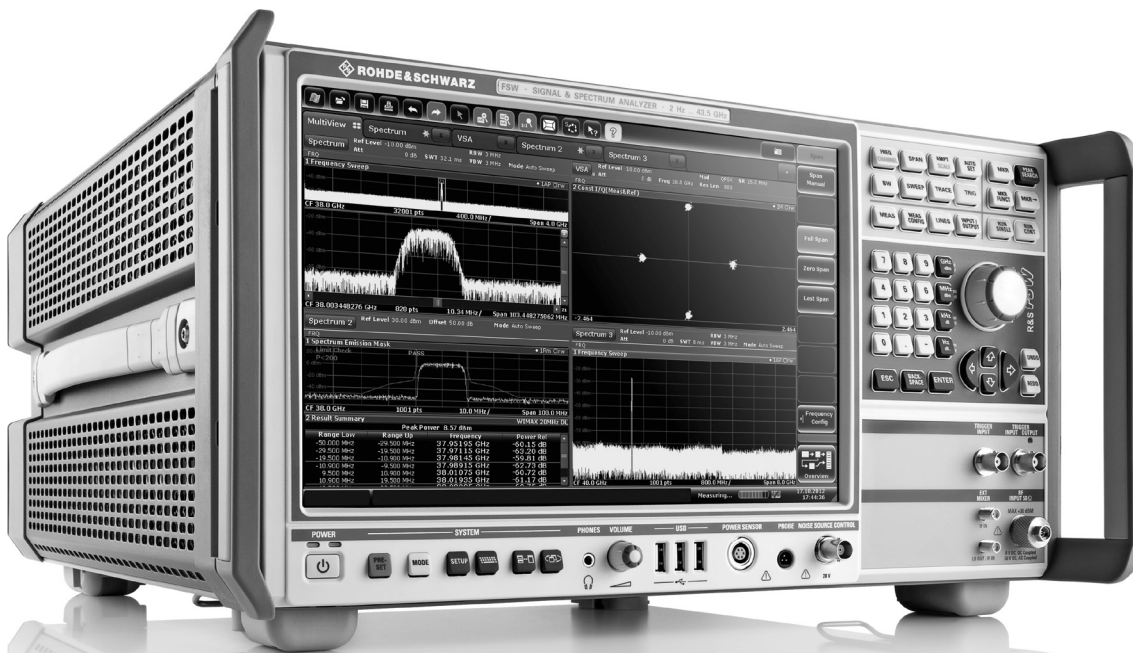


R&S®FSW

Signal and Spectrum Analyzer Specifications



CONTENTS

| | |
|--|-----------|
| Definitions | 3 |
| Specifications..... | 4 |
| Frequency | 4 |
| Sweep time | 5 |
| Resolution bandwidths..... | 6 |
| Level | 7 |
| Sensitivity..... | 9 |
| Spurious responses | 19 |
| Level measurement uncertainty..... | 20 |
| Adjacent channel power dynamic range..... | 22 |
| Measurement speed | 22 |
| Trigger functions | 23 |
| Audio demodulator..... | 23 |
| I/Q data | 24 |
| Inputs and outputs | 28 |
| General data | 32 |
| Options | 34 |
| R&S®FSW-B10 external generator control | 34 |
| R&S®FSW-B13 highpass filters | 34 |
| R&S®FSW-B17 digital baseband interface | 35 |
| R&S®FSW-B21 LO/IF connections for external mixers (not available for R&S®FSW8, R&S®FSW13)..... | 35 |
| R&S®FSW-B24 RF preamplifier..... | 36 |
| R&S®FSW-B25 electronic attenuator..... | 36 |
| R&S®FSW-B71 analog baseband inputs, R&S®FSW-B71E 80 MHz analysis bandwidth for analog baseband inputs..... | 37 |
| R&S®FSW-B2000 2 GHz analysis bandwidth (option available for all models except R&S®FSW8, R&S®FSW13)..... | 39 |
| Ordering information | 40 |
| Options..... | 40 |
| <i>Firmware</i> | 42 |
| <i>PC software</i> | 43 |
| Upgrades | 43 |
| Recommended extras..... | 44 |
| Power sensors supported | 45 |
| Probes supported by R&S®FSW-B71/-B71E option | 45 |
| Oscilloscope supported by R&S®FSW-B2000 option | 46 |
| Service options | 47 |

Definitions

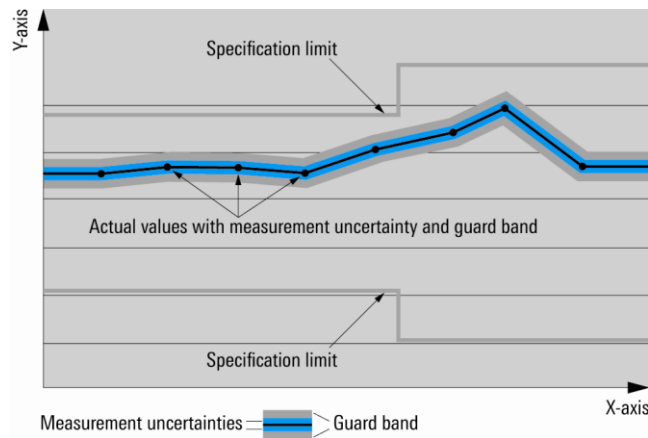
General

Product data applies under the following conditions:

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

Specifications with limits

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



Specifications without limits

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

Typical data (typ.)

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

Nominal values (nom.)

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

Measured values (meas.)

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

Uncertainties

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

Device settings and GUI parameters are indicated as follows: "parameter: value".

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

Specifications

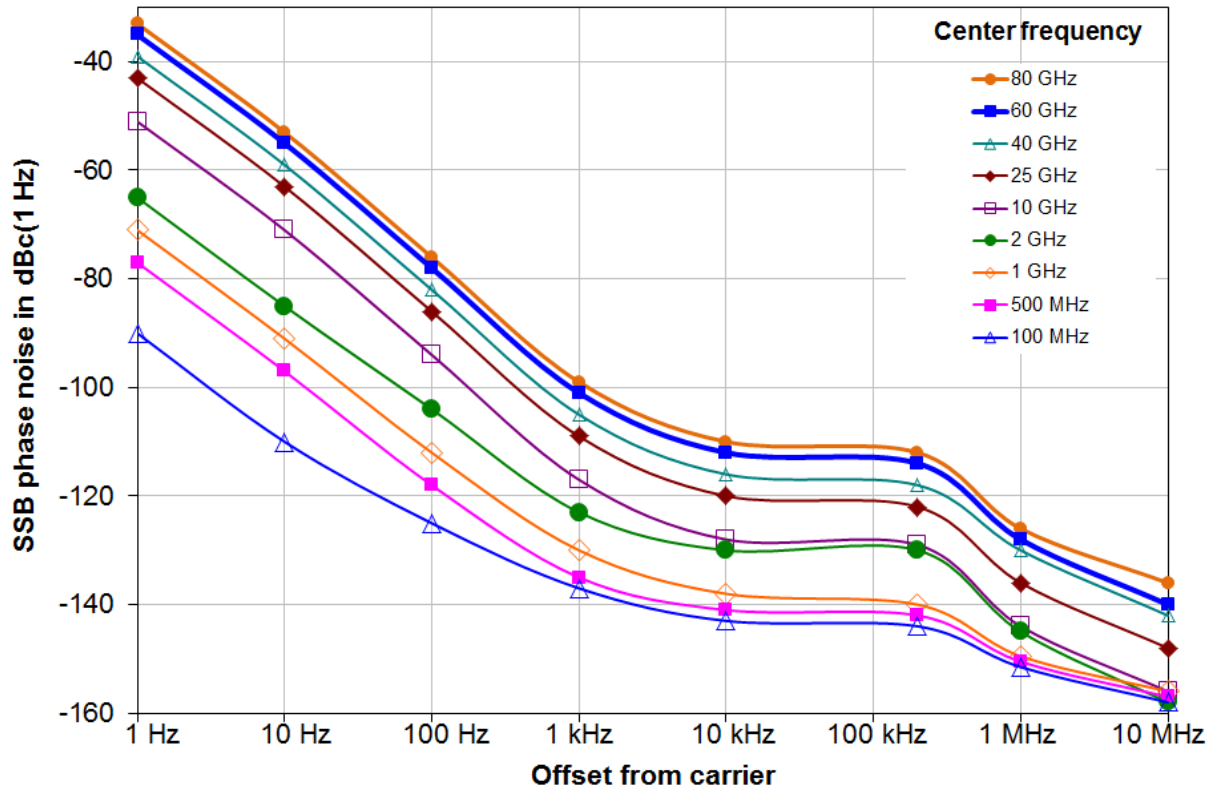
Frequency

| | | |
|-----------------------------|------------------|--------------------|
| 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 | | |
| DC coupled | 2 Hz to 85 GHz | |
| AC coupled | 10 MHz to 85 GHz | |
| Frequency resolution | | 0.01 Hz |

| | | |
|---|---|--|
| Reference frequency, internal | | |
| Accuracy | | $\pm(\text{time since last adjustment} \times \text{aging rate} + \text{temperature drift} + \text{calibration accuracy})$ |
| 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 | | $\pm(\text{marker frequency} \times \text{reference accuracy} + 10 \% \times \text{resolution bandwidth} + \frac{1}{2} (\text{span}/(\text{sweep points} - 1)) + 1 \text{ Hz})$ |
| Number of sweep (trace) points | default value | 1001 |
| | range | 101 to 100001 |
| Marker tuning frequency step size | marker step size = sweep points | $\text{span}/(\text{sweep points} - 1)$ |
| | marker step size = standard | $\text{span}/(\text{default sweep points} - 1)$ |
| Frequency counter resolution | | 0.001 Hz |
| Count accuracy | | $\pm(\text{frequency} \times \text{reference accuracy} + \frac{1}{2} (\text{last digit}))$ |
| Display range for frequency axis | | 0 Hz, 10 Hz to max. frequency |
| Resolution | | 0.1 Hz |
| Max. span deviation | | $\pm 0.1 \%$ |

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



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

Sweep time

| | | |
|---------------------|-------------------|-----------------------------------|
| Sweep time range | span = 0 Hz | 1 μ s to 16000 s |
| | span ≥ 10 Hz | 3 μ s to 16000 s ¹ |
| Sweep time accuracy | span = 0 Hz | ± 0.1 % (nom.) |
| | span ≥ 10 Hz | ± 3 % (nom.) |

¹ 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 |
| | with R&S®FSW-B8 option | 20 MHz, 50 MHz, 80 MHz additionally ² |
| 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-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:3 dB | | < 6 (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 |

| Max. signal analysis bandwidth | | |
|---------------------------------------|---------------------------|-----------------------------|
| | equalized | |
| | standard | 10 MHz (nom.) ³ |
| | with R&S®FSW-B28 option | 28 MHz (nom.) ³ |
| | with R&S®FSW-B40 option | 40 MHz (nom.) ³ |
| | with R&S®FSW-B80 option | 80 MHz (nom.) ³ |
| | with R&S®FSW-B160 option | 160 MHz (nom.) ³ |
| | with R&S®FSW-B320 option | 320 MHz (nom.) ³ |
| | with R&S®FSW-B512 option | 512 MHz (nom.) ³ |
| | with R&S®FSW-B2000 option | 2 GHz (nom.) ⁴ |

² The additional resolution bandwidths are available for span ≥ 0 Hz for instruments starting from the following serial numbers:
R&S®FSW8: 101580, R&S®FSW13: 101279, R&S®FSW26: 102000, R&S®FSW43: 100744, R&S®FSW50: 101024, R&S®FSW67: 101150.
For instruments with lower serial numbers, the additional resolution bandwidths are available for span = 0 Hz only.

³ YIG preselector off for $f \geq 8$ GHz.

⁴ The R&S®FSW-B2000 option can be combined with the base unit or any other analysis bandwidth option. For detailed specifications, see section "R&S®FSW-B2000 2 GHz analysis bandwidth".

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 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 |

| Max. 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 |
| Max. 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 |
| Max. 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 | |
| | $f_{in} \leq 3 \text{ GHz}$ | +15 dBm (nom.) |
| | $3 \text{ GHz} < f_{in} \leq 8 \text{ GHz}$ | +10 dBm (nom.) |
| | $f_{in} > 8 \text{ GHz}$ | +7 dBm (nom.) |
| | with R&S®FSW-B24 option, RF attenuation = 0 dB, RF preamplifier on | |
| | $f_{in} \leq 3 \text{ GHz}$ | -13 dBm (nom.) |
| | $3 \text{ GHz} < f_{in} \leq 8 \text{ GHz}$ | -20 dBm (nom.) |
| | $f_{in} > 8 \text{ GHz}$ | -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 2 x -15 dBm, $\Delta f > 5 \times$ RBW, RF preamplifier off | |
| | $f_{in} < 10$ MHz | 28 dBm (nom.) |
| | $10 \text{ MHz} \leq f_{in} < 1$ GHz | > 25 dBm, typ. 30 dBm |
| | $1 \text{ GHz} \leq f_{in} < 3$ GHz | > 20 dBm, typ. 25 dBm ⁵ |
| | $3 \text{ GHz} \leq f_{in} < 8$ GHz | > 17 dBm, typ. 20 dBm |
| | R&S®FSW85, RF attenuation = 0 dB, level 2 x -15 dBm, $\Delta f > 5 \times$ RBW, RF preamplifier off | |
| | $f_{in} < 100$ MHz | 22 dBm (nom.) |
| | $100 \text{ MHz} \leq f_{in} < 1$ GHz | > 22 dBm, typ. 30 dBm |
| | $1 \text{ GHz} \leq f_{in} < 3$ GHz | > 20 dBm, typ. 25 dBm ⁵ |
| | $3 \text{ GHz} \leq f_{in} < 8$ GHz | > 17 dBm, typ. 20 dBm |
| | R&S®FSW13, R&S®FSW26, RF attenuation = 0 dB, level 2 x -15 dBm, $\Delta f > 5 \times$ RBW, YIG preselector on, RF preamplifier off | |
| | $8 \text{ GHz} \leq f_{in} < 10$ GHz | > 14 dBm, typ. 17 dBm |
| | $10 \text{ GHz} \leq f_{in} < 12$ GHz | > 16 dBm, typ. 20 dBm |
| | $12 \text{ GHz} \leq f_{in} < 17$ GHz | > 18 dBm, typ. 23 dBm |
| | $17 \text{ GHz} \leq f_{in} < 19$ GHz | > 16 dBm, typ. 20 dBm |
| | $19 \text{ GHz} \leq f_{in} \leq 26.5$ GHz | > 18 dBm, typ. 23 dBm |
| | R&S®FSW43, R&S®FSW50, R&S®FSW67, R&S®FSW85, RF attenuation = 0 dB, level 2 x -20 dBm, $\Delta f > 5 \times$ RBW, YIG preselector on, RF preamplifier off | |
| | $8 \text{ GHz} \leq f_{in} \leq 13.6$ GHz | > 8 dBm, typ. 11 dBm |
| | $13.6 \text{ GHz} \leq f_{in} \leq 40$ 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 2 x -50 dBm, $\Delta f > 5 \times$ RBW, YIG preselector on, RF preamplifier on | |
| | $10 \text{ MHz} \leq f_{in} < 1$ GHz | -10 dBm (nom.) |
| | $1 \text{ GHz} \leq f_{in} < 8$ GHz | -13 dBm (nom.) |
| | $8 \text{ GHz} \leq f_{in} \leq 26.5$ GHz | -15 dBm (nom.) |
| | R&S®FSW43, R&S®FSW50, R&S®FSW67 with R&S®FSW-B24 option, RF attenuation = 0 dB, level 2 x -55 dBm, $\Delta f > 5 \times$ RBW, YIG preselector on, RF preamplifier on | |
| | $10 \text{ MHz} \leq f_{in} < 1$ GHz | -5 dBm (nom.) |
| | $1 \text{ GHz} \leq f_{in} < 4$ 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 | |
| | $1 \text{ MHz} < f_{in} \leq 350$ MHz | > 50 dBm, typ. 62 dBm |
| | $350 \text{ MHz} < f_{in} \leq 500$ MHz | > 70 dBm, typ. 80 dBm |
| | $500 \text{ MHz} < f_{in} < 1.5$ GHz ⁶ | > 47 dBm, typ. 52 dBm |
| | $500 \text{ MHz} < f_{in} < 1.5$ GHz ⁷ | > 62 dBm, typ. 70 dBm |
| | $1.5 \text{ GHz} \leq f_{in} \leq 4$ GHz | > 62 dBm, typ. 70 dBm |
| | $4 \text{ GHz} < f_{in} \leq 13.5$ 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 | |
| | $1 \text{ MHz} < f_{in} \leq 500$ MHz | > 45 dBm, typ. 55 dBm |
| | $500 \text{ MHz} < f_{in} < 1.5$ GHz ⁶ | > 47 dBm, typ. 56 dBm |
| | $500 \text{ MHz} < f_{in} < 1.5$ GHz ⁷ | > 52 dBm, typ. 60 dBm |
| | $1.5 \text{ GHz} \leq f_{in} \leq 4$ GHz | > 62 dBm, typ. 70 dBm |
| | $4 \text{ GHz} < f_{in} \leq 42.5$ 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 | |
| | $50 \text{ MHz} < f_{in} \leq 21.75$ GHz | 10 dBm (nom.) |

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

⁶ Without R&S®FSW-B13 highpass filter option or highpass off.

⁷ With R&S®FSW-B13 highpass filter option, highpass on.

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 ⁶ | -152 dBm, typ. -156 dBm |
| | 1 GHz < f < 3 GHz ⁷ | -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 ⁶ | -151 dBm, typ. -156 dBm | |
| | 1 GHz < f < 3 GHz ⁷ | -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 | | |
| | 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 ⁶ | -151 dBm, typ. -156 dBm | |
| | 1 GHz < f < 3 GHz ⁷ | -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 | | |
| 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 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 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 ⁶ | -151 dBm, typ. -156 dBm |
| | 1 GHz < f < 3 GHz ⁷ | -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 |
| | 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 ⁶ | -150 dBm, typ. -155 dBm |
| | 1 GHz < f < 3 GHz ⁷ | -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 |
| | 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 |
| 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 ⁶ | -151 dBm, typ. -156 dBm |
| | 1 GHz < f < 3 GHz ⁷ | -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 |
| | 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.) |

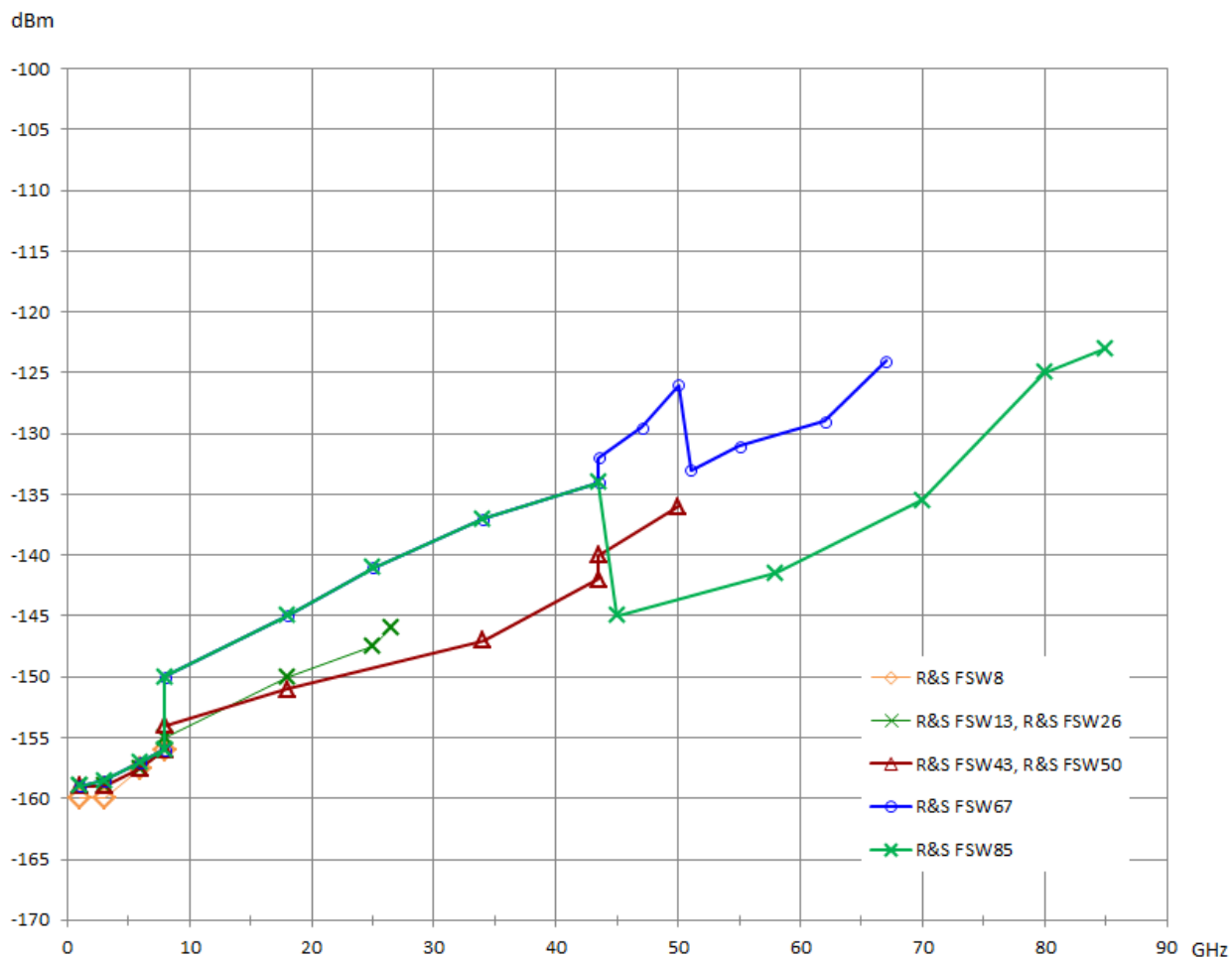
| Displayed average noise level of the R&S®FSW50 with R&S®FSW-B24 option | | | | |
|---|--|--|---|----------|
| RF preamplifier off | RF attenuation = 0 dB, termination = 50 Ω, normalized to 1 Hz RBW, trace average, average mode = log, sample detector, +5 °C to +40 °C | | | |
| | 2 Hz ≤ f ≤ 100 Hz | -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 ⁶ | -150 dBm | |
| | | 1 GHz < f < 3 GHz ⁷ | -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 | |
| | | 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 | | |
| 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 ⁶ | -151 dBm, typ. -156 dBm |
| | 1 GHz < f < 3 GHz ⁷ | -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 ≤ 51 GHz | -128 dBm, typ. -130 dBm |
| | 51 GHz < f ≤ 55 GHz | -131 dBm, typ. -133 dBm |
| | 55 GHz < f ≤ 62 GHz | -127 dBm, typ. -129 dBm |
| | 62 GHz < f ≤ 67 GHz | -122 dBm, typ. -124 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, 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 ≤ 51 GHz | -128 dBm, typ. -130 dBm |
| | 51 GHz < f ≤ 55 GHz | -131 dBm, typ. -133 dBm |
| | 55 GHz < f ≤ 62 GHz | -127 dBm, typ. -129 dBm |
| | 62 GHz < f ≤ 67 GHz | -122 dBm, typ. -124 dBm |
| Improvement with noise cancellation | for noise-like signals | 13 dB (nom.) |

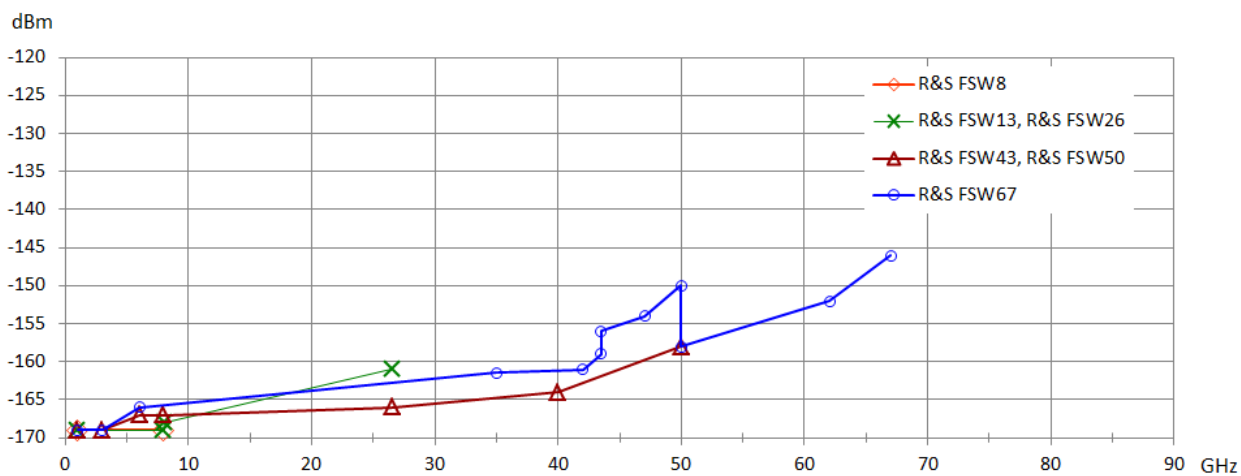
| Displayed average noise level of the R&S®FSW67 with R&S®FSW-B24 option | |
|--|--|
| RF preamplifier off | RF attenuation = 0 dB, termination = 50 Ω, normalized to 1 Hz RBW, trace average, average mode = log, sample detector, +5 °C to +40 °C |
| | 2 Hz ≤ f ≤ 100 Hz -110 dBm |
| | 100 Hz < f ≤ 1 kHz -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 ⁶ -150 dBm |
| | 1 GHz < f < 3 GHz ⁷ -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 ≤ 51 GHz -125 dBm |
| | 51 GHz < f ≤ 55 GHz -128 dBm |
| | 55 GHz < f ≤ 62 GHz -124 dBm |
| | 62 GHz < f ≤ 67 GHz -119 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, 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 ≤ 51 GHz -125 dBm | |
| 51 GHz < f ≤ 55 GHz -128 dBm | |
| 55 GHz < f ≤ 62 GHz -124 dBm | |
| 62 GHz < f ≤ 67 GHz -119 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 \leq 1 MHz | -160 dBm |
| | 1 MHz < f \leq 3 GHz | -165 dBm |
| | 3 GHz < f \leq 8 GHz | -162 dBm |
| | 8 GHz < f \leq 18 GHz | -161 dBm |
| | 18 GHz < f \leq 26.5 GHz | -160 dBm |
| | 26.5 GHz < f \leq 35 GHz | -159 dBm |
| | 35 GHz < f \leq 42 GHz | -157 dBm |
| | R&S®FSW-B24 option, model .66 | |
| | 42 GHz < f \leq 43 GHz | -150 dBm |
| | 43 GHz < f \leq 47 GHz | -146 dBm |
| | 47 GHz < f \leq 50 GHz | -144 dBm |
| | 50 GHz < f \leq 54 GHz | -148 dBm |
| | 54 GHz < f \leq 56 GHz | -146 dBm |
| | 56 GHz < f \leq 62 GHz | -144 dBm |
| | 62 GHz < f \leq 65 GHz | -142 dBm |
| | 65 GHz < f \leq 67 GHz | -140 dBm |
| | R&S®FSW-B24 option, model .67 | |
| | 42 GHz < f \leq 47 GHz | -150 dBm |
| | 47 GHz < f \leq 50 GHz | -146 dBm |
| | 50 GHz < f \leq 52 GHz | -154 dBm |
| 52 GHz < f \leq 54 GHz | -152 dBm | |
| 54 GHz < f \leq 62 GHz | -148 dBm | |
| 62 GHz < f \leq 67 GHz | -142 dBm | |
| Improvement with noise cancellation | for noise-like signals | |
| | R&S®FSW-B24 option, model .66 | |
| | 100 kHz < f \leq 43 GHz | 13 dB (nom.) |
| | 43 GHz < f \leq 67 GHz | 0 dB (nom.) |
| | R&S®FSW-B24 option, model .67 | |
| 100 kHz < f \leq 67 GHz | 13 dB (nom.) | |

| Displayed average noise level of the R&S®FSW85 | | |
|--|--|-------------------------|
| | 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 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 ⁶ | -151 dBm, typ. -156 dBm |
| | 1 GHz < f < 3 GHz ⁷ | -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 |
| | 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 ≤ 44 GHz | -131 dBm, typ. -134 dBm |
| | 44 GHz < f ≤ 58 GHz | -141 dBm, typ. -143 dBm |
| | 58 GHz < f ≤ 70 GHz | -135 dBm, typ. -138 dBm |
| | 70 GHz < f ≤ 78 GHz | -130 dBm, typ. -133 dBm |
| | 78 GHz < f ≤ 85 GHz | -125 dBm, typ. -128 dBm |
| Improvement with noise cancellation | for noise-like signals | 13 dB (nom.) |



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



Typical displayed average noise level of the R&S®FSW models for $f > 1$ GHz with R&S®FSW-B24⁸ RF preamplifier option, preamplifier gain = 30 dB.

⁸ For frequencies > 43 GHz, the curve shown for the R&S®FSW50 applies to the R&S®FSW-B24 option model .51.

Spurious responses

| | | |
|-----------------------------------|--|---|
| Spurious responses | YIG preselector on for $f \geq 8$ GHz, mixer level ≤ -10 dBm ⁹ , sweep optimization: auto or dynamic | |
| Image response | $f_{in} - 2 \times 8997$ MHz (1st IF) | < -90 dBc |
| | $f_{in} - 2 \times 1317$ MHz (2nd IF) | < -90 dBc |
| | $f_{in} - 2 \times 37$ MHz (3rd IF) | < -90 dBc |
| Intermediate frequency response | 1st IF (8997 MHz) | < -90 dBc |
| | 2nd IF (1317 MHz) | < -90 dBc |
| | 3rd IF (37 MHz) | < -90 dBc |
| Residual spurious response | RF attenuation = 0 dB | |
| | $f \leq 1$ MHz | < -90 dBm |
| | $1 \text{ MHz} < f \leq 8900$ MHz | < -110 dBm |
| | $8900 \text{ MHz} < f \leq 26.5$ GHz | < -100 dBm |
| | $26.5 \text{ GHz} < f \leq 85$ GHz | < -100 dBm |
| $f =$ receive frequency | | |
| Local oscillator related spurious | $f_{in} < 1$ GHz | |
| | $10 \text{ Hz} \leq$ offset from carrier < 200 Hz | < -90 dBc |
| | offset from carrier > 200 Hz | < -100 dBc |
| | $f_{in} \geq 1$ GHz | |
| | $10 \text{ Hz} \leq$ offset from carrier < 200 Hz | < -90 dBc + 20 log (f_{in}/GHz) |
| | offset from carrier > 200 Hz | |
| | $f \leq 50$ 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.) |

⁹ 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 ($\sigma = 0.07$ dB) |
| | with R&S®FSW-B25 option, electronic attenuator on | < 0.4 dB ($\sigma = 0.14$ dB) |
| Frequency response, referenced to 64 MHz, YIG preselector on | RF attenuation = 10 dB, 20 dB, 30 dB, 40 dB, RF preamplifier off, +20 °C to +30 °C, electronic attenuator off | |
| | 2 Hz \leq f < 9 kHz | < 1 dB (nom.) |
| | 9 kHz \leq f < 10 MHz | < 0.45 dB ($\sigma = 0.17$ dB) |
| | 10 MHz \leq f < 3.6 GHz ¹⁰ | < 0.3 dB ($\sigma = 0.10$ dB) |
| | 10 MHz \leq f < 3.6 GHz ¹¹ | < 0.5 dB ($\sigma = 0.17$ dB) |
| | 3.6 GHz \leq f \leq 8 GHz | < 0.5 dB ($\sigma = 0.17$ dB) |
| | 8 GHz < f < 22 GHz, span < 1 GHz | < 1.5 dB ($\sigma = 0.50$ dB) |
| | 22 GHz \leq f \leq 26.5 GHz, span < 1 GHz | < 2 dB ($\sigma = 0.67$ dB) |
| | 26.5 GHz < f \leq 50 GHz, span < 1 GHz | < 2.5 dB ($\sigma = 0.83$ dB) |
| | 50 GHz < f \leq 67 GHz, span < 1 GHz | < 3.0 dB ($\sigma = 1.0$ dB) |
| | 67 GHz < f \leq 85 GHz, span < 1 GHz | < 3.5 dB ($\sigma = 1.17$ dB) |
| | any RF attenuation or electronic attenuator on, +15 °C to +40 °C | |
| | 2 Hz \leq f < 9 kHz | < 1 dB (nom.) |
| | 9 kHz \leq f < 3.6 GHz | < 0.6 dB ($\sigma = 0.20$ dB) |
| | 3.6 GHz \leq f \leq 8 GHz | < 0.8 dB ($\sigma = 0.27$ dB) |
| | 8 GHz < f < 22 GHz, span < 1 GHz | < 2 dB ($\sigma = 0.67$ dB) |
| | 22 GHz \leq f \leq 26.5 GHz, span < 1 GHz | < 2.5 dB ($\sigma = 0.83$ dB) |
| | 26.5 GHz < f \leq 50 GHz, span < 1 GHz | < 3 dB ($\sigma = 1.0$ dB) |
| | 50 GHz < f \leq 67 GHz, span < 1 GHz | < 3.5 dB ($\sigma = 1.17$ dB) |
| | 67 GHz < f \leq 85 GHz, span < 1 GHz | < 4.0 dB ($\sigma = 1.33$ dB) |
| | RF attenuation \leq 20 dB, RF preamplifier on, +20 °C to +30 °C | |
| | 10 MHz \leq f < 3.6 GHz | < 0.6 dB ($\sigma = 0.2$ dB) |
| | 3.6 GHz \leq f \leq 8 GHz | < 0.8 dB ($\sigma = 0.27$ dB) |
| 8 GHz < f < 22 GHz, span < 1 GHz | < 2 dB ($\sigma = 0.67$ dB) | |
| 22 GHz \leq f \leq 26.5 GHz, span < 1 GHz | < 2.5 dB ($\sigma = 0.83$ dB) | |
| 26.5 GHz < f \leq 50 GHz, span < 1 GHz | < 3 dB ($\sigma = 1.0$ dB) | |
| 50 GHz < f \leq 67 GHz, span < 1 GHz | < 3.5 dB ($\sigma = 1.17$ dB) | |
| Frequency response, referenced to 64 MHz, YIG preselector off | RF attenuation = 10 dB, 20 dB, 30 dB, 40 dB, RF preamplifier off, +20 °C to +30 °C, electronic attenuator off | |
| | f < 8 GHz | same values as with preselector on |
| | 8 GHz \leq f < 22 GHz | < 1.5 dB ($\sigma = 0.5$ dB) |
| | 22 GHz \leq f \leq 26.5 GHz | < 2 dB ($\sigma = 0.6$ dB) |
| | 26.5 GHz < f \leq 67 GHz, span < 1 GHz | < 2.5 dB ($\sigma = 0.83$ dB) |
| | 67 GHz < f \leq 85 GHz, span < 1 GHz | < 3 dB ($\sigma = 1.0$ dB) |
| | any RF attenuation or electronic attenuator on, +15 °C to +40 °C | |
| | f < 8 GHz | same values as with preselector on |
| | 8 GHz \leq f < 22 GHz | < 2 dB ($\sigma = 0.6$ dB) |
| | 22 GHz \leq f \leq 26.5 GHz | < 2.5 dB ($\sigma = 0.75$ dB) |
| | 26.5 GHz < f \leq 67 GHz, span < 1 GHz | < 3 dB ($\sigma = 1.0$ dB) |
| | 67 GHz < f \leq 85 GHz, span < 1 GHz | < 3.5 dB ($\sigma = 1.17$ dB) |
| | RF attenuation \leq 20 dB, RF preamplifier on, +20 °C to +30 °C | |
| | f < 8 GHz | same values as with preselector on |
| | 8 GHz \leq f < 22 GHz | < 2 dB ($\sigma = 0.6$ dB) |
| | 22 GHz \leq f \leq 26.5 GHz | < 2.5 dB ($\sigma = 0.75$ dB) |
| | 26.5 GHz < f \leq 67 GHz, span < 1 GHz | < 3 dB ($\sigma = 1.0$ dB) |
| Attenuator switching uncertainty | f = 64 MHz, 0 dB to 70 dB, referenced to 10 dB attenuation | < 0.2 dB ($\sigma = 0.07$ dB) |
| Uncertainty of reference level setting | input mixer level \leq -15 dBm | 0 dB ¹² |
| | input mixer level > -15 dBm | < 0.1 dB (nom.) |
| Bandwidth switching uncertainty | referenced to RBW = 10 kHz | < 0.1 dB ($\sigma = 0.04$ dB) |

¹⁰ With R&S®FSW8, R&S®FSW13, R&S®FSW26, R&S®FSW43, R&S®FSW50, R&S®FSW67.

¹¹ With R&S®FSW85.

¹² 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.

| Nonlinearity of displayed level | | |
|--|--------------------------------------|---------------------------------|
| Logarithmic level display | S/N > 16 dB, 0 dB ≤ level ≤ -70 dB | < 0.1 dB ($\sigma = 0.04$ dB) |
| | S/N > 16 dB, -70 dB < level ≤ -90 dB | < 0.2 dB ($\sigma = 0.08$ 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 dB, 20 dB, 30 dB, 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 |
| YIG preselector off | signal level = 0 dB to -70 dB below reference level, S/N > 20 dB, sweep time = auto, RF attenuation = 10 dB, 20 dB, 30 dB, 40 dB, 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 ≤ 85 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 ¹³ | |
| | 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 ¹⁴

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

¹³ Noise cancellation off represents the raw performance of the R&S®FSW without numeric compensation for its inherent noise.

¹⁴ Sweep points set to 1001 points (= default), sweep optimization set to "speed".

¹⁵ 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 |
| | I/Q analyzer or modulation analysis | I/Q trigger additionally ¹⁶ |
| Trigger offset | span \geq 10 Hz | 5 ns to 20 s |
| | span = 0 Hz | (–sweep time) to 20 s |
| Min. trigger offset resolution | span > 0 Hz | 5 ns |
| | span = 0 Hz, trigger offset > 0 | 5 ns |
| | span = 0 Hz, trigger offset < 0 | sweep time/number of sweep points |
| Max. deviation of trigger offset | | 5 ns |
| IF power trigger | | |
| Sensitivity | min. signal power | |
| | spectrum analysis | –60 dBm + RF attenuation – RF preamplifier gain (nom.) |
| | I/Q analyzer or modulation analysis | |
| | set analysis bandwidth \leq 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.) ¹⁷ |
| | RBW \leq 500 kHz, FFT | 20 MHz (nom.) |
| | RBW \leq 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 | $f \leq$ 8 GHz | 8 GHz (nom.) |
| | $f >$ 8 GHz | center frequency \pm 250 MHz (nom.) ¹⁸ |
| Gated sweep | | |
| Gate source | | video, external, IF power, RF power |
| Gate delay | | 5 ns to 20 s, min. resolution 5 ns |
| Gate length | | 5 ns to 20 s, min. resolution 5 ns |
| Max. deviation of gate length | | \pm 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 |

¹⁶ Not available for analysis bandwidth > 80 MHz if R&S®FSW-B512 is installed.

¹⁷ Sweep optimization = auto.

¹⁸ YIG preselector off for $f \geq$ 8 GHz.

I/Q data

The specifications in this section apply to the base unit and the R&S®FSW-B28/-B40/-B80/-B160/-B320/-B512 options. For specifications of the R&S®FSW-B2000 option, see section “R&S®FSW-B2000 2 GHz analysis bandwidth”.

| | | |
|---|--|---|
| Record length | | max. 400 Msample I and Q |
| Word length of I/Q samples | sampling rate > 100 MHz or number of samples > 300 Msample | 18 bit |
| | otherwise | 24 bit |
| Sampling rate | standard | 100 Hz to 200 MHz |
| | with R&S®FSW-B28/-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 option | 100 Hz to 1.2 GHz |
| Max. signal analysis bandwidth (equalized) | standard | 10 MHz (nom.) |
| | with R&S®FSW-B28 option | 28 MHz (nom.) ¹⁸ |
| | with R&S®FSW-B40 option | 40 MHz (nom.) ¹⁸ |
| | with R&S®FSW-B80 option | 80 MHz (nom.) ¹⁸ |
| | with R&S®FSW-B160 option | 160 MHz (nom.) ¹⁸ |
| | with R&S®FSW-B320 option | 320 MHz (nom.) ¹⁸ |
| with R&S®FSW-B512 option | 512 MHz (nom.) ¹⁸ | |
| Signal analysis bandwidth ≤ 80 MHz | | |
| Amplitude flatness | $(1.25 \times \text{signal analysis BW}) \leq f_{\text{center}} < 8 \text{ GHz}$ | ±0.3 dB (nom.) |
| | $f_{\text{center}} \geq 8 \text{ GHz}$, YIG preselector off | ±0.5 dB (nom.) |
| Deviation from linear phase | $(1.25 \times \text{signal analysis BW}) \leq f_{\text{center}} < 8 \text{ GHz}$ | ±1° (nom.) |
| | $f_{\text{center}} \geq 8 \text{ GHz}$, 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 ¹⁹ | |
| | analysis bandwidth < 17 MHz | -100 dBc (nom.) |
| | 17 MHz ≤ analysis bandwidth < 80 MHz | -80 dBc (nom.) |
| Other spurious responses | | see section “Spurious responses” |

¹⁹ Level of a tone at the input mixer (also abbreviated as mixer level) = signal level – RF attenuation + preamplifier gain.

| Signal analysis bandwidth 80 MHz to 160 MHz ²⁰ | | |
|--|--|--|
| Amplitude flatness | RF attenuation = 10 dB, 20 dB, 30 dB, 40 dB, RF preamplifier off, electronic attenuator off, YIG preselector off for $f \geq 8$ GHz | |
| | $150 \text{ MHz} \leq f_{\text{center}} < 4 \text{ GHz}$ | $\pm 0.5 \text{ dB (nom.)}$ |
| | $4 \text{ GHz} \leq f_{\text{center}} < 8 \text{ GHz}$ | $\pm 0.7 \text{ dB (nom.)}$ |
| | $8 \text{ GHz} \leq f_{\text{center}} < 26.5 \text{ GHz}$ | $\pm 1 \text{ dB (nom.)}$ |
| | $26.5 \text{ GHz} \leq f_{\text{center}} \leq 67 \text{ GHz}$ | $\pm 2 \text{ dB (nom.)}$ |
| | $67 \text{ GHz} < f_{\text{center}} \leq 85 \text{ GHz}$ | $\pm 2.5 \text{ dB (nom.)}$ |
| Deviation from linear phase | RF attenuation = 10 dB, 20 dB, 30 dB, 40 dB, RF preamplifier off, electronic attenuator off, YIG preselector off for $f \geq 8$ GHz | |
| | $150 \text{ MHz} \leq f_{\text{center}} < 4 \text{ GHz}$ | $\pm 1^\circ \text{ (nom.)}$ |
| | $4 \text{ GHz} \leq f_{\text{center}} < 8 \text{ GHz}$ | $\pm 2^\circ \text{ (nom.)}$ |
| | $8 \text{ GHz} \leq f_{\text{center}} < 26.5 \text{ GHz}$ | $\pm 2.5^\circ \text{ (nom.)}$ |
| | $26.5 \text{ GHz} \leq f_{\text{center}} < 43.5 \text{ GHz}$ | $\pm 4^\circ \text{ (nom.)}$ |
| | $43.5 \text{ GHz} \leq f_{\text{center}} \leq 67 \text{ GHz}$ | $\pm 8^\circ \text{ (nom.)}$ |
| 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 | |
| | $150 \text{ MHz} \leq f_{\text{center}} < 8 \text{ GHz}$: two -20 dBm tones at input mixer within analysis bandwidth ¹⁹ , $f_{\text{center}} \geq 8 \text{ GHz}$: two -30 dBm tones at input mixer within analysis bandwidth ¹⁹ | -75 dBc (nom.) |
| Residual spurious response | RF attenuation 0 dB, $f_{\text{center}} \geq 150 \text{ MHz}$ | -90 dBm (nom.) |
| ADC related spurious response | single tone within analysis bandwidth, mixer level = -10 dBm ¹⁹ , reference level = signal level, $f_{\text{center}} \geq 150 \text{ MHz}$ | -78 dBc (nom.) |
| Other spurious responses | | see section "Spurious responses" |

| Signal analysis bandwidth ≤ 96 MHz within R&S®FSW-K193 DOCSIS 3.1 OFDM upstream option ²¹ | | |
|---|--|--|
| Amplitude flatness | RF attenuation = 10 dB, 20 dB, 30 dB, 40 dB, RF preamplifier off, electronic attenuator off | |
| | $5 \text{ MHz} \leq f \leq 204 \text{ MHz}$ | $\pm 0.6 \text{ dB (nom.)}$ |
| Deviation from linear phase | RF attenuation = 10 dB, 20 dB, 30 dB, 40 dB, RF preamplifier off, electronic attenuator off | |
| | $5 \text{ MHz} \leq f \leq 204 \text{ MHz}$ | $\pm 2^\circ \text{ (nom.)}$ |
| 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 | |
| | $5 \text{ MHz} \leq f \leq 204 \text{ MHz}$: two -20 dBm tones at input mixer within analysis bandwidth ¹⁹ , | -75 dBc (nom.) |
| Residual spurious response | RF attenuation 0 dB, $5 \text{ MHz} \leq f \leq 204 \text{ MHz}$ | -90 dBm (nom.) |
| ADC related spurious response | single tone within analysis bandwidth, mixer level = -10 dBm ¹⁹ , reference level = signal level, $5 \text{ MHz} \leq f \leq 204 \text{ MHz}$ | -78 dBc (nom.) |
| Other spurious responses | | see section "Spurious responses" |

²⁰ The specifications for 80 MHz to 160 MHz analysis bandwidth in this section apply to the following options:

R&S®FSW-B160 (order no. 1325.4850.04), R&S®FSW-B160R (order no. 1325.4850.06), R&S®FSW-B320 (order no. 1325.4867.04).

²¹ The specifications in this section apply in combination with the R&S®FSW-B320 option (order no. 1325.4867.04).

| Signal analysis bandwidth 160 MHz to 320 MHz ²² | | |
|--|--|--|
| Amplitude flatness | RF attenuation = 10 dB, 20 dB, 30 dB, 40 dB, RF preamplifier off, electronic attenuator off, YIG preselector off for $f \geq 8$ GHz | |
| | $200 \text{ MHz} \leq f_{\text{center}} < 4 \text{ GHz}$ | $\pm 0.7 \text{ dB (nom.)}$ |
| | $4 \text{ GHz} \leq f_{\text{center}} < 7 \text{ GHz}$ | $\pm 1.2 \text{ dB (nom.)}$ |
| | $7 \text{ GHz} \leq f_{\text{center}} < 8 \text{ GHz}$ ²³ | $\pm 1.4 \text{ dB (nom.)}$ |
| | $8 \text{ GHz} \leq f_{\text{center}} < 22 \text{ GHz}$ | $\pm 1.6 \text{ dB (nom.)}$ |
| | $22 \text{ GHz} \leq f_{\text{center}} \leq 43.5 \text{ GHz}$ | $\pm 2 \text{ dB (nom.)}$ |
| | $43.5 \text{ GHz} < f_{\text{center}} \leq 67 \text{ GHz}$ | $\pm 2.5 \text{ dB (nom.)}$ |
| Deviation from linear phase | RF attenuation = 10 dB, 20 dB, 30 dB, 40 dB, RF preamplifier off, electronic attenuator off, YIG preselector off for $f \geq 8$ GHz | |
| | $200 \text{ MHz} \leq f_{\text{center}} < 4 \text{ GHz}$ | $\pm 2.5^\circ \text{ (nom.)}$ |
| | $4 \text{ GHz} \leq f_{\text{center}} < 8 \text{ GHz}$ ²³ | $\pm 4^\circ \text{ (nom.)}$ |
| | $8 \text{ GHz} \leq f_{\text{center}} < 43.5 \text{ GHz}$ | $\pm 5^\circ \text{ (nom.)}$ |
| | $43.5 \text{ GHz} \leq f_{\text{center}} \leq 67 \text{ GHz}$ | $\pm 8^\circ \text{ (nom.)}$ |
| Nonlinearity of displayed level | 0 dB to -70 dB | |
| | | $< 0.15 \text{ dB (nom.)}$ |
| 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 | |
| | $200 \text{ MHz} \leq f_{\text{center}} < 8 \text{ GHz}$: two -20 dBm tones at input mixer within analysis bandwidth ¹⁹ , $f_{\text{center}} \geq 8 \text{ GHz}$: two -30 dBm tones at input mixer within analysis bandwidth ¹⁹ | -75 dBc (nom.) |
| Residual spurious response | RF attenuation 0 dB, $f_{\text{center}} \geq 200 \text{ MHz}$ | -90 dBm (nom.) |
| ADC related spurious response | single tone within analysis bandwidth, mixer level = -10 dBm ¹⁹ , reference level = signal level | |
| | $200 \text{ MHz} \leq f_{\text{center}} \leq 460 \text{ MHz}$ | -70 dBc (nom.) |
| | $f_{\text{center}} > 460 \text{ MHz}$ | -72 dBc (nom.) |
| Other spurious responses | | see section "Spurious responses" |

²² The specifications for 160 MHz to 320 MHz analysis bandwidth in this section apply to the R&S®FSW-B320 option (order no. 1325.4867.04).

²³ To obtain the set analysis bandwidth, $(f_{\text{center}} + \frac{1}{2} \text{ analysis bandwidth}) \leq 8 \text{ GHz}$ must be met.

| Signal analysis bandwidth 80 MHz to 512 MHz with R&S®FSW-B512 option and R&S®FSW-B512R option | | |
|--|---|--|
| Amplitude flatness | RF attenuation = 10 dB, 20 dB, 30 dB, 40 dB, RF preamplifier off, electronic attenuator off, YIG preselector off for $f \geq 8$ GHz | |
| | analysis bandwidth ≤ 160 MHz | |
| | $150 \text{ MHz} \leq f_{\text{center}} < 4 \text{ GHz}$ | $\pm 0.4 \text{ dB (nom.)}$ |
| | $4 \text{ GHz} \leq f_{\text{center}} \leq 8 \text{ GHz}$ | $\pm 0.6 \text{ dB (nom.)}$ |
| | analysis bandwidth ≤ 500 MHz | |
| | $260 \text{ MHz} \leq f_{\text{center}} < 4 \text{ GHz}$ | $\pm 0.5 \text{ dB (nom.)}$ |
| | $4 \text{ GHz} \leq f_{\text{center}} \leq 8 \text{ GHz}$ | $\pm 0.7 \text{ dB (nom.)}$ |
| | analysis bandwidth ≤ 512 MHz | |
| | $460 \text{ MHz} \leq f_{\text{center}} < 4 \text{ GHz}$ | $\pm 0.5 \text{ dB (nom.)}$ |
| | $4 \text{ GHz} \leq f_{\text{center}} \leq 8 \text{ GHz}$ | $\pm 0.7 \text{ dB (nom.)}$ |
| | any analysis bandwidth | |
| | $8 \text{ GHz} < f_{\text{center}} \leq 26.5 \text{ GHz}$ | $\pm 1.0 \text{ dB (nom.)}$ |
| | $26.5 \text{ GHz} < f_{\text{center}} \leq 43.5 \text{ GHz}$ | $\pm 1.5 \text{ dB (nom.)}$ |
| | $43.5 \text{ GHz} < f_{\text{center}} \leq 67 \text{ GHz}$ | $\pm 2 \text{ dB (nom.)}$ |
| $67 \text{ GHz} < f_{\text{center}} \leq 85 \text{ GHz}$ | $\pm 2.5 \text{ dB (nom.)}$ | |
| Deviation from linear phase | RF attenuation = 10 dB, 20 dB, 30 dB, 40 dB, RF preamplifier off, electronic attenuator off, YIG preselector off for $f \geq 8$ GHz | |
| | analysis bandwidth ≤ 160 MHz | |
| | $150 \text{ MHz} \leq f_{\text{center}} < 4 \text{ GHz}$ | $\pm 1^\circ \text{ (nom.)}$ |
| | $4 \text{ GHz} \leq f_{\text{center}} \leq 8 \text{ GHz}$ | $\pm 2^\circ \text{ (nom.)}$ |
| | $8 \text{ GHz} < f_{\text{center}} \leq 26.5 \text{ GHz}$ | $\pm 2.5^\circ \text{ (nom.)}$ |
| | $26.5 \text{ GHz} < f_{\text{center}} \leq 43.5 \text{ GHz}$ | $\pm 4^\circ \text{ (nom.)}$ |
| | $43.5 \text{ GHz} < f_{\text{center}} \leq 85 \text{ GHz}$ | $\pm 8^\circ \text{ (nom.)}$ |
| | analysis bandwidth ≤ 500 MHz | |
| | $260 \text{ MHz} \leq f_{\text{center}} < 4 \text{ GHz}$ | $\pm 1.5^\circ \text{ (nom.)}$ |
| | $4 \text{ GHz} \leq f_{\text{center}} \leq 8 \text{ GHz}$ | $\pm 2^\circ \text{ (nom.)}$ |
| | $8 \text{ GHz} < f_{\text{center}} \leq 26.5 \text{ GHz}$ | $\pm 5^\circ \text{ (nom.)}$ |
| | $26.5 \text{ GHz} < f_{\text{center}} \leq 85 \text{ GHz}$ | $\pm 8^\circ \text{ (nom.)}$ |
| | analysis bandwidth ≤ 512 MHz | |
| | $460 \text{ MHz} \leq f_{\text{center}} < 4 \text{ GHz}$ | $\pm 1.5^\circ \text{ (nom.)}$ |
| | $4 \text{ GHz} \leq f_{\text{center}} \leq 8 \text{ GHz}$ | $\pm 2^\circ \text{ (nom.)}$ |
| | $8 \text{ GHz} < f_{\text{center}} \leq 26.5 \text{ GHz}$ | $\pm 5^\circ \text{ (nom.)}$ |
| $26.5 \text{ GHz} < f_{\text{center}} \leq 85 \text{ GHz}$ | $\pm 8^\circ \text{ (nom.)}$ | |
| Nonlinearity of displayed level | 0 dB to -70 dB | $< 0.15 \text{ dB (nom.)}$ |
| 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 | |
| | $f_{\text{center}} \leq 8 \text{ GHz}$: two -20 dBm tones at input mixer within analysis bandwidth ¹⁹ | -70 dBc (nom.) |
| | $f_{\text{center}} > 8 \text{ GHz}$: two -25 dBm tones at input mixer within analysis bandwidth ¹⁹ , YIG preselector off | |
| Residual spurious response | RF attenuation 0 dB, analysis bandwidth ≤ 160 MHz and $f_{\text{center}} \geq 150$ MHz, or analysis bandwidth ≤ 512 MHz and $f_{\text{center}} \geq 650$ MHz, YIG preselector off for $f \geq 8$ GHz | -90 dBm (nom.) |
| ADC related spurious response | single tone at center frequency | -78 dBc (nom.) |
| | single tone within analysis bandwidth, mixer level = -15 dBm ¹⁹ , reference level = signal level, analysis bandwidth ≤ 160 MHz and $f_{\text{center}} \geq 150$ MHz, or analysis bandwidth ≤ 512 MHz and $f_{\text{center}} \geq 260$ MHz, YIG preselector off for $f \geq 8$ GHz | -70 dBc (nom.) |
| Other spurious responses | | see section "Spurious responses" |

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 | 1.00 mm male |
| VSWR of R&S®FSW8 | RF attenuation \leq 4 dB | |
| | 10 MHz \leq f \leq 8 GHz | typ. 1.87 ²⁴ |
| | 5 dB \leq RF attenuation \leq 9 dB | |
| | 10 MHz \leq f < 1 GHz | < 1.5, typ. 1.20 ²⁴ |
| | 10 MHz \leq f < 3.6 GHz | < 1.5, typ. 1.31 ²⁴ |
| | 3.6 GHz \leq f \leq 8 GHz | < 2.0, typ. 1.51 ²⁴ |
| | RF attenuation \geq 10 dB | |
| | 10 MHz \leq f < 1 GHz | < 1.2, typ. 1.09 ²⁴ |
| | 1 GHz \leq f < 3.6 GHz | < 1.5, typ. 1.19 ²⁴ |
| 3.6 GHz \leq f \leq 8 GHz | < 2.0, typ. 1.42 ²⁴ | |
| VSWR of R&S®FSW13 | RF attenuation \leq 4 dB | |
| | 10 MHz \leq f \leq 13.6 GHz | typ. 1.87 ²⁴ |
| | 5 dB \leq RF attenuation \leq 9 dB | |
| | 10 MHz \leq f < 3.6 GHz | < 1.5, typ. 1.25 ²⁴ |
| | 3.6 GHz \leq f \leq 13.6 GHz | < 2.0, typ. 1.29 ²⁴ |
| | RF attenuation \geq 10 dB | |
| | 10 MHz \leq f < 1 GHz | < 1.2, typ. 1.10 ²⁴ |
| | 1 GHz \leq f < 3.6 GHz | < 1.5, typ. 1.14 ²⁴ |
| | 3.6 GHz \leq f \leq 13.6 GHz | < 2.0, typ. 1.22 ²⁴ |
| VSWR of R&S®FSW26, R&S®FSW43, R&S®FSW50, R&S®FSW67, R&S®FSW85 | RF attenuation \leq 4 dB | |
| | 10 MHz \leq f \leq 26.5 GHz | typ. 1.87 ^{24, 25} |
| | 26.5 GHz < f \leq 40 GHz | typ. 2.0 ²⁴ |
| | 40 GHz < f \leq 70 GHz | 2.0 (nom.) |
| | 70 GHz < f \leq 85 GHz | 2.4 (nom.) |
| | 5 dB \leq RF attenuation \leq 9 dB | |
| | 10 MHz \leq f \leq 3.5 GHz | < 1.5, typ. 1.24 ^{24, 25} |
| | 3.5 GHz < f \leq 8 GHz | < 1.8, typ. 1.26 ²⁴ |
| | 8 GHz < f \leq 18 GHz | < 1.8, typ. 1.39 ²⁴ |
| | 18 GHz < f \leq 26.5 GHz | < 2.0, typ. 1.43 ²⁴ |
| | 26.5 GHz < f \leq 40 GHz | < 2.5, typ. 1.8 ²⁴ |
| | 40 GHz < f \leq 70 GHz | 2.0 (nom.) |
| | 70 GHz < f \leq 85 GHz | 2.4 (nom.) |
| | RF attenuation \geq 10 dB | |
| | 10 MHz \leq f \leq 3.5 GHz | < 1.2, typ. 1.12 ^{24, 25} |
| | 3.5 GHz < f \leq 8 GHz | < 1.5, typ. 1.19 ²⁴ |
| | 8 GHz < f \leq 18 GHz | < 1.5, typ. 1.25 ²⁴ |
| | 18 GHz < f \leq 26.5 GHz | < 2.0, typ. 1.37 ²⁴ |
| | 26.5 GHz < f \leq 40 GHz | < 2.5, typ. 1.7 ²⁴ |
| | 40 GHz < f \leq 70 GHz | 2.0 (nom.) |
| | 70 GHz < f \leq 85 GHz | 2.4 (nom.) |
| R&S®FSW85, input coupling AC, RF attenuation \geq 10 dB | | |
| 50 MHz \leq f \leq 3.5 GHz | < 1.5, typ. 1.19 ²⁴ | |
| Setting range of attenuator | | 0 dB to 79 dB, in 1 dB steps ^{26, 27} |

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

²⁴ 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.

²⁵ R&S®FSW85: specification applies to input coupling DC.

²⁶ R&S®FSW8 to R&S®FSW67: Mechanical RF attenuator: 5 dB steps. Electronic IF attenuator: 1 dB steps.

²⁷ R&S®FSW85: Mechanical RF attenuator: 10 dB steps. Electronic IF attenuator: 1 dB steps.

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

| Power sensor | | |
|---------------------|--|---|
| Connector | | 6-pin LEMOSA female for R&S®NRP-Zxx power sensors |

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

| AF output | | |
|------------------------------|--|---|
| Connector | | 3.5 mm mini-jack |
| Output impedance | | 10 Ω (nom.) |
| Open-circuit voltage | | up to 1.5 V, adjustable |
| External trigger/gate | | |
| Number of ports | | 1 × input, 2 × input/output, selectable |
| Connector | | BNC female |
| Trigger input voltage | | 0.5 V to 3.5 V (nom.) |
| Trigger output voltage | | TTL-compatible, 0 V/5 V (nom.) |
| Impedance | | 10 kΩ (nom.) |

| Reference input 1 MHz to 20 MHz | | |
|--|--|---|
| Connector | | BNC female |
| Impedance | | 50 Ω (nom.) |
| Input frequency range | | 1 MHz ≤ f _{in} ≤ 20 MHz, in 1 Hz steps |
| Required level | | > 0 dBm |

| Reference input 100 MHz | | |
|--------------------------------|--|-----------------|
| Connector | | SMA female |
| Impedance | | 50 Ω (nom.) |
| Input frequency range | | 100 MHz |
| 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 20 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 lin. display scale | logarithmic 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, R&S®FSW-B320 or R&S®FSW-B512 option only) | | |
| Connector | R&S®FSW-B160 or R&S®FSW-B320 R&S®FSW-B512 | BNC female, 50 Ω (nom.) SMA female, 50 Ω (nom.) |
| IF frequency | center frequency \geq 200 MHz | 50 MHz to 550 MHz (nom.) |
| Max. bandwidth (6 dB) | YIG preselector off | 500 MHz |
| Output level | RF attenuation = auto, reference level \geq –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 and R&S®FSW67 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 |
| Output level | RF attenuation = 0 dB, signal level = 0 dBm | |
| | R&S®FSW43, R&S®FSW50 | –20 dBm (nom.) |
| | R&S®FSW67 | –30 dBm (nom.) |
| Amplitude flatness | within IF frequency \pm 1 GHz, peak-to-peak, RF attenuation = 10 dB, RF preamplifier off, electronic attenuator off, YIG preselector off | |
| | R&S®FSW26 | |
| | 8 GHz \leq $f_{\text{center}} <$ 22 GHz | 8 dB (nom.) |
| | $f_{\text{center}} \geq$ 22 GHz | 10 dB (nom.) |
| | R&S®FSW43, R&S®FSW50 | |
| | $f_{\text{center}} \geq$ 8 GHz | 8 dB (nom.) |
| | R&S®FSW67 | |
| | 8 GHz \leq $f_{\text{center}} <$ 49 GHz | 8 dB (nom.) |
| | 49 GHz \leq $f_{\text{center}} <$ 51 GHz | 16 dB (nom.) |
| | 51 GHz \leq $f_{\text{center}} <$ 57 GHz | 8 dB (nom.) |
| | 57 GHz \leq $f_{\text{center}} <$ 59 GHz | 16 dB (nom.) |
| | 59 GHz \leq $f_{\text{center}} <$ 63 GHz | 10 dB (nom.) |
| | 63 GHz \leq $f_{\text{center}} \leq$ 67 GHz | 16 dB (nom.) |

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

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

| External monitor | | |
|-------------------------|--|----------------------------|
| Connector | | 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 | | $< 1 \times 10^{-5}$ |

| | | |
|---------------------|----------|--|
| Data storage | | |
| Internal | standard | solid state disk ≥ 32 Gbyte |
| External | | supports USB 2.0 compatible memory devices |

| | | |
|--------------------|-------------------------------|--|
| Temperature | | |
| Temperature | operating temperature range | +5 °C to +50 °C ²⁸ |
| | permissible temperature range | 0 °C to +55 °C ²⁸ |
| | 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 | | |
| Max. 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 | 10 Hz to 300 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 | | in line with EMC Directive 2004/108/EC including: IEC/EN 61326-1 ^{29, 30} IEC/EN 61326-2-1 CISPR 11/EN 55011 ²⁹ IEC/EN 61000-3-2 IEC/EN 61000-3-3 |
|------------|--|--|

| | | |
|---|--|--------|
| Recommended calibration interval | | 1 year |
|---|--|--------|

| | | |
|-----------------|-------------|---------|
| Warranty | base unit | 3 years |
| | accessories | 1 year |

²⁸ With built-in R&S®FSW-B512R option, the upper operating and permissible temperature is limited to +45 °C.

²⁹ Emission limits for class B equipment apply.

³⁰ 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 |
| Max. 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.) ³¹ |
| | R&S®FSW13, R&S®FSW26 | 175 W without options, 275 W with all options (meas.) ³¹ |
| | R&S®FSW43, R&S®FSW50 | 200 W without options, 300 W with all options (meas.) ³¹ |
| | R&S®FSW67 | 220 W without options, 320 W with all options (meas.) ³¹ |
| | R&S®FSW85 | 230 W without options, 330 W with all options (meas.) ³¹ |
| Safety | | in line with IEC 61010-1, EN 61010-1, UL 61010-1, CAN/CSA-C22.2 No. 61010-1 |
| Test mark | | VDE-GS, cCSA _{US} |

| 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 | 18.6 kg (41.01 lb) |
| | R&S®FSW13 | 20.2 kg (44.53 lb) |
| | R&S®FSW26 | 20.2 kg (44.53 lb) |
| | R&S®FSW43, R&S®FSW50 | 20.9 kg (46.07 lb) |
| | R&S®FSW67 | 23.6 kg (52.03 lb) |
| | R&S®FSW85 | 26.6 kg (58.64 lb) |

³¹ All options except R&S®FSW-B512R. For R&S®FSW-B512R add 130 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®SMB100A, R&S®SMBV100A, R&S®SMC100A, 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®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 ³² |
| User data | sample rate | 100 sample/s to 100 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 ³² |
| User data | sample rate | 100 sample/s to 200 Msample/s (nom.) |
| | resolution | 18 bit for I and 18 bit for Q |
| | standard | 10 MHz |
| Max. I/Q bandwidth | with R&S®FSW-B28 option | 28 MHz |
| | with R&S®FSW-B40 option | 40 MHz |
| | with R&S®FSW-B80 option | 80 MHz |
| | with R&S®FSW-B160 option | 160 MHz |
| | with R&S®FSW-B320 option | 160 MHz |
| | with R&S®FSW-B512 option | 160 MHz |

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 |
| Level | +20 °C to +30 °C | +15.5 dBm ± 1 dB |
| | +5 °C to +40 °C | +15.5 dBm ± 3 dB |

| IF input | | |
|-----------------------------------|---|----------------------|
| IF frequency | set signal analysis bandwidth | |
| | ≤ 80 MHz, bandwidth-dependent | 1310 MHz to 1330 MHz |
| | 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 | 1580 MHz |
| Full-scale level | compression < 1 dB | |
| | 2-port mixer (LO output/IF input, front panel) | -20 dBm (nom.) |
| | 3-port mixer (IF input, front panel) | -20 dBm (nom.) |
| Level uncertainty at IF frequency | IF input level = reference level = -25 dBm, RBW = 30 kHz, mixer conversion loss set to 0 dB, 2-port mixer, LO output/IF input connector (front panel) | |
| | +20 °C to +30 °C | < 1 dB |
| | +5 °C to +40 °C | < 3 dB |
| | IF input level = reference level = -25 dBm, RBW = 30 kHz, mixer conversion loss set to 0 dB, 3-port mixer, IF input connector (front panel) | |
| | +20 °C to +30 °C | < 1 dB |
| | +5 °C to +40 °C | < 3 dB |

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

³² 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 and the R&S®EX-IQ-Box).

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 | R&S®FSW8, R&S®FSW13 | 15 dB/30 dB (nom.) (selectable) |
| | R&S®FSW26, R&S®FSW43, R&S®FSW50, R&S®FSW67 | 30 dB (nom.) |

| 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 ³³ |

| 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.) |

³³ 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.) |
| | T and \bar{Q} ³⁴ | 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 |
| Max. 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 | $f_{\text{input}} = 1 \text{ MHz}$, 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 | |
| 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.) |

³⁴ 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 ($\sqrt{1 \text{ Hz}}$)) (nom.) |
| | ±1 V peak | -136 dBm (1 Hz) (36 nV ($\sqrt{1 \text{ Hz}}$)) (nom.) |
| | ±0.5 V peak | -142 dBm (1 Hz) (18 nV ($\sqrt{1 \text{ Hz}}$)) (nom.) |
| | ±0.25 V peak | -148 dBm (1 Hz) (9 nV ($\sqrt{1 \text{ Hz}}$)) (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 ³⁵ | | |
| Supported connector | input source RF set to baseband input I | I |
| Maximum input frequency | | 5 GHz ³⁶ |
| Frequency response | see probe specification for frequency response of probe | add the probe frequency response to the R&S®FSW frequency response specified in section "Total measurement uncertainty" |

³⁵ Feature not available for R&S®FSW67 and R&S®FSW85.

³⁶ 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.

R&S®FSW-B2000 2 GHz analysis bandwidth (option available for all models except R&S®FSW8, R&S®FSW13)

The specifications in this section apply to I/Q data recorded using the R&S®FSW-B2000 option. "B2000" must be configured as data source in the INPUT menu. When using other input settings for I/Q data recording, i.e. in relation with the R&S®FSW-B28/-B40/-B80/-B160/-B320/-B512 options, see section "I/Q data" in the base unit specification.

The R&S®FSW-B2000 option uses an oscilloscope as external digitizer. An R&S®RTO-1044 or R&S®RTO-2044 with R&S®RTO-B4 option is needed to obtain the specified performance.

For ordering information, see section "Oscilloscopes supported by R&S®FSW-B2000".

| | | |
|---|---|--|
| Frequency range | dependent on instrument model | 8 GHz to 26/43/50/67/85 GHz |
| Record length ³⁷ | 2 GHz analysis bandwidth, R&S®RTO-1044 | with R&S®RTO-B104 option |
| | trigger: free run, IF power | max. 200 Msample I and Q ³⁸ |
| | trigger: external | max. 100 Msample I and Q ³⁸ |
| | 2 GHz analysis bandwidth, R&S®RTO-2044 | with R&S®RTO-B110 option |
| Sampling rate | trigger: free run, IF power | max. 500 Msample I and Q ³⁸ |
| | trigger: external | max. 250 Msample I and Q ³⁸ |
| | Signal analysis bandwidth (equalized) | 10 kHz to 2.5 GHz |
| Amplitude flatness | dependent on sampling rate, YIG preselector off | 8 kHz to 2 GHz |
| | RF attenuation = 10 dB, 20 dB, 30 dB, 40 dB, RF preamplifier off, electronic attenuator off, YIG preselector off, +20 °C to +30 °C analysis bandwidth ≤ 2 GHz | |
| | 8 GHz ≤ f _{center} < 22 GHz | ±1.2 dB |
| | 22 GHz ≤ f _{center} ≤ 26.5 GHz | ±1.4 dB |
| | 26.5 GHz < f _{center} ≤ 43.5 GHz | ±1.6 dB |
| | 43.5 GHz < f _{center} ≤ 50.0 GHz | ±1.7 dB |
| | 50.0 GHz < f _{center} ≤ 67.0 GHz | ±2.0 dB |
| | 67 GHz < f _{center} ≤ 85 GHz | ±2.5 dB |
| Deviation from linear phase | RF attenuation = 10 dB, 20 dB, 30 dB, 40 dB, RF preamplifier off, electronic attenuator off, YIG preselector off, +20 °C to +30 °C analysis bandwidth ≤ 500 MHz | |
| | 8 GHz ≤ f _{center} < 13 GHz | ±4° (nom.) |
| | 13 GHz ≤ f _{center} ≤ 37 GHz | ±2° (nom.) |
| | 37 GHz < f _{center} ≤ 40 GHz | ±4° (nom.) |
| | 40.0 GHz < f _{center} ≤ 50.0 GHz | ±6° (nom.) |
| | 50.0 GHz < f _{center} ≤ 67.0 GHz | ±4° (nom.) |
| | 67 GHz < f _{center} ≤ 85 GHz | ±6° (nom.) |
| | analysis bandwidth ≤ 1 GHz | |
| | 8 GHz ≤ f _{center} < 13 GHz | ±6° (nom.) |
| | 13 GHz ≤ f _{center} ≤ 37 GHz | ±4° (nom.) |
| | 37 GHz < f _{center} ≤ 40 GHz | ±6° (nom.) |
| | 40.0 GHz < f _{center} ≤ 50.0 GHz | ±8° (nom.) |
| | 50.0 GHz < f _{center} ≤ 67.0 GHz | ±6° (nom.) |
| | 67 GHz < f _{center} ≤ 85 GHz | ±8° (nom.) |
| | analysis bandwidth ≤ 2 GHz | |
| | R&S®FSW26 | |
| | f _{center} ≥ 8 GHz | ±8° (nom.) |
| | R&S®FSW43 to R&S®FSW85 | |
| | 8 GHz ≤ f _{center} < 13 GHz | ±8° (nom.) |
| | 13 GHz ≤ f _{center} ≤ 37 GHz | ±6° (nom.) |
| | 37 GHz < f _{center} ≤ 40 GHz | ±8° (nom.) |
| | 40.0 GHz < f _{center} ≤ 50.0 GHz | ±10° (nom.) |
| 50.0 GHz < f _{center} ≤ 67.0 GHz | ±8° (nom.) | |
| 67 GHz < f _{center} ≤ 85 GHz | ±10° (nom.) | |
| Level measurement uncertainty at center frequency | add 1 dB (nom.) to the values in "Total measurement uncertainty – YIG preselector off" | |

³⁷ The maximum record length with the R&S®FSW-B2000 option depends on the R&S®RTO memory configuration.

The following equation indicates the relation between record length, R&S®RTO memory size and set R&S®FSW sampling rate:

Record length (rounded to Msample) = (R&S®RTO memory size per channel in Msample) * R&S®FSW sample rate/10 GHz.

This equation is valid for measurements with free run or IF power trigger. For use with external trigger, divide the above value by 2.

At 2 GHz analysis bandwidth the R&S®FSW sample rate is 2.5 GHz.

³⁸ Rounded to Msample.

Ordering information

| Designation | Type | Order No. |
|---|-----------|--------------|
| Signal and Spectrum Analyzer, 2 Hz to 8 GHz | R&S®FSW8 | 1312.8000.08 |
| Signal and Spectrum Analyzer, 2 Hz to 13.6 GHz | R&S®FSW13 | 1312.8000.13 |
| Signal and Spectrum Analyzer, 2 Hz to 26.5 GHz | R&S®FSW26 | 1312.8000.26 |
| Signal and Spectrum Analyzer, 2 Hz to 43.5 GHz | R&S®FSW43 | 1312.8000.43 |
| Signal and Spectrum Analyzer, 2 Hz to 50 GHz | R&S®FSW50 | 1312.8000.50 |
| Signal and Spectrum Analyzer, 2 Hz to 67 GHz | R&S®FSW67 | 1312.8000.67 |
| Signal and Spectrum Analyzer, 2 Hz to 85 GHz | R&S®FSW85 | 1312.8000.85 |
| Accessories supplied | | |
| Power cable, quick start guide and CD-ROM (with operating manual and service manual) | | |
| 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 | | |

Options

| Designation | Type | Order No. | Retro-fittable | Remarks |
|--|-------------|--------------|----------------|--|
| OCXO Precision Frequency Reference | R&S®FSW-B4 | 1313.0703.02 | yes | user-retrofittable |
| Resolution Bandwidth > 10 MHz | R&S®FSW-B8 | 1313.2464.26 | no | for R&S®FSW8/13/26, with span = 0 Hz; the signal analysis bandwidth is defined by the R&S®FSW-B28/-B40/-B80/-B160/-B160R/-B320/-B512/-B512R/-B2000 options, not by the R&S®FSW-B8 option |
| Resolution Bandwidth > 10 MHz | R&S®FSW-B8 | 1313.2464.02 | no | for R&S®FSW43/50/67, with span = 0 Hz; the signal analysis bandwidth is defined by the R&S®FSW-B28/-B40/-B80/-B160/-B160R/-B320/-B512/-B512R/-B2000 options, not by the R&S®FSW-B8 option; 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 | 1313.0790.02 | yes | for R&S®FSW8/13/26/43/50; user-retrofittable |
| Spare Solid State Drive (removable hard drive) | R&S®FSW-B18 | 1313.0790.06 | yes | for R&S®FSW67; user-retrofittable |
| LO/IF Connections for external mixers | R&S®FSW-B21 | 1313.1100.26 | yes | for R&S®FSW26; contact service center |
| LO/IF Connections for external mixers | R&S®FSW-B21 | 1313.1100.43 | yes | for R&S®FSW43/50/67; contact service center |
| LO/IF Connections for external mixers | R&S®FSW-B21 | 1313.1100.85 | yes | for R&S®FSW85; contact service center |
| RF Preamp, 100 kHz to 13.6 GHz | R&S®FSW-B24 | 1313.0832.13 | yes | for R&S®FSW8/13; contact service center |
| RF Preamp, 100 kHz to 26.5 GHz | R&S®FSW-B24 | 1313.0832.26 | yes | for R&S®FSW26; contact service center |
| RF Preamp, 100 kHz to 43.5 GHz | R&S®FSW-B24 | 1313.0832.43 | yes | for R&S®FSW43/67; no export license required; contact service center |
| RF Preamp, 100 kHz to 50 GHz | R&S®FSW-B24 | 1313.0832.49 | yes | for R&S®FSW50; no export license required; contact service center |
| RF Preamp, 100 kHz to 50 GHz | R&S®FSW-B24 | 1313.0832.51 | yes | for R&S®FSW50; export license required; contact service center |

| Designation | Type | Order No. | Retro-fittable | Remarks |
|---|---------------|--------------|----------------|--|
| RF Preamplifier, 100 kHz to 67 GHz | R&S®FSW-B24 | 1313.0832.66 | yes | for R&S®FSW67; no export license required; contact service center |
| RF Preamplifier, 100 kHz to 67 GHz | R&S®FSW-B24 | 1313.0832.67 | yes | for R&S®FSW67; export license required; 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 |
| 28 MHz Analysis Bandwidth | R&S®FSW-B28 | 1313.1645.02 | yes | user-retrofittable |
| 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 | 1325.4850.04 | yes | contact service center |
| 320 MHz Analysis Bandwidth | R&S®FSW-B320 | 1325.4867.04 | yes | contact service center |
| 512 MHz Analysis Bandwidth | R&S®FSW-B512 | 1313.4296.04 | yes | contact service center |
| 2 GHz Analysis Bandwidth | R&S®FSW-B2000 | 1325.4750.26 | no | for R&S®FSW26 ex-factory; for later upgrade of R&S®FSW26 instruments use R&S®FSW-U2000 |
| 2 GHz Analysis Bandwidth | R&S®FSW-B2000 | 1325.4750.02 | yes | for R&S®FSW43/50/67/85; contact service center |
| 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 | 1313.1651.85 | 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 |
| Real-Time Spectrum Analyzer 160 MHz, POI ≤ 15 µs | R&S®FSW-B160R | 1325.4850.06 | yes | contact service center; includes 160 MHz analysis bandwidth; no export license required |
| Real-Time Spectrum Analyzer 512 MHz POI ≤ 15 µs | R&S®FSW-B512R | 1313.4296.06 | yes | contact service center includes 512 MHz analysis bandwidth; export license required |

Firmware

| Designation | Type | Order No. | Retro-fittable | Remarks |
|--|----------------|--------------|----------------|---|
| Pulse Measurements | R&S®FSW-K6 | 1313.1322.02 | | |
| Time Side Lobe Measurement | R&S®FSW-K6S | 1325.3738.02 | | R&S®FSW-K6 option required |
| Analog Modulation Analysis for AM/FM/φM | R&S®FSW-K7 | 1313.1339.02 | | |
| GSM/EDGE/EDGE Evolution/ VAMOS Measurements | 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 | | |
| Amplifier Measurements | R&S®FSW-K18 | 1325.2170.02 | | |
| Noise Figure Measurements | R&S®FSW-K30 | 1313.1380.02 | | |
| Security Write Protection of solid state drive | R&S®FSW-K33 | 1322.7936.02 | | |
| Phase Noise Measurements | R&S®FSW-K40 | 1313.1397.02 | | |
| EMI Measurements | R&S®FSW-K54 | 1313.1400.02 | | |
| 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 |
| Vector Signal Analysis | R&S®FSW-K70 | 1313.1416.02 | | |
| 3GPP FDD (WCDMA) BS Measurements (incl. HSDPA and HSDPA+) | R&S®FSW-K72 | 1313.1422.02 | | |
| 3GPP FDD (WCDMA) MS Measurements (incl. HSUPA and HSUPA+) | 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 | R&S®FSW-K91 | 1313.1500.02 | | To support signal analysis bandwidths > 10 MHz, one of the R&S®FSW-B28/-B40/-B80/-B160/-B320/-B512 options is needed. ³⁹ |
| WLAN 802.11n Measurements | R&S®FSW-K91N | 1313.1516.02 | | R&S®FSW-K91 required; |
| WLAN 802.11ac Measurements | R&S®FSW-K91AC | 1313.4209.02 | | to support signal analysis |
| WLAN 802.11p Measurements | R&S®FSW-K91P | 1321.5646.02 | | bandwidths > 10 MHz, one of the R&S®FSW-B28/-B40/-B80/-B160/-B320/-B512 options is needed ³⁹ |
| WLAN 802.11ad Measurements | R&S®FSW-K95 | 1313.1639.02 | | R&S®FSW-B2000 option required |
| EUTRA/LTE FDD BS Measurements | R&S®FSW-K100 | 1313.1545.02 | | To support signal analysis |
| EUTRA/LTE TDD UE Measurements | R&S®FSW-K101 | 1313.1551.02 | | bandwidths > 10 MHz, one of the |
| EUTRA/LTE BS MIMO Measurements | R&S®FSW-K102 | 1313.1568.02 | | R&S®FSW-B28/-B40/-B80/ |
| EUTRA/LTE UL Advanced UL Measurements | R&S®FSW-K103 | 1313.2478.02 | | -B160/-B320/-B512 options is needed. |
| EUTRA/LTE TDD BS Measurements | R&S®FSW-K104 | 1313.1574.02 | | |
| EUTRA/LTE TDD Uplink Measurements | R&S®FSW-K105 | 1313.1580.02 | | |
| DOCSIS 3.1 OFDM Downstream | R&S®FSW-K192 | 1325.4138.02 | | R&S®FSW-B320 option required |
| DOCSIS 3.1 OFDMA Upstream | R&S®FSW-K193 | 1325.4144.02 | | R&S®FSW-B320 option required |
| 160 MHz Real-Time Measurement Application, POI > 15 μs | R&S®FSW-K160RE | 1313.7766.02 | | one of the R&S®FSW-B160/-B320 options is required; not available for R&S®FSW-B512; no export license required |

³⁹ Signal analysis bandwidth is limited to 80 MHz if R&S®FSW-B512 is installed.

PC software

| Designation | Type | Order No. | Retro-fittable | Remarks |
|--|---------------|--------------|----------------|--|
| OFDM Vector Signal Analysis Software | R&S®FS-K96 | 1310.0202.02 | | spectrum analyzer required |
| OFDM Vector Signal Analysis Software | R&S®FS-K96PC | 1310.0219.02 | | usable with or without spectrum analyzer |
| EUTRA/LTE FDD Downlink PC Software | R&S®FS-K100PC | 1309.9916.02 | | |
| EUTRA/LTE Uplink FDD PC Software | R&S®FS-K101PC | 1309.9922.02 | | |
| EUTRA/LTE Downlink MIMO PC Software (incl. LTE-Advanced) | R&S®FS-K102PC | 1309.9939.02 | | |
| EUTRA/LTE Uplink MIMO PC Software (incl. LTE-Advanced) | R&S®FS-K103PC | 1309.9945.02 | | |
| EUTRA/LTE TDD Downlink PC Software | R&S®FS-K104PC | 1309.9951.02 | | |
| EUTRA/LTE TDD Uplink PC Software | R&S®FS-K105PC | 1309.9968.02 | | |
| Distortion Analysis PC Software | R&S®FS-K130PC | 1310.0090.02 | | |

Upgrades

| Designation | Type | Order No. | Retro-fittable | Remarks |
|---|---------------|--------------|----------------|--|
| LO/IF Connections for external mixers | R&S®FSW-U21 | 1313.6318.26 | yes | for R&S®FSW26; contact service center |
| Analysis Bandwidth Upgrade from 28 MHz to 40 MHz | R&S®FSW-U40 | 1313.5205.02 | yes | user-retrofitable; R&S®FSW-B28 required |
| Analysis Bandwidth Upgrade from 40 MHz to 80 MHz | R&S®FSW-U80 | 1313.5211.02 | yes | user-retrofitable; R&S®FSW-B40 or R&S®FSW-U40 required |
| Analysis Bandwidth Upgrade from 80 MHz to 160 MHz | R&S®FSW-U160 | 1325.5357.04 | 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-retrofitable; R&S®FSW-B160 or R&S®FSW-U160 or R&S®FSW-B160R or R&S®FSW-U160R required |
| Real-Time Spectrum Analyzer, 160 MHz, POI ≤ 15 µs | R&S®FSW-U160R | 1325.5357.06 | yes | contact service center; R&S®FSW-B80 or R&S®FSW-U80 required; includes analysis bandwidth upgrade from 80 MHz to 160 MHz; no export license required |
| Upgrade Real-Time Spectrum Analyzer 512 MHz POI ≤ 15 µs | R&S®FSW-U512R | 1321.6320.06 | yes | contact service center includes 512 MHz analysis bandwidth; R&S®FSW-B80 or R&S®FSW-U80 required export license required |
| Upgrade to 2 GHz Signal Analysis Bandwidth | R&S®FSW-U2000 | 1325.5405.26 | yes | for R&S®FSW26; contact service center |
| Upgrade to 2 GHz Signal Analysis Bandwidth | R&S®FSW-U2000 | 1325.5405.50 | yes | for R&S®FSW50 with serial number < 103080; contact service center |
| Upgrade to 2 GHz Signal Analysis Bandwidth | R&S®FSW-U2000 | 1325.5405.67 | yes | for R&S®FSW67 with serial number < 103205; contact service center |

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 |
| 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, 3/6/10/20/30 dB, 2 GHz | R&S®RBU50 | 1073.8695.xx (xx = 03/06/10/20/30) |
| 50 W, 20 dB, 6 GHz | R&S®RDL50 | 1035.1700.52 |
| Connectors and cables | | |
| Probe power connector, 3-pin | | 1065.9480.00 |
| N-Type Adapter for R&S®RT-Zxx oscilloscope probes | R&S®RT-ZA9 | 1417.0909.02 |
| Cable for connecting digital baseband interfaces of Rohde & Schwarz instruments (accessory for R&S®FSW-B17) | R&S®SMU-Z6 | 1415.0201.02 |
| DC blocks | | |
| DC Block, 10 kHz to 18 GHz (N type) | R&S®FSE-Z4 | 1084.7443.02 |
| 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 | R&S®FS-Z60 | 1089.0799.02 |
| Harmonic Mixer, 50 GHz to 75 GHz | R&S®FS-Z75 | 1048.0271.02 |
| Harmonic Mixer, 60 GHz to 90 GHz | R&S®FS-Z90 | 1048.0371.02 |
| Harmonic Mixer, 75 GHz to 110 GHz | R&S®FS-Z110 | 1048.0471.02 |
| Harmonic Mixer, 90 GHz to 140 GHz | RPG FS-Z140 ⁴⁰ | 3622.0708.02 |
| Harmonic Mixer, 110 GHz to 170 GHz | RPG FS-Z170 ⁴⁰ | 3622.0714.02 |
| Harmonic Mixer, 140 GHz to 220 GHz | RPG FS-Z220 ⁴⁰ | 3593.3250.02 |
| Harmonic Mixer, 220 GHz to 325 GHz | RPG FS-Z325 ⁴⁰ | 3593.3267.02 |
| Harmonic Mixer, 325 GHz to 500 GHz | RPG FS-Z500 ⁴⁰ | 3593.3273.02 |
| 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 |

⁴⁰ RPG is the abbreviation of Radiometer Physics GmbH, a Rohde & Schwarz company.

Power sensors supported ⁴¹

| Designation | Type | Order No. |
|---|--------------|--------------|
| Universal power sensors | | |
| 10 MHz to 8 GHz, 100 mW, 2-path | R&S®NRP-Z211 | 1417.0409.02 |
| 10 MHz to 8 GHz, 200 mW | R&S®NRP-Z11 | 1138.3004.02 |
| 10 MHz to 18 GHz, 100 mW, 2-path | R&S®NRP-Z221 | 1417.0309.02 |
| 10 MHz to 18 GHz, 200 mW | R&S®NRP-Z21 | 1137.6000.02 |
| 10 MHz to 18 GHz, 2 W | R&S®NRP-Z22 | 1137.7506.02 |
| 10 MHz to 18 GHz, 15 W | R&S®NRP-Z23 | 1137.8002.02 |
| 10 MHz to 18 GHz, 30 W | R&S®NRP-Z24 | 1137.8502.02 |
| Power sensor modules with power splitter | | |
| DC to 18 GHz, 500 mW | R&S®NRP-Z27 | 1169.4102.02 |
| DC to 26.5 GHz, 500 mW | R&S®NRP-Z37 | 1169.3206.02 |
| Thermal power sensors | | |
| 0 Hz to 18 GHz, 100 mW | R&S®NRP-Z51 | 1138.0005.02 |
| 0 Hz to 40 GHz, 100 mW | R&S®NRP-Z55 | 1138.2008.02 |
| 0 Hz to 50 GHz, 100 mW | R&S®NRP-Z56 | 1171.8201.02 |
| 0 Hz to 67 GHz, 100 mW | R&S®NRP-Z57 | 1171.8401.02 |
| 0 Hz to 110 GHz, 100 mW | R&S®NRP-Z58 | 1173.7031.02 |
| Average power sensors | | |
| 9 kHz to 6 GHz, 200 mW | R&S®NRP-Z91 | 1168.8004.02 |
| 9 kHz to 6 GHz, 2 W | R&S®NRP-Z92 | 1171.7005.02 |
| Three path diode power sensors | | |
| 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 |
| 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 |
| Wideband power sensors | | |
| 50 MHz to 18 GHz, 100 mW | R&S®NRP-Z81 | 1137.9009.02 |

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

| Designation | Type | Order No. |
|--|--------------|--------------|
| 1.0 GHz, active, 1 M Ω , 0.8 pF | R&S®RT-ZS10E | 1418.7007.02 |
| 1.0 GHz, active, 1 M Ω , 0.8 pF, micro button | R&S®RT-ZS10 | 1410.4080.02 |
| 1.5 GHz, active, 1 M Ω , 0.8 pF, micro button | R&S®RT-ZS20 | 1410.3502.02 |
| 3.0 GHz, active, 1 M Ω , 0.8 pF, micro button | R&S®RT-ZS30 | 1410.4309.02 |
| 6.0 GHz, active, 1 M Ω , 0.3 pF, micro button | R&S®RT-ZS60 | 1418.7307.02 |
| 1.5 GHz, active, differential, 1 M Ω , 0.6 pF, micro button | R&S®RT-ZD20 | 1410.4409.02 |
| 3.0 GHz, active, differential, 1 M Ω , 0.6 pF, micro button | R&S®RT-ZD30 | 1410.4609.02 |
| 4.5 GHz, active, differential, 1 M Ω , 0.4 pF, micro button | R&S®RT-ZD40 | 1410.5205.02 |

⁴¹ For average power measurement only.

Oscilloscopes supported by R&S®FSW-B2000 option

| Designation | Type | Order No. |
|--|--------------|--------------|
| Digital Oscilloscope, 4 GHz, 20 Gsample/s, 20/80 Msample, 4 channels | R&S®RTO1044 | 1316.1000.44 |
| 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 |

| Designation | Type | Order No. |
|--|--------------|--------------|
| Digital Oscilloscope, 4 GHz, 20 Gsample/s, 20/80 Msample, 4 channels | R&S®RTO2044 | 1329.7002.44 |
| 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 |

Service options

| Service options | | |
|--|---------|---|
| Extended Warranty, one year | R&S®WE1 | Please contact your local Rohde & Schwarz sales office. |
| Extended Warranty, two years | R&S®WE2 | |
| Extended Warranty with Calibration Coverage, one year | R&S®CW1 | |
| Extended Warranty with Calibration Coverage, two years | R&S®CW2 | |

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

Repairs carried out during the contract term are free of charge ⁴². Necessary calibration and adjustments carried out during repairs are also covered.

Extended warranty with calibration coverage (CW1 and CW2)

Enhance your extended warranty by adding calibration coverage at a package price. This package ensures that your Rohde & Schwarz product is regularly calibrated, inspected and maintained during the term of the contract. It includes all repairs ⁴² and calibration at the recommended intervals as well as any calibration carried out during repairs or option upgrades.

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⁴² Excluding defects caused by incorrect operation or handling and force majeure. Wear-and-tear parts are not included.

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- ▮ Local and personalized
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- ▮ Uncompromising quality
- ▮ Long-term dependability

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R&S®FSW Signal and Spectrum Analyzer

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