

# R&S® FSVA3000

## Signal and Spectrum Analyzer Specifications



**3** year  
warranty

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# Definitions

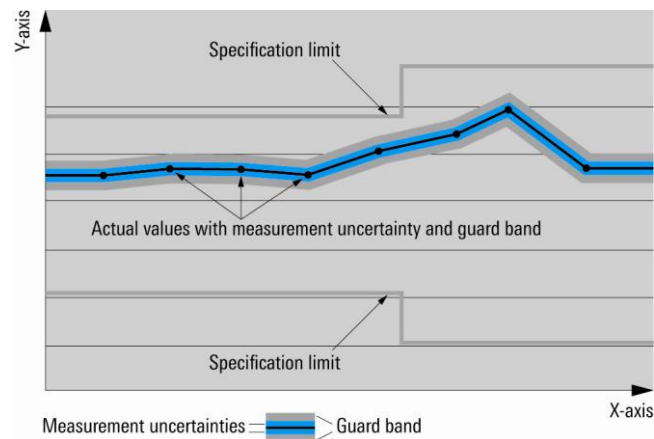
## General

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

|                             |                  |                    |
|-----------------------------|------------------|--------------------|
| <b>Frequency range</b>      | R&S®FSVA3004     |                    |
|                             | DC coupled       | 10 Hz to 4 GHz     |
|                             | AC coupled       | 10 MHz to 4 GHz    |
|                             | R&S®FSVA3007     |                    |
|                             | DC coupled       | 10 Hz to 7.5 GHz   |
|                             | AC coupled       | 10 MHz to 7.5 GHz  |
|                             | R&S®FSVA3013     |                    |
|                             | DC coupled       | 10 Hz to 13.6 GHz  |
|                             | AC coupled       | 10 MHz to 13.6 GHz |
|                             | R&S®FSVA3030     |                    |
|                             | DC coupled       | 10 Hz to 30 GHz    |
|                             | AC coupled       | 10 MHz to 30 GHz   |
| R&S®FSVA3044                |                  |                    |
| DC coupled                  | 10 Hz to 44 GHz  |                    |
| AC coupled                  | 10 MHz to 44 GHz |                    |
| <b>Frequency resolution</b> |                  | 0.01 Hz            |

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

|                                   |                                 |   |
|-----------------------------------|---------------------------------|---|
| <b>Frequency readout</b>          |                                 |   |
| 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 | span / (sweep points - 1)   |
|                                   | marker step size = standard     | span / (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 to max. frequency  |
| Resolution                        |                                 | 0.1 Hz  |

|                        |   |                       |
|------------------------|---|-----------------------|
| <b>Spectral purity</b> |   |                       |
| SSB phase noise (1 Hz) | frequency = 1 GHz, carrier offset   |                       |
|                        | 100 Hz  | < -95 dBc             |
|                        | 1 kHz   | < -115 dBc            |
|                        | 10 kHz  | < -120 dBc            |
|                        | 100 kHz   | < -125 dBc            |
|                        | 1 MHz   | < -137 dBc            |
|                        | 10 MHz  | -150 dBc (nom.)       |
| Residual FM            | frequency = 1000 MHz,<br>demodulation bandwidth = 25 kHz,<br>AF highpass filter 50 Hz,<br>AF lowpass filter 3 kHz | < 0.1 Hz (RMS) (nom.) |

## Sweep time

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

## Resolution bandwidths

|                                      |  |                                    |
|--------------------------------------|--|------------------------------------|
| <b>Sweep filters and FFT filters</b> |  |                                    |
| Resolution bandwidths (-3 dB)        |  | 1 Hz to 10 MHz in 1/2/3/5 sequence |
| Bandwidth uncertainty                |  | < 3 % (nom.)                       |
| Shape factor 60 dB:3 dB              |  | < 5 (nom.)                         |

|                         |  |   |
|-------------------------|--|---|
| <b>Channel filters</b>  |  |   |
| Bandwidths (-3 dB)      | standard<br>(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   |
| Bandwidth uncertainty   |  | < 2 % (nom.)  |
| Shape factor 60 dB:3 dB |  | < 2 (nom.)  |

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

## Signal analysis bandwidths

|                                       |   |                |
|---------------------------------------|---|----------------|
| <b>Max. signal analysis bandwidth</b> | 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.) |
|                                       | with R&S®FSV3-B400 option                                     | 400 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.) |
|                                       | with R&S®FSV3-B400 option                                     | 400 MHz (nom.) |

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

<sup>2</sup> Time for data acquisition for FFT calculation.

## Level

| <b>Level display</b>             |                           |   |
|----------------------------------|---------------------------|---|
| 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                                  |
| 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 $\mu$ V, dBmV, dB $\mu$ A, dBpW   |
|                                  | linear level display      | $\mu$ V, mV, $\mu$ A, mA, pW, nW  |

| <b>Max. input level</b>                           |  |                   |
|---|--|-------------------|
| 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®FSV3-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®FSV3-B24 option, RF preamplifier = on | 23 dBm (= 0.2 W)  |
| Max. pulse power, pulse duration $\tau = 3 \mu$ s | RF attenuation $\geq$ 10 dB                    | 100 W             |
| Max. pulse voltage                                | RF attenuation $\geq$ 10 dB                    | 50 V              |

| <b>Intermodulation</b>            |   |                       |
|-----------------------------------|---|-----------------------|
| 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®FSV3-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 $f \geq 7.5$ GHz, level $2 \times -15$ dBm, $\Delta f > 5 \times$ RBW or 10 kHz, whichever is larger                             |                       |
|                                   | R&S®FSVA3004, R&S®FSVA3007  |                       |
|                                   | $10 \text{ MHz} \leq f_{in} < 3.6 \text{ GHz}$  | > 17 dBm, typ. 20 dBm |
|                                   | $3.6 \text{ GHz} \leq f_{in} \leq 7.5 \text{ GHz}$  | > 16 dBm, typ. 19 dBm |
|                                   | R&S®FSVA3013, R&S®FSVA3030, YIG preselector on for $f \geq 7.5$ GHz   |                       |
|                                   | $10 \text{ MHz} \leq f_{in} \leq 26.5 \text{ GHz}$  | > 17 dBm, typ. 20 dBm |
|                                   | $26.5 \text{ GHz} < f_{in} \leq 30 \text{ GHz}$   | > 15 dBm, typ. 21 dBm |
|                                   | R&S®FSVA3044, YIG preselector on for $f \geq 7.5$ GHz   |                       |
|                                   | $10 \text{ MHz} \leq f_{in} < 3.6 \text{ GHz}$  | > 17 dBm, typ. 20 dBm |
|                                   | $3.6 \text{ GHz} \leq f_{in} \leq 7.5 \text{ GHz}$  | > 16 dBm, typ. 19 dBm |
|                                   | $7.5 \text{ GHz} < f_{in} \leq 40 \text{ GHz}$  | > 15 dBm, typ. 21 dBm |
|                                   | $40 \text{ GHz} < f_{in} \leq 44 \text{ GHz}$   | > 12 dBm, typ. 20 dBm |
|                                   | with R&S®FSV3-B24 option, RF attenuation = 0 dB, RF preamplifier = 30 dB, YIG preselector on for $f \geq 7.5$ GHz, level $2 \times -45$ dBm, $\Delta f > 5 \times$ RBW or 10 kHz, whichever is larger |                       |
|                                   | $10 \text{ MHz} \leq f_{in} \leq 43.5 \text{ GHz}$  | -20 dBm (nom.)        |
| Second harmonic intercept (SHI)   | RF attenuation = 0 dB, RF preamplifier = off, YIG preselector on for $f_{in} \geq 3.75$ GHz, level -10 dBm  |                       |
|                                   | $100 \text{ MHz} < f_{in} \leq 1.75 \text{ GHz}$  | 45 dBm (nom.)         |
|                                   | $1.75 \text{ GHz} < f_{in} \leq 22 \text{ GHz}$   | 80 dBm (nom.)         |
|                                   | with R&S®FSV3-B24 option, RF preamplifier = 30 dB, RF attenuation = 0 dB, YIG preselector on for $f_{in} \geq 3.75$ GHz, level -40 dBm  |                       |
|                                   | $100 \text{ MHz} < f_{in} \leq 21.75 \text{ GHz}$   | 10 dBm (nom.)         |

## Sensitivity

| 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, log. scaling, normalized to 1 Hz RBW, RBW = 1 kHz, VBW = 1 Hz, +20 °C to +30 °C              |                         |
|  | R&S®FSVA3004, R&S®FSVA3007  |                         |
|  | 9 kHz ≤ f < 100 kHz   | -140 dBm, typ. -146 dBm |
|  | 100 kHz ≤ f < 1 MHz   | -145 dBm, typ. -150 dBm |
|  | 1 MHz ≤ f < 1 GHz   | -152 dBm, typ. -155 dBm |
|  | 1 GHz ≤ f < 3 GHz   | -151 dBm, typ. -153 dBm |
|  | 3 GHz ≤ f < 6 GHz   | -150 dBm, typ. -152 dBm |
|  | 6 GHz ≤ f ≤ 7.5 GHz   | -149 dBm, typ. -151 dBm |
|  | R&S®FSVA3013, R&S®FSVA3030  |                         |
|  | 9 kHz ≤ f < 100 kHz   | -140 dBm, typ. -146 dBm |
|  | 100 kHz ≤ f < 1 MHz   | -145 dBm, typ. -150 dBm |
|  | 1 MHz ≤ f < 1 GHz   | -151 dBm, typ. -154 dBm |
|  | 1 GHz ≤ f < 3 GHz   | -149 dBm, typ. -152 dBm |
|  | 3 GHz ≤ f < 6 GHz   | -147 dBm, typ. -150 dBm |
|  | 6 GHz ≤ f ≤ 7.5 GHz   | -145 dBm, typ. -147 dBm |
|  | 7.5 GHz < f ≤ 15 GHz  | -148 dBm, typ. -151 dBm |
|  | 15 GHz < f ≤ 26.5 GHz   | -145 dBm, typ. -148 dBm |
|  | 26.5 GHz < f ≤ 30 GHz   | -144 dBm, typ. -147 dBm |
|  | R&S®FSVA3044  |                         |
|  | 9 kHz ≤ f < 100 kHz   | -140 dBm, typ. -146 dBm |
|  | 100 kHz ≤ f < 1 MHz   | -145 dBm, typ. -150 dBm |
|  | 1 MHz ≤ f < 1 GHz   | -151 dBm, typ. -154 dBm |
|  | 1 GHz ≤ f < 3 GHz   | -149 dBm, typ. -152 dBm |
|  | 3 GHz ≤ f < 6 GHz   | -147 dBm, typ. -150 dBm |
|  | 6 GHz ≤ f ≤ 7.5 GHz   | -145 dBm, typ. -147 dBm |
|  | 7.5 GHz < f ≤ 15 GHz  | -148 dBm, typ. -151 dBm |
|  | 15 GHz < f ≤ 34 GHz   | -145 dBm, typ. -148 dBm |
|  | 34 GHz < f ≤ 40 GHz   | -139 dBm, typ. -142 dBm |
|  | 40 GHz < f ≤ 44 GHz   | -136 dBm, typ. -139 dBm |
| Improvement with noise cancellation                                    | for noise-like signals  |                         |
|  | 10 MHz < f ≤ 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, log. scaling, normalized to 1 Hz RBW, RBW = 1 kHz, VBW = 1 Hz, +20 °C to +30 °C              |                         |
|   | R&S®FSVA3004, R&S®FSVA3007  |                         |
|   | 9 kHz ≤ f < 100 kHz   | -140 dBm, typ. -146 dBm |
|   | 100 kHz ≤ f < 1 MHz   | -145 dBm, typ. -150 dBm |
|   | 1 MHz ≤ f < 1 GHz   | -151 dBm, typ. -154 dBm |
|   | 1 GHz ≤ f < 3 GHz   | -150 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®FSVA3013, R&S®FSVA3030  |                         |
|   | 9 kHz ≤ f < 100 kHz   | -140 dBm, typ. -146 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 |
|   | 7.5 GHz < f ≤ 15 GHz  | -145 dBm, typ. -148 dBm |
|   | 15 GHz < f ≤ 30 GHz   | -141 dBm, typ. -144 dBm |
|   | R&S®FSVA3044  |                         |
|   | 9 kHz ≤ f < 100 kHz   | -140 dBm, typ. -146 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   |                         |
| 7.5 GHz < f ≤ 15 GHz  | -146 dBm, typ. -149 dBm   |                         |
| 15 GHz < f ≤ 34 GHz   | -143 dBm, typ. -146 dBm   |                         |
| 34 GHz < f ≤ 40 GHz   | -137 dBm, typ. -140 dBm   |                         |
| 40 GHz < f ≤ 44 GHz   | -133 dBm, typ. -136 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, +20 °C to +30 °C              |                         |
|   | R&S®FSVA3004, R&S®FSVA3007, R&S®FSVA3013, R&S®FSVA3030  |                         |
|   | 10 MHz ≤ f < 50 MHz   | -158 dBm, typ. -162 dBm |
|   | 50 MHz ≤ f ≤ 7.5 GHz  | -164 dBm, typ. -167 dBm |
|   | 7.5 GHz < f ≤ 13.6 GHz  | -162 dBm, typ. -165 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®FSVA3044 <sup>3</sup>   |                         |
|   | 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 ≤ 40 GHz   | -158 dBm                |
| 40 GHz < f ≤ 43.5 GHz   | -149 dBm  |                         |
| Improvement with noise cancellation                                 | for noise-like signals  |                         |
|   | 10 MHz < f ≤ 43.5 GHz   | 13 dB (nom.)            |
|   | f > 43.5 GHz  | 0 dB (nom.)             |

<sup>3</sup> The frequency range of the RF preamplifier for the R&S®FSVA3044 is limited to 43.5 GHz.



## Spurious responses

|   |  |                  |
|---|--|------------------|
| Image response                            | YIG preselector on for $f \geq 7.5$ GHz, mixer level $\leq -10$ dBm <sup>4</sup> , sweep optimization: auto or dynamic |                  |
|   | 20 MHz $\leq f \leq 7.5$ GHz   |                  |
|   | $f_{in} - 2 \times 8796$ MHz (1st IF)  | < -80 dBc (nom.) |
|   | $f_{in} - 2 \times 732$ MHz (2nd IF)   | < -80 dBc        |
|   | $f_{in} - 2 \times 92$ MHz (3rd IF)  | < -80 dBc        |
|   | 7.5 GHz $< f \leq 30$ GHz  |                  |
|   | $f_{in} \pm 2 \times 732$ MHz (1st IF)   | < -80 dBc        |
|   | $f_{in} - 2 \times 92$ MHz (2nd IF)  | < -80 dBc        |
|   | 30 GHz $< f \leq 44$ GHz   |                  |
|   | $f_{in} \pm 2 \times 732$ MHz (1st IF)   | < -70 dBc        |
| $f_{in} - 2 \times 92$ MHz (2nd IF)       | < -80 dBc  |                  |
| Intermediate frequency response           | 1st IF (8796 MHz)  | < -80 dBc        |
|   | 2nd IF (732 MHz)   | < -80 dBc        |
|   | 3rd IF (92 MHz)  | < -80 dBc        |
| Residual spurious response                | RF attenuation = 0 dB  |                  |
|   | $f \leq 1$ MHz   | < -90 dBm        |
|   | 1 MHz $< f \leq 7.5$ GHz   | < -103 dBm       |
|   | 7.5 GHz $< f \leq 44$ GHz  | < -100 dBm       |
| Local oscillator related spurious         | $f < 15$ GHz   |                  |
|   | 1 kHz $\leq$ carrier offset $\leq 10$ MHz  | < -70 dBc        |
|   | carrier offset $> 10$ MHz  | < -80 dBc        |
|   | 15 GHz $\leq f \leq 30$ GHz  |                  |
|   | 1 kHz $\leq$ carrier offset $\leq 10$ MHz  | < -64 dBc        |
|   | carrier offset $> 10$ MHz  | < -74 dBc        |
|   | 30 GHz $< f \leq 44$ GHz   |                  |
| 1 kHz $\leq$ carrier offset $\leq 10$ MHz | < -58 dBc  |                  |
| carrier offset $> 10$ MHz                 | < -68 dBc  |                  |
| Vibrational environmental stimuli         | max. 0.21 g (RMS)  |                  |
|   | < -60 dBc + 20 log ( $f_{in}/\text{GHz}$ ) (nom.)  |                  |

<sup>4</sup> 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<br>referenced to 64 MHz          | RF attenuation = 10 dB, 20 dB, 30 dB, 40 dB, RF preamplifier = off,<br>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 $< f \leq 44$ GHz, span < 1 GHz   | < 3 dB (nom.)                   |
|   | 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 $< f \leq 44$ GHz   | < 4 dB (nom.)                   |
|   | RF attenuation $\leq 10$ dB, RF preamplifier = on <sup>3</sup> , 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)   |                                 |
| 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,<br>referenced to RF attenuation = 10 dB   | < 0.2 dB ( $\sigma = 0.07$ dB)  |
| Uncertainty of reference level setting              |  | 0 dB <sup>5</sup>               |
| 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 $\leq$ level $\leq$ -70 dB | < 0.1 dB ( $\sigma = 0.033$ dB) |
|                           | S/N > 16 dB, -70 dB < level $\leq$ -80 dB    | < 0.2 dB ( $\sigma = 0.067$ 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,<br>sweep type = sweep, RF attenuation = 10 dB, 20 dB, 30 dB, 40 dB,<br>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 $< f \leq 44$ GHz   | 1.97 dB |

<sup>5</sup> 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

| <b>Trigger</b>  |   |   |
|---|---|---|
| Trigger source  | spectrum analysis   | free run, external, IF power, video                             |
|   | I/Q analysis or modulation analysis                       | free run, external, IF power, 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 pre-trigger 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 |   |   |
| Max. deviation of trigger offset                          |   | 7.81 ns (nom.)  |
| <b>IF power trigger</b>                                   |   |   |
| Sensitivity   | min. signal power   | –60 dBm + RF attenuation – RF preamplifier gain (nom.)          |
|   | max. 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 |   |
| <b>Gated sweep</b>  |   |   |
| Gate source   |   | external, IF power, video                                       |
| Gate delay  |   | 7.81 ns to 30 s (nom.)  |
| Gate length   |   | 7.81 ns to 30 s (nom.)  |
| Max. deviation of gate length                             |   | 7.81 ns (nom.)  |

**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 pre-trigger 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 |
| Sampling rate                              | standard                                 | 100 Hz to 128 MHz             |
|  | with R&S®FSV3-B40 option                 | 100 Hz to 128 MHz             |
|  | with R&S®FSV3-B200, R&S®FSV3-B400 option | 100 Hz to 512 MHz             |
| Max. signal analysis bandwidth (equalized) | standard                                 | 28 MHz <sup>6</sup>           |
|  | with R&S®FSV3-B40 option                 | 40 MHz <sup>6</sup>           |
|  | with R&S®FSV3-B200 option                | 200 MHz <sup>6</sup>          |
|  | with R&S®FSV3-B400 option                | 400 MHz <sup>6</sup>          |

| <b>Signal analysis bandwidth ≤ 40 MHz <sup>6</sup></b> |   |   |
|--|---|---|
| Amplitude flatness                                     | $(1.25 \times \text{signal analysis bandwidth}) \leq f_{\text{center}} \leq 7.5 \text{ GHz}$                | ±0.3 dB (nom.)                              |
|  | $f_{\text{center}} > 7.5 \text{ GHz}$ , YIG preselector off   | ±0.5 dB (nom.)                              |
| Deviation from linear phase                            | $(1.25 \times \text{signal analysis bandwidth}) \leq f_{\text{center}} \leq 7.5 \text{ GHz}$                | ±1° (nom.)                                  |
|  | $f_{\text{center}} > 7.5 \text{ GHz}$ , 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     | $f_{\text{center}} \geq 100 \text{ MHz}$ ,<br>two -30 dBm tones at input mixer<br>within analysis bandwidth | -80 dBc (nom.)                              |
| Residual spurious response                             | RF attenuation = 0 dB, $f_{\text{center}} \geq 100 \text{ MHz}$   | -90 dBm (nom.)                              |
| Other spurious responses                               |   | see section Spurious responses              |
| IF power trigger bandwidth                             |   | 40 MHz (nom.)                               |
| Trigger resolution                                     | trigger source extern or IF power   | 7.81 ns (nom.)                              |

<sup>6</sup> For  $f > 7.5 \text{ GHz}$ , R&S®FSV3-B11 option is required and YIG preselector = off must be set.

| <b>Signal analysis bandwidth 40 MHz to 200 MHz</b> <sup>6,7</sup> |   |  |
|---|---|--|
| Amplitude flatness  | RF attenuation $\geq 10$ dB, RF preamplifier = off, YIG preselector off for $f > 7.5$ GHz   |  |
|   | $150 \text{ MHz} \leq f_{\text{center}} < 4 \text{ GHz}$  | $\pm 0.5 \text{ dB (nom.)}$ <sup>8</sup>                                 |
|   | $4 \text{ GHz} \leq f_{\text{center}} \leq 7.5 \text{ GHz}$   | $\pm 0.7 \text{ dB (nom.)}$ <sup>8</sup>                                 |
|   | $7.5 \text{ GHz} < f_{\text{center}} \leq 26.5 \text{ GHz}$   | $\pm 1.0 \text{ dB (nom.)}$ <sup>8</sup>                                 |
| Deviation from linear phase                                       | RF attenuation $\geq 10$ dB, RF preamplifier = off, YIG preselector off for $f > 7.5$ GHz   |  |
|   | $150 \text{ MHz} \leq f_{\text{center}} < 4 \text{ GHz}$  | $\pm 2^\circ \text{ (nom.)}$ <sup>9</sup>                                |
|   | $4 \text{ GHz} \leq f_{\text{center}} \leq 7.5 \text{ GHz}$   | $\pm 2.5^\circ \text{ (nom.)}$ <sup>9</sup>                              |
|   | $7.5 \text{ GHz} < f_{\text{center}} \leq 26.5 \text{ GHz}$   | $\pm 3^\circ \text{ (nom.)}$ <sup>9</sup>                                |
| 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 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                | $f_{\text{center}} \geq 150 \text{ MHz}$<br>two $-25 \text{ dBm}$ tones at input mixer within analysis bandwidth  | $-75 \text{ dBc (nom.)}$   |
| Residual spurious response  | RF attenuation = 0 dB, $f_{\text{center}} \geq 150 \text{ MHz}$   | $-90 \text{ dBm (nom.)}$   |
| ADC related spurious response                                     | single tone within analysis bandwidth<br>mixer level = $-10 \text{ dBm}$ <sup>4</sup><br>reference level = signal level<br>$f_{\text{center}} \geq 150 \text{ MHz}$ | $-75 \text{ dBc (nom.)}$   |
| Other spurious responses  |   | see section Spurious responses   |
| IF power trigger bandwidth  |   | 200 MHz (nom.)   |
| Trigger resolution  | trigger source extern   | 3.91 ns (nom.)   |
|   | trigger source IF power   | 0.997 ns (nom.)  |

| <b>Signal analysis bandwidth 200 MHz to 400 MHz</b> <sup>6,10</sup> |  |  |
|---|--|--|
| Amplitude flatness  | RF attenuation $\geq 10$ dB, RF preamplifier = off, YIG preselector off for $f > 7.5$ GHz                                  |  |
|   | $300 \text{ MHz} \leq f_{\text{center}} < 4 \text{ GHz}$   | $\pm 0.7 \text{ dB (nom.)}$ <sup>8</sup>                                 |
|   | $4 \text{ GHz} \leq f_{\text{center}} \leq 7.5 \text{ GHz}$  | $\pm 1.2 \text{ dB (nom.)}$ <sup>8</sup>                                 |
|   | $7.5 \text{ GHz} < f_{\text{center}} \leq 22 \text{ GHz}$  | $\pm 1.6 \text{ dB (nom.)}$ <sup>8</sup>                                 |
| Deviation from linear phase   | RF attenuation $\geq 10$ dB, RF preamplifier = off, YIG preselector off for $f > 7.5$ GHz                                  |  |
|   | $300 \text{ MHz} \leq f_{\text{center}} < 4 \text{ GHz}$   | $\pm 4^\circ \text{ (nom.)}$ <sup>9</sup>                                |
|   | $4 \text{ GHz} \leq f_{\text{center}} \leq 7.5 \text{ GHz}$  | $\pm 6^\circ \text{ (nom.)}$ <sup>9</sup>                                |
|   | $7.5 \text{ GHz} < f_{\text{center}} \leq 22 \text{ GHz}$  | $\pm 4^\circ \text{ (nom.)}$ <sup>9</sup>                                |
| 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 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                  | $f_{\text{center}} \geq 300 \text{ MHz}$<br>two $-25 \text{ dBm}$ tones at input mixer within analysis bandwidth           | $-75 \text{ dBc (nom.)}$   |
| Residual spurious response  | RF attenuation = 0 dB, $f_{\text{center}} \geq 300 \text{ MHz}$  | $-90 \text{ dBm (nom.)}$   |
| ADC related spurious response                                       | single tone within analysis bandwidth,<br>mixer level = $-10 \text{ dBm}$ <sup>4</sup> ,<br>reference level = signal level |  |
|   | $300 \text{ MHz} \leq f_{\text{center}} \leq 7.5 \text{ GHz}$  |  |
|   | analysis bandwidth $\leq 300 \text{ MHz}$  | $-72 \text{ dBc (nom.)}$   |
|   | analysis bandwidth $> 300 \text{ MHz}$   | $-60 \text{ dBc (nom.)}$   |
|   | $f_{\text{center}} > 7.5 \text{ GHz}$  | $-72 \text{ dBc (nom.)}$   |
| Other spurious responses  |  | see section Spurious responses   |
| IF power trigger bandwidth  |  | 400 MHz (nom.)   |
| Trigger resolution  | trigger source extern  | 3.91 ns (nom.)   |
|   | trigger source IF power  | 0.997 ns (nom.)  |

<sup>7</sup> The specifications in this section apply for the R&S®FSV3-B200 and R&S®FSV3-B400 options and for the temperature range from  $+20$  °C to  $+30$  °C.

<sup>8</sup> With R&S®FSV3-B24 option installed, add 0.2 dB to the specifications.

<sup>9</sup> With R&S®FSV3-B24 option installed, add  $1^\circ$  to the specifications.

<sup>10</sup> The specifications in this section apply for the R&S®FSV3-B400 option and for the temperature range from  $+20$  °C to  $+30$  °C.

## Inputs and outputs

| <b>RF input</b>                           |   |  |
|---|---|--|
| Impedance                                 |   | 50 $\Omega$                                |
| Connector                                 | R&S®FSVA3004, R&S®FSVA3007,<br>R&S®FSVA3013   | N female                                   |
|   | R&S®FSVA3030                                  | APC 3.5 mm male (compatible with SMA)      |
|   | R&S®FSVA3044                                  | 2.92 mm male (compatible with SMA)         |
| VSWR of R&S®FSVA3004,<br>R&S®FSVA3007     | RF attenuation $\geq 10$ dB                   |  |
|   | 10 MHz $\leq f < 1$ GHz                       | $< 1.2$ , typ. 1.09 <sup>11</sup>          |
|   | 1 GHz $\leq f < 3.6$ GHz                      | $< 1.5$ , typ. 1.19 <sup>11</sup>          |
|   | 3.6 GHz $\leq f \leq 7.5$ GHz                 | $< 2.0$ , typ. 1.42 <sup>11</sup>          |
|   | 5 dB $\leq$ RF attenuation $\leq 9$ dB        |  |
|   | 10 MHz $\leq f < 3.6$ GHz                     | $< 1.5$ , typ. 1.31 <sup>11</sup>          |
|   | 3.6 GHz $\leq f \leq 7.5$ GHz                 | $< 2.0$ , typ. 1.51 <sup>11</sup>          |
|   | RF attenuation $< 4$ dB, DC coupled           |  |
| 10 MHz $\leq f < 7.5$ GHz                 | typ. 1.87 <sup>11</sup>                       |  |
| VSWR of R&S®FSVA3013,<br>R&S®FSVA3030     | RF attenuation $\geq 10$ dB                   |  |
|   | 10 MHz $\leq f < 3.5$ GHz                     | $< 1.2$ , typ. 1.12 <sup>11</sup>          |
|   | 3.5 GHz $\leq f \leq 18$ GHz                  | $< 1.6$ , typ. 1.22 <sup>11</sup>          |
|   | 18 GHz $< f \leq 26.5$ GHz                    | $< 2.0$ , typ. 1.37 <sup>11</sup>          |
|   | 26.5 GHz $< f \leq 30$ GHz                    | $< 2.5$ , typ. 1.70 <sup>11</sup>          |
|   | 5 dB $\leq$ RF attenuation $\leq 9$ dB        |  |
|   | 10 MHz $\leq f < 3.5$ GHz                     | $< 1.5$ , typ. 1.24 <sup>11</sup>          |
|   | 3.5 GHz $\leq f \leq 18$ GHz                  | $< 1.8$ , typ. 1.39 <sup>11</sup>          |
|   | 18 GHz $< f \leq 26.5$ GHz                    | $< 2.2$ , typ. 1.43 <sup>11</sup>          |
|   | 26.5 GHz $< f \leq 30$ GHz                    | $< 2.5$ , typ. 1.80 <sup>11</sup>          |
|   | RF attenuation $< 4$ dB, DC coupled           |  |
|   | 10 MHz $\leq f \leq 7.5$ GHz                  | typ. 2.0 <sup>11</sup>                     |
|   | 7.5 GHz $< f \leq 26.5$ GHz                   | typ. 2.5 <sup>11</sup>                     |
| 26.5 GHz $< f \leq 30$ GHz                | typ. 3.0 <sup>11</sup>                        |  |
| VSWR of R&S®FSVA3044                      | RF attenuation $\geq 5$ dB                    |  |
|   | 10 MHz $\leq f \leq 3.5$ GHz                  | $< 1.5$ , typ. 1.3 <sup>11</sup>           |
|   | 3.5 GHz $\leq f \leq 18$ GHz                  | $< 2.0$ , typ. 1.8 <sup>11</sup>           |
|   | 18 GHz $< f \leq 26.5$ GHz                    | $< 2.2$ , typ. 2.0 <sup>11</sup>           |
|   | 26.5 GHz $< f \leq 40$ GHz                    | $< 2.5$ , typ. 2.2 <sup>11</sup>           |
|   | 40 GHz $< f \leq 44$ GHz                      | $< 2.5$ (nom.)                             |
|   | RF attenuation $< 4$ dB, DC coupled           |  |
|   | 10 MHz $\leq f \leq 7.5$ GHz                  | typ. 2.0 <sup>11</sup>                     |
|   | 7.5 GHz $< f \leq 26.5$ GHz                   | typ. 2.5 <sup>11</sup>                     |
| 26.5 GHz $< f \leq 40$ GHz                | typ. 3.0 <sup>11</sup>                        |  |
| 40 GHz $< f \leq 44$ GHz                  | 3.0 (nom.)                                    |  |
| Setting range of RF attenuator            |   | 0 dB to 75 dB, in 1 dB steps <sup>12</sup> |
| Setting range of electronic RF attenuator | with R&S®FSV3-B25 option,<br>$f \leq 7.5$ GHz | 0 dB to 25 dB, in 1 dB steps               |

### Probe power supply

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

### Noise source control and power sensor

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

<sup>11</sup> 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.

<sup>12</sup> 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.

|                      |  |  |
|----------------------|--|--|
| <b>USB interface</b> | standard CPU board                       | 5 ports, type A plug, version 2.0,<br>2 ports, type A plug, version 3.0                                      |
|                      | with R&S®FSV3-B114 option                | 5 ports, type A plug, version 2.0,<br>2 ports, type A plug, version 3.0,<br>1 port, type B plug, version 3.0 |
|                      | output current                           | 0.5 A (nom.) version 2.0,<br>0.9 A (nom.) version 3.0  |
|                      | max. sum of output current via USB ports | 2 A (nom.)   |

|                          |  |  |
|--------------------------|--|--|
| <b>Reference input 1</b> |  |  |
| Connector                |  | BNC female                                 |
| Impedance                |  | 50 Ω                                       |
| Input frequency range    |  | 1 MHz ≤ $f_{in}$ ≤ 100 MHz, in 1 ppm steps |
| Required level           |  | > 0 dBm, < 13 dBm into 50 Ω                |

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

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

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

|                                    |                         |                                |
|------------------------------------|-------------------------|--------------------------------|
| <b>External trigger/gate input</b> |                         |                                |
| 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.)                   |

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

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

|                         |                           |                             |
|-------------------------|---------------------------|-----------------------------|
| <b>External monitor</b> |                           |                             |
| Connector               | standard                  | DVI-D                       |
|                         | with R&S®FSV3-B114 option | DVI-D, display port rev 1.1 |

## General data

|   |   |  |
|---|---|--|
| <b>Display</b>                          |   | LCD TFT color display (10.1")  |
| Resolution                              |   | 1280 × 800 pixel (WXGA resolution)   |
| Pixel failure rate                      |   | $< 1 \times 10^{-5}$   |
| <b>Data storage</b>                     |   |  |
| Internal                                |   | solid state drive $\geq 50$ Gbyte (nom.)   |
| External                                |   | support of USB 2.0 and USB 3.0 compatible memory devices   |
| <b>Environmental conditions</b>         |   |  |
| 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   |
| <b>Altitude</b>                         |   |  |
| Max. operating altitude                 | above sea level                             | 4600 m (approx. 15100 ft)  |
| <b>Mechanical resistance</b>            |   |  |
| Vibration                               | sinusoidal                                  | 5 Hz to 55 Hz<br>0.15 mm constant amplitude (1.8 g at 55 Hz);<br>55 Hz to 150 Hz<br>acceleration: 0.5 g constant;<br>in line with EN 60068-2-6 |
|   | random                                      | 10 Hz to 300 Hz, acceleration 1.2 g (RMS),<br>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   |
| <b>EMC</b>                              |   | in line with EMC Directive 2004/108/EC including:<br>IEC/EN 61326-1 <sup>13, 14</sup><br>CISPR 11/EN 55011 <sup>14</sup>                       |
| <b>Recommended calibration interval</b> |   | 1 year   |
| <b>Warranty</b>                         | instrument and hardware options             | 3 years  |
|   | accessories                                 | 1 year   |
| <b>Power supply</b>                     |   |  |
| AC supply                               |   | 100 V to 240 V, 3 A to 1.25 A;<br>50 Hz to 400 Hz,<br>protection class I in line with VDE 411  |
| Power consumption                       | R&S®FSVA3004, R&S®FSVA3007                  | 120 W (nom.),<br>max. 250 W with all options   |
|   | R&S®FSVA3013, R&S®FSVA3030,<br>R&S®FSVA3044 | 170 W (nom.),<br>max. 300 W with all options   |
| Safety                                  |   | in line with EN 61010-1, IEC 61010-1,<br>UL 61010-1, CAN/CSA-C22.2 No. 61010-1   |
| Test mark                               |   | VDE, cCSA <sub>US</sub> , KC   |
| <b>Dimensions and weight</b>            |   |  |
| Dimensions (nom.)                       | W × H × D                                   | 462 mm × 197 mm × 417 mm<br>(18.15 in × 7.76 in × 16.42 in)  |
| Net weight without options (nom.)       | R&S®FSVA3004, R&S®FSVA3007                  | 12.2 kg (26.9 lb)  |
|   | R&S®FSVA3013                                | 13.6 kg (30 lb)  |
|   | R&S®FSVA3030                                | 13.8 kg (30.44 lb)   |
|   | R&S®FSVA3044                                | 14.6 kg (32.2 lb)  |

<sup>13</sup> Immunity test requirement for industrial environment (EN 61326 table 2).

<sup>14</sup> Emission limits for class A equipment apply.



# 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 $\Omega$             |
| Open-circuit voltage |  | up to 1.5 V, adjustable |

## R&S®FSV3-B5 additional interfaces

| IF output                           |  |  |
|-------------------------------------|--|--|
| Connector                           |  | BNC female, 50 $\Omega$  |
| Bandwidth                           |  | equal to bandwidth setting   |
| IF frequency                        |  | (50 kHz + $\frac{1}{2}$ RBW) to (53 MHz – $\frac{1}{2}$ RBW), selectable |
| Output level (gain versus RF input) | RF attenuation = 0 dB,<br>RF preamplifier = off, span = 0 Hz | 0 dB (nom.)  |

| Video output   |   |                                |
|----------------|---|--------------------------------|
| Connector      |   | BNC female, 50 $\Omega$        |
| Bandwidth      |   | equal to bandwidth setting     |
| Output scaling | log. display scale<br>lin. display scale  | logarithmic<br>linear          |
| Output level   | center frequency > 10 MHz, span = 0 Hz,<br>signal at reference level and center frequency | 1 V at 50 $\Omega$ 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.),<br>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       |  |                        |
|----------------------|--|------------------------|
| IEC/IEEE bus control |  | 24-pin Amphenol female |

## R&S®FSV3-B10 external generator control

|  |                         |  |
|--|-------------------------|--|
| <b>Supported signal generators</b>         |                         | 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®SMC100B, 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 |
| <b>Synchronization handshake interface</b> | standard                | LAN  |
|  | with R&S®FSV3-B5 option | LAN, TTL   |

## R&S®FSV3-B24 RF preamplifier

|                  |              |                    |
|------------------|--------------|--------------------|
| <b>Frequency</b> |              |                    |
| Frequency range  | R&S®FSVA3004 | 10 MHz to 4 GHz    |
|                  | R&S®FSVA3007 | 10 MHz to 7.5 GHz  |
|                  | R&S®FSVA3013 | 10 MHz to 13.6 GHz |
|                  | R&S®FSVA3030 | 10 MHz to 30 GHz   |
|                  | R&S®FSVA3044 | 10 MHz to 43.5 GHz |

|                      |  |                                 |
|----------------------|--|---------------------------------|
| <b>Setting range</b> |  |                                 |
| RF preamplifier gain | R&S®FSVA3004, R&S®FSVA3007, R&S®FSVA3013, R&S®FSVA3030 | 15 dB/30 dB (nom.) (selectable) |
|                      | R&S®FSVA3044   | 30 dB (nom.)                    |

|                               |  |                             |
|-------------------------------|--|-----------------------------|
| <b>Other specifications</b>   |  |                             |
| 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  |

|                                   |   |                             |
|-----------------------------------|---|-----------------------------|
| <b>Intermodulation</b>            |   |                             |
| Third-order intercept point (TOI) | electronic attenuator off or<br>electronic attenuator on and<br>RF attenuation = 0 dB | see base unit specification |
|                                   | electronic attenuator on, RF attenuation = 30 dB                                      |                             |
|                                   | 10 MHz to 7.5 GHz   | 40 dBm (nom.)               |

## Ordering information

| Designation  | Type         | Order No.    |
|--|--------------|--------------|
| Signal and spectrum analyzer, 10 Hz to 4 GHz                   | R&S®FSVA3004 | 1330.5000.05 |
| Signal and spectrum analyzer, 10 Hz to 7.5 GHz                 | R&S®FSVA3007 | 1330.5000.08 |
| Signal and spectrum analyzer, 10 Hz to 13.6 GHz                | R&S®FSVA3013 | 1330.5000.14 |
| Signal and spectrum analyzer, 10 Hz to 30 GHz                  | R&S®FSVA3030 | 1330.5000.31 |
| Signal and spectrum analyzer, 10 Hz to 44 GHz                  | R&S®FSVA3044 | 1330.5000.44 |
| <b>Accessories supplied</b>                                    |              |              |
| Power cable, quick start guide                                 |              |              |
| R&S®FSVA3030: adapter 3.5 mm (APC3.5-compatible) female/female |              |              |
| R&S®FSVA3044: adapter 2.92 mm female/female                    |              |              |

## Options

### Hardware <sup>15</sup>

| 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 | IF out, video out (2 × BNC), trigger out, aux port, aux control, GPIB                        |
| 10 Gbit/s LAN interface                           | R&S®FSV3-B6   | 1330.3913.02 | for fast remote control and fast I/Q data transfer   |
| 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®FSVA3013, R&S®FSVA3030 and R&S®FSVA3044, user-retrofittable (license key)            |
| 40 MHz analysis bandwidth                         | R&S®FSV3-B40  | 1330.4103.02 | user-retrofittable (license key)   |
| 200 MHz analysis bandwidth                        | R&S®FSV3-B200 | 1330.4132.02 | R&S®FSV3-B11 option is required for frequencies > 7.5 GHz                                    |
| 400 MHz analysis bandwidth                        | R&S®FSV3-B400 | 1330.7154.02 | R&S®FSV3-B11 option is required for frequencies > 7.5 GHz                                    |
| Spare hard drive                                  | R&S®FSV3-B18  | 1330.4003.02 | requires R&S®FSV3-B20, user-retrofittable  |
| Removable hard drive                              | R&S®FSV3-B20  | 1330.3971.02 | at front panel   |
| RF preamplifier for R&S®FSVA3004 and R&S®FSVA3007 | R&S®FSV3-B24  | 1330.4049.07 |  |
| RF preamplifier for R&S®FSVA3013                  | R&S®FSV3-B24  | 1330.4049.13 |  |
| RF preamplifier for R&S®FSVA3030                  | R&S®FSV3-B24  | 1330.4049.30 |  |
| RF preamplifier for R&S®FSVA3044                  | R&S®FSV3-B24  | 1330.4049.44 |  |
| Electronic attenuator, 1 dB steps                 | R&S®FSV3-B25  | 1330.4078.02 | user-retrofittable (license key)   |
| USB mass memory write protection                  | R&S®FSV3-B33  | 1330.4861.02 | pre-installation ex-factory, for later retrofit see instrument security manuals              |
| Enhanced computing power                          | R&S®FSV3-B114 | 1330.4910.02 |  |
| Noise source control via BNC                      | R&S®FSV3-B28V | 1330.6664.02 |  |
| 1 GHz reference                                   | R&S®FSV3-K703 | 1330.7502.02 | user-retrofittable (license key)   |

<sup>15</sup> The hardware options can be retrofitted in service center unless otherwise noted.

Firmware <sup>16</sup>

| Designation  | Type           | Order No.    | Remarks  |
|--|----------------|--------------|--|
| Pulse measurements   | R&S®FSV3-K6    | 1346.3330.02 |  |
| Analog modulation analysis for AM/FM/φM                      | R&S®FSV3-K7    | 1330.5022.02 |  |
| Power sensor support   | R&S®FSV3-K9    | 1346.3676.02 |  |
| GSM/EDGE/EDGE evolution/<br>VAMOS measurements               | 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   |
| Noise figure measurements                                    | R&S®FSV3-K30   | 1330.5045.02 | for legacy noise sources R&S®FSV3-B28V option is required              |
| Security write protection of solid state drive               | R&S®FSV3-K33   | 1346.3360.02 |  |
| Phase noise measurements                                     | R&S®FSV3-K40   | 1330.5051.02 |  |
| Vector signal analysis                                       | R&S®FSV3-K70   | 1330.5074.02 |  |
| Multi-modulation analysis                                    | R&S®FSV3-K70M  | 1346.3376.02 | R&S®FSV3-K70 option required   |
| BER PRBS measurements  | R&S®FSV3-K70P  | 1346.3382.02 | R&S®FSV3-K70 option required   |
| 3GPP FDD (WCDMA) BS measurements<br>(incl. HSDPA and HSDPA+) | R&S®FSV3-K72   | 1330.5080.02 |  |
| 3GPP FDD (WCDMA) MS measurements<br>(incl. HSUPA and HSUPA+) | R&S®FSV3-K73   | 1330.5097.02 |  |
| WLAN 802.11a/b/g measurements                                | R&S®FSV3-K91   | 1330.5100.02 |  |
| WLAN 802.11n measurements                                    | R&S®FSV3-K91N  | 1330.5139.02 | R&S®FSV3-K91 option required   |
| WLAN 802.11ac measurements                                   | R&S®FSV3-K91AC | 1330.5116.02 |  |
| WLAN 802.11ax measurements                                   | R&S®FSV3-K91AX | 1346.3399.02 |  |
| WLAN 802.11p measurements                                    | R&S®FSV3-K91P  | 1330.5122.02 |  |
| EUTRA/LTE FDD BS measurements                                | R&S®FSV3-K100  | 1330.5145.02 |  |
| EUTRA/LTE FDD UE measurements                                | R&S®FSV3-K101  | 1330.5151.02 |  |
| EUTRA/LTE BS MIMO measurements                               | R&S®FSV3-K102  | 1330.5168.02 | R&S®FSV3-K100 or R&S®FSV3-K104 option required                         |
| EUTRA/LTE UL advanced UL measurements                        | R&S®FSV3-K103  | 1330.7231.02 | R&S®FSV3-K101 or R&S®FSV3-K105 option required                         |
| EUTRA/LTE TDD BS measurements                                | R&S®FSV3-K104  | 1330.5174.02 |  |
| EUTRA/LTE TDD uplink measurements                            | R&S®FSV3-K105  | 1330.5180.02 |  |
| EUTRA/LTE NB-IoT downlink measurements                       | R&S®FSV3-K106  | 1346.3418.02 |  |
| 3GPP 5G-NR DL measurements                                   | R&S®FSV3-K144  | 1330.7219.02 |  |
| 3GPP 5G-NR UL measurements                                   | R&S®FSV3-K145  | 1330.7225.02 |  |
| User defined frequency correction by SnP file                | R&S®FSV3-K544  | 1346.3630.02 | corrects frequency response (amplitude and phase) of measurement setup |

## PC software

| Designation                              | Type                       | Order No.                  |
|--|----------------------------|----------------------------|
| R&S®VSE Basic Edition <sup>17, 18</sup>  | R&S®VSE                    | 1345.1011.06 <sup>19</sup> |
| R&S®VSE Enterprise Edition <sup>20</sup> | R&S®VSE Enterprise Edition | 1345.1105.06 <sup>19</sup> |
| <b>License dongle</b>                    |                            |                            |
| License dongle                           | R&S®FSPC                   | 1310.0002.03               |
| Floating license dongle                  | R&S®FSPC-FL                | 1310.0002.04               |
| <b>Service option</b>                    |                            |                            |
| R&S®VSE software maintenance             | R&S®VSE-SWM                | 1320.7622.81               |

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

<sup>16</sup> For measurements with analysis bandwidths > 28 MHz an appropriate bandwidth option is required.

<sup>17</sup> Requires R&S®FSPC.

<sup>18</sup> Not available for R&S®FSPC-FL.

<sup>19</sup> 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.

<sup>20</sup> Requires R&S®FSPC or R&S®FSPC-FL.

## 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  | R&S®ZZA-KN4        | 1175.3033.00                          |
| <b>Noise Sources</b>  |                    |                                       |
| Smart noise sources for noise figure and gain measurements up to 55 GHz (requires R&S®FSV3-K30)         | R&S®FS-SNS26/40/55 | 1338.8008.xx<br>(xx = 26/40/55)       |
| <b>Matching pads, 50/75 Ω</b>   |                    |                                       |
| L section, matching at both ends  | R&S®RAM            | 0358.5414.02                          |
| Series resistor, 25 Ω, matching at one end<br>(taken into account in instrument function RF INPUT 75 Ω) | R&S®RAZ            | 0358.5714.02                          |
| <b>High-power attenuators</b>   |                    |                                       |
| 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.xx<br>(xx = 03/06/10/20/30) |
| 50 W, 3/6/10/20/30 dB, 2 GHz  | R&S®RBU50          | 1073.8695.xx<br>(xx = 03/06/10/20/30) |
| 50 W, 20 dB, 6 GHz  | R&S®RDL50          | 1035.1700.52                          |
| <b>RF adapters and cables</b>   |                    |                                       |
| Coaxial adapter 2.92 mm (f) - 2.92 mm (f)   |                    | 3588.8664.00                          |
| Coaxial adapter 3.5 mm (f) - 3.5 mm (f), APC3.5-compatible  |                    | 3587.7793.00                          |
| Coaxial adapter 3.5 mm (m) - 3.5 mm (m), APC3.5-compatible  |                    | 3587.7770.00                          |
| Coaxial adapter N (f) - 3.5 mm (m), APC3.5-compatible   |                    | 3587.7806.00                          |
| Coaxial adapter N (f) - 3.5 mm (f), APC3.5-compatible   |                    | 3587.7829.00                          |
| Coaxial cable SMA (m) - SMA (m), length: 1 m  |                    | 3586.9970.00                          |
| <b>Connectors and cables</b>  |                    |                                       |
| 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 high speed digital baseband interfaces of Rohde & Schwarz instruments              | R&S®DIGIQ-HS       | 3641.2948.03                          |
| <b>DC block</b>   |                    |                                       |
| DC block, 10 kHz to 18 GHz (N type)   | R&S®FSE-Z4         | 1084.7443.02                          |
| <b>Tools</b>  |                    |                                       |
| Torque wrench for type N connectors,<br>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,<br>0.9 Nm coupling torque (for R&S® FSV3030/3044)    | R&S®ZN-ZTW         | 1328.8534.35                          |

## Power sensors supported by the R&S®FSV3-K9 option <sup>21</sup>

| Designation   | Type          | Order No.    |
|---|---------------|--------------|
| <b>Universal power sensors</b>                                  |               |              |
| 10 MHz to 8 GHz, 100 mW, two-path                               | R&S®NRP-Z211  | 1417.0409.02 |
| 10 MHz to 8 GHz, 200 mW <sup>22</sup>                           | R&S®NRP-Z11   | 1138.3004.02 |
| 10 MHz to 18 GHz, 100 mW, two-path <sup>22</sup>                | R&S®NRP-Z221  | 1417.0309.02 |
| 10 MHz to 18 GHz, 200 mW <sup>22</sup>                          | R&S®NRP-Z21   | 1137.6000.02 |
| 10 MHz to 18 GHz, 2 W <sup>22</sup>                             | R&S®NRP-Z22   | 1137.7506.02 |
| 10 MHz to 18 GHz, 15 W <sup>22</sup>                            | R&S®NRP-Z23   | 1137.8002.02 |
| 10 MHz to 18 GHz, 30 W <sup>22</sup>                            | R&S®NRP-Z24   | 1137.8502.02 |
| <b>Power sensor modules with power splitter</b>                 |               |              |
| 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 |
| <b>Thermal power sensors <sup>23</sup></b>                      |               |              |
| 0 Hz to 18 GHz, 100 mW  | R&S®NRP18T    | 1424.6115.02 |
| 0 Hz to 18 GHz, 100 mW  | 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  | 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  | 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  | 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  | R&S®NRP67TN   | 1424.6209.02 |
| 0 Hz to 110 GHz, 100 mW   | R&S®NRP110T   | 1424.6215.02 |
| <b>Thermal waveguide power sensors</b>                          |               |              |
| 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 |
| <b>Average power sensors <sup>23</sup></b>                      |               |              |
| 8 kHz to 6 GHz, 200 mW  | R&S®NRP6A     | 1424.6796.02 |
| 8 kHz to 6 GHz, 200 mW  | R&S®NRP6AN    | 1424.6809.02 |
| 9 kHz to 6 GHz, 200 mW <sup>22</sup>                            | 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   | R&S®NRP18AN   | 1424.6821.02 |
| <b>Three path diode power sensors <sup>23</sup></b>             |               |              |
| 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 |
| <b>Wideband power sensors <sup>23</sup></b>                     |               |              |
| 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 |

<sup>21</sup> For average power measurement only.

<sup>22</sup> Product discontinued.

<sup>23</sup> 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.

## Service options

| Warranty  |         |   |
|---|---------|---|
| Standard  |         | 3 years <sup>24</sup>                                   |
| 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 accredited calibration coverage, one year  | R&S®AW1 |   |
| Extended warranty with accredited calibration coverage, two years | R&S®AW2 |   |

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

Repairs carried out during the contract term are free of charge <sup>25</sup>. 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 <sup>25</sup> and calibration at the recommended intervals as well as any calibration carried out during repairs or option upgrades.

### Extended warranty with accredited calibration (AW1 and AW2)

Enhance your extended warranty by adding accredited calibration coverage at a package price. This package ensures that your Rohde & Schwarz product is regularly calibrated under accreditation, inspected and maintained during the term of the contract. It includes all repairs <sup>25</sup> and accredited calibration at the recommended intervals as well as any accredited calibration carried out during repairs or option upgrades.

<sup>24</sup> For instrument and hardware options. For accessories 1 year applies.

<sup>25</sup> Excluding defects caused by incorrect operation or handling and force majeure. Wear-and-tear parts are not included.

## Service that adds value

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

## Rohde & Schwarz

The Rohde & Schwarz electronics group offers innovative solutions in the following business fields: test and measurement, broadcast and media, secure communications, cybersecurity, monitoring and network testing. Founded more than 80 years ago, the independent company which is headquartered in Munich, Germany, has an extensive sales and service network with locations in more than 70 countries.

[www.rohde-schwarz.com](http://www.rohde-schwarz.com)

## Sustainable product design

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

Certified Quality Management  
**ISO 9001**

Certified Environmental Management  
**ISO 14001**

## Rohde & Schwarz training

[www.training.rohde-schwarz.com](http://www.training.rohde-schwarz.com)

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