

R&S® FSV

Signal and Spectrum Analyzer

Specifications



75 Years of
Driving
Innovation



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Specifications

Specifications apply under the following conditions: 30 minutes warm-up time at ambient temperature, specified environmental conditions met, calibration cycle adhered to, and all internal automatic adjustments performed. Data without tolerances: typical values only. Data designated "nominal" applies to design parameters and is not tested.

Rohde & Schwarz equipment is designed for reliable operation up to an altitude of 3000 m above sea level, and for transport up to an altitude of 4500 m above sea level.

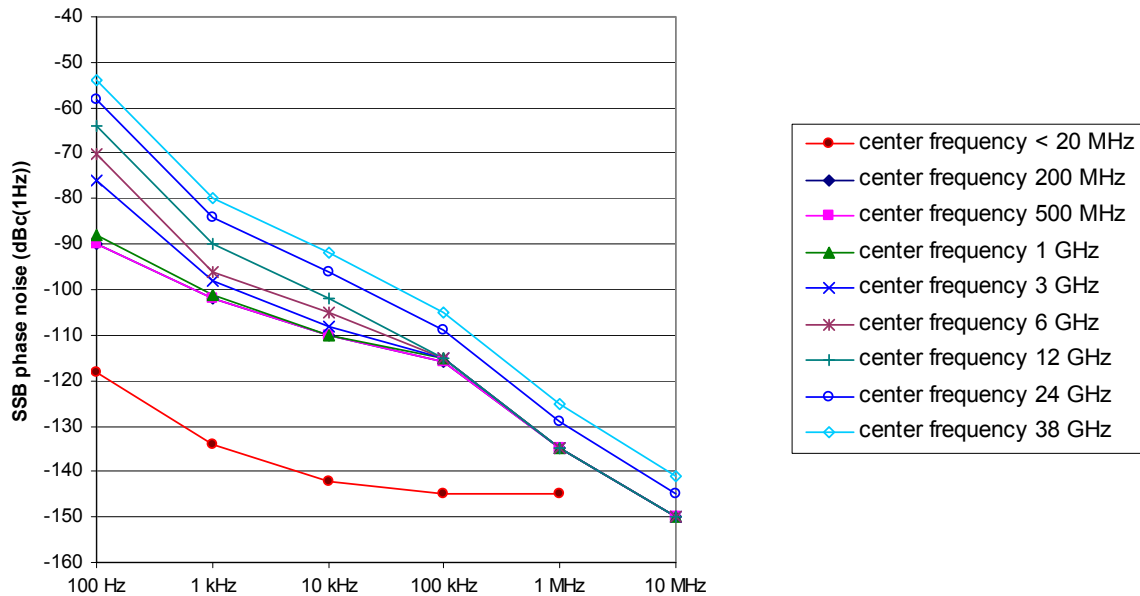
Frequency

Frequency range	R&S®FSV3	
	DC-coupled	9 kHz to 3.6 GHz
	AC-coupled	1 MHz to 3.6 GHz
	R&S®FSV7	
	DC-coupled	9 kHz to 7 GHz
	AC-coupled	1 MHz to 7 GHz
	R&S®FSV13	
	DC-coupled	9 kHz to 13.6 GHz
	AC-coupled	10 MHz to 13.6 GHz
	R&S®FSV30	
	DC-coupled	9 kHz to 30 GHz
	AC-coupled	10 MHz to 30 GHz
	R&S®FSV40	
	DC-coupled	9 kHz to 40 GHz
AC-coupled	10 MHz to 40 GHz	
	with R&S®FSV-B29 option, DC-coupled	10 Hz to max. frequency
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®FSV-B4 OCXO reference frequency option	1×10^{-7}
Temperature drift (+5 °C to +45 °C)	standard	1×10^{-6}
	with R&S®FSV-B4, OCXO reference frequency option, model 02	1×10^{-7}
	with R&S®FSV-B4, OCXO extended frequency stability option, model 03	1×10^{-8}
Max. initial calibration accuracy	standard	5×10^{-7}
	with R&S®FSV-B4 OCXO reference frequency option	5×10^{-8}

Frequency readout		
Marker resolution		1 Hz
Uncertainty		$\pm(\text{marker frequency} \times \text{reference uncertainty} + 10\% \times \text{resolution bandwidth} + \frac{1}{2}(\text{span} / (\text{sweep points} - 1)) + 1 \text{ Hz})$
Number of sweep (trace) points	default value	691
	range	101 to 32001
Marker tuning frequency step size	marker step size = sweep points	$\text{span} / (\text{sweep points} - 1)$
	marker step size = standard	$\text{span} / (\text{default sweep points} - 1)$
Frequency counter resolution		0.001 Hz
Count accuracy		$\pm(\text{frequency} \times \text{reference uncertainty} + \frac{1}{2}(\text{last digit}))$
Display range for frequency axis		0 Hz, 10 Hz to max. frequency
Resolution		0.1 Hz
Max. span deviation		0.1 %

Spectral purity		
SSB phase noise	frequency = 500 MHz, carrier offset	
	100 Hz	<-84 dBc (1 Hz)
	1 kHz	<-101 dBc (1 Hz)
	10 kHz	<-106 dBc (1 Hz)
	100 kHz	<-115 dBc (1 Hz)
	1 MHz	<-134 dBc (1 Hz)
10 MHz	typ. -150 dBc (1 Hz)	
Residual FM	frequency = 500 MHz, RBW = 1 kHz, sweep time = 100 ms	<3 Hz, nominal



Typical phase noise at different center frequencies

Sweep time

Range	span = 0 Hz	1 μ s to 16000 s
	span \geq 10 Hz, swept	1 ms to 16000 s ¹
	span \geq 10 Hz, FFT	7 μ s to 16000 s ²
Sweep time accuracy	span = 0 Hz	0.1 %, nominal
	span \geq 10 Hz, swept	3 %, nominal

¹ Net sweep time without additional hardware settling time.

² Time for data acquisition for FFT calculation.

Resolution bandwidths

Sweep filters and FFT filters		
Resolution bandwidths (-3 dB)	span \geq 10 Hz, sweep filters	1 Hz to 10 MHz in 1/2/3/5 sequence
	span \geq 10 Hz, FFT filters	1 Hz to 300 kHz in 1/2/3/5 sequence
	span = 0 Hz	20 MHz, 28 MHz additionally
	with R&S®FSV-B70 option, span = 0 Hz, $f \leq$ 7 GHz	40 MHz additionally
Bandwidth uncertainty		<3 %, nominal
Shape factor 60 dB:3 dB		<5, nominal
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®FSV-B70 option, $f \leq$ 7 GHz	40 MHz additionally
Bandwidth accuracy		<2 %, nominal
Shape factor 60 dB:3 dB		<2, nominal
EMI filters		
Bandwidths (-6 dB)		200 Hz, 9 kHz, 120 kHz, 1 MHz
Bandwidth uncertainty		<3 %, nominal
Shape factor 60 dB:3 dB		<6, nominal
Video bandwidths		
		1 Hz to 10 MHz in 1/2/3/5 sequence, 20 MHz, 28 MHz
	with R&S®FSV-B70 option, $f \leq$ 7 GHz	40 MHz additionally
Signal analysis bandwidth		
	$f \leq$ 7 GHz	
	standard	28 MHz, nominal
	with R&S®FSV-B70 option	40 MHz, nominal

Level

Display range		displayed noise floor up to +30 dBm
Maximum input level		
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®FSV-B22 option, RF preamplifier = ON	13 dBm (= 0.02 W)
	RF attenuation ≥ 10 dB	
	RF preamplifier = OFF	30 dBm (= 1 W)
	with R&S®FSV-B22 option, RF preamplifier = ON	23 dBm (= 0.2 W)
Pulse spectral density	RF attenuation 0 dB, RF preamplifier = OFF	97 dB μ V/MHz
Max. pulse voltage	RF attenuation ≥ 10 dB	150 V
Max. pulse energy	RF attenuation ≥ 10 dB, 10 μ s	1 mWs
Intermodulation		
1 dB compression of input mixer	RF attenuation 0 dB, $f \leq 7$ GHz	
	RF preamplifier = OFF	+3 dBm, nominal
	with R&S®FSV-B22 option, RF preamplifier = ON	-12 dBm, nominal
	RF attenuation 0 dB, $f > 7$ GHz	+5 dBm, nominal
Third-order intercept point (TOI)	RF attenuation 0 dB, level 2×-15 dBm, $\Delta f > 5 \times$ RBW or 10 kHz, whichever is larger, RF preamplifier = OFF	
	$10 \text{ MHz} \leq f_{in} < 100 \text{ MHz}$	>12 dBm, typ. 15 dBm
	$100 \text{ MHz} \leq f_{in} < 3.6 \text{ GHz}$	>13 dBm, typ. 16 dBm
	$3.6 \text{ GHz} \leq f_{in} \leq 40 \text{ GHz}$	>15 dBm, typ. 18 dBm
	with R&S®FSV-B22 option, RF preamplifier = ON, RF attenuation 0 dB, level 2×-35 dBm, $\Delta f > 5 \times$ RBW or 10 kHz, whichever is larger	
	$10 \text{ MHz} \leq f_{in} < 100 \text{ MHz}$	-3 dBm, nominal
	$100 \text{ MHz} \leq f_{in} < 3.6 \text{ GHz}$	-2 dBm, nominal
	$3.6 \text{ GHz} \leq f_{in} \leq 7 \text{ GHz}$	0 dBm, nominal
Second harmonic intercept (SHI)	RF attenuation 0 dB, level -10 dBm, RF preamplifier = OFF	
	$100 \text{ MHz} < f_{in} \leq 3.5 \text{ GHz}$	typ. 45 dBm
	$3.5 \text{ GHz} < f_{in} \leq 20 \text{ GHz}$	typ. 90 dBm
	with R&S®FSV-B22 option, RF preamplifier = ON, RF attenuation 0 dB, level -30 dBm	
$100 \text{ MHz} < f_{in} \leq 3.5 \text{ GHz}$	25 dBm, nominal	

Displayed average noise level

0 dB RF attenuation, termination 50 Ω , log. scaling, normalized to 1 Hz RBW, RBW = 1 kHz, VBW = 3 kHz, zero span, sweep time 50 ms, sample detector, trace average, sweep count = 20, mean marker, RF preamplifier = OFF	
R&S [®] FVS3, R&S [®] FVS7	
9 kHz \leq f < 100 kHz	<-130 dBm, typ. -140 dBm
100 kHz \leq f < 1 MHz	<-145 dBm, typ. -150 dBm
1 MHz \leq f < 1 GHz	<-152 dBm, typ. -155 dBm
1 GHz \leq f < 3.6 GHz	<-150 dBm, typ. -153 dBm
3.6 GHz \leq f < 6 GHz	<-148 dBm, typ. -151 dBm
6 GHz \leq f \leq 7 GHz	<-146 dBm, typ. -149 dBm
R&S [®] FVS13, R&S [®] FVS30	
9 kHz \leq f < 100 kHz	<-130 dBm, typ. -140 dBm
100 kHz \leq f < 1 MHz	<-145 dBm, typ. -150 dBm
1 MHz \leq f < 1 GHz	<-151 dBm, typ. -154 dBm
1 GHz \leq f < 3.6 GHz	<-149 dBm, typ. -152 dBm
3.6 GHz \leq f < 6 GHz	<-146 dBm, typ. -149 dBm
6 GHz \leq f < 7.4 GHz	<-144 dBm, typ. -147 dBm
7.4 GHz \leq f < 15 GHz	<-148 dBm, typ. -151 dBm
15 GHz \leq f \leq 30 GHz	<-144 dBm, typ. -147 dBm
R&S [®] FVS40	
9 kHz \leq f < 100 kHz	<-130 dBm, typ. -140 dBm
100 kHz \leq f < 1 MHz	<-145 dBm, typ. -150 dBm
1 MHz \leq f < 1 GHz	<-151 dBm, typ. -154 dBm
1 GHz \leq f < 3.6 GHz	<-149 dBm, typ. -152 dBm
3.6 GHz \leq f < 6 GHz	<-146 dBm, typ. -149 dBm
6 GHz \leq f < 7.4 GHz	<-144 dBm, typ. -147 dBm
7.4 GHz \leq f < 15 GHz	<-145 dBm, typ. -148 dBm
15 GHz \leq f < 34 GHz	<-142 dBm, typ. -145 dBm
34 GHz \leq f \leq 40 GHz	<-136 dBm, typ. -139 dBm
with R&S [®] FVS-B22 option, RF preamplifier = ON	
0 dB RF attenuation, termination 50 Ω , log. scaling, normalized to 1 Hz RBW, RBW = 1 kHz, VBW = 3 kHz, zero span, sweep time 50 ms, sample detector, trace average, sweep count = 20, mean marker	
R&S [®] FVS3, R&S [®] FVS7	
100 kHz \leq f < 1 MHz	<-150 dBm, typ. -155 dBm
1 MHz \leq f < 1 GHz	<-162 dBm, typ. -165 dBm
1 GHz \leq f < 3.6 GHz	<-160 dBm, typ. -163 dBm
3.6 GHz \leq f < 6 GHz	<-158 dBm, typ. -161 dBm
6 GHz \leq f \leq 7 GHz	<-156 dBm, typ. -159 dBm
R&S [®] FVS13, R&S [®] FVS30, R&S [®] FVS40	
100 kHz \leq f < 1 MHz	<-145 dBm, typ. -148 dBm
1 MHz \leq f < 20 MHz	<-155 dBm, typ. -158 dBm
20 MHz \leq f < 1 GHz	<-161 dBm, typ. -164 dBm
1 GHz \leq f < 3.6 GHz	<-159 dBm, typ. -162 dBm
3.6 GHz \leq f < 6 GHz	<-156 dBm, typ. -159 dBm
6 GHz \leq f \leq 7 GHz	<-154 dBm, typ. -157 dBm
with R&S [®] FVS-B29 option, RF preamplifier = OFF	
0 dB RF attenuation, termination 50 Ω , log. scaling, normalized to 1 Hz RBW, RBW = 5 Hz, VBW = 5 Hz, zero span, sweep time 500 ms, sample detector, trace average, sweep count = 20, mean marker	
10 Hz	<-90 dBm, nominal
20 Hz	<-100 dBm, typ. -110 dBm
100 Hz	<-110 dBm, typ. -120 dBm
1 kHz	<-120 dBm, typ. -130 dBm

Spurious responses		
Image response	20 MHz \leq f \leq 7 GHz	
	$f_{in} - 2 \times 8409.9$ MHz (1st IF)	typ. < -80 dBc
	$f_{in} - 2 \times 729.9$ MHz (2nd IF)	< -80 dBc
	$f_{in} - 2 \times 89.9$ MHz (3rd IF)	< -80 dBc
	7 GHz $<$ f $<$ 30 GHz	
	$f_{in} \pm 2 \times 729.9$ MHz (1st IF)	< -80 dBc
	$f_{in} - 2 \times 89.9$ MHz (2nd IF)	< -80 dBc
	30 GHz $<$ f \leq 40 GHz	
	$f_{in} \pm 2 \times 729.9$ MHz (1st IF)	< -70 dBc
	$f_{in} - 2 \times 89.9$ MHz (2nd IF)	< -80 dBc
Intermediate frequency response	20 MHz \leq f \leq 7 GHz	
	1st IF (8409.9 MHz)	typ. < -70 dBc
	2nd IF (729.9 MHz)	< -80 dBc
	3rd IF (89.9 MHz)	< -80 dBc
	7 GHz $<$ f \leq 40 GHz	
	1st IF (729.9 MHz)	< -80 dBc
2nd IF (89.9 MHz)	< -80 dBc	
Residual spurious response	0 dB RF attenuation	
	f \leq 1 MHz	< -90 dBm
	f $>$ 1 MHz	< -103 dBm
Local oscillator related spurious	f $<$ 15 GHz	
	1 kHz \leq offset from carrier \leq 10 MHz	< -70 dBc
	offset from carrier $>$ 10 MHz	< -80 dBc
	15 GHz \leq f $<$ 30 GHz	
	1 kHz \leq offset from carrier \leq 10 MHz	< -64 dBc
	offset from carrier $>$ 10 MHz	< -74 dBc
	30 GHz \leq f \leq 40 GHz	
	1 kHz \leq offset from carrier \leq 10 MHz	< -58 dBc
offset from carrier $>$ 10 MHz	< -68 dBc	
Other interfering signals		
Subharmonic of 1st LO	20 MHz \leq f $<$ 7 GHz, spurious at 8410 MHz $- 2 \times f_{in}$	< -70 dBc
Harmonic of 1st LO	mixer level $<$ -25 dBm, spurious at $f_{in} - 4205$ MHz	< -70 dBc

Level display		
Logarithmic level axis		1 dB to 200 dB, in steps of 1/2/5
Linear level axis		10 % of reference level per level division, 10 divisions or logarithmic scaling
Number of traces		6
Trace detector		Max Peak, Min Peak, Auto Peak (Normal), Sample, RMS, Average
	EMI detectors	Quasi Peak
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 μ V, dBmV, dB μ A, dBpW
	linear level display	μ V, mV, μ A, mA, pW, nW

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)
	+5 °C to +40 °C	<0.35 dB ($\sigma = 0.12$ dB)
Frequency response referenced to 64 MHz	DC coupling, RF attenuation 10 dB, 20 dB, 30 dB, 40 dB, RF preamplifier = 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 ($\sigma = 0.1$ dB)
	3.6 GHz \leq f < 7 GHz	<0.5 dB ($\sigma = 0.17$ dB)
	7 GHz \leq f < 13.6 GHz, span < 1 GHz	<1.5 dB ($\sigma = 0.5$ dB)
	13.6 GHz \leq f < 30 GHz, span < 1 GHz	<2 dB ($\sigma = 0.66$ dB)
	30 GHz \leq f \leq 40 GHz, span < 1 GHz	<2.5 dB ($\sigma = 1$ dB)
	any setting of RF attenuation or RF preamplifier, +5 °C to +40 °C	
	9 kHz \leq f < 3.6 GHz	<1 dB ($\sigma = 0.33$ dB)
	3.6 GHz \leq f < 7 GHz	<1.5 dB ($\sigma = 0.5$ dB)
	7 GHz \leq f < 13.6 GHz	<2.5 dB ($\sigma = 0.83$ dB)
	13.6 GHz \leq f < 30 GHz	<3 dB ($\sigma = 1$ dB)
	30 GHz \leq f \leq 40 GHz	<3.5 dB ($\sigma = 1.33$ dB)
	with R&S®FSV-B29 option, DC coupling, RF preamplifier = OFF, +5 °C to +40 °C	
	10 Hz \leq f < 20 Hz	< 1.5 dB, nominal
20 Hz \leq f < 9 kHz	<1 dB ($\sigma = 0.33$ dB)	
Attenuator switching uncertainty	f = 64 MHz, 0 dB to 70 dB, referenced to 10 dB attenuation	<0.2 dB ($\sigma = 0.07$ dB)
Uncertainty of reference level setting		0 dB ³
Bandwidth switching uncertainty	referenced to RBW = 10 kHz	
	sweep filters	<0.1 dB ($\sigma = 0.04$ dB)
	FFT filters	<0.2 dB ($\sigma = 0.07$ dB)

Display nonlinearity

Logarithmic level display	S/N > 16 dB, 0 dB to –70 dB	<0.1 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	0.28 dB
	3.6 GHz \leq f < 7 GHz	0.39 dB
	7 GHz \leq f < 13.6 GHz	1 dB
	13.6 GHz \leq f < 30 GHz	1.32 dB
	30 GHz \leq f \leq 40 GHz	1.65 dB

³ 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.

Measurement speed

Local measurement and display update rate		2 ms (500/s)
Remote measurement, 1000 sweep averages ⁴		1 ms (1000/s)
Remote measurement and LAN transfer ⁴		3 ms (333/s)
Marker peak search ⁴		1.5 ms
Center frequency tune and transfer ⁴	f ≤ 7 GHz	15 ms
	f > 7 GHz	28 ms

Trigger functions

Trigger		
Trigger source		free run, video, external, IF power
Trigger offset	span ≥ 10 Hz	31.25 ns to 30 s, min. resolution 31.25 ns (or 1 % of offset)
	span = 0 Hz	sweep time to 30 s, min. resolution 31.25 ns (or 1 % of offset)
Max. deviation of trigger offset		±(7.8125 ns + (0.1 % × trigger offset))
IF power trigger		
Sensitivity	minimum signal power	-60 dBm + RF attenuation – RF preamplifier gain
	maximum signal power	-10 dBm + RF attenuation – RF preamplifier gain
IF power trigger bandwidth	RBW > 500 kHz, swept	40 MHz, nominal
	RBW > 20 kHz, FFT	
	RBW ≤ 500 kHz, swept	6 MHz, nominal
	RBW ≤ 20 kHz, FFT	
Gated sweep		
Gate source		video, external, IF power
Gate delay		31.25 ns to 30 s, min. resolution 31.25 ns (or 1 % of delay)
Gate length		31.25 ns to 30 s, min. resolution 31.25 ns (or 1 % of gate length)
Max. deviation of gate length		±(7.8125 ns + (0.1 % × gate length))

I/Q data

Interface		GPIB or LAN interface
Memory length		max. 200 Msample I and Q
Word length of I/Q samples	sampling rate > 64 MHz or number of samples > 100 Msample	18 bit
	otherwise	24 bit
Sample rate	standard	100 Hz to 45 MHz
	with R&S®FSV-B70 option	100 Hz to 128 MHz
Max. signal bandwidth (equalized)	f ≤ 7 GHz	
	standard	28 MHz
	with R&S®FSV-B70 option	40 MHz
Amplitude flatness	f ≤ 7 GHz	0.3 dB, nominal
Deviation from linear phase	f ≤ 7 GHz	1°, nominal

⁴ Measured with personal computer equipped with Intel® Core2 Duo 2,13 GHz and Gbit-LAN interface.

Inputs and outputs

RF input		
Impedance		50 Ω
Connector	R&S®FSV3, R&S®FSV7, R&S®FSV13	N female
	R&S®FSV30	test port adapter APC 3.5 mm/N female
	R&S®FSV40	test port adapter 2.92 mm (K)/N female
VSWR	RF attenuation ≥ 10 dB	
	10 MHz $\leq f < 3.6$ GHz	<1.5, typ. 1.3
	3.6 GHz $\leq f < 20$ GHz	<2, typ. 1.8
	20 GHz $\leq f < 27$ GHz	<2.2, typ. 2
	27 GHz $\leq f < 30$ GHz	
	DC-coupled	<2.2, typ. 2
	AC-coupled	typ. 2.5
	30 GHz $\leq f \leq 40$ GHz	
	DC-coupled	<2.5, typ. 2.2
	AC-coupled	typ. 3
	RF attenuation < 10 dB, DC-coupled	
	10 MHz $\leq f < 7$ GHz	typ. 2
	7 GHz $\leq f < 30$ GHz	typ. 2.5
30 GHz $\leq f \leq 40$ GHz	typ. 3	
Setting range of attenuator	standard	0 dB to 75 dB, in 5 dB steps
	with R&S®FSV-B25 option	0 dB to 75 dB, in 1 dB steps
Setting range of electronic attenuator	with R&S®FSV-B25 option, $f \leq 7$ GHz	0 dB to 25 dB, in 1 dB steps
	with R&S®FSV-B25 option, $f > 7$ GHz	0 dB to 9 dB, in 1 dB steps
RF preamplifier gain	with R&S®FSV-B22 option	20 dB, nominal

Probe power supply		
Supply voltages		+15 V DC, -12.6 V DC and ground, max. 150 mA, nominal

Noise source drive		
Connector		BNC female
Output voltage		0 V/28 V, max. 100 mA, switchable, nominal

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

USB interface		
		2 ports, type A plug, version 2.0

Reference output		
Connector		BNC female
Impedance		50 Ω
Output frequency	internal reference	10 MHz
	external reference	same as reference input signal
Level		>0 dBm, nominal

Reference input		
Connector		BNC female
Impedance		50 Ω
Input frequency range		1 MHz $\leq f_{in} \leq 20$ MHz, in 1 MHz steps
Required level		>0 dBm into 50 Ω

External trigger/gate input		
Connector		BNC female
Trigger voltage		0.5 V to 3.5 V
Input impedance		10 k Ω

IEC/IEEE bus control		interface in line with IEC 625-2 (IEEE 488.2)
Command set		SCPI 1997.0
Connector		24-pin Amphenol female
Interface functions		SH1, AH1, T6, L4, SR1, RL1, PP1, DC1, DT1, C0
LAN interface		
Connector		10/100/1000BaseT RJ-45
External monitor		
Connector		VGA-compatible, 15-pin, mini D-Sub

General data

Display		21 cm LC TFT color display (8.4")
Resolution		800 × 600 pixel (SVGA resolution)
Pixel failure rate		$<1 \times 10^{-5}$
Data storage		
Internal		hard disk \geq 40 Gbyte, nominal
External		supports USB-2.0-compatible memory devices
Temperature		
Temperature	operating temperature range	+5 °C to +40 °C
	permissible temperature range	0 °C to +50 °C
	storage temperature range	-40 °C to +70 °C
Climatic loading		+40 °C at 90 % rel. humidity, in line with EN 60068-2-30
Mechanical resistance		
Vibration	sinusoidal	5 Hz to 150 Hz, max. 2 g at 55 Hz; 0.5 g from 55 Hz to 150 Hz; in line with EN 60068-2-6
	random	10 Hz to 130 Hz, acceleration 1.2 g (rms), in line with EN 60068-2-64
Shock		40 g shock spectrum, in line with MIL-T-28800F, classes 3 and 5
EMC		EMC Directive 2004/108/EC including: EN 61326 class B (emission), CISPR 11/EN 55011/ group 1 class A ⁵ (emission) EN 61326 table A.1 (immunity, industrial)
Recommended calibration interval		1 year

⁵ Note regarding use of instrument:

The instrument complies with the emission requirements stipulated by EN 55011 class A. This means that the instrument is suitable for use in industrial environments. In line with EN 61000-6-4, operation in residential, commercial and business areas or in small-size companies is not covered.

Thus, the instrument may not be operated in residential, commercial and business areas or in small-size companies, unless additional measures are taken to ensure that EN 61000-6-3 is complied with.

Power supply		
AC supply		100 V to 240 V, 3 A to 1.25 A; 50 Hz to 400 Hz, class of protection I in line with VDE 411
Power consumption	R&S®FSV3, R&S®FSV7	typ. 90 W, max. 180 W with all options
	R&S®FSV13, R&S®FSV30, R&S®FSV40	typ. 115 W, max. 180 W with all options
Safety		in line with EN 61010-1, UL 3111-1, CSA C22.2 No. 1010-1, IEC 1010-1
Test mark		VDE, GS, CSA, CSA-NRTL

Weight and dimensions		
Dimensions	W × H × D	412 mm × 197 mm × 417 mm 16.22 in × 7.76 in × 16.42 in
Net weight without options, nominal	R&S®FSV3, R&S®FSV7	9.5 kg 20.94 lb
	R&S®FSV13	10.3 kg 22.7 lb
	R&S®FSV30	10.7 kg 23.58 lb
	R&S®FSV40	11.1 kg 24.46 lb

Options

R&S® FSV-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		10 Ω
Open-circuit voltage		up to 1.5 V, adjustable

R&S® FSV-B5 additional interfaces

User port		
Connector		9-pin D-Sub male
Output		TTL-compatible, 0 V/5 V, max. 15 mA
Input		TTL-compatible, max. 5 V

IF/video/demod out		
Connector		BNC female, 50 Ω
IF out		
Bandwidth		equal to RBW setting
IF frequency		32 MHz
Output level (gain versus RF input)	RF attenuation 0 dB, RF preamplifier OFF, span 0 Hz	0 dB, nominal
Video out		
Bandwidth		equal to VBW setting
Output scaling	log. display scale	logarithmic
	lin. display scale	linear
Output level	center frequency > 10 MHz, span 0 Hz, signal at reference level and center frequency	1 V, open circuit, nominal

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

USB interface		2 ports, type A plug, version 2.0
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R&S® FSV-B9 tracking generator

Frequency		
Frequency range	R&S®FSV3	100 kHz to 3.6 GHz
	R&S®FSV7, R&S®FSV13, R&S®FSV30, R&S®FSV40	100 kHz to 7 GHz
Frequency offset		
Setting range		±1 GHz
Setting resolution		1 Hz
Spectral purity		
SSB phase noise	frequency = 1000 MHz, carrier offset = 100 kHz	typ. -90 dBc (1 Hz)
Level		
Setting range	normal mode	-60 dBm to 0 dBm, in 0.1 dB steps
	with AM, I/Q	-60 dBm to -10 dBm, in 0.1 dB steps
Max. deviation of output level	frequency = 64 MHz, +20 °C to +30 °C, output level = -10 dBm, frequency offset = 0 Hz, modulation OFF	<1 dB
Frequency response	output level = -10 dBm, referenced to level at 64 MHz, 100 kHz ≤ f ≤ 7 GHz, frequency offset = 0 Hz, modulation OFF	<3 dB
Dynamic range		
	RBW = 1 kHz, f > 10 MHz	110 dB
Harmonics, non-harmonic spurious		
	output level = -10 dBm	-30 dBc
Modulation		
Modulation format	external	I/Q, AM, FM
AM	f > 10 MHz	
Modulation depth		0 % to 100 %
Modulation frequency range		0 Hz to 1 MHz
FM	f > 10 MHz	
Frequency deviation		0 Hz to 10 MHz
Modulation frequency range		0 Hz to 10 kHz
RF output		
Connector		N female, 50 Ω
VSWR		1.3, nominal
TG I/AM IN		
Connector		BNC female, 50 Ω
Input voltage		1 V (pp)
TG Q/FM IN		
Connector		BNC female, 50 Ω
Input voltage		1 V (pp)

R&S® FSV-B10 external generator control

Interface		
IEC/IEEE bus control		24-pin Amphenol female
Aux control		9-pin D-Sub female
Supported signal generators		
		R&S®SMA100A, R&S®SMB100A, R&S®SMBV100A, R&S®SMC100A, R&S®SME, R&S®SMF100A, R&S®SMG, R&S®SMGL, R&S®SMGU, R&S®SMH, R&S®SMHU, R&S®SMIQ, R&S®SMJ100A, R&S®SML, R&S®SMP, R&S®SMR, R&S®SMT, R&S®SMU200A, R&S®SMV03, R&S®SMX, R&S®SMY

Ordering information

Designation	Type	Order No.
Signal Analyzer	R&S®FSV3	1307.9002.03
Signal Analyzer	R&S®FSV7	1307.9002.07
Signal Analyzer	R&S®FSV13	1307.9002.13
Signal Analyzer	R&S®FSV30	1307.9002.30
Signal Analyzer	R&S®FSV40	1307.9002.40
Accessories supplied		
Power cable, quick start guide and CD-ROM (with operating manual and service manual)		
R&S®FSV30: test port adapter with 3.5 mm female (1021.0512.00) and N female (1021.0535.00) connectors		
R&S®FSV40: test port adapter with 2.92 mm (K) female (1036.4790.00) and N female (1036.4777.00) connectors		

Options

Designation	Type	Order No.	Retrofittable	Remarks
Ruggedized Housing	R&S®FSV-B1	1310.9500.02	no	
Audio Demodulator	R&S®FSV-B3	1310.9516.02	yes	retrofit in service center
OCXO Reference Frequency	R&S®FSV-B4	1310.9522.02	yes	user-retrofittable
OCXO Extended Frequency Stability	R&S®FSV-B4	1310.9522.03	yes	user-retrofittable
Additional Interfaces	R&S®FSV-B5	1310.9539.02	yes	IF out, video out, AUX port, trigger out, 2 × USB
Tracking Generator (100 kHz to 7 GHz)	R&S®FSV-B9	1310.9545.02	yes	retrofit in service center
External Generator Control	R&S®FSV-B10	1310.9551.02	yes	retrofit in service center
Spare Hard Drive	R&S®FSV-B19	1310.9574.02	yes	user-retrofittable
RF Preamplifier (9 kHz to 7 GHz)	R&S®FSV-B22	1310.9600.02	yes	user-retrofittable
Electronic Attenuator, 1 dB steps	R&S®FSV-B25	1310.9622.02	yes	user-retrofittable
Frequency Range Extension 20 Hz	R&S®FSV-B29	1310.9639.02	yes	user-retrofittable
40 MHz Analysis Bandwidth	R&S®FSV-B70	1310.9645.02	yes	user-retrofittable, for frequencies ≤ 7 GHz
Firmware/software				
Analog Modulation Analysis (AM/FM/φM)	R&S®FSV-K7	1310.8103.02		
Power Sensor Support	R&S®FSV-K9	1310.8203.02		supports R&S®NRP-Zxx power sensors
GSM/EDGE Analysis	R&S®FSV-K10	1310.8055.02		
Noise Figure and Gain Measurements	R&S®FSV-K30	1310.8355.02		
Phase Noise Measurement Application	R&S®FSV-K40	1310.8403.02		
3GPP FDD BS Analysis	R&S®FSV-K72	1310.8503.02		
3GPP FDD UE Analysis	R&S®FSV-K73	1310.8555.02		
CDMA2000® BS (DL) Analysis	R&S®FSV-K82	1310.8703.02		
1xEV-DO BS (DL) Analysis	R&S®FSV-K84	1310.8803.02		
WLAN IEEE 802.11a/b/g/j Analysis	R&S®FSV-K91	1310.8903.02		
WLAN IEEE 802.11n Analysis	R&S®FSV-K91n	1310.9468.02		requires R&S®FSV-B70
WiMAX™ IEEE 802.16 OFDM/OFDMA Analysis	R&S®FSV-K93	1310.8955.02		
EUTRA/LTE BS Analysis	R&S®FSV-K100	1310.9051.02		
EUTRA/LTE UE Analysis	R&S®FSV-K101	1310.9100.02		

Recommended extras

Designation	Type	Order No.
Headphones		0708.9010.00
IEC/IEEE Bus Cable, 1 m	R&S®PCK	0292.2013.10
IEC/IEEE Bus Cable, 2 m	R&S®PCK	0292.2013.20
19" Rack Adapter (not for R&S®FSV-B1)	R&S®ZZA-478	1096.3248.00
Soft Carrying Case (gray)	R&S®ZZT-473	1109.5048.00
Matching pads, 50/75 Ω		
L Section, matching at both ends	R&S®RAM	0358.5414.02
Series Resistor, 25 Ω, matching at one end (taken into account in instrument function RF INPUT 75 Ω)	R&S®RAZ	0358.5714.02
SWR bridges, 50 Ω		
SWR Bridge, 5 MHz to 3 GHz	R&S®ZRB2	0373.9017.5X
SWR Bridge, 40 kHz to 4 GHz	R&S®ZRC	1039.9492.5X
High-power attenuators		
100 W, 3/6/10/20/30 dB, 1 GHz	R&S®RBU100	1073.8495.XX (XX = 03/06/10/20/30)
50 W, 3/6/10/20/30 dB, 2 GHz	R&S®RBU50	1073.8695.XX (XX = 03/06/10/20/30)
50 W, 20 dB, 6 GHz	R&S®RDL50	1035.1700.52
Connectors and cables		
Probe Power Connector, 3-pin		1065.9480.00
DC blocks		
DC Block, 10 kHz to 18 GHz (type N)	R&S®FSE-Z4	1084.7443.02
For R&S®FSV30 only:		
Test Port Adapter, N male		1021.0541.00
Test Port Adapter, 3.5 mm male		1021.0529.00
Microwave Measurement Cable with test port adapter set (N male and 3.5 mm male)	R&S®FSE-Z15	1046.2002.02
For R&S®FSV40 only:		
Test Port Adapter N male		1036.4783.00
Test Port Adapter K male		1036.4802.00
Test Port Adapter 2.4 mm female	R&S®FSE-Z5	1088.1627.02

Power sensors supported by the R&S®FSV-K9 option ⁶

Designation	Type	Order No.
Universal Power Sensor 10 MHz to 8 GHz, 200 mW	R&S®NRP-Z11	1138.3004.02
Universal Power Sensor 10 MHz to 18 GHz, 200 mW	R&S®NRP-Z21	1137.6000.02
Universal Power Sensor 10 MHz to 18 GHz, 2 W	R&S®NRP-Z22	1137.7506.02
Universal Power Sensor 10 MHz to 18 GHz, 15 W	R&S®NRP-Z23	1137.8002.02
Universal Power Sensor 10 MHz to 18 GHz, 30 W	R&S®NRP-Z24	1137.8502.02
Power Sensor Module with Power Splitter DC to 18 GHz, 500 mW	R&S®NRP-Z27	1169.4102.02
Power Sensor Module with Power Splitter DC to 26.5 GHz, 500 mW	R&S®NRP-Z37	1169.3206.02
Thermal Power Sensor 0 Hz to 18 GHz, 100 mW	R&S®NRP-Z51	1138.0005.02
Thermal Power Sensor 0 Hz to 40 GHz, 100 mW	R&S®NRP-Z55	1138.2008.02
Wideband Power Sensor 50 MHz to 18 GHz, 100 mW	R&S®NRP-Z81	1137.9009.02
Average Power Sensor 9 kHz to 6 GHz, 200 mW	R&S®NRP-Z91	1168.8004.02
Average Power Sensor 9 kHz to 6 GHz, 2 W	R&S®NRP-Z92	1171.7005.02

⁶ For average power measurement only.

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Regional contact

Europe, Africa, Middle East

+49 1805 12 42 42* or +49 89 4129 137 74

customersupport@rohde-schwarz.com

North America

1 888 TEST RSA (1 888 837 87 72)

customer.support@rsa.rohde-schwarz.com

Latin America

+1 410 910 79 88

customersupport.la@rohde-schwarz.com

Asia/Pacific

+65 65 13 04 88

customersupport.asia@rohde-schwarz.com

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Rohde & Schwarz GmbH & Co. KG

Mühldorfstraße 15 | 81671 München

Phone +49 89 41 290 | Fax +49 89 41 29 121 64

www.rohde-schwarz.com

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