

R&S® FSV3000 SIGNAL AND SPECTRUM ANALYZER

Specifications

3
year
warranty



Data Sheet
Version 09.00

ROHDE & SCHWARZ

Make ideas real



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Definitions

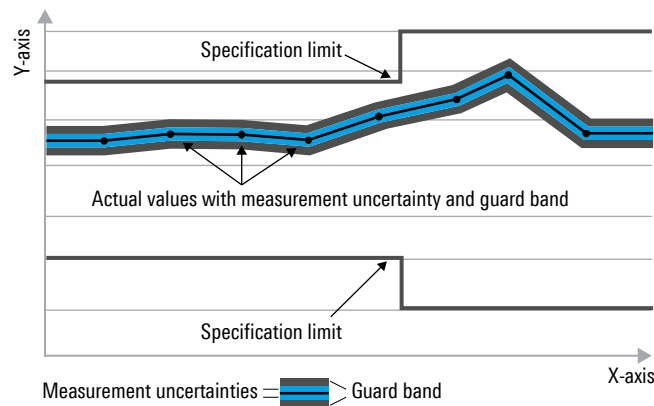
General

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.



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/3GPP2 standard, chip rates are specified in million chips per second (Mcps), whereas bit rates and symbol rates are specified in billion bits per second (Gbps), million bits per second (Mbps), thousand bits 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

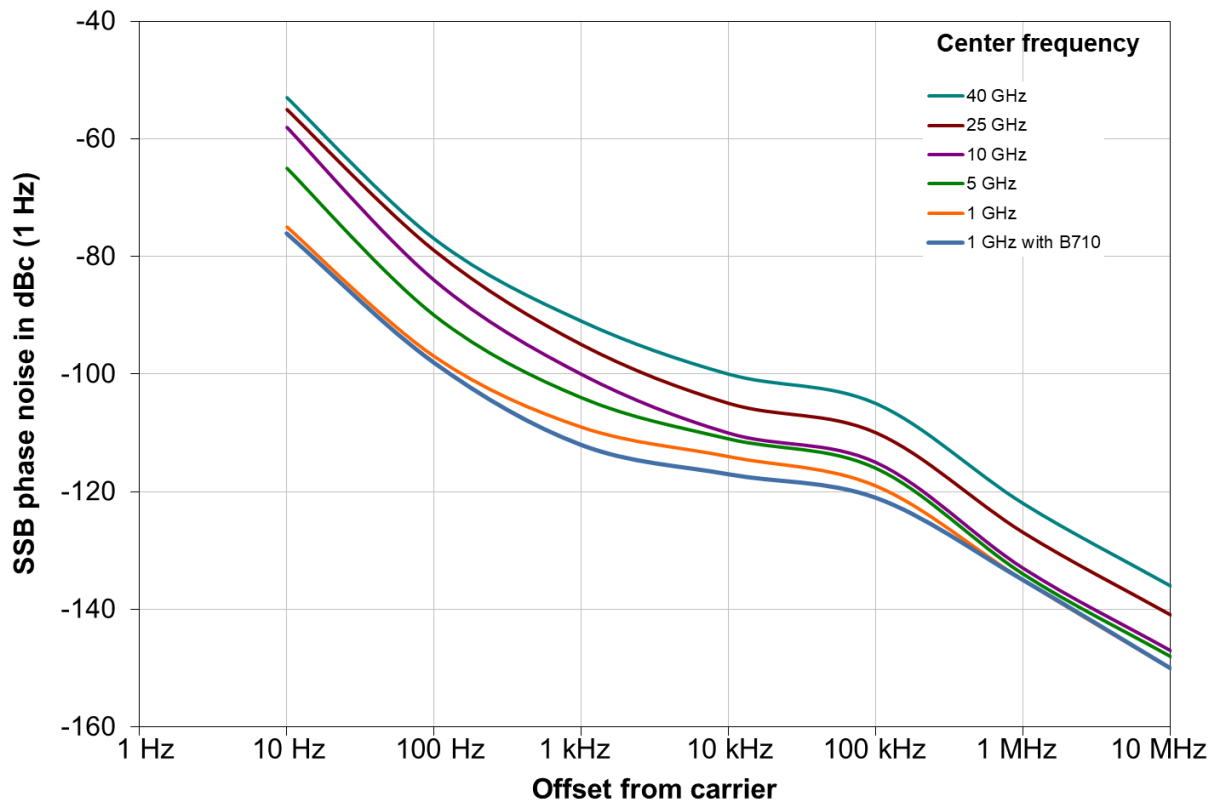
Frequency

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	
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		$\pm(\text{marker frequency} \times \text{reference accuracy} + 10 \% \times \text{resolution bandwidth} + \frac{1}{2} (\text{span} / (\text{sweep points} - 1)) + 1 \text{ Hz})$
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

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 filters		
Resolution bandwidths (-3 dB)	standard	1 Hz to 10 MHz in 1/2/3/5 sequence
	with R&S®FSV3-B8E option ³	20 MHz, 28 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
Bandwidth uncertainty		< 2 % (nom.)
Shape factor 60 dB:3 dB		< 2 (nom.)

Video bandwidths		1 Hz to 10 MHz in 1/2/3/5 sequence
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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 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 ⁴		
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)
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®FSV3-B24 option, RF preamplifier = 30 dB, RF attenuation = 0 dB	
	$f \leq 7.5$ GHz	-20 dBm (nom.)
Third order intercept point (TOI)	$f > 7.5$ GHz	-23 dBm (nom.)
	RF attenuation = 0 dB, RF preamplifier = off, YIG preselector on for $f \geq 7.5$ GHz, level = -15 dBm (both), $\Delta f > 5 \times$ RBW or 10 kHz, whichever is larger	
	R&S®FSV3004, R&S®FSV3007	
	$10 \text{ MHz} \leq f_{in} < 100 \text{ MHz}$	> 12 dBm, typ. 15 dBm
	$100 \text{ MHz} \leq f_{in} \leq 7.5 \text{ GHz}$	> 15 dBm, typ. 18 dBm
	R&S®FSV3013, R&S®FSV3030, R&S®FSV3044, YIG preselector on for $f \geq 7.5$ GHz	
	$10 \text{ MHz} \leq f_{in} \leq 30 \text{ GHz}$	> 15 dBm, typ. 18 dBm
	$30 \text{ GHz} < f_{in} \leq 44 \text{ GHz}$	> 12 dBm, typ. 15 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 = -45 dBm (both), $\Delta f > 5 \times$ RBW or 10 kHz, whichever is larger	
	$10 \text{ MHz} \leq f_{in} \leq 44 \text{ GHz}$	-18 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	
	$100 \text{ MHz} < f_{in} \leq 22 \text{ GHz}$	10 dBm (nom.)

⁴ Maximum input level while instrument is in operation.

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, log. 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 ≤ 7.5 GHz	-148 dBm, typ. -151 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 < 6 GHz	-148 dBm, typ. -151 dBm
	6 GHz ≤ f ≤ 13.6 GHz	-145 dBm, typ. -147 dBm
	R&S®FSV3030, R&S®FSV3044	
	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	-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 ≤ 34 GHz	-143 dBm, typ. -146 dBm
	34 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®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	
	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	
	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	
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®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 ⁵	
	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
Improvement with noise cancellation	for noise-like signals	
	10 MHz < f ≤ 43.5 GHz	13 dB (nom.)
	f > 43.5 GHz	0 dB (nom.)

⁵ The frequency range of the RF preamplifier for the R&S®FSV3044 is limited to 43.5 GHz.

Spurious responses

Image response	YIG preselector on for $f \geq 7.5$ GHz, mixer level ≤ -10 dBm ⁶ , sweep optimization: auto or dynamic	
	20 MHz $\leq f \leq 7.5$ 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 $< f \leq 30$ GHz	
	$f_{in} \pm 2 \times 732$ MHz (first IF)	< -80 dBc
	$f_{in} - 2 \times 92$ MHz (second IF)	< -80 dBc
	30 GHz $< f \leq 44$ GHz	
	$f_{in} \pm 2 \times 732$ MHz (first IF)	< -70 dBc
	$f_{in} - 2 \times 92$ MHz (second IF)	< -80 dBc
	f_{in} = external interfering signal frequency	
	Intermediate frequency response	f_{in} = first IF (8796 MHz)
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	
	$f \leq 1$ MHz	< -90 dBm
	1 MHz $< f \leq 7.5$ GHz	< -103 dBm
	7.5 GHz $< f \leq 44$ GHz	< -100 dBm
	f = receive frequency	
Local oscillator related spurious	$f < 15$ GHz	
	1 kHz \leq carrier offset ≤ 10 MHz	< -70 dBc
	carrier offset > 10 MHz	< -80 dBc
	15 GHz $\leq f \leq 30$ GHz	
	1 kHz \leq carrier offset ≤ 10 MHz	< -64 dBc
	carrier offset > 10 MHz	< -74 dBc
	30 GHz $< f \leq 44$ GHz	
	1 kHz \leq 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.)

⁶ 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 $< f \leq 44$ 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 ≤ 10 dB, RF preamplifier = on ⁵ , 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, referenced to RF attenuation = 10 dB	< 0.2 dB ($\sigma = 0.07$ dB)
Uncertainty of reference level setting		0 dB ⁷
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	< 0.12 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 $< f \leq 44$ GHz	1.97 dB

⁷ 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 ≥ 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 ≥ 10 Hz	7.81 ns (nom.)
	span = 0 Hz, trigger offset ≥ 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		7.81 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	$500 \text{ MHz} \leq f \leq 7.5 \text{ GHz}$	$f_{\text{center}} \pm 250 \text{ MHz (nom.)}^8$
	$f > 7.5 \text{ GHz}$	$f_{\text{center}} \pm 250 \text{ MHz (nom.)}$
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 ≤ 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.)

⁸ 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
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 ⁹
	with R&S®FSV3-B40 option	40 MHz ⁹
	with R&S®FSV3-B200 option	200 MHz ⁹

Signal analysis bandwidth ≤ 40 MHz ⁹		
Amplitude flatness	(1.25 × signal analysis bandwidth) ≤ f _{center} ≤ 7.5 GHz	±0.3 dB (nom.)
	f _{center} > 7.5 GHz, YIG preselector off	±0.5 dB (nom.)
Deviation from linear phase	(1.25 × signal analysis bandwidth) ≤ f _{center} ≤ 7.5 GHz	±1° (nom.)
	f _{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 _{center} ≥ 100 MHz, two -30 dBm tones at input mixer within analysis bandwidth	-80 dBc (nom.)
Residual spurious response	RF attenuation = 0 dB, f _{center} ≥ 100 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.)

⁹ For f > 7.5 GHz, R&S®FSV3-B11 option is required and YIG preselector = off must be set.

Signal analysis bandwidth 40 MHz to 200 MHz ^{10, 11}		
Amplitude flatness	RF attenuation ≥ 10 dB, RF preamplifier = off, YIG preselector off for $f > 7.5$ GHz	
	$150 \text{ MHz} \leq f_{\text{center}} < 4 \text{ GHz}$	$\pm 0.5 \text{ dB (nom.)}$ ¹²
	$4 \text{ GHz} \leq f_{\text{center}} \leq 7.5 \text{ GHz}$	$\pm 0.7 \text{ dB (nom.)}$ ¹²
	$7.5 \text{ GHz} < f_{\text{center}} \leq 26.5 \text{ GHz}$	$\pm 1.0 \text{ dB (nom.)}$ ¹²
Deviation from linear phase	RF attenuation ≥ 10 dB, RF preamplifier = off, YIG preselector off for $f > 7.5$ GHz	
	$150 \text{ MHz} \leq f_{\text{center}} < 4 \text{ GHz}$	$\pm 2^\circ \text{ (nom.)}$ ¹³
	$4 \text{ GHz} \leq f_{\text{center}} \leq 7.5 \text{ GHz}$	$\pm 2.5^\circ \text{ (nom.)}$ ¹³
	$7.5 \text{ GHz} < f_{\text{center}} \leq 26.5 \text{ GHz}$	$\pm 3^\circ \text{ (nom.)}$ ¹³
Nonlinearity of displayed level	0 dB to -70 dB	
	$150 \text{ MHz} \leq f_{\text{center}} < 4 \text{ GHz}$	$\pm 2^\circ \text{ (nom.)}$ ¹³
	$4 \text{ GHz} \leq f_{\text{center}} \leq 7.5 \text{ GHz}$	$\pm 2.5^\circ \text{ (nom.)}$ ¹³
	$7.5 \text{ GHz} < f_{\text{center}} \leq 26.5 \text{ GHz}$	$\pm 3^\circ \text{ (nom.)}$ ¹³
Level measurement uncertainty at center frequency		$< 0.15 \text{ dB (nom.)}$
Displayed average noise level 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	$f_{\text{center}} \geq 150 \text{ MHz}$, two -25 dBm tones at input mixer within analysis bandwidth	-75 dBc (nom.)
Residual spurious response	RF attenuation = 0 dB, $f_{\text{center}} \geq 150 \text{ MHz}$	-90 dBm (nom.)
ADC related spurious response	single tone within analysis bandwidth, mixer level = -10 dBm ⁶ , reference level = signal level, $f_{\text{center}} \geq 150 \text{ MHz}$	-75 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.)

¹⁰ The specifications in this section apply for the temperature range from $+20 \text{ }^\circ\text{C}$ to $+30 \text{ }^\circ\text{C}$.

¹¹ 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.

¹² With R&S®FSV3-B24 option installed, add 0.2 dB to the specifications.

¹³ With R&S®FSV3-B24 option installed, add 1° to the specifications.

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)
VSWR of R&S®FSV3004, R&S®FSV3007	RF attenuation ≥ 10 dB	
	10 MHz $\leq f < 1$ GHz	< 1.2 , typ. 1.09 ¹⁴
	1 GHz $\leq f < 3.6$ GHz	< 1.5 , typ. 1.19 ¹⁴
	3.6 GHz $\leq f \leq 7.5$ GHz	< 2.0 , typ. 1.42 ¹⁴
	5 dB \leq RF attenuation ≤ 9 dB	
	10 MHz $\leq f < 3.6$ GHz	< 1.5 , typ. 1.31 ¹⁴
	3.6 GHz $\leq f \leq 7.5$ GHz	< 2.0 , typ. 1.51 ¹⁴
VSWR of R&S®FSV3013, R&S®FSV3030, R&S®FSV3044	RF attenuation ≥ 5 dB	
	10 MHz $\leq f \leq 3.5$ GHz	< 1.5 , typ. 1.3 ¹⁴
	3.5 GHz $\leq f \leq 18$ GHz	< 2.0 , typ. 1.8 ¹⁴
	18 GHz $< f \leq 26.5$ GHz	< 2.2 , typ. 2.0 ¹⁴
	26.5 GHz $< f \leq 40$ GHz	< 2.5 , typ. 2.2 ¹⁴
	40 GHz $< f \leq 44$ GHz	2.5 (nom.)
	RF attenuation ≤ 4 dB, DC coupled	
10 MHz $\leq f \leq 7.5$ GHz	typ. 1.87	
Setting range of RF attenuator		0 dB to 75 dB, in 5 dB steps ¹⁵
	with R&S®FSV3-B25 option	0 dB to 75 dB, in 1 dB steps ¹⁵
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.)

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 \times 10 Gbit/s, 1 \times 5 Gbit/s)
	output current	0.5 A (nom.), version 2.0, 0.9 A (nom.), version 3.0/3.1
	max. sum of output current via USB ports	2 A (nom.)

¹⁴ 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.

¹⁵ 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.

Reference input 1		
Connector		BNC female
Impedance		50 Ω
Input frequency range		1 MHz $\leq f_{in} \leq$ 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 \times input/output, selectable
	with R&S®FSV3-B5 option	1 \times 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 k Ω (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	10BASE-T/100BASE-T/1000BASE-T
	with R&S®FSV3-B6 option	10GBASE-T in addition
Connector		RJ-45

External monitor		
Connector	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-B114 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
Altitude		
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	10 Hz to 300 Hz, acceleration: 1.2 g (RMS), in line with EN 60068-2-64
Shock		40 g shock spectrum, in line with MIL-STD-810E method no. 516.4 procedure I, MIL-PRF-28800F, class 3
EMC		in line with EMC Directive 2014/30/EU including: <ul style="list-style-type: none"> • IEC/EN 61326-1^{16, 17} • CISPR 11/EN 55011¹⁷
Recommended calibration interval		1 year
Warranty	instrument and hardware options	3 years
	accessories	1 year
Power supply		
AC supply		100 V to 240 V, 3 A to 1.25 A; 50 Hz to 60 Hz, 400 Hz, protection class I, in line with VDE 411
Power consumption	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
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

¹⁶ Immunity test requirement for industrial environment (EN 61326 table 2).

¹⁷ Emission limits for class A equipment apply.

Dimensions and weight		
Dimensions (nom.)	W × H × D	462 mm × 197 mm × 417 mm (18.15 in × 7.76 in × 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)

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 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	log. display scale lin. display scale	logarithmic linear
Output level	center frequency > 10 MHz, span = 0 Hz, signal at reference level and center frequency	1 V at 50 Ω load (nom.)

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		
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®SMU200A, R&S®SMW200A
Synchronization handshake interface	standard	LAN
	with R&S®FSV3-B5 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 400 MHz	768 MHz
	> 400 MHz	1536 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

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

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-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
Accessories supplied		
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		

Options

Hardware ¹⁸

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	requires R&S®FSV3-B114 option
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, requires R&S®FSV3-B114 option
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 and R&S®FSV3044, 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 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
LO/IF connections, for external mixers	R&S®FSV3-B21	1330.4010.02	ex-factory only; not available for R&S®FSV3004, R&S®FSV3007, R&S®FSV3013

¹⁸ The hardware options can be retrofitted in service center unless otherwise noted.

Designation	Type	Order No.	Remarks
RF preamplifier, for R&S®FSV3004 and R&S®FSV3007	R&S®FSV3-B24	1330.4049.07	
RF preamplifier, for R&S®FSV3013	R&S®FSV3-B24	1330.4049.13	
RF preamplifier, for R&S®FSV3030	R&S®FSV3-B24	1330.4049.30	
RF preamplifier, for R&S®FSV3044	R&S®FSV3-B24	1330.4049.44	
Electronic attenuator, 1 dB steps	R&S®FSV3-B25	1330.4078.02	user-retrofitable (license key)
Enhanced computing power	R&S®FSV3-B114	1330.4910.03	not retrofittable
Noise source control via BNC	R&S®FSV3-B28V	1330.6664.02	
1 GHz reference	R&S®FSV3-K703	1330.7502.02	user-retrofitable (license key)
Enhanced performance, for R&S®FSV3004	R&S®FSV3-B710	1346.4950.04	enhanced phase noise specifications, requires R&S®FSV3-B114, not retrofittable
Enhanced performance, for R&S®FSV3007	R&S®FSV3-B710	1346.4950.07	enhanced phase noise specifications, requires R&S®FSV3-B114, not retrofittable
Enhanced performance, for R&S®FSV3013	R&S®FSV3-B710	1346.4950.13	enhanced phase noise specifications, requires R&S®FSV3-B114, not retrofittable
Enhanced performance, for R&S®FSV3030	R&S®FSV3-B710	1346.4950.30	enhanced phase noise specifications, requires R&S®FSV3-B114, not retrofittable
Enhanced performance, for R&S®FSV3044	R&S®FSV3-B710	1346.4950.43	enhanced phase noise specifications, requires R&S®FSV3-B114, not retrofittable
Floating license smart card, with USB adapter	R&S®FSV3-FL	1345.1957.02	enhanced phase noise specifications, requires R&S®FSV3-B114, not retrofittable

Firmware ¹⁹

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	
Power sensor support	R&S®FSV3-K9	1346.3676.02	
GSM/EDGE/EDGE Evolution/ VAMOS measurements ²⁰	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 ²⁰	R&S®FSV3-K30	1330.5045.02	for legacy noise sources R&S®FSV3-B28V option is required
Phase noise measurements ²⁰	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
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
Vector signal analysis ²⁰	R&S®FSV3-K70	1330.5074.02	
Multi-modulation analysis ²⁰	R&S®FSV3-K70M	1346.3376.02	R&S®FSV3-K70 option required
BER PRBS measurements ²⁰	R&S®FSV3-K70P	1346.3382.02	R&S®FSV3-K70 option required
3GPP FDD (WCDMA) base station measurements (incl. HSDPA and HSDPA+) ²⁰	R&S®FSV3-K72	1330.5080.02	
3GPP FDD (WCDMA) mobile station measurements (incl. HSUPA and HSUPA+) ²⁰	R&S®FSV3-K73	1330.5097.02	
WLAN 802.11a/b/g measurements ²⁰	R&S®FSV3-K91	1330.5100.02	
WLAN 802.11n measurements ²⁰	R&S®FSV3-K91N	1330.5139.02	R&S®FSV3-K91 option required
WLAN 802.11ac measurements ²⁰	R&S®FSV3-K91AC	1330.5116.02	
WLAN 802.11ax measurements ²⁰	R&S®FSV3-K91AX	1346.3399.02	
WLAN 802.11p measurements ²⁰	R&S®FSV3-K91P	1330.5122.02	
WLAN IEEE802.11be measurements ²⁰	R&S®FSV3-K91BE	1346.4966.02	
EUTRA/LTE FDD base station measurements ²⁰	R&S®FSV3-K100	1330.5145.02	
EUTRA/LTE FDD UE measurements ²⁰	R&S®FSV3-K101	1330.5151.02	
EUTRA/LTE base station MIMO measurements ²⁰	R&S®FSV3-K102	1330.5168.02	R&S®FSV3-K100 or R&S®FSV3-K104 option required
EUTRA/LTE-Advanced uplink measurements ²⁰	R&S®FSV3-K103	1330.7231.02	R&S®FSV3-K101 or R&S®FSV3-K105 option required
EUTRA/LTE TDD base station measurements ²⁰	R&S®FSV3-K104	1330.5174.02	
EUTRA/LTE TDD uplink measurements ²⁰	R&S®FSV3-K105	1330.5180.02	
EUTRA/LTE NB-IoT downlink measurements ²⁰	R&S®FSV3-K106	1346.3418.02	

¹⁹ For measurements with analysis bandwidths > 28 MHz an appropriate bandwidth option is required.

²⁰ Also available as floating license. Order number is xxxx.xxxx.51 instead of xxxx.xxxx.02 and requires R&S®FSV3-FL hardware option.

Designation	Type	Order No.	Remark
5G NR Rel. 15 downlink measurements ²⁰	R&S®FSV3-K144	1330.7219.02	
5G NR Rel. 15 uplink measurements ²⁰	R&S®FSV3-K145	1330.7225.02	
5G NR combined ACLR/SEM/EVM measurements ²⁰	R&S®FSV3-K147	1346.4250.02	R&S®FSV3-K144 option required
5G NR Rel. 16 extension for uplink/downlink measurements ²⁰	R&S®FSV3-K148	1346.4914.02	R&S®FSV3-K144 or R&S®FSV3-K145 option required
User defined frequency correction by SnP file ²⁰	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	
Health and utilization monitoring service (HUMS)	R&S®FSV3-K980	1346.4943.02	

PC software

Designation	Type	Order No
R&S®VSE basic edition ^{21, 22, 23}	R&S®VSE	1345.1011.06
R&S®VSE enterprise edition ^{23, 24}	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, refer to document PD 3607.1371.22 (specifications) and PD 3607.1371.12 (product brochure).

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	

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
Noise sources		
Smart noise sources for noise figure and gain measurements up to 55 GHz (requires R&S®FSV3-K30)	R&S®FS-SNS18/ R&S®FS-SNS26/ R&S®FS-SNS40/ R&S®FS-SNS55	1338.8008.18, 1338.8008.26, 1338.8008.40, 1338.8008.55
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

²¹ Requires R&S®FSPC.

²² Not available for R&S®FSPC-FL.

²³ 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.

²⁴ Requires R&S®FSPC or R&S®FSPC-FL.

Designation	Type	Order No.
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, 2.92 mm (f) – 2.92 mm (f)		3588.8664.00
Coaxial adapter, 3.5 mm (f) – 3.5 mm (f), APC3.5-compatible		3689.9442.00
Coaxial adapter, 3.5 mm (m) – 3.5 mm (m), APC3.5-compatible		3587.7770.00
Coaxial adapter, type N (f) – 3.5 mm (m), APC3.5-compatible		3587.7806.00
Coaxial adapter, type N (f) – 3.5 mm (f), APC3.5-compatible		3587.7829.00
Coaxial cable, SMA (m) – SMA (m), length: 1 m		3586.9970.00
Connectors and cables		
Probe power connector, 3-pin		1065.9480.00
Type N 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
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
External harmonic mixers (for R&S®FSV3030 and R&S®FSV3044 with R&S®FSV3-B21 option)		
Harmonic mixer, 40 GHz to 60 GHz	RPG FS-Z60 ²⁵	1048.0171.02
Harmonic mixer, 50 GHz to 75 GHz	RPG FS-Z75 ²⁵	3638.2240.02
Harmonic mixer, 60 GHz to 90 GHz	RPG FS-Z90 ²⁵	3638.2270.02
Harmonic mixer, 75 GHz to 110 GHz	RPG FS-Z110 ²⁵	3638.2292.02
Harmonic mixer, 90 GHz to 140 GHz	RPG FS-Z140 ²⁵	3622.0708.02
Harmonic mixer, 110 GHz to 170 GHz	RPG FS-Z170 ²⁵	3622.0714.02
Harmonic mixer, 140 GHz to 220 GHz	RPG FS-Z220 ²⁵	3593.3250.02
Harmonic mixer, 220 GHz to 325 GHz	RPG FS-Z325 ²⁵	3593.3267.02
Harmonic mixer, 325 GHz to 500 GHz	RPG FS-Z500 ²⁵	3593.3273.02
Waveguide to coaxial adapters		
Waveguide to coaxial adapter, WR10 – 1 mm (f)	WCA110	3626.1067.02
Waveguide to coaxial adapter, WR10 – 1 mm (m)	WCA110	3626.1067.03
Waveguide to coaxial adapter, WR12 – 1 mm (m)	WCA90	3626.1050.03
Waveguide to coaxial adapter, WR15 – 1 mm (f)	WCA75	3626.1044.02
Waveguide to coaxial adapter, WR15 – 1 mm (m)	WCA75	3626.1044.03
Waveguide to coaxial adapter, WR12 – 1 mm (f)	WCA90	3626.1050.02
Horn antennas		
Horn antenna, 110 GHz to 170 GHz	FH-SG-170	3629.2493.02
Horn antenna, 26 GHz to 40 GHz	FH-SG-40	3629.2393.02
Horn antenna, 50 GHz to 75 GHz	FH-SG-75	3629.2458.02
Horn antenna, 60 GHz to 90 GHz	FH-SG-90	3629.2464.02
Tools		
Torque wrench, for type N connectors, 1.5 Nm coupling torque (for R&S®FSV3004/R&S®FSV3007/R&S®FSV3013)	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/R&S®FSV3044)	R&S®ZN-ZTW	1328.8534.35

²⁵ RPG is the abbreviation of Radiometer Physics GmbH, a Rohde & Schwarz company.

Power sensors supported by the R&S®FSV3-K9 option ²⁶

Designation	Type	Order No.
Universal power sensors		
10 MHz to 8 GHz, 100 mW, two-path	R&S®NRP-Z211	1417.0409.02
10 MHz to 8 GHz, 200 mW ²⁷	R&S®NRP-Z11	1138.3004.02
10 MHz to 18 GHz, 100 mW, two-path ²⁷	R&S®NRP-Z221	1417.0309.02
10 MHz to 18 GHz, 200 mW ²⁷	R&S®NRP-Z21	1137.6000.02
10 MHz to 18 GHz, 2 W ²⁷	R&S®NRP-Z22	1137.7506.02
10 MHz to 18 GHz, 15 W ²⁷	R&S®NRP-Z23	1137.8002.02
10 MHz to 18 GHz, 30 W ²⁷	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 ²⁸		
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 ²⁸		
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 ²⁷	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 ²⁸		
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		1424.6415.02

²⁶ For average power measurement only.

²⁷ Product discontinued.

²⁸ 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 ²⁸		
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

Service options

Warranty		
Standard		3 years ²⁹
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	
DAkkS calibration (ISO 17025, ISO 9000)	R&S®FSV3000ACA	

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

Repairs carried out during the contract term are free of charge ³⁰. 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 ³⁰ 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 ³⁰ and accredited calibration at the recommended intervals as well as any accredited calibration carried out during repairs or option upgrades.

²⁹ For instrument and hardware options. For accessories 1 year applies.

³⁰ 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

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