

R&S® FSV3000 SIGNAL AND SPECTRUM ANALYZER

Specifications



Specifications
Version 14.01

ROHDE & SCHWARZ

Make ideas real



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Definitions

General

Product data applies under the following conditions:

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

Specifications with limits

Represent warranted product performance by means of a range of values for the specified parameter. These specifications are marked with limiting symbols such as $<$, \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.



Non-traceable specifications with limits (n. trc.)

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

Specifications without limits

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

Typical data (typ.)

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

Nominal values (nom.)

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

Measured values (meas.)

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

Uncertainties

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

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

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

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

Specifications

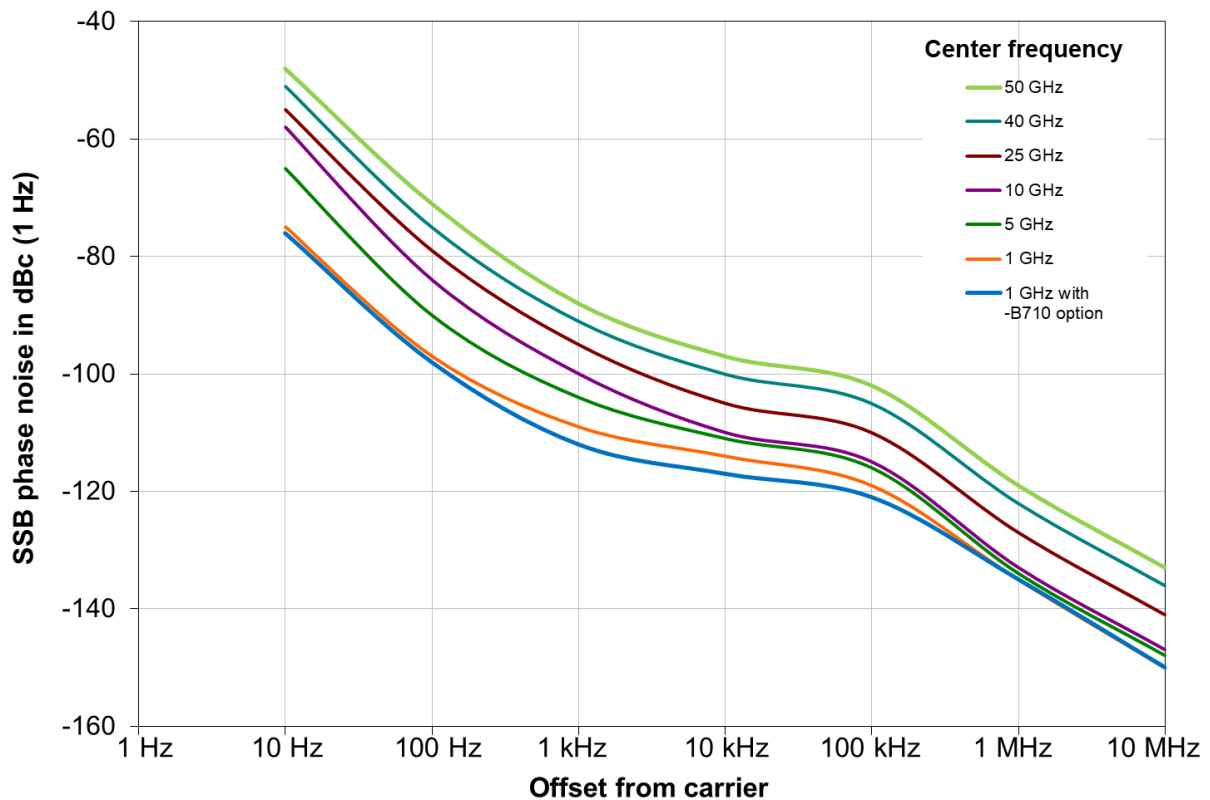
Frequency

| | | |
|-----------------------------|------------------|--------------------|
| Frequency range | R&S®FSV3004 | |
| | DC coupled | 10 Hz to 4 GHz |
| | AC coupled | 10 MHz to 4 GHz |
| | R&S®FSV3007 | |
| | DC coupled | 10 Hz to 7.5 GHz |
| | AC coupled | 10 MHz to 7.5 GHz |
| | R&S®FSV3013 | |
| | DC coupled | 10 Hz to 13.6 GHz |
| | AC coupled | 10 MHz to 13.6 GHz |
| | R&S®FSV3030 | |
| | DC coupled | 10 Hz to 30 GHz |
| | AC coupled | 10 MHz to 30 GHz |
| | R&S®FSV3044 | |
| | DC coupled | 10 Hz to 44 GHz |
| AC coupled | 10 MHz to 44 GHz | |
| R&S®FSV3050 | | |
| DC coupled | 10 Hz to 50 GHz | |
| AC coupled | 10 MHz to 50 GHz | |
| Frequency resolution | | 0.01 Hz |

| | | |
|---|---|---|
| Reference frequency, internal | | |
| Accuracy | | (time since last adjustment × aging rate) + temperature drift + calibration accuracy |
| Aging per year | standard | 1×10^{-6} |
| | with R&S®FSV3-B4 OCXO reference frequency option | 1×10^{-7} |
| Temperature drift (0 °C to +50 °C) | standard | 1×10^{-6} |
| | with R&S®FSV3-B4 OCXO reference frequency option | 1×10^{-8} |
| Achievable initial calibration accuracy | standard | 5×10^{-7} |
| | with R&S®FSV3-B4 OCXO reference frequency option | 5×10^{-8} |

| | | |
|-----------------------------------|--|--|
| Frequency readout | | |
| Marker resolution | | 1 Hz |
| Uncertainty | | \pm (marker frequency × reference accuracy + 10 % × resolution bandwidth + $\frac{1}{2}$ (span / (sweep points - 1)) + 1 Hz) |
| Number of sweep (trace) points | default value | 1001 |
| | range | 101 to 100001 |
| | range with active EMI measurements (R&S®FSV3-K54 option required) | 101 to 200001 |
| Marker tuning frequency step size | marker step size = sweep points | span / (sweep points - 1) |
| | marker step size = standard | span / (default sweep points - 1) |
| Frequency counter resolution | | 0.001 Hz |
| Count accuracy | | \pm (frequency × reference accuracy + $\frac{1}{2}$ (last digit)) |
| Display range for frequency axis | | 0 Hz to max. frequency |
| Resolution | | 0.1 Hz |

| Spectral purity | | |
|---|---|-----------------------|
| SSB phase noise (1 Hz), without R&S®FSV3-B710 option | frequency = 1 GHz, carrier offset | |
| | 100 Hz | < -91 dBc |
| | 1 kHz | < -101 dBc |
| | 10 kHz | < -107 dBc |
| | 100 kHz | < -115 dBc |
| | 1 MHz | < -135 dBc |
| | 10 MHz | -150 dBc (nom.) |
| SSB phase noise (1 Hz), with R&S®FSV3-B710 option | frequency = 1 GHz, carrier offset | |
| | 100 Hz | < -93 dBc |
| | 1 kHz | < -109 dBc |
| | 10 kHz | < -114 dBc |
| | 100 kHz | < -119 dBc |
| | 1 MHz | < -135 dBc |
| | 10 MHz | -150 dBc (nom.) |
| Residual FM | frequency = 1000 MHz, demodulation bandwidth = 25 kHz, AF highpass filter 50 Hz, AF lowpass filter 3 kHz | < 0.5 Hz (RMS) (nom.) |



Typical phase noise at different center frequencies

Sweep time

| | | |
|---------------------|--------------------------|-------------------------------------|
| Sweep time range | span = 0 Hz | 1 μ s to 16000 s |
| | span \geq 10 Hz, swept | 1.01 ms to 16000 s ¹ |
| | span \geq 10 Hz, FFT | 0.7 μ s to 16000 s ² |
| Sweep time accuracy | span = 0 Hz | \pm 0.1 % (nom.) |
| | span \geq 10 Hz, swept | \pm 3 % (nom.) |

Resolution bandwidths

| | | |
|--|---------------------------------------|--|
| Sweep filters and FFT filters³ | | |
| Resolution bandwidths (-3 dB) | standard | 1 Hz to 10 MHz in 1/2/3/5 sequence, additionally: 51 kHz, 150 kHz, 250 kHz, 400 kHz, 450 kHz, 6 MHz, 8 MHz |
| | with R&S®FSV3-B8E option ⁴ | 20 MHz, 28 MHz, 30 MHz, 40 MHz additionally |
| Bandwidth uncertainty | | < 3 % (nom.) |
| Shape factor 60 dB:3 dB | | < 5 (nom.) |

| | | |
|-------------------------|--|---|
| Channel filters | | |
| Bandwidths (-3 dB) | standard (RRC = root raised cosine) | 100 Hz, 200 Hz, 300 Hz, 500 Hz 1, 1.5, 2, 2.4, 2.7, 3, 3.4, 4, 4.5, 5, 6, 8.5, 9, 10, 12.5, 14, 15, 16, 18 (RRC), 20, 21, 24.3 (RRC), 25, 30, 50, 100, 150, 192, 200, 300, 500 kHz |
| | with R&S®FSV3-B8E option | 1, 1.228, 1.28 (RRC), 1.5, 2, 3, 3.84 (RRC), 4.096 (RRC), 5, 10 MHz 20 MHz, 28 MHz, 40 MHz additionally |
| Bandwidth uncertainty | | < 2 % (nom.) |
| Shape factor 60 dB:3 dB | | < 2 (nom.) |

| | | |
|---|--|--|
| EMI filters (with R&S®FSV3-K54 only) | | |
| Bandwidths (-6 dB) | | 10 Hz, 100 Hz, 200 Hz, 1 kHz, 9 kHz, 10 kHz, 100 kHz, 120 kHz, 1 MHz |
| Bandwidth uncertainty | | < 3 % (nom.) |
| Shape factor 60 dB:6 dB | | < 4 (nom.) |

| | | |
|-------------------------|--|------------------------------------|
| Video bandwidths | | 1 Hz to 10 MHz in 1/2/3/5 sequence |
|-------------------------|--|------------------------------------|

Signal analysis bandwidths

| | | |
|--|---|----------------|
| Maximum signal analysis bandwidth | f \leq 7.5 GHz | |
| | standard | 28 MHz (nom.) |
| | with R&S®FSV3-B40 option | 40 MHz (nom.) |
| | with R&S®FSV3-B200 option | 200 MHz (nom.) |
| | f > 7.5 GHz, with R&S®FSV3-B11 option and YIG preselector off | |
| | standard | 28 MHz (nom.) |
| | with R&S®FSV3-B40 option | 40 MHz (nom.) |
| | with R&S®FSV3-B200 option | 200 MHz (nom.) |

¹ The selected sweep time is the net data acquisition time (without the extra time needed for hardware settling or FFT processing).

² Time for data acquisition for FFT calculation.

³ Resolution bandwidths > 3 MHz are available in sweep mode only.

⁴ Gaussian shape for RBW \leq 28 MHz.

Level

| Level display | | |
|----------------------------------|---------------------------|---|
| Display range | | displayed noise floor up to +30 dBm |
| Logarithmic level axis | | 1 dB to 200 dB |
| 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 |
| Trace functions | | clear/write, max. hold, min. hold, average, view, spectrogram |
| 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, dB μ V, dBmV, dB μ A, dBpW |
| | linear level display | μ V, mV, μ A, mA, pW, nW |

| Maximum input level ⁵ | | |
|--|---|-------------------|
| DC voltage | AC coupled | 50 V |
| | DC coupled | 0 V |
| CW RF power | RF attenuation = 0 dB | |
| | RF preamplifier = off | 20 dBm (= 0.1 W) |
| | with R&S [®] FVS3-B24 option, RF preamplifier = on | 13 dBm (= 0.02 W) |
| | RF attenuation \geq 10 dB | |
| | RF preamplifier = off | 30 dBm (= 1 W) |
| | with R&S [®] FVS3-B24 option, RF preamplifier = on | 23 dBm (= 0.2 W) |
| Maximum pulse power, pulse duration $\tau = 3 \mu$ s | RF attenuation \geq 10 dB | 100 W |
| Maximum pulse voltage | RF attenuation \geq 10 dB | 50 V |

| Intermodulation | | |
|--|---|-----------------------|
| 1 dB compression of input mixer | RF attenuation = 0 dB, RF preamplifier = off | |
| | $f \leq 7.5$ GHz | +10 dBm (nom.) |
| | $f > 7.5$ GHz | +5 dBm (nom.) |
| | with R&S [®] FVS3-B24 option, RF preamplifier = 30 dB, RF attenuation = 0 dB | |
| | $f \leq 7.5$ GHz | -20 dBm (nom.) |
| | $f > 7.5$ GHz | -23 dBm (nom.) |
| Third order intercept point (TOI) | RF attenuation = 0 dB, RF preamplifier = off, YIG preselector on for $f > 7.5$ GHz, level = -15 dBm (both), $\Delta f > 5 \times$ RBW or 10 kHz, whichever is larger | |
| | R&S [®] FVS3004, R&S [®] FVS3007 | |
| | $10 \text{ MHz} \leq f_{in} < 100 \text{ MHz}$ | > 12 dBm, typ. 15 dBm |
| | $100 \text{ MHz} \leq f_{in} \leq 7.5 \text{ GHz}$ | > 15 dBm, typ. 18 dBm |
| | R&S [®] FVS3013, R&S [®] FVS3030, R&S [®] FVS3044, R&S [®] FVS3050, YIG preselector on for $f > 7.5$ GHz | |
| | $10 \text{ MHz} \leq f_{in} \leq 16 \text{ GHz}$ | > 15 dBm, typ. 18 dBm |
| | $16 \text{ GHz} < f_{in} \leq 20 \text{ GHz}$ | > 14 dBm, typ. 18 dBm |
| | $20 \text{ GHz} < f_{in} \leq 24 \text{ GHz}$ | > 12 dBm, typ. 15 dBm |
| | $24 \text{ GHz} < f_{in} \leq 30 \text{ GHz}$ | > 15 dBm, typ. 15 dBm |
| | $30 \text{ GHz} < f_{in} \leq 44 \text{ GHz}$ | > 12 dBm, typ. 15 dBm |
| | $44 \text{ GHz} < f_{in} \leq 50 \text{ GHz}$ | > 10 dBm, typ. 13 dBm |
| | with R&S [®] FVS3-B24 option, RF attenuation = 0 dB, RF preamplifier = 30 dB, YIG preselector on for $f > 7.5$ GHz, level = -45 dBm (both), $\Delta f > 5 \times$ RBW or 10 kHz, whichever is larger | |
| | $10 \text{ MHz} \leq f_{in} \leq 43.5 \text{ GHz}$ | -20 dBm (nom.) |
| | R&S [®] FVS3050 with R&S [®] FVS3-B24 option model .49 | |
| $43.5 \text{ GHz} < f_{in} \leq 50 \text{ GHz}$ | -20 dBm (nom.) | |
| R&S [®] FVS3050 with R&S [®] FVS3-B24 option model .50 | | |
| $43.5 \text{ GHz} < f_{in} \leq 50 \text{ GHz}$ | -20 dBm (nom.) | |

⁵ Maximum input level while instrument is in operation.

| | | |
|----------------------------------|---|---------------|
| Second harmonic intercept (SHI) | RF attenuation = 0 dB, RF preamplifier = off, YIG preselector on for $f_{in} > 3.75$ GHz, level = -10 dBm | |
| | 100 MHz < $f_{in} \leq 1.75$ GHz | 45 dBm (nom.) |
| | 1.75 GHz < $f_{in} \leq 22$ GHz | 80 dBm (nom.) |
| | R&S®FSV3050 | |
| | 22 GHz < $f_{in} \leq 25$ GHz | 80 dBm (nom.) |
| | with R&S®FSV3-B24 option, RF preamplifier = 30 dB, RF attenuation = 0 dB, YIG preselector on for $f_{in} > 3.75$ GHz, level = -40 dBm | |
| | 100 MHz < $f_{in} \leq 21.75$ GHz | 10 dBm (nom.) |
| | R&S®FSV3050 with R&S®FSV3-B24 option model .49 | |
| | 21.75 GHz < $f_{in} \leq 25$ GHz | 5 dBm (nom.) |
| | R&S®FSV3050 with R&S®FSV3-B24 option model .50 | |
| 21.75 GHz < $f_{in} \leq 25$ GHz | 10 dBm (nom.) | |

Sensitivity

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

| | | |
|---|---|-------------------------|
| Displayed average noise level without R&S®FSV3-B24 preamplifier option | | |
| | RF attenuation = 0 dB, termination = 50 Ω , normalized to 1 Hz RBW, trace average, average mode = log, sample detector, +20 °C to +30 °C | |
| | 10 Hz | -90 dBm (nom.) |
| | 20 Hz | -100 dBm, typ. -110 dBm |
| | 100 Hz | -110 dBm, typ. -120 dBm |
| | 1 kHz | -120 dBm, typ. -130 dBm |
| | RF attenuation = 0 dB, termination = 50 Ω , logarithmic scaling, normalized to 1 Hz RBW, RBW = 1 kHz, VBW = 1 Hz, +20 °C to +30 °C | |
| | R&S®FSV3004, R&S®FSV3007 | |
| | 9 kHz $\leq f < 100$ kHz | -135 dBm, typ. -140 dBm |
| | 100 kHz $\leq f < 1$ MHz | -145 dBm, typ. -150 dBm |
| | 1 MHz $\leq f \leq 7.5$ GHz | -148 dBm, typ. -151 dBm |
| | R&S®FSV3013 | |
| | 9 kHz $\leq f < 100$ kHz | -135 dBm, typ. -140 dBm |
| | 100 kHz $\leq f < 1$ MHz | -145 dBm, typ. -150 dBm |
| | 1 MHz $\leq f < 6$ GHz | -148 dBm, typ. -151 dBm |
| | 6 GHz $\leq f \leq 13.6$ GHz | -145 dBm, typ. -147 dBm |
| | R&S®FSV3030, R&S®FSV3044, R&S®FSV3050 | |
| | 9 kHz $\leq f < 100$ kHz | -135 dBm, typ. -140 dBm |
| | 100 kHz $\leq f < 1$ MHz | -145 dBm, typ. -150 dBm |
| | 1 MHz $\leq f < 1$ GHz | -151 dBm, typ. -154 dBm |
| | 1 GHz $\leq f < 3$ GHz | -149 dBm, typ. -152 dBm |
| 3 GHz $\leq f < 6$ GHz | -147 dBm, typ. -150 dBm | |
| 6 GHz $\leq f \leq 7.5$ GHz | -145 dBm, typ. -147 dBm | |
| 7.5 GHz < $f \leq 15$ GHz | -148 dBm, typ. -151 dBm | |
| 15 GHz < $f \leq 26.5$ GHz | -145 dBm, typ. -148 dBm | |
| 26.5 GHz < $f \leq 34$ GHz | -143 dBm, typ. -146 dBm | |
| 34 GHz < $f \leq 44$ GHz | -136 dBm, typ. -139 dBm | |
| 44 GHz < $f \leq 50$ GHz | -133 dBm, typ. -137 dBm | |
| Improvement with noise cancellation | for noise-like signals | |
| | 10 MHz < $f \leq 43.5$ GHz | 13 dB (nom.) |
| | $f > 43.5$ GHz | 0 dB (nom.) |

| Displayed average noise level with R&S®FSV3-B24 preamplifier option | | |
|--|---|-------------------------|
| RF preamplifier = off | RF attenuation = 0 dB, termination = 50 Ω, normalized to 1 Hz RBW, trace average, average mode = log, sample detector, +20 °C to +30 °C | |
| | 10 Hz | -90 dBm (nom.) |
| | 20 Hz | -100 dBm, typ. -110 dBm |
| | 100 Hz | -110 dBm, typ. -120 dBm |
| | 1 kHz | -120 dBm, typ. -130 dBm |
| | RF attenuation = 0 dB, termination = 50 Ω, logarithmic scaling, normalized to 1 Hz RBW, RBW = 1 kHz, VBW = 1 Hz, +20 °C to +30 °C | |
| | R&S®FSV3004, R&S®FSV3007 | |
| | 9 kHz ≤ f < 100 kHz | -135 dBm, typ. -140 dBm |
| | 100 kHz ≤ f < 1 MHz | -145 dBm, typ. -150 dBm |
| | 1 MHz ≤ f < 3 GHz | -148 dBm, typ. -154 dBm |
| | 3 GHz ≤ f < 6 GHz | -147 dBm, typ. -150 dBm |
| | 6 GHz ≤ f ≤ 7.5 GHz | -146 dBm, typ. -148 dBm |
| | R&S®FSV3013 | |
| | 9 kHz ≤ f < 100 kHz | -135 dBm, typ. -140 dBm |
| | 100 kHz ≤ f < 1 MHz | -145 dBm, typ. -150 dBm |
| | 1 MHz ≤ f < 3 GHz | -148 dBm, typ. -154 dBm |
| | 3 GHz ≤ f < 6 GHz | -145 dBm, typ. -148 dBm |
| | 6 GHz ≤ f ≤ 7.5 GHz | -142 dBm, typ. -144 dBm |
| | 7.5 GHz < f ≤ 13.6 GHz | -145 dBm, typ. -148 dBm |
| | R&S®FSV3030, R&S®FSV3044, R&S®FSV3050 | |
| | 9 kHz ≤ f < 100 kHz | -135 dBm, typ. -140 dBm |
| | 100 kHz ≤ f < 1 MHz | -145 dBm, typ. -150 dBm |
| | 1 MHz ≤ f < 1 GHz | -150 dBm, typ. -153 dBm |
| | 1 GHz ≤ f < 3 GHz | -148 dBm, typ. -151 dBm |
| | 3 GHz ≤ f < 6 GHz | -145 dBm, typ. -148 dBm |
| | 6 GHz ≤ f ≤ 7.5 GHz | -142 dBm, typ. -144 dBm |
| | R&S®FSV3030 | |
| | 7.5 GHz < f ≤ 15 GHz | -145 dBm, typ. -148 dBm |
| | 15 GHz < f ≤ 26.5 GHz | -142 dBm, typ. -145 dBm |
| | 26.5 GHz < f ≤ 30 GHz | -141 dBm, typ. -144 dBm |
| | R&S®FSV3044, R&S®FSV3050 | |
| | 7.5 GHz < f ≤ 15 GHz | -146 dBm, typ. -149 dBm |
| | 15 GHz < f ≤ 26.5 GHz | -144 dBm, typ. -147 dBm |
| 26.5 GHz < f ≤ 34 GHz | -143 dBm, typ. -146 dBm | |
| 34 GHz < f ≤ 40 GHz | -136 dBm, typ. -139 dBm | |
| 40 GHz < f ≤ 44 GHz | -133 dBm, typ. -136 dBm | |
| 44 GHz < f ≤ 50 GHz | -130 dBm, typ. -133 dBm | |
| RF preamplifier = 30 dB | RF attenuation = 0 dB, termination = 50 Ω, logarithmic scaling, normalized to 1 Hz RBW, RBW = 1 kHz, VBW = 1 Hz, +20 °C to +30 °C, YIG preselector on | |
| | R&S®FSV3004, R&S®FSV3007, R&S®FSV3013, R&S®FSV3030 | |
| | 10 MHz ≤ f < 50 MHz | -158 dBm, typ. -162 dBm |
| | 50 MHz ≤ f < 3 GHz | -162 dBm, typ. -165 dBm |
| | 3 GHz ≤ f ≤ 13.6 GHz | -161 dBm, typ. -164 dBm |
| | 13.6 GHz < f ≤ 22 GHz | -160 dBm, typ. -163 dBm |
| | 22 GHz < f ≤ 26.5 GHz | -157 dBm, typ. -160 dBm |
| | 26.5 GHz < f ≤ 30 GHz | -155 dBm, typ. -158 dBm |
| | R&S®FSV3044 ⁶ | |
| | 10 MHz ≤ f < 3 GHz | -164 dBm |
| | 3 GHz ≤ f ≤ 7.5 GHz | -161 dBm |
| | 7.5 GHz < f ≤ 26.5 GHz | -160 dBm |
| | 26.5 GHz < f ≤ 34 GHz | -157 dBm |
| | 34 GHz < f ≤ 40 GHz | -155 dBm |
| | 40 GHz < f ≤ 43.5 GHz | -149 dBm |
| | R&S®FSV3050 with R&S®FSV3-B24 option model .49 | |
| | 10 MHz ≤ f < 2.5 GHz | -164 dBm |
| | 2.5 GHz ≤ f ≤ 7.5 GHz | -161 dBm |
| | 7.5 GHz < f ≤ 26.5 GHz | -160 dBm |
| | 26.5 GHz < f ≤ 40 GHz | -158 dBm |
| | 40 GHz < f ≤ 43.5 GHz | -149 dBm |
| 43.5 GHz < f ≤ 50 GHz | -139 dBm | |

⁶ The frequency range of the RF preamplifier for the R&S®FSV3044 is limited to 43.5 GHz.

| Displayed average noise level with R&S®FSV3-B24 preamplifier option | | |
|---|---|--------------|
| RF preamplifier = 30 dB (continued) | R&S®FSV3050 with R&S®FSV3-B24 option model .50 | |
| | 10 MHz ≤ f < 2.5 GHz | −164 dBm |
| | 2.5 GHz ≤ f ≤ 7.5 GHz | −161 dBm |
| | 7.5 GHz < f ≤ 26.5 GHz | −160 dBm |
| | 26.5 GHz < f ≤ 40 GHz | −158 dBm |
| | 40 GHz < f ≤ 44 GHz | −154 dBm |
| Improvement with noise cancellation | for noise-like signals | |
| | with R&S®FSV3-B24 option models .07/.13/.30/.44/.49 | |
| | 10 MHz < f ≤ 43.5 GHz | 13 dB (nom.) |
| | f > 43.5 GHz | 0 dB (nom.) |
| | R&S®FSV3-B24 option model .50 | |
| | 10 MHz < f ≤ 50 GHz | 13 dB (nom.) |

Spurious responses

| | | |
|--|--|---|
| Image response | YIG preselector on for f > 7.5 GHz, mixer level ≤ −10 dBm ⁷ , sweep optimization: auto or dynamic | |
| | 20 MHz ≤ f ≤ 7.5 GHz | |
| | $f_{in} - 2 \times 8796$ MHz (first IF) | < −80 dBc (nom.) |
| | $f_{in} - 2 \times 732$ MHz (second IF) | < −80 dBc |
| | $f_{in} - 2 \times 92$ MHz (third IF) | < −80 dBc |
| | 7.5 GHz < f ≤ 30 GHz | |
| | $f_{in} \pm 2 \times 732$ MHz (first IF) | < −80 dBc |
| | $f_{in} - 2 \times 92$ MHz (second IF) | < −80 dBc |
| | 30 GHz < f ≤ 46 GHz | |
| | $f_{in} \pm 2 \times 732$ MHz (first IF) | < −70 dBc |
| | $f_{in} - 2 \times 92$ MHz (second IF) | < −80 dBc |
| | 46 GHz < f ≤ 50 GHz | |
| | $f_{in} - 2 \times 6948$ MHz (first IF) | < −70 dBc (nom.) |
| | $f_{in} - 2 \times 732$ MHz (second IF) | < −70 dBc (nom.) |
| | $f_{in} - 2 \times 6948 + 2 \times 732$ MHz | < −80 dBc (nom.) |
| f_{in} = external interfering signal frequency | | |
| Intermediate frequency response | f_{in} = first IF (8796 MHz) | < −80 dBc |
| | f_{in} = second IF (732 MHz) | < −80 dBc |
| | f_{in} = third IF (92 MHz) | < −80 dBc |
| | f_{in} = external interfering signal frequency | |
| Residual spurious response | RF attenuation = 0 dB | |
| | f ≤ 1 MHz | < −90 dBm |
| | 1 MHz < f ≤ 7.5 GHz | < −103 dBm |
| | 7.5 GHz < f ≤ 50 GHz | < −100 dBm |
| | f = receive frequency | |
| Local oscillator related spurious | f < 15 GHz | |
| | 1 kHz ≤ carrier offset ≤ 10 MHz | < −70 dBc |
| | carrier offset > 10 MHz | < −80 dBc |
| | 15 GHz ≤ f ≤ 30 GHz | |
| | 1 kHz ≤ carrier offset ≤ 10 MHz | < −64 dBc |
| | carrier offset > 10 MHz | < −74 dBc |
| | 30 GHz < f ≤ 50 GHz | |
| | 1 kHz ≤ carrier offset ≤ 10 MHz | < −58 dBc |
| | carrier offset > 10 MHz | < −68 dBc |
| | f = receive frequency | |
| Vibrational environmental stimuli | max. 0.21 g (RMS) | < −60 dBc + 20 log (f_{in}/GHz) (nom.) |

⁷ 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 | |
| | +20 °C to +30 °C | < 0.2 dB ($\sigma = 0.07$ dB) |
| | 0 °C to +50 °C | < 0.35 dB ($\sigma = 0.12$ dB) |
| Frequency response referenced to 64 MHz | RF attenuation = 10 dB, 20 dB, 30 dB, 40 dB, RF preamplifier = off, electronic attenuator off, +20 °C to +30 °C | |
| | 9 kHz $\leq f < 10$ MHz | < 0.5 dB ($\sigma = 0.17$ dB) |
| | 10 MHz $\leq f < 3.6$ GHz | < 0.3 dB ($\sigma = 0.10$ dB) |
| | 3.6 GHz $\leq f \leq 7.5$ GHz | < 0.5 dB ($\sigma = 0.17$ dB) |
| | 7.5 GHz $< f \leq 13.6$ GHz, span < 1 GHz | < 1.5 dB ($\sigma = 0.5$ dB) |
| | 13.6 GHz $< f \leq 30$ GHz, span < 1 GHz | < 2.0 dB ($\sigma = 0.66$ dB) |
| | 30 GHz $< f \leq 43.5$ GHz, span < 1 GHz | < 2.5 dB ($\sigma = 0.83$ dB) |
| | 43.5 GHz $< f \leq 50$ GHz, span < 1 GHz | < 3.5 dB ($\sigma = 1.16$ dB) |
| | any setting of RF attenuation, RF preamplifier = off, 0 °C to +50 °C | |
| | 9 kHz $\leq f < 3.6$ GHz | < 1.0 dB ($\sigma = 0.33$ dB) |
| | 3.6 GHz $\leq f \leq 7.5$ GHz | < 1.5 dB ($\sigma = 0.5$ dB) |
| | 7.5 GHz $< f \leq 13.6$ GHz | < 2.5 dB ($\sigma = 0.83$ dB) |
| | 13.6 GHz $< f \leq 30$ GHz | < 3.0 dB ($\sigma = 1.0$ dB) |
| | 30 GHz $< f \leq 43.5$ GHz | < 3.5 dB ($\sigma = 1.17$ dB) |
| | 43.5 GHz $< f \leq 50$ GHz | < 4 dB (nom.) |
| | RF attenuation ≤ 10 dB, RF preamplifier = on ⁶ , 0 °C to +50 °C | |
| | 10 MHz $\leq f < 3.6$ GHz | < 1.0 dB ($\sigma = 0.33$ dB) |
| | 3.6 GHz $\leq f \leq 7.5$ GHz | < 1.5 dB ($\sigma = 0.5$ dB) |
| | 7.5 GHz $< f \leq 13.6$ GHz | < 3.0 dB ($\sigma = 1.0$ dB) |
| | 13.6 GHz $< f \leq 30$ GHz | < 3.5 dB ($\sigma = 1.17$ dB) |
| 30 GHz $< f \leq 43.5$ GHz | < 4.0 dB ($\sigma = 1.17$ dB) | |
| 43.5 GHz $< f \leq 50$ GHz | < 4.5 dB (nom.) | |
| DC coupling, RF preamplifier = off, 0 °C to +50 °C | | |
| 10 Hz $\leq f < 20$ Hz | < 1.5 dB (nom.) | |
| 20 Hz $\leq f < 9$ kHz | < 1.0 dB ($\sigma = 0.33$ dB) | |
| Attenuator switching uncertainty | f = 64 MHz, 0 dB to 70 dB, referenced to RF attenuation = 10 dB | < 0.2 dB ($\sigma = 0.07$ dB) |
| Uncertainty of reference level setting | | 0 dB ⁸ |
| Bandwidth switching uncertainty at center frequency | referenced to RBW = 10 kHz | < 0.1 dB ($\sigma = 0.04$ dB) |

Nonlinearity of displayed level

| | | |
|---------------------------|--|---------------------------------|
| Logarithmic level display | S/N > 16 dB, 0 dB \geq level \geq –70 dB | < 0.12 dB ($\sigma = 0.04$ dB) |
| Linear level display | S/N > 16 dB, 0 dB to –70 dB | 5 % of reference level |

Total measurement uncertainty

| | | |
|--|--|---------|
| | signal level 0 dB to –70 dB below reference level, S/N > 20 dB, sweep time auto, sweep type = sweep, RF attenuation = 10 dB, 20 dB, 30 dB, 40 dB, RF preamplifier = off, span/RBW < 100, 95 % confidence level, +20 °C to +30 °C | |
| | 9 kHz $\leq f < 10$ MHz | 0.39 dB |
| | 10 MHz $\leq f < 3.6$ GHz | 0.29 dB |
| | 3.6 GHz $\leq f \leq 7.5$ GHz | 0.39 dB |
| | 7.5 GHz $< f \leq 13.6$ GHz | 1.00 dB |
| | 13.6 GHz $< f \leq 30$ GHz | 1.32 dB |
| | 30 GHz $< f \leq 43.5$ GHz | 1.65 dB |
| | 43.5 GHz $< f \leq 50$ GHz | 1.97 dB |

⁸ The setting of the reference level affects only the graphical representation of the measurement result on the display, not the measurement itself. Therefore, the reference level setting causes no additional uncertainty in measurement results.

Trigger functions

| Trigger | | |
|---|---|--|
| Trigger source | spectrum analysis | free run, video, external, IF power, RF power, periodic time |
| | I/Q analysis or modulation analysis | free run, external, IF power, RF power, periodic time, I/Q power |
| Trigger offset | spectrum analysis | |
| | span \geq 10 Hz | 0 s to 30 s |
| | span = 0 Hz | (–sweep time) to 30 s |
| | I/Q analysis or modulation analysis | –16 s to 16 s, limited by maximum number of pretrigger samples |
| Trigger resolution | spectrum analysis, trigger source external or IF power | |
| | span \geq 10 Hz | 7.81 ns (nom.) |
| | span = 0 Hz, trigger offset \geq 0 | 7.81 ns (nom.) |
| | span = 0 Hz, trigger offset $<$ 0 | sweep time / number of sweep points |
| I/Q analysis or modulation analysis: see section I/Q data | | |
| Maximum deviation of trigger offset | | 3.91 ns (nom.) |
| RF power trigger | | |
| Sensitivity | minimum signal power | –40 dBm + RF attenuation – RF preamplifier gain (nom.) |
| | maximum signal power | 0 dBm + RF attenuation – RF preamplifier gain (nom.) |
| RF power trigger frequency range | $500 \text{ MHz} \leq f \leq 7.5 \text{ GHz}$ | $f_{\text{center}} \pm 250 \text{ MHz}$ (nom.) ⁹ |
| | $f > 7.5 \text{ GHz}$ | $f_{\text{center}} \pm 250 \text{ MHz}$ (nom.) |
| IF power trigger | | |
| Sensitivity | minimum signal power | –60 dBm + RF attenuation – RF preamplifier gain (nom.) |
| | maximum signal power | 0 dBm + RF attenuation – RF preamplifier gain (nom.) |
| IF power trigger bandwidth | spectrum analysis | |
| | RBW $>$ 1 kHz | 40 MHz (nom.) |
| | RBW \leq 1 kHz | 6 MHz (nom.) |
| | I/Q analysis or modulation analysis: see section I/Q data | |
| Gated sweep (FFT or sweep mode) | | |
| Gate source | | external, RF power, IF power, video |
| Gate delay | | 7.81 ns to 30 s (nom.) |
| Gate length | | 7.81 ns to 30 s (nom.) |
| Maximum deviation of gate length | | 7.81 ns (nom.) |

⁹ For R&S®FSV3004, R&S®FSV3007, R&S®FSV3013, R&S®FSV3030, R&S®FSV3044 with frontend model .02: –100 MHz to +150 MHz.

I/Q data

| | | |
|---|---------------------------|--------------------------------------|
| Record length | standard | max. 100 Msample I and Q |
| | with R&S®FSV3-B114 option | max. 800 Msample I and Q |
| Maximum number of pretrigger samples | standard | 100 Msample I and Q |
| | with R&S®FSV3-B114 option | 200 Msample I and Q |
| Word length of I/Q samples | | 32 bit for I and 32 bit for Q |
| I/Q file export | supported formats | *.iq.tar, *.aid, *.iqw, *.csv, *.mat |
| Sampling rate | standard | 100 Hz to 128 MHz |
| | with R&S®FSV3-B40 option | 100 Hz to 128 MHz |
| | with R&S®FSV3-B200 option | 100 Hz to 256 MHz |
| Maximum signal analysis bandwidth (equalized) | standard | 28 MHz ¹⁰ |
| | with R&S®FSV3-B40 option | 40 MHz ¹⁰ |
| | with R&S®FSV3-B200 option | 200 MHz ¹⁰ |

Signal analysis bandwidth ≤ 40 MHz¹⁰

| | | |
|--|---|---|
| Amplitude flatness | (1.25 × signal analysis bandwidth) ≤ $f_{\text{center}} \leq 7.5$ GHz | ±0.3 dB (nom.) |
| | $f_{\text{center}} > 7.5$ GHz, YIG preselector off | ±0.5 dB (nom.) |
| Deviation from linear phase | (1.25 × signal analysis bandwidth) ≤ $f_{\text{center}} \leq 7.5$ GHz | ±1° (nom.) |
| | $f_{\text{center}} > 7.5$ GHz, YIG preselector off | ±2° (nom.) |
| Nonlinearity of displayed level | | see section Nonlinearity of displayed level |
| Level measurement uncertainty at center frequency | | see section Total measurement uncertainty |
| Displayed average noise level at center frequency | | see section Displayed average noise level |
| ADC related third order intermodulation distortion | $f_{\text{center}} \geq 100$ MHz, two –30 dBm tones at input mixer within analysis bandwidth | –80 dBc (nom.) |
| Residual spurious response | RF attenuation = 0 dB, $f_{\text{center}} \geq 100$ MHz | –90 dBm (nom.) |
| Other spurious responses | | see section Spurious responses |
| IF power trigger bandwidth | | 40 MHz (nom.) |
| Trigger resolution | trigger source: external | 3.91 ns (nom.) |
| | trigger source: IF power | 7.81 ns (nom.) |

Signal analysis bandwidth 40 MHz to 200 MHz^{11, 12}

| | | |
|--|---|--|
| Amplitude flatness | RF attenuation ≥ 10 dB, RF preamplifier = off, YIG preselector off for $f > 7.5$ GHz | |
| | 150 MHz ≤ $f_{\text{center}} < 4$ GHz | ±0.5 dB (nom.) ¹³ |
| | 4 GHz ≤ $f_{\text{center}} \leq 7.5$ GHz | ±0.7 dB (nom.) ¹³ |
| | 7.5 GHz < $f_{\text{center}} \leq 26.5$ GHz | ±1.0 dB (nom.) ¹³ |
| | 26.5 GHz < $f_{\text{center}} \leq 46$ GHz | ±2.0 dB (nom.) ¹³ |
| | 46 GHz < $f_{\text{center}} \leq 50$ GHz | ±2.2 dB (nom.) ¹³ |
| Deviation from linear phase | RF attenuation ≥ 10 dB, RF preamplifier = off, YIG preselector off for $f > 7.5$ GHz | |
| | 150 MHz ≤ $f_{\text{center}} < 4$ GHz | ±2° (nom.) ¹⁴ |
| | 4 GHz ≤ $f_{\text{center}} \leq 7.5$ GHz | ±2.5° (nom.) ¹⁴ |
| | 7.5 GHz < $f_{\text{center}} \leq 26.5$ GHz | ±3° (nom.) ¹⁴ |
| | 26.5 GHz < $f_{\text{center}} \leq 46$ GHz | ±4° (nom.) ¹⁴ |
| | 46 GHz < $f_{\text{center}} \leq 50$ GHz | ±7° (nom.) ¹⁴ |
| 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 section Total measurement uncertainty |
| Displayed average noise level at center frequency | | add 5 dB (nom.) to the values in section Displayed average noise level |
| ADC related third order intermodulation distortion | $f_{\text{center}} \geq 150$ MHz, two –25 dBm tones at input mixer within analysis bandwidth | –75 dBc (nom.) |
| Residual spurious response | RF attenuation = 0 dB, $f_{\text{center}} \geq 150$ MHz | –90 dBm (nom.) |

¹⁰ For $f > 7.5$ GHz, R&S®FSV3-B11 option is required and YIG preselector = off must be set.¹¹ The specifications in this section apply for the temperature range from +20 °C to +30 °C.¹² To obtain the set analysis bandwidth, $(f_{\text{center}} + \frac{1}{2} \text{ analysis bandwidth}) \leq f_{\text{max}}$ must be met; f_{max} : maximum frequency of the instrument.¹³ With R&S®FSV3-B24 option installed, add 0.2 dB to the specifications.¹⁴ With R&S®FSV3-B24 option installed, add 1° to the specifications.

| | | |
|-------------------------------|---|--------------------------------|
| ADC related spurious response | single tone within analysis bandwidth, mixer level = -10 dBm ⁷ , reference level = signal level, $f_{\text{center}} \geq 150$ MHz | -75 dBc (nom.) |
| Other spurious responses | | see section Spurious responses |
| IF power trigger bandwidth | | 200 MHz (nom.) |
| Trigger resolution | trigger source external | 3.91 ns (nom.) |
| | trigger source IF power | 0.997 ns (nom.) |

Inputs and outputs

| RF input | | |
|---|---|--|
| Impedance | | 50 Ω |
| Connector | R&S®FSV3004, R&S®FSV3007, R&S®FSV3013 | type N, female |
| | R&S®FSV3030 | APC 3.5 mm male (compatible with SMA) |
| | R&S®FSV3044 | 2.92 mm male (compatible with SMA) |
| | R&S®FSV3050 | 1.85 mm male |
| VSWR of R&S®FSV3004, R&S®FSV3007 | RF attenuation ≥ 10 dB | |
| | 10 MHz $\leq f < 1$ GHz | < 1.2 , typ. 1.09 ¹⁵ |
| | 1 GHz $\leq f < 3.6$ GHz | < 1.5 , typ. 1.19 ¹⁵ |
| | 3.6 GHz $\leq f \leq 7.5$ GHz | < 2.0 , typ. 1.42 ¹⁵ |
| | 5 dB \leq RF attenuation ≤ 9 dB | |
| | 10 MHz $\leq f < 3.6$ GHz | < 1.5 , typ. 1.31 ¹⁵ |
| | 3.6 GHz $\leq f \leq 7.5$ GHz | < 2.0 , typ. 1.51 ¹⁵ |
| VSWR of R&S®FSV3013, R&S®FSV3030, R&S®FSV3044, R&S®FSV3050 | RF attenuation ≤ 4 dB, DC coupled | |
| | 10 MHz $\leq f < 7.5$ GHz | typ. 1.87 |
| | RF attenuation ≥ 5 dB | |
| | 10 MHz $\leq f \leq 3.5$ GHz | < 1.5 , typ. 1.3 ¹⁵ |
| | 3.5 GHz $\leq f \leq 18$ GHz | < 2.0 , typ. 1.8 ¹⁵ |
| | 18 GHz $< f \leq 26.5$ GHz | < 2.2 , typ. 2.0 ¹⁵ |
| | 26.5 GHz $< f \leq 40$ GHz | < 2.5 , typ. 2.2 ¹⁵ |
| | 40 GHz $< f \leq 50$ GHz | 2.5 (nom.) |
| | RF attenuation ≤ 4 dB, DC coupled | |
| | 10 MHz $\leq f \leq 7.5$ GHz | typ. 2.0 ¹⁵ |
| 7.5 GHz $< f \leq 26.5$ GHz | typ. 2.5 ¹⁵ | |
| 26.5 GHz $< f \leq 40$ GHz | typ. 3.0 ¹⁵ | |
| 40 GHz $< f \leq 50$ GHz | 3.0 (nom.) | |
| Setting range of RF attenuator | | 0 dB to 75 dB, in 5 dB steps ¹⁶ |
| | with R&S®FSV3-B25 option | 0 dB to 75 dB, in 1 dB steps ¹⁶ |
| Setting range of electronic RF attenuator | with R&S®FSV3-B25 option, $f \leq 7.5$ GHz | 0 dB to 25 dB, in 1 dB steps |

Probe power supply

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

Noise source control and power sensor

| | | |
|-------------------------------------|---------------------------|---|
| Connector | | 7-pin LEMOSA female, for R&S®FS-SNSxx smart noise sources and R&S®NRP-Zxx power sensors |
| | with R&S®FSV3-B28V option | BNC female, for noise source control additionally |
| Noise source control output voltage | | 0 V/28 V, switchable, max. 100 mA (nom.) |

¹⁵ Typical VSWR performance: performance expected to be met in 95 % of the cases with a confidence level of 95 %, temperature range from $+20$ °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.

¹⁶ With R&S®FSV3-B25 option: mechanical RF attenuator with 5 dB steps and electronic attenuator with 1 dB steps. The electronic attenuator is located in the signal path behind the mechanical attenuator and the RF preamplifier (R&S®FSV3-B24 option) on the RF for $f \leq 7.5$ GHz, on the IF for $f > 7.5$ GHz.

| | | |
|---|---------------------------|---|
| USB interface | standard CPU board | |
| | front panel | 3 ports, type A plug, version 2.0 |
| | rear panel | 2 ports, type A plug, version 2.0; 2 ports, type A plug, version 3.0 |
| | with R&S®FSV3-B114 option | |
| | front panel | 3 ports, type A plug, version 2.0 |
| | rear panel | 2 ports, type A plug, version 3.1 (1 × 10 Gbit/s, 1 × 5 Gbit/s) |
| | output current | 0.5 A (nom.), version 2.0, 0.9 A (nom.), version 3.0/3.1 |
| maximum sum of output current via USB ports | 2 A (nom.) | |

| | | |
|--------------------------|--|---|
| Reference input 1 | | |
| Connector | | BNC female |
| Impedance | | 50 Ω |
| Input frequency range | | 1 MHz ≤ f _{in} ≤ 100 MHz, in 1 ppm steps |
| Required level | | > 0 dBm, < 15 dBm into 50 Ω |

| | | |
|--------------------------|---------------------------|--|
| Reference input 2 | | |
| Connector | | SMA |
| Impedance | | 50 Ω |
| Input frequencies | with R&S®FSV3-K703 option | 10 MHz, 100 MHz, 128 MHz, 640 MHz, 1000 MHz, 1280 MHz |
| Required level | | > 3 dBm, < 13 dBm into 50 Ω |

| | | |
|---------------------------|--|--|
| Reference output 1 | | |
| Connector | | BNC female |
| Impedance | | 50 Ω |
| Output frequency | internal reference external reference | 10 MHz same as reference input 1 or input 2 |
| Level | | > 0 dBm (nom.) |

| | | |
|---------------------------|---------------------------|---------------|
| Reference output 2 | | |
| Connector | | SMA female |
| Impedance | | 50 Ω |
| Output frequency | with R&S®FSV3-K703 option | 640 MHz |
| Level | | 10 dBm (nom.) |

| | | |
|------------------------------------|-------------------------|--------------------------------|
| External trigger/gate input | | |
| Number of ports | | 2 × input/output, selectable |
| | with R&S®FSV3-B5 option | 1 × output additionally |
| Connector | | BNC female |
| Trigger input voltage | | 0.5 V to 3.5 V (nom.) |
| Trigger output voltage | | TTL-compatible, 0 V/5 V (nom.) |
| Input impedance | | 10 kΩ (nom.) |

| | | |
|-----------------------------|-------------------------|--|
| IEC/IEEE bus control | | |
| | | interface in line with IEC 625-2 (IEEE 488.2) |
| Command set | | SCPI 1997.0 |
| Connector | with R&S®FSV3-B5 option | 24-pin Amphenol female (GPIB) |
| Interface functions | | SH1, AH1, T6, L4, SR1, RL1, PP1, DC1, DT1, C0 |

| | | |
|----------------------|-------------------------|-----------------------|
| LAN interface | standard | 10/100/1000BASE-T |
| | with R&S®FSV3-B6 option | 10GBASE-T in addition |
| Connector | | RJ-45 |

| | | |
|-------------------------|---------------------------|--------------------------------|
| External monitor | | |
| Connectors | standard | DVI-D |
| | with R&S®FSV3-B114 option | HDMI 2.0, DisplayPort Rev. 1.3 |

General data

| | | |
|--------------------|--|------------------------------------|
| Display | | LCD TFT color display (10.1") |
| Resolution | | 1280 × 800 pixel (WXGA resolution) |
| Pixel failure rate | | $< 1 \times 10^{-5}$ |

| | | |
|---------------------|---|--|
| Data storage | | |
| Internal | | solid-state drive ≥ 50 Gbyte (nom.) |
| | with R&S®FSV3-B20 option | solid-state drive ≥ 50 Gbyte (nom.) |
| | with R&S®FSV3-B114 option and without R&S®FSV3-B20 option | solid-state drive ≥ 120 Gbyte (nom.) |
| External | | support of USB 2.0 and USB 3.0 compatible memory devices |

| | | |
|---------------------------------|-----------------------------|--|
| Environmental conditions | | |
| Temperature | operating temperature range | +0 °C to +50 °C |
| | storage temperature range | -40 °C to +70 °C |
| Climatic loading | | +40 °C at 90 % rel. humidity, without condensation, in line with EN 60068-2-30 |
| Maximum operating altitude | above sea level | 4600 m (approx. 15100 ft) |

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

| | | |
|------------|--|--|
| EMC | | in line with EMC Directive 2014/30/EU including: <ul style="list-style-type: none"> • IEC/EN 61326-1^{17, 18} • CISPR 11/EN 55011¹⁸ |
|------------|--|--|

| | | |
|---|--|---------|
| Recommended calibration interval | | 2 years |
|---|--|---------|

| | | |
|---------------------|--|--|
| Power supply | | |
| AC supply | | 100 V to 240 V, max. 3.5 A; 50 Hz to 60 Hz, 400 Hz, protection class I, in line with VDE 411 |
| Safety | | in line with EN 61010-1, IEC 61010-1, UL 61010-1, CAN/CSA-C22.2 No. 61010-1 |
| Test mark | | CE, VDE, cCSA _{US} , KC |

| | | |
|--------------------------|---------------------------------------|---|
| Power consumption | | |
| Operating | R&S®FSV3004, R&S®FSV3007 | 120 W (nom.), max. 250 W with all options |
| | R&S®FSV3013, R&S®FSV3030, R&S®FSV3044 | 170 W (nom.), max. 300 W with all options |
| | R&S®FSV3050 | 200 W (nom.), max. 330 W with all options |
| Non-operating | standby (all models) | |
| | without R&S®FSV3-B4 option | 5 W (nom.) |
| | with R&S®FSV3-B4 option | 8 W (nom.) |
| | power off (all models) | 0 W (nom.) |

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

¹⁸ Emission limits for class A equipment apply.

| Dimensions and weight | | |
|-----------------------------------|--------------------------|---|
| Dimensions (nom.) | W x H x D | 462 mm x 197 mm x 417 mm (18.15 in x 7.76 in x 16.42 in) |
| Net weight without options (nom.) | R&S®FSV3004, R&S®FSV3007 | 12.2 kg (26.9 lb) |
| | R&S®FSV3013 | 13.6 kg (30 lb) |
| | R&S®FSV3030 | 13.8 kg (30.04 lb) |
| | R&S®FSV3044 | 14.6 kg (32.2 lb) |
| | R&S®FSV3050 | 15.6 kg (34.4 lb) |

Options

R&S®FSV3-B3 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 |

| AF output | | |
|----------------------|--|-------------------------|
| Connector | | 3.5 mm mini jack |
| Output impedance | | 32 Ω |
| Open-circuit voltage | | up to 1.5 V, adjustable |

R&S®FSV3-B5 and R&S®FSV3-B5E additional interfaces

| IF output | | |
|-------------------------------------|--|--|
| Connector | | BNC female, 50 Ω |
| Bandwidth | | equal to bandwidth setting |
| IF frequency | | (50 kHz + ½ RBW) to (53 MHz – ½ RBW), selectable |
| Output level (gain versus RF input) | RF attenuation = 0 dB, RF preamplifier = off, span = 0 Hz | 0 dB (nom.) |

| Video output | | |
|---------------------|---|----------------------------|
| Connector | | BNC female, 50 Ω |
| Bandwidth | | equal to bandwidth setting |
| Output scaling | logarithmic display scale linear 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.) |

| Trigger out | | |
|--------------------|--|-------------------------|
| Connector | | BNC female |
| Output | | TTL-compatible, 0 V/5 V |

| 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.) |

| AUX control (for external generator control) | | |
|---|--|--------------------|
| AUX control | | 9-pin D-Sub female |

| GPIB interface (not available for R&S®FSV3-B5E) | | |
|---|--|------------------------|
| IEC/IEEE bus control | | 24-pin Amphenol female |

R&S®FSV3-B10 external generator control

| | | |
|--|-----------------------------|--|
| Supported signal generators | | R&S®SGS100A, R&S®SGT100A, R&S®SMA100A, R&S®SMA100B, R&S®SMB100A, R&S®SMB100B, R&S®SMBV100A, R&S®SMBV100B, R&S®SMC100A, R&S®SMCV100B, R&S®SMF100A, R&S®SMJ100A, R&S®SMM100A, R&S®SMU200A, R&S®SMW200A |
| Synchronization handshake interface | standard | LAN |
| | with R&S®FSV3-B5/B5E option | LAN, TTL |

R&S®FSV3-B21 LO/IF connections for external mixers (not available for R&S®FSV3004, R&S®FSV3007, R&S®FSV3013)

| | | |
|--------------------------|------------------|---------------------------|
| LO signal | | |
| Frequency range | | 8.05 GHz to 16.4 GHz |
| Output level | | +13 dBm to +17 dBm (nom.) |
| Accuracy of set LO level | +20 °C to +30 °C | ±1.5 dB |
| | +5 °C to +40 °C | ±3 dB |

| | | |
|-----------------------------------|---|----------------|
| IF input | | |
| Supported mixer types | | 3-port mixer |
| IF frequency | set signal analysis bandwidth | |
| | ≤ 40 MHz | 732 MHz |
| | > 40 MHz to 200 MHz | 768 MHz |
| Full-scale level | compression < 1 dB | |
| | 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 IF input connector, front panel | |
| | +20 °C to +30 °C | < 1 dB |
| | +5 °C to +40 °C | < 3 dB |

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

R&S®FSV3-B24 RF preamplifier

| | | |
|------------------|-------------|--------------------|
| Frequency | | |
| Frequency range | R&S®FSV3004 | 10 MHz to 4 GHz |
| | R&S®FSV3007 | 10 MHz to 7.5 GHz |
| | R&S®FSV3013 | 10 MHz to 13.6 GHz |
| | R&S®FSV3030 | 10 MHz to 30 GHz |
| | R&S®FSV3044 | 10 MHz to 43.5 GHz |
| | R&S®FSV3050 | 10 MHz to 50 GHz |

| | | |
|----------------------|--|---------------------------------|
| Setting range | | |
| RF preamplifier gain | R&S®FSV3004, R&S®FSV3007, R&S®FSV3013, R&S®FSV3030, R&S®FSV3044, R&S®FSV3050 | 15 dB/30 dB (nom.) (selectable) |

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

R&S®FSV3-B25 electronic attenuator

| | | |
|-------------------------------|--|------------------------------|
| Frequency range | | 10 Hz to 7.5 GHz |
| Setting range | | 0 dB to 25 dB, in 1 dB steps |
| Level measurement uncertainty | | see base unit specification |
| Displayed average noise level | | see base unit specification |

| 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 7.5 GHz | 40 dBm (nom.) |

R&S®FSV3-B271 analog baseband inputs

| Frequency | | |
|-----------------------------|----------------|---------------------|
| Frequency range (equalized) | I only, Q only | DC to 200 MHz |
| | I + jQ | -200 MHz to 200 MHz |

| Spectral purity | | |
|-----------------|------------------|------------------------|
| Phase noise | offset 1 kHz | -109 dBc (1 Hz) (nom.) |
| | offset 10 kHz | -114 dBc (1 Hz) (nom.) |
| | offset ≥ 100 kHz | -119 dBc (1 Hz) (nom.) |

| Inputs | | |
|----------------------------------|---------------------------|--|
| Connectors | I and Q | BNC female, 50 Ω (nom.); The I and Q inputs additionally support Rohde & Schwarz oscilloscope probes (see page 28). |
| | T and \bar{Q} | BNC female, 50 Ω (nom.) |
| Maximum safe input voltage | any input, sum of DC + AC | ±3 V |
| Input voltage range (full scale) | peak voltage | ±2 V, ±1 V, ±0.5 V, ±0.25 V |
| Maximum common mode input range | | -2 V to 2 V |
| Input impedance | single-ended | 50 Ω (nom.) |
| | differential | 100 Ω (nom.) |
| | common mode at DC | 150 Ω (nom.) |
| Input return loss | 0 Hz to 80 MHz | -28 dB (nom.) |
| | 80 MHz to 200 MHz | -24 dB (nom.) |

| Amplitude | | |
|-------------------------------|---|----------------|
| Absolute amplitude accuracy | $f_{\text{input}} = 1 \text{ MHz}$, input voltage = full scale - 6 dB | ±0.25 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 80 MHz | ±0.15 dB |
| | 80 MHz to 160 MHz | ±0.25 dB |
| | 160 MHz to 200 MHz | ±0.35 dB |
| Deviation from linear phase | 0 Hz to 80 MHz | ±1° (nom.) |
| | 80 MHz to 160 MHz | ±1.5° (nom.) |
| | 160 MHz to 200 MHz | ±2° (nom.) |
| Channel match (I/Q imbalance) | | |
| Amplitude match accuracy | 0 Hz to 160 MHz | ±0.10 dB (2σ) |
| | 160 MHz to 200 MHz | ±0.15 dB (2σ) |
| Phase match accuracy | 0 Hz to 80 MHz | ±0.4° (nom.) |
| | 80 MHz to 200 MHz | ±1.0° (nom.) |

| Dynamic range | | |
|--|---|---|
| Crosstalk | 0 Hz to 200 MHz | -80 dB (nom.) |
| Signal-to-noise ratio | any input range, relative to full scale | 142 dBc (1 Hz) (nom.) |
| Displayed average noise level (RMS) | 5 MHz to 200 MHz range | |
| | ±2 V peak | -128 dBm (1 Hz) (89 nV ($\sqrt{1}$ Hz)) (nom.) |
| | ±1 V peak | -134 dBm (1 Hz) (45 nV ($\sqrt{1}$ Hz)) (nom.) |
| | ±0.5 V peak | -140 dBm (1 Hz) (23 nV ($\sqrt{1}$ Hz)) (nom.) |
| | ±0.25 V peak | -146 dBm (1 Hz) (12 nV ($\sqrt{1}$ Hz)) (nom.) |
| Residual DC (I/Q offset) | relative to full scale, 50 Ω termination | -54 dB (nom.) |
| Residual response | range ± 0.25 V peak | -80 dBm (nom.), -90 dBm (typ.) |
| Spurious response | with full scale input signal | |
| | 0 Hz to 200 MHz | -70 dBc (nom.) |
| Third order intermodulation distortion | two CW signals, voltage = full scale - 6 dB (each signal) | |
| | 0 Hz to 80 MHz | -80 dBc (nom.) |
| | 80 MHz to 200 MHz, differential | -80 dBc (nom.) |
| | 80 MHz to 200 MHz, single-ended | -74 dBc (nom.) |

R&S®FSV3-K980 health and utilization monitoring service (HUMS)

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

Ordering information

| Designation | Type | Order No. |
|---|-------------|--------------|
| Signal and spectrum analyzer, 10 Hz to 4 GHz | R&S®FSV3004 | 1330.5000.04 |
| Signal and spectrum analyzer, 10 Hz to 7.5 GHz | R&S®FSV3007 | 1330.5000.07 |
| Signal and spectrum analyzer, 10 Hz to 13.6 GHz | R&S®FSV3013 | 1330.5000.13 |
| Signal and spectrum analyzer, 10 Hz to 30 GHz | R&S®FSV3030 | 1330.5000.30 |
| Signal and spectrum analyzer, 10 Hz to 44 GHz | R&S®FSV3044 | 1330.5000.43 |
| Signal and spectrum analyzer, 10 Hz to 50 GHz | R&S®FSV3050 | 1330.5000.50 |
| Accessories supplied | | |
| <ul style="list-style-type: none"> Power cable, quick start guide R&S®FSV3030: adapter 3.5 mm (APC3.5-compatible) female/female R&S®FSV3044: adapter 2.92 mm female/female R&S®FSV3050: adapter 1.85 mm female/female | | |

Options

Hardware ¹⁹

| Designation | Type | Order No. | Remarks |
|--|---------------|--------------|--|
| Side carry handles | R&S®FSV3-B1 | 1330.5700.02 | user-retrofittable |
| Audio demodulator | R&S®FSV3-B3 | 1330.3765.02 | |
| OCXO frequency reference | R&S®FSV3-B4 | 1330.3794.02 | |
| Additional interfaces | R&S®FSV3-B5 | 1330.3820.02 | GPIO, IF out, video out (2 × BNC), trigger out, AUX port, AUX control |
| Additional interfaces | R&S®FSV3-B5E | 1330.3820.03 | IF out, video out (2 × BNC), trigger out, AUX port, AUX control |
| 10 Gbit/s LAN interface | R&S®FSV3-B6 | 1330.3913.02 | for fast remote control and fast I/Q data transfer, R&S®FSV3-B114 option required |
| Resolution bandwidth up to 40 MHz | R&S®FSV3-B8E | 1346.4337.02 | the signal analysis bandwidth is defined by the R&S®FSV3-B40/R&S®FSV3-B200 options, not by the R&S®FSV3-B8E option; user-retrofittable, R&S®FSV3-B11 option is recommended in addition for frequencies > 7.5 GHz |
| External generator control | R&S®FSV3-B10 | 1330.3859.02 | LAN based, user-retrofittable (license key), R&S®FSV3-B5 is recommended for high sweep speed |
| YIG preselector bypass | R&S®FSV3-B11 | 1330.3865.02 | for R&S®FSV3013, R&S®FSV3030, R&S®FSV3044 and R&S®FSV3050, user-retrofittable (license key) |
| 40 MHz analysis bandwidth | R&S®FSV3-B40 | 1330.4103.02 | user-retrofittable (license key); R&S®FSV3-B11 option is recommended in addition for frequencies > 7.5 GHz |
| 200 MHz analysis bandwidth | R&S®FSV3-B200 | 1330.4132.02 | R&S®FSV3-B114 option required, R&S®FSV3-B11 option required in addition for frequencies > 7.5 GHz |
| Spare solid-state drive | R&S®FSV3-B18 | 1330.4003.21 | includes Windows IoT Enterprise LTSC 2021 license; R&S®FSV3-B20 option required; user-retrofittable |
| Removable hard drive | R&S®FSV3-B20 | 1330.3971.02 | at front panel |
| LO/IF connections, for external mixers | R&S®FSV3-B21 | 1330.4010.02 | includes two cables (length: 1 m) for IF and LO ports; for R&S®FSV3030, R&S®FSV3044, R&S®FSV3050 |
| RF preamplifier, for R&S®FSV3004 and R&S®FSV3007 | R&S®FSV3-B24 | 1330.4049.07 | retrofittable ²⁰ |
| RF preamplifier, for R&S®FSV3013 | R&S®FSV3-B24 | 1330.4049.13 | retrofittable ²⁰ |
| RF preamplifier, for R&S®FSV3030 | R&S®FSV3-B24 | 1330.4049.30 | retrofittable ²⁰ |
| RF preamplifier, for R&S®FSV3044 | R&S®FSV3-B24 | 1330.4049.44 | retrofittable ²⁰ |
| RF preamplifier, for R&S®FSV3050 | R&S®FSV3-B24 | 1330.4049.49 | retrofittable ²⁰ |
| RF preamplifier, for R&S®FSV3050 | R&S®FSV3-B24 | 1330.4049.50 | export license required ²⁰ |
| Electronic attenuator, 1 dB steps | R&S®FSV3-B25 | 1330.4078.02 | user-retrofittable (license key) |

¹⁹ The hardware options can be retrofitted in Rohde & Schwarz service centers unless otherwise noted.

²⁰ For retrofitting, please contact your local Rohde & Schwarz sales office.

| Designation | Type | Order No. | Remarks |
|--|---------------|--------------|--|
| Noise source control via BNC | R&S®FSV3-B28V | 1330.6664.02 | |
| Enhanced computing power | R&S®FSV3-B114 | 1330.4910.03 | not retrofittable |
| Analog baseband inputs, 2 x 200 MHz | R&S®FSV3-B271 | 1330.4190.02 | R&S®FSV3-B200 option required; supports I/Q analyzer mode and R&S®FSV3-K91, R&S®FSV3-K144, R&S®FSV3-K145 options |
| Analog baseband inputs, 2 x 200 MHz | R&S®FSV3-B271 | 1330.4190.03 | R&S®FSV3-B114 option required, not available in combination with R&S®FSV3-B200 option; supports I/Q analyzer mode and R&S®FSV3-K91, R&S®FSV3-K144, R&S®FSV3-K145 options |
| 1 GHz reference | R&S®FSV3-K703 | 1330.7502.02 | user-retrofittable (license key) |
| Enhanced performance, for R&S®FSV3004 | R&S®FSV3-B710 | 1346.4950.04 | enhanced phase noise specifications, R&S®FSV3-B114 option required, not retrofittable |
| Enhanced performance, for R&S®FSV3007 | R&S®FSV3-B710 | 1346.4950.07 | |
| Enhanced performance, for R&S®FSV3013 | R&S®FSV3-B710 | 1346.4950.13 | |
| Enhanced performance, for R&S®FSV3030 | R&S®FSV3-B710 | 1346.4950.30 | |
| Enhanced performance, for R&S®FSV3044 | R&S®FSV3-B710 | 1346.4950.43 | |
| Enhanced performance, for R&S®FSV3050 | R&S®FSV3-B710 | 1346.4950.50 | |
| Floating license smart card, with USB adapter | R&S®FSV3-FL | 1345.1957.02 | |

Firmware ²¹

| Designation | Type | Order No. | Remark |
|--|---------------|--------------|---|
| Pulse measurements | R&S®FSV3-K6 | 1346.3330.02 | |
| AM/FM/PM modulation analysis | R&S®FSV3-K7 | 1330.5022.02 | |
| Bluetooth® BR/EDR/LE measurements ²² | R&S®FSV3-K8 | 1346.5679.02 | |
| Power sensor support | R&S®FSV3-K9 | 1346.3676.02 | |
| GSM/EDGE/EDGE Evolution/ VAMOS measurements ²² | R&S®FSV3-K10 | 1330.5039.02 | |
| Amplifier measurements | R&S®FSV3-K18 | 1346.3347.02 | |
| Direct DPD measurements | R&S®FSV3-K18D | 1346.3353.02 | R&S®FSV3-K18 option required |
| Frequency response and group delay measurements | R&S®FSV3-K18F | 1346.4408.02 | R&S®FSV3-K18 option required |
| Memory-polynomial DPD | R&S®FSV3-K18M | 1345.1486.02 | R&S®FSV3-K18 and R&S®FSV3-K18D options required |
| Noise figure measurements ²² | R&S®FSV3-K30 | 1330.5045.02 | for legacy noise sources R&S®FSV3-B28V option is required |
| Phase noise measurements ²² | R&S®FSV3-K40 | 1330.5051.02 | |
| EMI measurements | R&S®FSV3-K54 | 1330.5068.02 | |
| CISPR calibration, for R&S®FSV3-K54 | R&S®FSV3-K54C | 1346.3624.02 | R&S®FSV3-K54 option required; retrofit requires instrument calibration by the Rohde & Schwarz service |

²¹ For measurements with analysis bandwidths > 28 MHz an appropriate bandwidth option is required.

²² Also available as floating license. Order number is xxxx.xxxx.51 instead of xxxx.xxxx.02 and R&S®FSV3-FL hardware option is required.

| Designation | Type | Order No. | Remark |
|---|----------------|--------------|--|
| Transient measurements | R&S®FSV3-K60 | 1346.4350.02 | |
| Transient chirp measurements | R&S®FSV3-K60C | 1346.4366.02 | R&S®FSV3-K60 option required |
| Transient hop measurements | R&S®FSV3-K60H | 1346.4372.02 | R&S®FSV3-K60 option required |
| Transient phase noise measurements | R&S®FSV3-K60P | 1346.6298.02 | R&S®FSV3-K60 and (R&S®FSV3-K60C or R&S®FSV3-K60H) options required |
| Vector signal analysis ²² | R&S®FSV3-K70 | 1330.5074.02 | |
| Multi-modulation analysis ²² | R&S®FSV3-K70M | 1346.3376.02 | R&S®FSV3-K70 option required |
| BER PRBS measurements ²² | R&S®FSV3-K70P | 1346.3382.02 | R&S®FSV3-K70 option required |
| 3GPP FDD (WCDMA) base station measurements (incl. HSDPA and HSDPA+) ²² | R&S®FSV3-K72 | 1330.5080.02 | |
| 3GPP FDD (WCDMA) mobile station measurements (incl. HSUPA and HSUPA+) ²² | R&S®FSV3-K73 | 1330.5097.02 | |
| WLAN 802.11a/b/g measurements ²² | R&S®FSV3-K91 | 1330.5100.02 | |
| WLAN 802.11n measurements ²² | R&S®FSV3-K91N | 1330.5139.02 | R&S®FSV3-K91 option required |
| WLAN 802.11ac measurements ²² | R&S®FSV3-K91AC | 1330.5116.02 | |
| WLAN 802.11ax measurements ²² | R&S®FSV3-K91AX | 1346.3399.02 | |
| WLAN 802.11p measurements ²² | R&S®FSV3-K91P | 1330.5122.02 | |
| WLAN 802.11be measurements ²² | R&S®FSV3-K91BE | 1346.4966.02 | |
| OFDM signal analysis | R&S®FSV3-K96 | 1346.6469.02 | |
| EUTRA/LTE FDD base station measurements ²² | R&S®FSV3-K100 | 1330.5145.02 | |
| EUTRA/LTE FDD UE measurements ²² | R&S®FSV3-K101 | 1330.5151.02 | |
| EUTRA/LTE base station MIMO measurements ²² | R&S®FSV3-K102 | 1330.5168.02 | R&S®FSV3-K100 or R&S®FSV3-K104 option required |
| EUTRA/LTE-Advanced uplink measurements ²² | R&S®FSV3-K103 | 1330.7231.02 | R&S®FSV3-K101 or R&S®FSV3-K105 option required |
| EUTRA/LTE TDD base station measurements ²² | R&S®FSV3-K104 | 1330.5174.02 | |
| EUTRA/LTE TDD uplink measurements ²² | R&S®FSV3-K105 | 1330.5180.02 | |
| EUTRA/LTE NB-IoT downlink measurements ²² | R&S®FSV3-K106 | 1346.3418.02 | |
| 5G NR Rel. 15 downlink measurements ²² | R&S®FSV3-K144 | 1330.7219.02 | |
| 5G NR Rel. 15 uplink measurements ²² | R&S®FSV3-K145 | 1330.7225.02 | |
| 5G NR combined ACLR/SEM/EVM measurements ²² | R&S®FSV3-K147 | 1346.4250.02 | R&S®FSV3-K144 option required |
| 5G NR combined multicarrier ACLR/SEM/EVM measurements ²² | R&S®FSV3-K147C | 1346.6498.02 | R&S®FSV3-K147 option required |
| 5G NR Rel. 16 extension for uplink/downlink measurements ²² | R&S®FSV3-K148 | 1346.4914.02 | R&S®FSV3-K144 or R&S®FSV3-K145 option required |
| 5G NR Rel. 17/18 extension for uplink/downlink measurements ²² | R&S®FSV3-K171 | 1346.5362.02 | R&S®FSV3-K144 option or R&S®FSV3-K145 and R&S®FSV3-K148 options required |
| O-RAN measurements ²² | R&S®FSV3-K175 | 1346.6452.02 | |
| User defined frequency correction by SnP file ²² | R&S®FSV3-K544 | 1346.3630.02 | corrects frequency response (amplitude and phase) of measurement setup |
| External frontend control | R&S®FSV3-K553 | 1346.4889.02 | |

| Designation | Type | Order No. | Remark |
|--|---------------|--------------|---|
| I/Q noise cancellation | R&S®FSV3-K575 | 1346.6769.02 | supports I/Q analyzer mode and R&S®FSV3-K91, R&S®FSV3-K144, R&S®FSV3-K145 options |
| Health and utilization monitoring service (HUMS) | R&S®FSV3-K980 | 1346.4943.02 | |
| Local VSE enabler | R&S®FSV3-VSE | 1345.2247.02 | |

PC software

| Designation | Type | Order No |
|--|-------------|--------------|
| R&S®VSE basic edition ^{23, 24, 25} | R&S®VSE | 1345.1011.06 |
| R&S®VSE enterprise edition ^{25, 26} | R&S®VSE | 1345.1105.06 |
| License dongle | | |
| License dongle | R&S®FSPC | 1310.0002.03 |
| Floating license dongle | R&S®FSPC-FL | 1310.0002.04 |
| Service option | | |
| R&S®VSE software maintenance | R&S®VSE-SWM | 1320.7622.81 |

For further information on the R&S®VSE vector signal explorer software, see specifications (PD 3607.1371.22) and product brochure (PD 3607.1371.12).

Instrument security

| Designation | Type | Order No. | Remark |
|--|--------------|--------------|--|
| USB mass memory write protection | R&S®FSV3-B33 | 1330.4861.02 | preinstallation ex-factory, for later retrofit see instrument security manuals |
| Security write protection of solid-state drive | R&S®FSV3-K33 | 1346.3360.02 | |

Upgrades

| Designation | Type | Order No. | Remark |
|---|---------------|--------------|-------------------------|
| LO/IF connections for external mixers upgrade ²⁷ | R&S®FSV3-U21 | 1356.3291.xy | |
| RF preamplifier 7.5 GHz upgrade ²⁷ | R&S®FSV3-U24C | 1346.6581.07 | |
| RF preamplifier 13.6 GHz upgrade ²⁷ | R&S®FSV3-U24C | 1346.6581.13 | |
| RF preamplifier 30 GHz upgrade ²⁷ | R&S®FSV3-U24C | 1346.6581.30 | |
| RF preamplifier 44 GHz upgrade ²⁷ | R&S®FSV3-U24C | 1346.6581.44 | |
| RF preamplifier 50 GHz upgrade ²⁷ | R&S®FSV3-U24C | 1346.6581.49 | |
| RF preamplifier 50 GHz upgrade ²⁷ | R&S®FSV3-U24C | 1346.6581.50 | export license required |
| RF preamplifier 13.6 GHz upgrade ²⁷ | R&S®FSV3-U24N | 1346.6575.13 | |
| RF preamplifier 30 GHz upgrade ²⁷ | R&S®FSV3-U24N | 1346.6575.30 | |
| RF preamplifier 44 GHz upgrade ²⁷ | R&S®FSV3-U24N | 1346.6575.44 | |
| RF preamplifier 50 GHz upgrade ²⁷ | R&S®FSV3-U24N | 1346.6575.49 | |
| RF preamplifier 50 GHz upgrade ²⁷ | R&S®FSV3-U24N | 1346.6575.50 | export license required |
| Upgrade to Windows IoT Enterprise LTSC 2021 ²⁷ | R&S®FSV3-U10 | 1346.6698.21 | |

²³ R&S®FSPC required.

²⁴ Not available for R&S®FSPC-FL.

²⁵ To obtain the floating license of the product, R&S®FSPC-FL is needed and order number xxxx.xxxx.51 must be used instead of xxxx.xxxx.06.

²⁶ R&S®FSPC or R&S®FSPC-FL required.

²⁷ For retrofitting, contact your local Rohde & Schwarz sales office.

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, 4 HU, 1/1, dark blue | R&S®ZZA-KN4B | 1703.1346.00 |
| Noise sources | | |
| Smart noise sources, for noise figure and gain measurements up to 110 GHz (R&S®FSV3-K30 required) | R&S®FS-SNS18/26/40/55/67/90/110 | 1338.8008.18, 1338.8008.26, 1338.8008.40, 1338.8008.55, 1338.8008.67, 1338.8008.90, 1338.8008.11 |
| Matching pads, 50/75 Ω | | |
| L section, matching at both ends | R&S®RAM | 0358.5414.02 |
| Series resistor, 25 Ω, matching at one end (taken into account in instrument function RF INPUT 75 Ω) | R&S®RAZ | 0358.5714.02 |
| High-power attenuators | | |
| 1000 W, 40 dB, 400 (1000) MHz | R&S®RBS1000 | 0207.4010.55 |
| 100 W, 3/6/10/20/30 dB, 2 GHz | R&S®RBU100 | 1073.8495.03, 1073.8495.06, 1073.8495.10, 1073.8495.20, 1073.8495.30 |
| 50 W, 3/6/10/20/30 dB, 2 GHz | R&S®RBU50 | 1073.8695.03, 1073.8695.06, 1073.8695.10, 1073.8695.20, 1073.8695.30 |
| 50 W, 20 dB, 6 GHz | R&S®RDL50 | 1035.1700.52 |
| RF adapters and cables | | |
| Coaxial adapter, 1.85 mm (f) to 1.85 mm (f) | | 3588.9654.00 |
| Coaxial adapter, 1.85 mm (f) to 2.92 mm (f) | | 3628.4728.02 |
| Coaxial adapter, 2.92 mm (f) to 2.92 mm (f) | | 3588.8664.00 |
| Coaxial adapter, 3.5 mm (f) to 3.5 mm (f), APC3.5-compatible | | 3689.9442.00 |
| Coaxial adapter, 3.5 mm (m) to 3.5 mm (m), APC3.5-compatible | | 3587.7770.00 |
| Coaxial adapter, type N (f) to 3.5 mm (m), APC3.5-compatible | | 3587.7806.00 |
| Coaxial adapter, type N (f) to 3.5 mm (f), APC3.5-compatible | | 3587.7829.00 |
| Coaxial cable, SMA (m) to SMA (m), length: 1 m | | 3586.9970.00 |
| Connectors and cables | | |
| Probe power connector, 3-pin | | 1065.9480.00 |
| Type N adapter, for R&S®RT-Zxx oscilloscope probes (for R&S®FSV3004/3007/3013) | R&S®RT-ZA9 | 1417.0909.02 |
| Type 3.5 mm (f) adapter, for R&S®RT-Zxx oscilloscope probes (for R&S®FSV3030 and R&S®FSV3044). Not suitable for R&S®FSV3050. Hint: access to "Trigger 1 in/out" and "Noise source control and power sensor" ports can be limited. | R&S®RT-ZA51 | 1803.5365.02 |
| Cable for connecting high speed digital baseband interfaces of Rohde & Schwarz instruments | R&S®DIGIQ-HS | 3641.2948.03 |
| D-Sub BNC cable, 9 pole | | 1103.9735.00 |
| D-Sub cable, 2 × 9 pole | | 1103.9729.00 |
| DC block | | |
| DC block, 10 kHz to 18 GHz (type N) | R&S®FSE-Z4 | 1084.7443.03 |

| Designation | Type | Order No. |
|---|---------------------------|--------------|
| External harmonic mixers (for R&S®FSV3030, R&S®FSV3044 and R&S®FSV3050 with R&S®FSV3-B21 option) | | |
| Harmonic mixer, 40 GHz to 60 GHz | RPG FS-Z60 ²⁸ | 1048.0171.02 |
| Harmonic mixer, 50 GHz to 75 GHz | RPG FS-Z75 ²⁸ | 3638.2240.02 |
| Harmonic mixer, 60 GHz to 90 GHz | RPG FS-Z90 ²⁸ | 3638.2270.02 |
| Harmonic mixer, 75 GHz to 110 GHz | RPG FS-Z110 ²⁸ | 3638.2292.02 |
| Harmonic mixer, 90 GHz to 140 GHz | RPG FS-Z140 ²⁸ | 3622.0708.02 |
| Harmonic mixer, 110 GHz to 170 GHz | RPG FS-Z170 ²⁸ | 3622.0714.02 |
| Harmonic mixer, 140 GHz to 220 GHz | RPG FS-Z220 ²⁸ | 3593.3250.02 |
| Harmonic mixer, 220 GHz to 325 GHz | RPG FS-Z325 ²⁸ | 3593.3267.02 |
| Waveguide to coaxial adapters | | |
| Waveguide to coaxial adapter, WR10 to 1 mm (f) | WCA110 | 3626.1067.02 |
| Waveguide to coaxial adapter, WR10 to 1 mm (m) | WCA110 | 3626.1067.03 |
| Waveguide to coaxial adapter, WR12 to 1 mm (m) | WCA90 | 3626.1050.03 |
| Waveguide to coaxial adapter, WR15 to 1 mm (f) | WCA75 | 3626.1044.02 |
| Waveguide to coaxial adapter, WR15 to 1 mm (m) | WCA75 | 3626.1044.03 |
| Waveguide to coaxial adapter, WR12 to 1 mm (f) | WCA90 | 3626.1050.02 |
| Horn antennas | | |
| Horn antenna, 26 GHz to 40 GHz | FH-SG-40 | 3629.2393.02 |
| Horn antenna, 50 GHz to 75 GHz | FH-SG-75 | 3629.2458.02 |
| Horn antenna, 60 GHz to 90 GHz | FH-SG-90 | 3629.2464.02 |
| Horn antenna, 110 GHz to 170 GHz | FH-SG-170 | 3629.2493.02 |
| Tools | | |
| Torque wrench, for type N connectors, 1.5 Nm coupling torque (for R&S®FSV3004/3007/3013) | 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®FSV3030/3044) | R&S®ZN-ZTW | 1328.8534.35 |

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

Power sensors supported by the R&S®FSV3-K9 option ²⁹

| Designation | Type | Order No. |
|---|---------------|--------------|
| Universal power sensors | | |
| 10 MHz to 8 GHz, 100 mW | R&S®NRP-Z211 | 1417.0409.02 |
| 10 MHz to 8 GHz, 200 mW ³⁰ | R&S®NRP-Z11 | 1138.3004.02 |
| 10 MHz to 18 GHz, 100 mW, two-path ³⁰ | R&S®NRP-Z221 | 1417.0309.02 |
| 10 MHz to 18 GHz, 200 mW ³⁰ | R&S®NRP-Z21 | 1137.6000.02 |
| 10 MHz to 18 GHz, 2 W ³⁰ | R&S®NRP-Z22 | 1137.7506.02 |
| 10 MHz to 18 GHz, 15 W ³⁰ | R&S®NRP-Z23 | 1137.8002.02 |
| 10 MHz to 18 GHz, 30 W ³⁰ | 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 ³¹ | | |
| 0 Hz to 18 GHz, 100 mW | R&S®NRP18T | 1424.6115.02 |
| 0 Hz to 18 GHz, 100 mW, LAN version | R&S®NRP18TN | 1424.6121.02 |
| 0 Hz to 33 GHz, 100 mW | R&S®NRP33T | 1424.6138.02 |
| 0 Hz to 33 GHz, 100 mW, LAN version | R&S®NRP33TN | 1424.6144.02 |
| 0 Hz to 40 GHz, 100 mW | R&S®NRP40T | 1424.6150.02 |
| 0 Hz to 40 GHz, 100 mW, LAN version | R&S®NRP40TN | 1424.6167.02 |
| 0 Hz to 50 GHz, 100 mW | R&S®NRP50T | 1424.6173.02 |
| 0 Hz to 50 GHz, 100 mW, LAN version | R&S®NRP50TN | 1424.6180.02 |
| 0 Hz to 67 GHz, 100 mW | R&S®NRP67T | 1424.6196.02 |
| 0 Hz to 67 GHz, 100 mW, LAN version | R&S®NRP67TN | 1424.6209.02 |
| 0 Hz to 90 GHz, 100 mW | R&S®NRP90T | 1424.6473.02 |
| 0 Hz to 90 GHz, 100 mW, LAN version | R&S®NRP90TN | 1424.6480.02 |
| 0 Hz to 110 GHz, 100 mW | R&S®NRP110T | 1424.6215.02 |
| Thermal waveguide power sensors | | |
| 50 GHz to 75 GHz, 100 mW | R&S®NRP75TWG | 1700.2529.02 |
| 60 GHz to 90 GHz, 100 mW | R&S®NRP90TWG | 1700.2312.02 |
| 75 GHz to 110 GHz, 100 mW | R&S®NRP110TWG | 1173.8709.02 |
| Average power sensors ³¹ | | |
| 8 kHz to 6 GHz, 200 mW | R&S®NRP6A | 1424.6796.02 |
| 8 kHz to 6 GHz, 200 mW, LAN version | R&S®NRP6AN | 1424.6809.02 |
| 9 kHz to 6 GHz, 200 mW ³⁰ | R&S®NRP-Z91 | 1168.8004.02 |
| 8 kHz to 18 GHz, 200 mW | R&S®NRP18A | 1424.6815.02 |
| 8 kHz to 18 GHz, 200 mW, LAN version | R&S®NRP18AN | 1424.6821.02 |
| Three path diode power sensors ³¹ | | |
| 100 pW to 200 mW, 10 MHz to 8 GHz | R&S®NRP8S | 1419.0006.02 |
| 100 pW to 200 mW, 10 MHz to 8 GHz, LAN version | R&S®NRP8SN | 1419.0012.02 |
| 100 pW to 200 mW, 10 MHz to 18 GHz | R&S®NRP18S | 1419.0029.02 |
| 100 pW to 200 mW, 10 MHz to 18 GHz, LAN version | R&S®NRP18SN | 1419.0035.02 |
| 1 nW to 2 W, 10 MHz to 18 GHz | R&S®NRP18S-10 | 1424.6721.02 |
| 10 nW to 15 W, 10 MHz to 18 GHz | R&S®NRP18S-20 | 1424.6738.02 |
| 30 nW to 30 W, 10 MHz to 18 GHz | R&S®NRP18S-25 | 1424.6744.02 |
| 100 pW to 200 mW, 10 MHz to 33 GHz | R&S®NRP33S | 1419.0064.02 |
| 100 pW to 200 mW, 10 MHz to 33 GHz, LAN version | R&S®NRP33SN | 1419.0070.02 |
| 100 pW to 200 mW, 10 MHz to 33 GHz, LAN version, TVAC-compliant | R&S®NRP33SN-V | 1419.0129.02 |
| 100 pW to 100 mW, 50 MHz to 40 GHz | R&S®NRP40S | 1419.0041.02 |
| 100 pW to 100 mW, 50 MHz to 40 GHz, LAN version | R&S®NRP40SN | 1419.0058.02 |
| 100 pW to 100 mW, 50 MHz to 50 GHz | R&S®NRP50S | 1419.0087.02 |
| 100 pW to 100 mW, 50 MHz to 50 GHz, LAN version | R&S®NRP50SN | 1419.0093.02 |
| 100 pW to 100 mW, 50 MHz to 67 GHz | R&S®NRP67S | 1424.6396.02 |
| 100 pW to 100 mW, 50 MHz to 67 GHz, LAN version | R&S®NRP67SN | 1424.6409.02 |
| 100 pW to 200 mW, 50 MHz to 67 GHz, LAN version, TVAC-compliant | R&S®NRP67SN-V | 1424.6415.02 |
| 100 pW to 100 mW, 50 MHz to 90 GHz | R&S®NRP90S | 1424.6421.02 |
| 100 pW to 100 mW, 50 MHz to 90 GHz, LAN version | R&S®NRP90SN | 1424.6421.03 |

²⁹ For average power measurement only.

³⁰ Product discontinued.

³¹ In addition to RF power measurements the R&S®NRP-Z8x, R&S®NRPxxT/TN, R&S®NRPxxA/AN and R&S®NRPxxS/SN power sensors can be used as wideband RF power trigger sources.

| Designation | Type | Order No. |
|--|-------------|--------------|
| Wideband power sensors ³¹ | | |
| 50 MHz to 40 GHz, 100 mW (2.92 mm) ³⁰ | R&S®NRP-Z41 | 1171.8801.02 |
| 50 MHz to 18 GHz, 100 mW | R&S®NRP-Z81 | 1137.9009.02 |
| 50 MHz to 40 GHz, 100 mW (2.92 mm) | R&S®NRP-Z85 | 1411.7501.02 |
| 50 MHz to 40 GHz, 100 mW (2.40 mm) | R&S®NRP-Z86 | 1417.0109.40 |
| 50 MHz to 44 GHz, 100 mW (2.40 mm) | R&S®NRP-Z86 | 1417.0109.44 |

Probes supported by R&S®FSV3-B271 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 |
| 1.0 GHz, active, differential, 1 M Ω , 0.6 pF, micro button | R&S®RT-ZD10 | 1410.4715.02 |
| 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 |
| 1.5 GHz modular probe amplifier, multimode for differential, single-ended and common mode, 1.2 m cable, 400 k Ω differential, 200 k Ω single-ended, R&S®ProbeMeter, micro button | R&S®RT-ZM15 | 1800.4700.02 |
| 3 GHz modular probe amplifier, multimode for differential, single-ended and common mode, 1.2 m cable, 400 k Ω differential, 200 k Ω single-ended, R&S®ProbeMeter, micro button | R&S®RT-ZM30 | 1419.3005.02 |
| 6 GHz modular probe amplifier, multimode for differential, single-ended and common mode, 1.2 m cable, 400 k Ω differential, 200 k Ω single-ended, R&S®ProbeMeter, micro button | R&S®RT-ZM60 | 1419.3105.02 |
| 9 GHz modular probe amplifier, multimode for differential, single-ended and common mode, 1.2 m cable, 400 k Ω differential, 200 k Ω single-ended, R&S®ProbeMeter, micro button | R&S®RT-ZM90 | 1419.3205.02 |
| 13 GHz modular probe amplifier, multimode for differential, single-ended and common mode, 1.2 m cable, 400 k Ω differential, 200 k Ω single-ended, R&S®ProbeMeter, micro button | R&S®RT-ZM130 | 1800.4500.02 |
| 16 GHz modular probe amplifier, multimode for differential, single-ended and common mode, 1.2 m cable, 400 k Ω differential, 200 k Ω single-ended, R&S®ProbeMeter, micro button | R&S®RT-ZM160 | 1800.4600.02 |
| Extras for modular probes | | |
| Tip cable, solder in, extended temperature, length: 15 cm, multimode compatible | R&S®RT-ZMA11 | 1419.4318.02 |
| Tip cable, square pin, for 1.27 mm pin header, length: 15 cm, multimode compatible | R&S®RT-ZMA12 | 1419.4324.02 |
| Tip cable, quick connect, for solder in resistor connection, length: 15 cm, multimode compatible | R&S®RT-ZMA15 | 1419.4224.02 |
| Browser module, variable span from 0.5 mm to 8 mm, spring-loaded, incl. spring loaded resistor tips (2 pairs) | R&S®RT-ZMA30 | 1419.4353.02 |
| SMA module, 2.92 mm/3.5 mm/SMA, differential, 100 Ω , DC termination, multimode compatible; incl. lead 11 cm (4.3 in) | R&S®RT-ZMA40 | 1419.4201.02 |
| Extended temperature kit, 1 m matched cable pair, multimode compatible, incl. R&S®RT-ZMA11 | R&S®RT-ZMA50 | 1419.4218.02 |

Warranty and service

| Warranty | | |
|--|--------------------------------|-----------------------|
| Base unit | | 1 year |
| All other items | | 1 year |
| Service options | | |
| | Service plans | On demand |
| Calibration | up to five years ³² | pay per calibration |
| Warranty and repair | up to five years ³² | standard price repair |
| Contact your Rohde & Schwarz sales office for further details. | | |

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³² For extended periods, contact your Rohde & Schwarz sales office.

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