50 MHz to 40 GHz, LAN version	R&S®NRP40SN	1419.0058.02
100 pW to 100 mW, 50 MHz to 50 GHz	R&S®NRP50S	1419.0087.02
100 pW to 100 mW, 50 MHz to 50 GHz, LAN version	R&S®NRP50SN	1419.0093.02
100 pW to 100 mW, 50 MHz to 67 GHz	R&S®NRP67S	1424.6396.02
100 pW to 100 mW, 50 MHz to 67 GHz, LAN version	R&S®NRP67SN	1424.6409.02
100 pW to 100 mW, 50 MHz to 67 GHz, LAN version, TVAC-compliant	R&S®NRP67SN-V	1424.6415.02
100 pW to 100 mW, 50 MHz to 90 GHz (1.35 mm)	R&S®NRP90S	1424.6421.02
100 pW to 100 mW, 50 MHz to 90 GHz (1.0 mm)	R&S®NRP90S	1424.6421.03
100 pW to 100 mW, 50 MHz to 90 GHz (1.35 mm), LAN version	R&S®NRP90SN	1424.6450.02

[62] For average power measurement only.

[63] Product discontinued.

[64] In addition to RF power measurements the R&S®NRP-Z8x, R&S®NRPxxT/TN, R&S®NRPxxA/AN and R&S®NRPxxS/SN power sensors can be used as wideband RF power trigger sources.

Wideband power sensors [64]		
50 MHz to 18 GHz, 1 nW to 100 mW	R&S®NRP-Z81 [63]	1137.9009.02
50 MHz to 40 GHz, 1 nW to 100 mW (2.92 mm)	R&S®NRP-Z85 [63]	1411.7501.02
50 MHz to 40 GHz, 1 nW to 100 mW (2.40 mm)	R&S®NRP-Z86 [63]	1417.0109.40
50 MHz to 44 GHz, 1 nW to 100 mW (2.40 mm)	R&S®NRP-Z86 [63]	1417.0109.44
Pulse power sensors		
50 MHz to 18 GHz, 1 nW to 100 mW (N)	R&S®NRP18P	1444.1190.02
50 MHz to 40 GHz, 1 nW to 100 mW (2.92 mm)	R&S®NRP40P	1444.1290.02
50 MHz to 50 GHz, 1 nW to 100 mW (2.40 mm)	R&S®NRP50P	1444.1390.02

Probes supported by R&S®FSW-B71/-B71E option

Designation	Type	Order No.
1.0 GHz, active, 1 MΩ, 0.8 pF	R&S®RT-ZS10E	1418.7007.02
1.0 GHz, active, 1 MΩ, 0.8 pF, micro button	R&S®RT-ZS10	1410.4080.02
1.5 GHz, active, 1 MΩ, 0.8 pF, micro button	R&S®RT-ZS20	1410.3502.02
3.0 GHz, active, 1 MΩ, 0.8 pF, micro button	R&S®RT-ZS30	1410.4309.02
6.0 GHz, active, 1 MΩ, 0.3 pF, micro button	R&S®RT-ZS60	1418.7307.02
1.0 GHz, active, differential, 1 MΩ, 0.6 pF, micro button	R&S®RT-ZD10	1410.4715.02
1.5 GHz, active, differential, 1 MΩ, 0.6 pF, micro button	R&S®RT-ZD20	1410.4409.02
3.0 GHz, active, differential, 1 MΩ, 0.6 pF, micro button	R&S®RT-ZD30	1410.4609.02
4.5 GHz, active, differential, 1 MΩ, 0.4 pF, micro button	R&S®RT-ZD40	1410.5205.02
1.5 GHz modular probe amplifier, differential, 400 kΩ, multimode, incl. R&S®ProbeMeter; micro button	R&S®RT-ZM15	1800.4700.02
3 GHz modular probe amplifier, differential, 400 kΩ, multimode, incl. R&S®ProbeMeter; micro button	R&S®RT-ZM30	1419.3005.02
6 GHz modular probe amplifier, differential, 400 kΩ, multimode, incl. R&S®ProbeMeter; micro button	R&S®RT-ZM60	1419.3105.02
9 GHz modular probe amplifier, differential, 400 kΩ, multimode, incl. R&S®ProbeMeter; micro button	R&S®RT-ZM90	1419.3205.02
13 GHz modular probe amplifier, differential, 400 kΩ, multimode, incl. R&S®ProbeMeter; micro button	R&S®RT-ZM130	1800.4500.02
16 GHz modular probe amplifier, differential, 400 kΩ, multimode, incl. R&S®ProbeMeter; micro button	R&S®RT-ZM160	1800.4600.02
Extras for modular probes		
Tip cable, solder in, extended temperature, length: 15 cm, multimode compatible	R&S®RT-ZMA11	1419.4318.02
Tip cable, square pin, for 1.27 mm pin header, length: 15 cm, multimode compatible	R&S®RT-ZMA12	1419.4324.02
Tip cable, quick connect, for solder in resistor connection, length: 15 cm, multimode compatible	R&S®RT-ZMA15	1419.4224.02
Browser module, variable span from 0.5 mm to 8 mm, spring-loaded, incl. spring loaded resistor tips (2 pairs)	R&S®RT-ZMA30	1419.4353.02
SMA module, 2.92 mm/3.5 mm/SMA, differential, 100 Ω, DC termination, multimode compatible; incl. lead 11 cm (4.3 in)	R&S®RT-ZMA40	1419.4201.02
Extended temperature kit, 1 m matched cable pair, multimode compatible, incl. R&S®RT-ZMA11	R&S®RT-ZMA50	1419.4218.02

Oscilloscopes supported by R&S®FSW-B2071 option

Designation	Type	Order No.
R&S®RTO1000		
Oscilloscope, 4 GHz, 20 Gsample/s, 20/80 Msample, 4 channels	R&S®RTO1044 [63]	1316.1000.44
Oscilloscope, 1 GHz, 10 Gsample/s, 20/80 Msample, 4 channels and upgrade of the R&S®RTO1014 to 4 GHz bandwidth	R&S®RTO1014 with R&S®RTO-B204 [63]	1316.1000.14 with 1316.1369.02
OCXO 10 MHz	R&S®RTO-B4	1304.8305.02
Memory upgrade, 50 Msample per channel	R&S®RTO-B101	1304.8428.02
Memory upgrade, 100 Msample per channel	R&S®RTO-B102	1304.8434.02
Memory upgrade, 200 Msample per channel	R&S®RTO-B103	1304.8440.02
Memory upgrade, 400 Msample per channel	R&S®RTO-B104	1304.8457.02
R&S®RTO2000		
Oscilloscope, 4 GHz, 20 Gsample/s, 50/200 Msample, 4 channels	R&S®RTO2044	1329.7002.44
Oscilloscope, 6 GHz, 20 Gsample/s, 50/200 Msample, 4 channels	R&S®RTO2064	1329.7002.64
OCXO 10 MHz	R&S®RTO-B4	1304.8305.02
Memory upgrade, 100 Msample per channel	R&S®RTO-B101	1329.7060.02
Memory upgrade, 200 Msample per channel	R&S®RTO-B102	1329.7077.02
Memory upgrade, 400 Msample per channel	R&S®RTO-B104	1329.7083.02
Memory upgrade, 1 Gsample per channel	R&S®RTO-B110	1329.7090.04
R&S®RTO6		
Oscilloscope, 200/800 Mpoints, 4 channels, bandwidth option required	R&S®RTO6	1802.0001.04
Bandwidth option, 4 GHz, 20 Gsample/s	R&S®RTO6-B94	1802.0224.02
Bandwidth option, 6 GHz, 20 Gsample/s	R&S®RTO6-B96	1802.0230.02

Warranty and service

Warranty		
Base unit		1 year
All other items		1 year
Service options		
	Service plans	**On demand**
Calibration	up to five years [65]	pay per calibration
Warranty and repair	up to five years [65]	standard price repair
Contact your Rohde & Schwarz sales office for further details.		

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

Service at Rohde&Schwarz
You're in great hands

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

Rohde&Schwarz

The Rohde&Schwarz technology group is among the trailblazers when it comes to paving the way for a safer and connected world with its leading solutions in test&measurement, technology systems and networks&cybersecurity. Founded more than 90 years ago, the group is a reliable partner for industry and government customers around the globe. The independent company is headquartered in Munich, Germany and has an extensive sales and service network with locations in more than 70 countries.

www.rohde-schwarz.com

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

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PD 5215.6749.22 | Version 17.00 | July 2025 (as)
FSW Signal and Spectrum Analyzer
Data without tolerance limits is not binding | Subject to change