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# Signal Analyzer R&S®FSQ

## Specifications



**ROHDE & SCHWARZ**

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# Specifications

Specifications are valid under the following conditions:

30 minutes warm-up time at ambient temperature, specified environmental conditions met, calibration cycle adhered to, and total calibration performed. Data without tolerances: typical values only. Data designated 'nominal' applies to design parameters and is not tested.

## Frequency

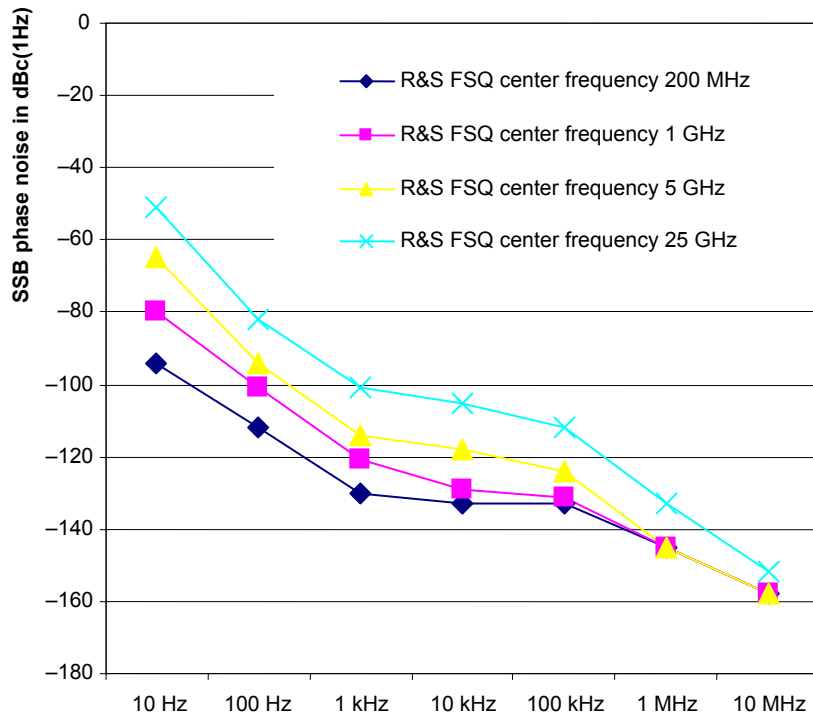
<b>Frequency range</b>	R&S®FSQ3:	DC coupled	20 Hz to 3.6 GHz
		AC coupled	1 MHz to 3.6 GHz
	R&S®FSQ8:	DC coupled	20 Hz to 8 GHz
		AC coupled	1 MHz to 8 GHz
	R&S®FSQ26:	DC coupled	20 Hz to 26.5 GHz
		AC coupled	10 MHz to 26.5 GHz
<b>Frequency resolution</b>	R&S®FSQ40:	DC coupled	20 Hz to 40 GHz
			0.01 Hz

<b>Reference frequency, internal, nominal</b>	<b>standard OCXO</b>	
Aging per day	after 30 days of continuous operation	$1 \times 10^{-9}$
Aging per year	after 30 days of continuous operation	$1 \times 10^{-7}$
Temperature drift	+5 °C to +45 °C	$8 \times 10^{-8}$
Total error	per year	$1.8 \times 10^{-7}$
<b>Reference frequency, internal, nominal</b>	<b>option R&amp;S®FSU-B4</b>	
Aging per day	after 30 days of continuous operation	$2 \times 10^{-10}$
Aging per year	after 30 days of continuous operation	$3 \times 10^{-8}$
Temperature drift	+5 °C to +45 °C	$1 \times 10^{-9}$
Total error	per year	$5 \times 10^{-8}$
<b>External reference frequency</b>		1 MHz to 20 MHz, 1 Hz steps

<b>Frequency display</b>		with marker or frequency counter
Marker resolution		span/624
Maximum deviation	sweep time > 3 × auto sweep time	$\pm(\text{marker frequency} \times \text{reference error} + 0.5 \% \times \text{span} + 10 \% \times \text{resolution bandwidth} + \frac{1}{2} \text{ (last digit)})$
Frequency counter resolution	selectable	0.1 Hz to 10 kHz
Count accuracy	S/N > 25 dB	$\pm(\text{frequency} \times \text{reference error} + \frac{1}{2} \text{ (last digit)})$
Display range for frequency axis		0 Hz, 10 Hz to max. frequency
Resolution		0.1 Hz
Max. span deviation		1 %

<b>Spectral purity, SSB phase noise (1 Hz)</b>	f = 640 MHz	
Residual FM	nominal, RBW 10 kHz, RMS	<1 Hz
Carrier offset	10 Hz	-73 dBc, nominal
	10 Hz with option R&S®FSU-B4 fitted	-86 dBc, nominal
	100 Hz	<-98 dBc <sup>1)</sup> , <-90 dBc, typ. -104 dBc <sup>1)</sup>
	1 kHz	<-116 dBc <sup>1)</sup> , <-112dBc, typ. -124 dBc <sup>1)</sup>
	10 kHz	<-128 dBc <sup>1)</sup> , <-120 dBc, typ. -133 dBc <sup>1)</sup>
	100 kHz	<-128 dBc <sup>1)</sup> , <-120 dBc, typ. -133 dBc <sup>1)</sup>
	1 MHz	<-140 dBc <sup>1)</sup> , <-138 dBc, typ. -146 dBc <sup>1)</sup>
	10 MHz	typ. -160 dBc

<sup>1)</sup> Valid as of serial number 200000.



## Sweep

Sweep time	time sweep, span = 0 Hz	1 $\mu$ s to 16000 s in 5 % steps
	frequency sweep, span $\geq$ 10 Hz	2.5 ms to 16000 s in steps $\leq$ 10 %
Max. deviation of sweep time		3 %
Measurement in time domain		with marker and cursor lines (resolution 31.25 ns)

## Resolution bandwidths

Sweep filters		
3 dB bandwidths		10 Hz to 20 MHz in 1/2/3/5 sequence, 50 MHz
Bandwidth uncertainty	10 Hz to 100 kHz (digital)	<3 %
	200 kHz to 5 MHz (analog)	<10 %
	10 MHz	-30 % to +10 %
	20 MHz	-20 % to +20 %
	50 MHz, $f \leq$ 3.6 GHz	-20 % to +20 %
	50 MHz, $f >$ 3.6 GHz	-30 % to +100 %
Shape factor 60 dB:3 dB	$\leq$ 100 kHz	<6
	200 kHz to 2 MHz	<12
	3 MHz to 10 MHz	<7
	20 MHz, 50 MHz	<6, nominal

FFT filters		
3 dB bandwidths		1 Hz to 30 kHz in 1/2/3/5 sequence
Bandwidth uncertainty		5 %, nominal
Shape factor 60 dB:3 dB		<3, nominal

EMI filters		
6 dB bandwidths		200 Hz, 9 kHz, 120 kHz
Bandwidth uncertainty		3 %, nominal
Shape factor 60 dB:3 dB		<6, nominal

<b>Channel filters</b>		
Bandwidths		100, 200, 300, 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, 1.2288, 1.28 (RRC), 1.5, 2, 3, 3.84 (RRC), 4.096 (RRC), 5 MHz
Shape factor 60 dB:3 dB		<2, nominal
Bandwidth uncertainty		2 %, nominal

<b>Video bandwidths</b>		1 Hz to 30 MHz in 1/2/3/5 sequence
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## Level

Display range		displayed noise floor to +30 dBm
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<b>Maximum input level</b>		
DC voltage	RF input AC coupled	50 V
	RF input DC coupled	0 V
CW RF power	RF attenuation 0 dB	20 dBm (= 0.1 W)
	RF attenuation ≥10 dB	30 dBm (= 1 W)
Pulse spectral density		97 dBμV/MHz
Max. pulse voltage	RF attenuation ≥10 dB	150 V
Max. pulse energy	RF attenuation ≥10 dB, 10 μs	1 mWs

<b>Intermodulation</b>		
1 dB compression of input mixer	0 dB RF attenuation	
	≤3.6 GHz	+13 dBm, nominal
	>3.6 GHz	
	R&S®FSQ8	+10 dBm, nominal
	R&S®FSQ26, R&S®FSQ40	+7 dBm, nominal
Third-order intercept point (TOI)	level 2 × -10 dBm, Δf > 5 × RBW or 10 kHz, whichever is larger	
	R&S®FSQ3	
	10 MHz ≤ f < 300 MHz	>17 dBm, typ. 20 dBm
	300 MHz ≤ f ≤ 3.6 GHz	>19 dBm, typ. 25 dBm
	R&S®FSQ8	
	10 MHz ≤ f < 300 MHz	>17 dBm, typ. 20 dBm
	300 MHz ≤ f ≤ 3.6 GHz	>20 dBm, typ. 25 dBm
	3.6 GHz ≤ f ≤ 8 GHz	>19 dBm, typ. 23 dBm
	R&S®FSQ26	
	10 MHz ≤ f < 300 MHz	>17 dBm, typ. 20 dBm
	300 MHz ≤ f < 3.6 GHz	>22 dBm, typ. 27 dBm
	3.6 GHz ≤ f < 26.5 GHz	>12 dBm, typ. 15 dBm
	R&S®FSQ40	
	10 MHz ≤ f < 300 MHz	>17 dBm, typ. 20 dBm
	300 MHz ≤ f < 3.6 GHz	>20 dBm, typ. 25 dBm
	26.5 GHz ≤ f ≤ 40 GHz	>12 dBm, typ. 15 dBm
Second harmonic intercept (SHI)	f < 100 MHz	>35 dBm
	100 MHz < f ≤ 400 MHz	>45 dBm, typ. 55 dBm
	400 MHz < f ≤ 500 MHz	>52 dBm, typ. 60 dBm
	500 MHz < f ≤ 1 GHz	>45 dBm, typ. 55 dBm
	1 GHz < f ≤ 1.8 GHz	>35 dBm
	>1.8 GHz	80 dBm, nominal

<b>Displayed average noise level</b>		
	0 dB RF attenuation, termination 50 $\Omega$ , normalized to 1 Hz RBW f < 10 kHz: 10 Hz FFT Filter, trace average, sweep count = 20, f $\geq$ 10 kHz: RBW = 1 kHz, VBW = 3 kHz, zero span, sweep time 50 ms, trace average, sweep count = 20, mean marker	
	20 Hz	<-90 dBm
	100 Hz	<-110 dBm
	1 kHz	<-120 dBm
	10 kHz	<-130 dBm
	100 kHz	<-136 dBm
	1 MHz	<-146 dBm
	10 MHz	<-153 dBm
	<b>R&amp;S<sup>®</sup>FSQ3</b>	
	20 MHz $\leq$ f < 2.0 GHz	<-155 dBm, typ. -158 dBm
	2.0 GHz $\leq$ f $\leq$ 3.0 GHz	<-153 dBm, typ. -157 dBm
	3.0 GHz $\leq$ f $\leq$ 3.6 GHz	<-152 dBm, typ. -157 dBm
	<b>R&amp;S<sup>®</sup>FSQ8</b>	
	20 MHz $\leq$ f < 2.0 GHz	<-155 dBm, typ. -158 dBm
	2 GHz $\leq$ f $\leq$ 3.0 GHz	<-153 dBm, typ. -157 dBm
	3 GHz $\leq$ f $\leq$ 3.6 GHz	<-152 dBm, typ. -156 dBm
	3.6 GHz $\leq$ f < 7 GHz	<-150 dBm, typ. -152 dBm
	7 GHz $\leq$ f < 8 GHz	<-149 dBm, typ. -152 dBm
	<b>R&amp;S<sup>®</sup>FSQ26</b>	
	20 MHz $\leq$ f < 2 GHz	<-152 dBm, typ. -156 dBm
	2 GHz $\leq$ f < 3.6 GHz	<-150 dBm, typ. -153 dBm
	3.6 GHz $\leq$ f < 8 GHz	<-151 dBm, typ. -155 dBm
	8 GHz $\leq$ f < 13 GHz	<-149 dBm, typ. -153 dBm
	13 GHz $\leq$ f < 18 GHz	<-147 dBm, typ. -151 dBm
	18 GHz $\leq$ f < 22 GHz	<-145 dBm, typ. -148 dBm
	22 GHz $\leq$ f < 26.5 GHz	<-143 dBm, typ. -146 dBm
	<b>R&amp;S<sup>®</sup>FSQ40</b>	
	20 MHz $\leq$ f < 2 GHz	<-152 dBm, typ. -156 dBm
	2 GHz $\leq$ f < 8 GHz	<-150 dBm, typ. -153 dBm
8 GHz $\leq$ f < 18 GHz	<-148 dBm, typ. -151 dBm	
18 GHz $\leq$ f < 22 GHz	<-145 dBm, typ. -148 dBm	
22 GHz $\leq$ f < 26.5 GHz	<-143 dBm, typ. -146 dBm	
26.5 GHz $\leq$ f < 40 GHz	<-135 dBm, typ. -138 dBm	

<b>Maximum dynamic range</b>		
1 dB compression to DANL (1 Hz)		170 dB

<b>Immunity to interference</b>		
Image frequency	f $\leq$ 3.6 GHz	>90 dB, typ. >110 dB
	3.6 GHz < f $\leq$ 26.5 GHz	>70 dB, typ. >100 dB
	f > 26.5 GHz	typ. >70 dB
Intermediate frequency	f $\leq$ 3.6 GHz	>90 dB, typ. >110 dB
	3.6 GHz < f $\leq$ 4.2 GHz	typ. 70 dB
	f > 4.2 GHz	>70 dB, typ. >90 dB
Spurious response	f > 1 MHz, without input signal, 0 dB RF attenuation	<-103 dBm
Other interfering signals	$\Delta$ f > 100 kHz mixer level <-10 dBm, f $\leq$ 2.3 GHz	<-80 dBc
	mixer level <-35 dBm, 2.3 GHz < f < 4 GHz	<-70 dBc
	mixer level <-10 dBm 4 GHz $\leq$ f < 8 GHz	<-70 dBc
	8 GHz $\leq$ f < 16 GHz	<-64 dBc
	16 GHz $\leq$ f < 26 GHz	<-58 dBc
	26.5 GHz $\leq$ f < 40 GHz	<-52 dBc

<b>Level display</b>		
Screen		625 × 500 pixel (one diagram), max. 2 diagrams with independent settings
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	1 measurement diagram	3
	2 measurement diagrams	6
Trace detector		Max Peak, Min Peak, Auto Peak (Normal), Sample, RMS, Average, Quasi Peak
Number of measurement points	default value	625
	range	155 to 30001 in steps of about a factor of 2
Trace functions		clear/write, Max Hold, Min Hold, average
Trace update rate	local measurement, display update rate, 625 points, zero span	80/s
	remote measurement, display off: zero span/sweep time 1 ms	70/s
	span = 10 MHz, sweep time 2.5 ms	50/s
Setting range of reference level	logarithmic level display	-130 dBm to (+5 dBm + RF attenuation), max. 30 dBm, in steps of 0.1 dB
	linear level display	7.0 nV to 7.07 V in steps of 1 %
Units of level axis	logarithmic level display	dBm, dBμV, dBmV, dBμA, dBpW
	linear level display	μV, mV, μA, mA, pW, nW

<b>Level measurement uncertainty</b>		
Absolute level uncertainty at 128 MHz	RBW = 10 kHz, level -30 dBm, reference level -30 dBm, RF attenuation 10 dB	<0.2 dB ( $\sigma = 0.07$ dB)
Frequency response referenced to 128 MHz	DC coupling, RF attenuation $\geq 10$ dB, +20 °C to +30 °C	
	10 MHz $\leq f < 3.6$ GHz	<0.3 dB ( $\sigma = 0.1$ dB)
	3.6 GHz $\leq f < 8$ GHz, span < 1 GHz	<1.5 dB ( $\sigma = 0.5$ dB)
	8 GHz $\leq f < 22$ GHz, span < 1 GHz	<2 dB ( $\sigma = 0.7$ dB)
	22 GHz $\leq f < 26.5$ GHz, span < 1 GHz	<2.5 dB ( $\sigma = 0.8$ dB)
	26.5 GHz $\leq f < 40$ GHz, span < 1 GHz	<2.5 dB ( $\sigma = 0.8$ dB)
	f $\geq 3.6$ GHz, span $\geq 1$ GHz	add 0.5 dB to above values
	+5 °C to +45 °C	
Attenuator switching uncertainty	f = 128 MHz	<0.2 dB ( $\sigma = 0.07$ dB)
	0 dB to 70 dB, referenced to 10 dB attenuation	
	f $\geq 26.5$ GHz	add 1.0 dB to above values
Uncertainty of reference level setting	RF attenuation 10 dB, referenced to -10 dBm reference level setting	<0.15 dB ( $\sigma = 0.05$ dB)

<b>Display non linearity</b>	+20 °C to +30 °C, mixer level $\leq -10$ dBm	
Logarithmic level display	RBW $\leq 100$ kHz or channel filters, S/N > 20 dB	
	0 dB to -70 dB	<0.1 dB ( $\sigma = 0.03$ dB)
	-70 dB to -90 dB	<0.3 dB ( $\sigma = 0.1$ dB)
	200 kHz $\leq$ RBW $\leq 10$ MHz, S/N > 16 dB	
	0 dB to -50 dB	<0.2 dB ( $\sigma = 0.07$ dB)
	-50 dB to -70 dB	<0.5 dB ( $\sigma = 0.17$ dB)
Linear level display	RBW > 10 MHz, S/N > 16 dB	
	0 dB to -50 dB	<0.5 dB ( $\sigma = 0.17$ dB)
Bandwidth switching error	referenced to RBW = 10 kHz	
	1 Hz to 100 kHz	<0.1 dB ( $\sigma = 0.03$ dB)
	200 kHz to 3 MHz	<0.2 dB ( $\sigma = 0.07$ dB)
	5 MHz to 50 MHz	<0.5 dB ( $\sigma = 0.15$ dB)
	FFT filter 1 Hz to 3 kHz	<0.2 dB ( $\sigma = 0.07$ dB)

<b>Total measurement uncertainty</b>		
	0 dB to -70 dB, S/N >20 dB, span/RBW < 100, 95 % confidence level, +20 °C to +30 °C, mixer level ≤ -10 dBm	
	f < 3.6 GHz, RBW ≤ 100 kHz	0.3 dB
	f < 3.6 GHz, RBW > 100 kHz	0.5 dB
	3.6 GHz ≤ f < 8 GHz	2.0 dB
	8 GHz ≤ f < 18 GHz	2.5 dB
	18 GHz ≤ f < 26.5 GHz	3.0 dB
26.5 GHz ≤ f < 40 GHz	3.0 dB	

## I/Q data

<b>General</b>		
Interface		GPIO or LAN interface
Sampling rate		programmable: 10 kHz to 81.6 MHz in 0.1 Hz steps
ADC resolution		14 bit
I/Q memory	standard	16 Msample each for I and Q data
	option R&S®FSQ-B100	235 Msample
	option R&S®FSQ-B100 and R&S®FSQ-B102	705 Msample

<b>RF path</b>		
Max. information bandwidth		28 MHz
Spurious	full-scale input signal	typ. < -70 dBc
Third order distortion	two tones -6 dBfs each	typ. < -80 dBc
LO feedthrough	$f_{I/Q} = 81.6 \text{ MHz} - f_{\text{center}}$ mixer level = -10 dBm	typ. < -65 dBfs
Aliased DC offset	$f_{I/Q} = 20.4 \text{ MHz}$ ; within ±10 K temperature change after I/Q or total calibration	typ. < -65 dBfs

<b>Frequency response</b>		
Equalized bandwidth	RBW setting	equalized bandwidth
	3 MHz	2 MHz
	5 MHz	3 MHz
	10 MHz	7 MHz
	20 MHz	17 MHz
	50 MHz	28 MHz
Amplitude flatness	within equalized bandwidth	
	f ≤ 3.6 GHz	typ. 0.3 dB
	f > 3.6 GHz, YIG filter off	typ. 0.5 dB
Deviation from linear phase	within equalized bandwidth	
	f ≤ 3.6 GHz	typ. 1°
	f > 3.6 GHz, YIG filter off	typ. 2°

## Audio demodulation

AF demodulation types		AM and FM
Audio output		loudspeaker and phone jack
Marker stop time in spectrum mode		100 ms to 60 s



## Trigger functions

Trigger		
Trigger source		free run, video, external, IF level (mixer level 10 dBm to -50 dBm)
Trigger offset	span $\geq 10$ Hz	125 ns to 100 s, resolution 125 ns min. (or 1 % of offset)
	span = 0 Hz	$\pm(125 \text{ ns to } 100 \text{ s})$ , resolution 125 ns min., dependent on sweep time
Max. deviation of trigger offset		$\pm(31.25 \text{ ns} + (0.1 \% \times \text{trigger offset}))$
Gated sweep		
Gate source		external, IF level, video
Gate delay		1 $\mu\text{s}$ to 100 s
Gate length		125 ns to 100 s, resolution min. 125 ns or 1 % of gate length
Max. deviation of gate length		$\pm(31.25 \text{ ns} + (0.05 \% \times \text{gate length}))$

## Inputs and outputs (front panel)

<b>RF input</b>		
Impedance		50 $\Omega$
Connector	R&S <sup>®</sup> FSQ3, R&S <sup>®</sup> FSQ8	N female
	R&S <sup>®</sup> FSQ26	testport adapter APC 3.5 mm/N female,
	R&S <sup>®</sup> FSQ40	testport adapter 2.92 mm (K)/N female
VSWR	RF attenuation $\geq 10$ dB, DC coupled $f < 3.6$ GHz	<1.5
	R&S <sup>®</sup> FSQ8: $3.6 \text{ GHz} \leq f < 8 \text{ GHz}$	<2
	R&S <sup>®</sup> FSQ26, R&S <sup>®</sup> FSQ40: $3.6 \text{ GHz} \leq f < 18 \text{ GHz}$	<1.8
	$18 \text{ GHz} \leq f < 26.5 \text{ GHz}$	<2.0
	$26.5 \text{ GHz} \leq f < 40 \text{ GHz}$	<2.5
	RF attenuation $\geq 10$ dB, DC coupled $f < 3.6$ GHz	<1.5
	RF attenuation <10 dB or AC coupling	typ. 1.5
Setting range of attenuator		0 dB to 75 dB, in 5 dB steps
<b>Probe power supply</b>		
Supply voltages		+15 V DC, -12.6 V DC and ground, max. 150 mA, nominal
<b>Power supply for antennas etc</b>		
Supply voltages		5-pin connector $\pm 10$ V and ground, max. 100 mA, nominal
<b>Keyboard connector</b>		
		PS/2 female for MF-2 keyboard
<b>AF output</b>		
Connector		3.5 mm mini jack
Output impedance		10 $\Omega$
Open-circuit voltage		up to 1.5 V, adjustable
<b>Power supply for noise source</b>		
Output voltage		BNC female 0 V and 28 V, switchable, nominal

## Inputs and outputs (rear panel)

<b>IF 20.4 MHz</b>		BNC female
Impedance		50 $\Omega$
Bandwidth	RBW $\leq$ 30 kHz	1.67 $\times$ resolution bandwidth, min. 2.6 kHz
	RBW = 50 kHz, 100 kHz	400 kHz
	200 kHz $\leq$ RBW $\leq$ 10 MHz	equal to resolution bandwidth
Level	RBW $\leq$ 100 kHz, FFT filter, mixer level $>-70$ dBm	$-20$ dBm at reference level
	RBW = 200 kHz to 10 MHz, mixer level $>-50$ dBm	0 dBm at reference level
<b>IF 404.4 MHz</b>	active only if RBW $>10$ MHz	BNC female
Impedance		50 $\Omega$
Bandwidth	RBW $>10$ MHz	equal to resolution bandwidth
Level	mixer level $\leq$ 0 dBm	mixer level typ. $-10$ dB
<b>Video output</b>		BNC female
Impedance		50 $\Omega$
Output voltage	RBW $\geq$ 200 kHz, logarithmic scaling, full scale	0 V to 1 V (EMF)
<b>Reference output</b>		BNC female
Impedance		50 $\Omega$
Output frequency	internal reference	10 MHz
	external reference	same as reference input signal
Level		$>0$ dBm, nominal
<b>Reference Input</b>		BNC female
Impedance		50 $\Omega$
Input frequency range		1 MHz $\leq f_{in} \leq$ 20 MHz, in 1 Hz steps
Required level		$>0$ dBm from 50 $\Omega$
<b>Sweep output</b>		BNC female
Output voltage		0 V to 5 V, proportional to displayed frequency
<b>External trigger/gate input</b>		BNC female
Trigger voltage		1.4 V (TTL)
Input impedance		$\geq 10$ k $\Omega$
<b>IEC/IEEE bus control</b>		interface to IEC 625-2 (IEEE 488.2)
Command set		SCPI 1997.0 or HP8566 compatible
Connector		24-pin Amphenol female
Interface functions		SH1, AH1, T6, L4, SR1, RL1, PP1, DC1, DT1, C0
<b>LAN interface</b>		10/100 BaseT, RJ-45
<b>USB interface</b>		type A plug, version 1.1
<b>Serial interface</b>		RS-232-C (COM), 9-pin female connectors
<b>Printer interface</b>		parallel (Centronics compatible)
<b>Mouse interface</b>		PS/2 compatible
<b>Connector for external monitor (VGA)</b>		15-pin D-sub

## General specifications

<b>Display</b>		21 cm LC TFT color display (8.4")
Resolution		800 × 600 pixel (SVGA resolution)
Pixel failure rate		$<1 \times 10^{-5}$

<b>Mass memory</b>		
Mass memory		1.44 Mbyte 3 ½" disk drive, hard disk, USB flash disk (not supplied)
Data storage		>500 instrument settings and traces

<b>Temperature</b>		
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 95 % relative humidity (DIN EN 60068-2-30: 2000-02)

<b>Mechanical resistance</b>		
	sinusoidal vibration	5 Hz to 150 Hz, max. 2 g at 55 Hz; 0.5 g from 55 Hz to 150 Hz; in line with DIN EN 60068-2-6: 1996-05, DIN EN 60068-2-30: 2000-02, DIN EN 61010-1, MIL-T-28800D, class 5
	random vibration	10 Hz to 100 Hz, acceleration 1 g (rms)
	shock	40 g shock spectrum, in line with MIL-STD-810C and MIL-T-28800D, classes 3 and 5
Recommended calibration interval	operation with external reference	2 years
	operation with internal reference	1 year
EMC		meets EMC directive of EU (89/336/EEC) and German EMC legislation; in line with CISPR 11/EN 55011 group 1 class B; in line with IEC/EN 61326, emission: class B (residential environment) immunity: industrial environment (excluding operating frequency)

<b>Power supply</b>		
AC supply		100 V to 240 V, 3.1 A to 1.3 A; 50 Hz to 400 Hz, class of protection I to VDE 411
Power consumption	R&S®FSQ3, R&S®FSQ8	typ. 130 VA
	R&S®FSQ26, R&S®FSQ40	typ. 150 VA
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
Dimensions	W × H × D	435 mm × 192 mm × 460 mm (17,13 in × 7,56 in × 18,11 in)
Weight Net, w/o options, nominal	R&S®FSQ3	14.6 kg (32.2 lb)
	R&S®FSQ8	15.4 kg (33.95 lb)
	R&S®FSQ26	16.5 kg (36.4 lb)
	R&S®FSQ40	16.8 kg (37.0 lb)

# Tracking Generator R&S®FSU-B9, Attenuator R&S®FSU-B12 for Tracking Generator

Unless specified otherwise, specifications not valid for frequency range from  $-3 \times \text{RBW}$  to  $+3 \times \text{RBW}$ , however at least not valid from  $-100 \text{ kHz}$  to  $+100 \text{ kHz}$ . Maximum output level  $+5 \text{ dBm}$  (peak modulation in the case of amplitude-modulated signals).

<b>Frequency</b>		
Frequency range		100 kHz to 3.6 GHz
Resolution		1 Hz
<b>Frequency offset</b>		
Setting range		$\pm 200 \text{ MHz}$
Resolution		1 Hz

<b>Spectral purity</b>		
SSB phase noise	f = 500 MHz, carrier offset 10 kHz	
	normal mode	typ. $-120 \text{ dBc}$ (1 Hz)
	with frequency offset	typ. $-110 \text{ dBc}$ (1 Hz)
	with FM modulation on	typ. $-110 \text{ dBc}$ (1 Hz)

<b>Level</b>		
Level setting range		$-30 \text{ dBm}$ to $+5 \text{ dBm}$ in steps of $0.1 \text{ dB}$
	with option R&S®FSU-B12	$-100 \text{ dBm}$ to $+5 \text{ dBm}$ in steps of $0.1 \text{ dB}$

<b>Max. deviation of output level</b>		
Absolute	f = 128 MHz, output level $-20 \text{ dBm}$ to $0 \text{ dBm}$	$<1 \text{ dB}$ ( $\sigma = 0.34 \text{ dB}$ )
Frequency response	referenced to level at 128 MHz, sweep time $>100 \text{ ms}$ , $+5 \text{ }^\circ\text{C}$ to $+45 \text{ }^\circ\text{C}$	
	output level $-20 \text{ dBm}$ to $0 \text{ dBm}$ , 100 kHz to 3.6 GHz	$<3 \text{ dB}$ , typ. $1.9 \text{ dB}$
	output level $-30 \text{ dBm}$ to $-20 \text{ dBm}$ , f = 100 kHz to 3.6 GHz	3 dB
	additional deviation with R&S®FSU-B12, 100 kHz to 3.6 GHz	$<1 \text{ dB}$

<b>Dynamic range</b>		
Attenuation measurement range	RBW = 1 kHz, f $> 10 \text{ MHz}$	100 dB
Harmonics	output level $-10 \text{ dBm}$	typ. $-30 \text{ dBc}$
Spurious, nonharmonics	output level $0 \text{ dBm}$	typ. $-30 \text{ dBc}$

<b>Level sweep</b>		
Level range		$0 \text{ dBm}$ to $-25 \text{ dBm}$
Max. deviation of output level	f = 100 kHz to 2 GHz	
	output level $0 \text{ dBm}$ to $-5 \text{ dBm}$	$<1.5 \text{ dB}$
	output level $-5 \text{ dBm}$ to $-15 \text{ dBm}$	$<2 \text{ dB}$
	output level $-15 \text{ dBm}$ to $-25 \text{ dBm}$	$<3 \text{ dB}$
	f = 2 GHz to 3 GHz	
	output level $0 \text{ dBm}$ to $-25 \text{ dBm}$	$<3 \text{ dB}$

<b>Modulation</b>		
Modulation format	external	I/Q, AM, FM
Input voltage	full scale	
	AM, FM, $V_{pp}$	1 V
	I/Q	$\sqrt{U_i^2 + U_q^2} = 0.5 \text{ V}$
<b>AM</b>	$f_{center} > f_{mod}$ , span = 0 Hz	
Modulation depth		0 % to 99 %
Modulation frequency response	0 Hz to 5 MHz	1 dB
	0 Hz to 30 MHz	3 dB
<b>FM</b>	$f_{center} > f_{mod}$ , span = 0 Hz	
Frequency deviation		full range: 100 Hz, 1 kHz, 10 kHz, 100 kHz, 1 MHz
Modulation frequency range	deviation = 10 MHz	0 Hz to 1 kHz
	deviation $\leq$ 1 MHz	0 Hz to 100 kHz
Modulation frequency response	0 kHz to 100 kHz	1 dB
<b>I/Q modulation</b>	$f_{center} > f_{mod}$ , span = 0 Hz	
Modulation frequency response	0 Hz to 5 MHz	1 dB
	0 Hz to 30 MHz	3 dB

<b>Modulation deviation of tracking generator</b>	I/Q modulation, typical values, baseband signals generated by the R&S® AMIQ	
EVM	NADC/TETRA/PDC	
	RMS	2 %
	peak	4 %
	PHS	
	RMS	2 %
Phase error	peak	5 %
	GSM/DCS1800/PCS1900	
	RMS	1.5°
Rho factor	peak	5°
	IS-95 CDMA	0.997

<b>Inputs and outputs (front panel)</b>		
RF output		N female, 50 $\Omega$
VSWR	100 kHz $\leq$ f $\leq$ 2 GHz	1.2
	2 GHz $\leq$ f $\leq$ 3.6 GHz	1.5

<b>Inputs and outputs (rear panel)</b>		
TG I/AM IN		BNC female
Impedance		50 $\Omega$
Input voltage	$V_{pp}$	1 V
TG Q/FM IN		BNC female
Impedance		50 $\Omega$
Input voltage	$V_{pp}$	1 V

## LO/IF Ports for External Mixers R&S®FSU-B21 (for R&S®FSQ26 and R&S®FSQ40 only)

<b>LO signal</b>		
Frequency range		7.0 GHz to 15.5 GHz
Level	+20 °C to +30 °C	+15.0 dBm ±1 dB
	+5 °C to +45 °C	+15.0 dBm ±3 dB

<b>IF input</b>		
IF frequency		404.4 MHz
Full scale level	2-port mixer (LO output/IF input, front panel)	-20 dBm
	3-port mixer (IF input, front panel)	-20 dBm
Level uncertainty	IF input level -30 dBm, RBW 30 kHz, 2-port mixer, LO output/IF input (front panel)	
	+20 °C to +30 °C	<1 dB
	+5 °C to +45 °C	<3 dB
	3-port mixer, IF input (front panel)	
	+20 °C to +30 °C	<1 dB
	+5 °C to +45 °C	<3 dB

### Inputs and outputs (front panel)

<b>Option R&amp;S®FSU-B21</b>		
LO output/IF input		SMA-female, 50 Ω
IF input		SMA-female, 50 Ω

**RF Preamplifier R&S®FSQ-B23**  
**(for R&S®FSQ26 only, requires option R&S®FSU-B25)**

<b>Level measurement uncertainty</b>		
Frequency response	preamplifier = on	
	3.6 GHz to 8 GHz	<2.0 dB ( $\sigma = 0.7$ dB)
	8 GHz to 22 GHz	<2.5 dB ( $\sigma = 0.8$ dB)
	22 GHz to 26.5 GHz	<3.0 dB ( $\sigma = 1$ dB)

<b>Displayed average noise level</b>		
	0 dB RF attenuation, termination 50 $\Omega$ , RBW = 1 kHz, VBW = 3 kHz, zero span, sweep time 50 ms, trace average, sweep count = 20, mean marker, normalized to 1 Hz RBW	
	preamplifier = off	
	3.6 GHz to 8 GHz	R&S®FSQ26 specifications + 2 dB
	8 GHz to 26.5 GHz	R&S®FSQ26 specifications + 3 dB
	preamplifier = on	
	3.6 GHz to 8 GHz	<-162 dBm, typ. -165 dBm
	8 GHz to 13 GHz	<-159 dBm, typ. -162 dBm
	13 GHz to 18 GHz	<-157 dBm, typ. -160 dBm
	18 GHz to 22 GHz	<-154 dBm, typ. -159 dBm
22 GHz to 26.5 GHz	<-150 dBm, typ. -155 dBm	



# Electronic Attenuator R&S® FSU-B25

Frequency		
Frequency range	R&S®FSQ3	100 kHz <sup>2)</sup> , 10 MHz to 3.6 GHz
	R&S®FSQ8	100 kHz <sup>2)</sup> , 10 MHz to 8 GHz
	R&S®FSQ26	100 kHz <sup>2)</sup> , 10 MHz to 3.6 GHz
	R&S®FSQ40	100 kHz <sup>2)</sup> , 10 MHz to 3.6 GHz

Setting range		
Electronic attenuator		0 dB to 30 dB, in 5 dB steps
Preamplifier		20 dB, switchable

Level measurement uncertainty		
Frequency response	with preamplifier or electronic attenuator	
	10 MHz to 50 MHz	<1 dB ( $\sigma = 0.34$ dB)
	50 MHz to 3.6 GHz	<0.6 dB ( $\sigma = 0.2$ dB)
	3.6 MHz to 8 GHz	<2.0 dB ( $\sigma = 0.7$ dB)
Reference error	at 128 MHz, RBW $\leq$ 100 kHz, reference level -30 dBm, RF attenuation 10 dB	
	electronic attenuator	<0.3 dB ( $\sigma = 0.1$ dB)
	preamplifier	<0.3 dB ( $\sigma = 0.1$ dB)

Displayed average noise level		
0 dB RF attenuation, termination 50 $\Omega$ RBW = 1 kHz, VBW = 3 kHz, zero span, sweep time 50 ms, trace average, sweep count = 20, mean marker, normalized to 1 Hz RBW		
preamplifier on		
R&S®FSQ3, R&S®FSQ8, R&S®FSQ26		
10 MHz to 2.0 GHz		<-162 dBm
2.0 GHz to 3.6 GHz		<-160 dBm
R&S®FSQ8		
3.6 GHz to 8 GHz		<-157 dBm
R&S®FSQ40		
10 MHz to 40 MHz		<-160 dBm
40 MHz to 2 GHz		<-162 dBm
2 GHz to 3.6 GHz		<-160 dBm
with the R&S®FSU-B25 built in, the average noise level values displayed by the base units degrade by (R&S®FSU-B25 off)		
20 Hz to 3.6 GHz		1 dB
R&S®FSQ8		
3.6 GHz to 8 GHz		2 dB
preamplifier off, electronic attenuator 0 dB		
20 Hz to 3.6 GHz		typ. 2.5 dB
R&S®FSQ8		
3.6 GHz to 8 GHz		typ. 3.5 dB

Intermodulation		
Third-order intercept point (TOI)	electronic attenuator on, $\Delta f > 5 \times$ RBW or 10 kHz	
	10 MHz to 300 MHz	>17 dBm
	300 MHz to 3.6 GHz	>20 dBm
	3.6 GHz to 8 GHz	>18 dBm

<sup>2)</sup> Valid as of electronic attenuator board stock number 1137.0724.02 (see instrument hardware info).

## I/Q Baseband Inputs R&S®FSQ-B71

I/Q baseband inputs for unbalanced and balanced signals. Input impedance selectable 50 Ω/1 MΩ. All data specified with 1 MΩ input impedance setting apply to 50 Ω source impedance. Specifications are valid under the following conditions: 30 minutes warm-up time at ambient temperature, specified environmental conditions met, calibration cycle adhered to, and baseband calibration performed. Data without tolerances: typical values only. Data designated "nominal" apply to design parameters and are not tested.

### Frequency

<b>Sampling</b>		
ADC sampling rate		81.6 MHz
ADC resolution		14 bit
<b>Frequency range</b>		
Useful bandwidth with specified frequency response	$f_s$ = output data rate	
	$f_s$ = 40.8 MHz to 81.6 MHz	DC to $0.441 \times f_s$
	$f_s$ > 20.4 MHz to <40.8 MHz	DC to $0.34 \times f_s$
	$f_s$ = 10 kHz to 20.4 MHz	DC to $0.40 \times f_s$

### Spectral purity

Phase noise at $f_{in} = 20$ MHz	1 kHz offset	typ. -135 dBc (1 Hz)
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### Amplitude

<b>Maximum safe input level</b>	50 Ω, power from 50 Ω source	+30 dBm (1 W)
	1 MΩ, peak voltage	±5 V
<b>Input level range (full scale)</b>	with balanced setting: differential voltage	
	50 Ω	±31.6 mV to ±5.62 V (5 dB steps)
	1 MΩ	±31.6 mV to ±1.78 V (5 dB steps)
Max. common mode input voltage	50 Ω	±2 × range, max. ±5 V
	1 MΩ, any range	-2.5 V to +3.5 V
<b>Level uncertainty</b>		
Level uncertainty	at 1 MHz (full scale)	<0.25 dB
	I/Q imbalance at 1 MHz	<0.1 dB
Frequency response	50 Ω, $f_s = 81.6$ MHz	
	DC to 30 MHz, filter on	<0.3 dB
	DC to 36 MHz, filter off	<0.3 dB
	I/Q imbalance, DC to 30 MHz, filter on	<0.15 dB
	I/Q imbalance, DC to 36 MHz, filter off	<0.15 dB
Frequency response	1 MΩ	
	DC to 10 MHz	<0.30 dB
	I/Q imbalance, DC to 10 MHz	<0.15 dB
Amplitude linearity		
	0 dB to -90 dB with dither on	typ. 0.1 dB
I/Q offset		
	50 Ω balanced setting	<0.15 % of range ±0.2 mV
	50 Ω unbalanced setting	<2 mV
	1 MΩ	<2 mV

## Dynamic range

<b>Noise level</b>		
Signal to noise ratio	range = 1 V, signal level equal to range	typ. 143 dBc (1 Hz)
Noise floor	range = 31.6 mV, RMS voltage in 1 Hz bandwidth	
	50 $\Omega$ , unbalanced setting	typ. <4 nV
	50 $\Omega$ , balanced setting	typ. <6 nV
	1 M $\Omega$ , unbalanced setting	typ. <16 nV
	1 M $\Omega$ , balanced setting	typ. <16 nV
<b>Spurious &amp; harmonics</b>		
	single signal, level equal to range 50 $\Omega$ : DC to 36 MHz 1 M $\Omega$ : DC to 10 MHz, range $\leq 1$ V	typ. -60 dBc
<b>Intermodulation distortion 2<sup>nd</sup> order and 3<sup>rd</sup> order</b>	two signals, level equal to range -6 dB	
	50 $\Omega$ : DC to 20 MHz	typ. -75 dBc
	50 $\Omega$ : 20 MHz to 36 MHz	typ. -70 dBc
	1 M $\Omega$ : DC to 10 MHz, range $\leq 1$ V	typ. -75 dBc
<b>Image rejection</b>	aliasing into useful bandwidth from single out of band signal equal to range	typ. -75 dB
<b>I/Q crosstalk</b>	DC to 36 MHz	typ. -70 dB

## Phase

<b>Group delay variation versus frequency</b>		
	aliasing filter on, DC to 30 MHz	typ. 1 ns
	aliasing filter off, DC to 36 MHz	typ. 1 ns
<b>Differential phase between I and Q</b>		
	DC to 10 MHz	typ. 1°
	aliasing filter on, >10 MHz to 30 MHz	typ. 2°
	aliasing filter off, >10 MHz to 36 MHz	typ. 2°

## Input ports

<b>Channels</b>		2 (I & Q)
Connector	each channel balanced or unbalanced	4 $\times$ BNC female
<b>Input impedance</b>		
	unbalanced setting	
	common mode	50 $\Omega$ /1 M $\Omega$ nominal
	balanced setting	
	common mode	50 $\Omega$ /1 M $\Omega$ nominal
	differential	100 $\Omega$ /2 M $\Omega$ nominal
<b>Return loss</b>	50 $\Omega$ input impedance	
	DC to 10 MHz	typ. 30 dB
	>10 MHz to 36 MHz	typ. 20 dB
<b>Input capacitance</b>	with 1 M $\Omega$ input impedance setting, common mode	typ. 9 pF

# I/Q Bandwidth Extension R&S®FSQ-B72

Activation of the 120 MHz I/Q bandwidth extension R&S®FSQ-B72 depends on the selected sampling rate.

It is active for sampling rates > 81.6 MHz. For sampling rates up to 81.6 MHz (max demodulation bandwidth 28 MHz) the standard I/Q path is used and the IQ data specifications of the basic unit apply. For sampling rates between 20.4 MHz and 81.6 MHz the 120 MHz bandwidth extension can be selected alternatively.

## Frequency

<b>RF Frequency range</b>	R&S®FSQ3	40 MHz <sup>3)</sup> to 3.6 GHz
	R&S®FSQ8	40 MHz <sup>3)</sup> to 8 GHz
	R&S®FSQ26	40 MHz <sup>3)</sup> to 26.5 GHz
	R&S®FSQ40	40 MHz <sup>3)</sup> to 40 GHz

<b>Useful bandwidth</b> Bandwidth with equalized frequency response as specified below	20.4 MHz < $f_s$ ≤ 81.6 MHz	0.8 × $f_s$
	81.6 MHz < $f_s$ < 163.2 MHz	0.68 × $f_s$
	163.2 MHz ≤ $f_s$ ≤ 326.4 MHz	120 MHz
	$f_s$ = output sampling rate	

<b>Frequency response</b>	within useful bandwidth, referenced to center frequency RF attenuation ≥ 10 dB, mixer level ≤ -10 dBm	
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<b>Amplitude flatness</b>	+20 °C to +30 °C		
	≤ 3.6 GHz	± 40 MHz	< 0.3 dB
		± 60 MHz	< 0.6 dB
	> 3.6 GHz to 26.5 GHz		< 0.6 dB
	> 26.5 GHz		typ. 0.6 dB
	+5 °C to +45 °C		
	≤ 3.6 GHz	± 40 MHz	< 0.4 dB
		± 60 MHz	< 0.8 dB
> 3.6 GHz to 26.5 GHz		< 1 dB	
> 26.5 GHz		typ. 1 dB	

<b>Deviation from linear phase</b>	+20 °C to +30 °C		
	≤ 3.6 GHz	± 40 MHz	typ. ± 2°
		± 60 MHz	typ. ± 3°
	> 3.6 GHz to 26.5 GHz		typ. ± 3°
	+5 °C to +45 °C		
	≤ 3.6 GHz	± 40 MHz	typ. ± 3°
		± 60 MHz	typ. ± 4°
	> 3.6 GHz to 26.5 GHz		typ. ± 4°

<b>Output sampling rate</b>	min.	> 20.4 MHz
	max.	326.4 MHz

<b>ADC sampling rate</b>		326.4 MHz
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## Level

<b>Level uncertainty</b>	at center frequency, RF attenuation ≥ 10 dB, mixer level ≤ 0 dBm signal level = reference level	
	+20 °C to +30 °C	
	≤ 3.6 GHz	< 0.8 dB
	3.6 GHz to 8 GHz	< 1.5 dB
	8 GHz to 26.5 GHz	< 2.5 dB
	26.5 GHz to 40 GHz	< 2.5 dB
	+5 °C to +45 °C	
	≤ 3.6 GHz	< 1.2 dB
	3.6 GHz to 8 GHz	< 2.0 dB
	8 GHz to 26.5 GHz	< 3.0 dB
	26.5 GHz to 40 GHz	< 3.5 dB

<b>Level nonlinearity</b>	0 dB to -70 dB, dither on	< 0.15 dB
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<sup>3)</sup> With center frequency < 120 MHz specifications apply for: reference level ≥ 0 dBm and RF attenuation / dB ≤ reference level / dBm

## Dynamic

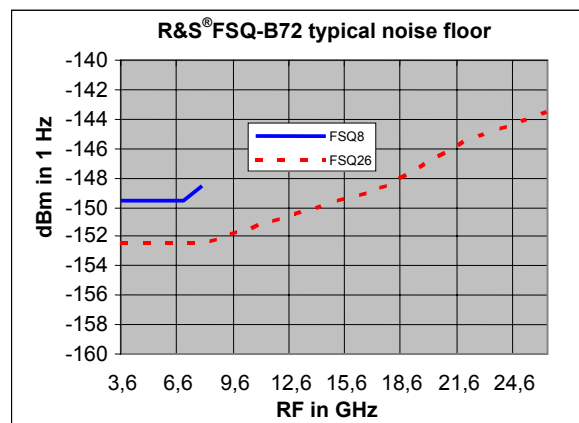
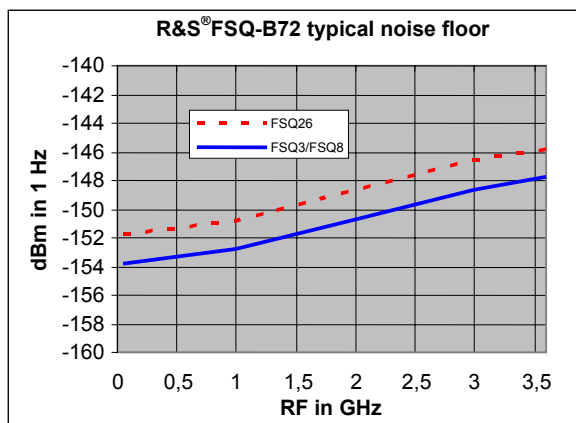
<b>Spurious response</b>		
Without input signal (I/Q offset not included)	0 dB RF attenuation, reference level -20 dBm	
	80 MHz ≤ f ≤ 3345 MHz	<-95 dBm
	3345 MHz < f < 3470 MHz	<-75 dBm
	3470 MHz ≤ f ≤ 3600 MHz	<-95 dBm
	f > 3600 MHz	<-80 dBm
With full scale input signal (I/Q offset not included)	mixer level ≤ -10 dBm center frequency ≥ 120 MHz	<-60 dBc, typ. -70 dBc
I/Q offset	mixer level > -20 dBm	<-70 dBfs
IF rejection	IF frequency range 408 MHz ± 60 MHz	
	center frequency ≤ 400 MHz	>40 dB
	center frequency > 400 MHz	>70 dB

<b>Third order intermodulation</b>	two signals, -6 dBfs each mixer level (each signal)	<-60 dBc, typ. -68 dBc
	≤ 3.6 GHz	≤ -20 dBm
	> 3.6 GHz	≤ -25 dBm

<b>Rejection of out of band signals</b>	≤ 3.6 GHz	typ. 60 dB
	> 3.6 GHz up to ±750 MHz offset	typ. 60 dB
	> ±750 MHz offset	0 dB nominal

<b>Signal to noise ratio</b>	mixer level = 0 dBm	
	≤ 26.5 GHz	>135 dBfs (1 Hz)
	26.5 GHz to 40 GHz	>130 dBfs (1 Hz)

<b>Noise floor</b>	RF attenuation 0 dB, reference level ≤ -20 dBm	
	R&S®FSQ3/R&S®FSQ8	1 GHz <-150 dBm (1 Hz)
	R&S®FSQ8	5 GHz <-147 dBm (1 Hz)
	R&S®FSQ26/R&S®FSQ40	1 GHz <-148 dBm (1 Hz)
	R&S®FSQ26/R&S®FSQ40	5 GHz <-149 dBm (1 Hz)
	R&S®FSQ26/R&S®FSQ40	13 GHz <-146 dBm (1 Hz)
	R&S®FSQ26/R&S®FSQ40	22 GHz <-142 dBm (1 Hz)



<b>Susceptibility to radiated emission</b>	relative to full scale, RF attenuation 0 dB, reference level ≤ -10 dBm, field strengths 10 V/m	
	IF frequency band 348 MHz to 468 MHz	typ. <-55 dB
	image frequency 837.6 MHz to 957.6 MHz	typ. <-60 dB
	other frequencies	typ. <-75 dB

## General data

Interface		GPIB or LAN interface
I/Q memory	standard	16 Msample each for I and Q data
	option R&S®FSQ-B100	235 Msample
	option R&S®FSQ-B100 and R&S®FSQ-B102	705 Msample
<b>Sampling rate</b>		programmable >20.4 MHz to 326.4 MHz in 0.1 Hz steps
IF pre-filter 3 dB bandwidth	≤3.6 GHz	typ. 125 MHz
	>3.6 GHz, YIG filter switched off	typ. 125 MHz

# Ordering information

Designation	Type	Order No.
Signal Analyzer 20 Hz to 3.6 GHz	R&S®FSQ3	1155.5001.03
Signal Analyzer 20 Hz to 8 GHz	R&S®FSQ8	1155.5001.08
Signal Analyzer 20 Hz to 26.5 GHz	R&S®FSQ26	1155.5001.26
Signal Analyzer 20 Hz to 40 GHz	R&S®FSQ40	1155.5001.40
<b>Accessories supplied</b>		
Power cable, quick start guide, CD-ROM (with operating manual and service manual)		
R&S®FSQ26: test port adapter with 3.5 mm female (1021.0512.00) and N female (1021.0535.00) connector		
R&S®FSQ40: test port adapter with K female (10366.4790.00) and N female (1036.4777.00) connector		

## Options

Designation	Type	Order No.	Retrofittable	Remarks
<b>Options</b>				
OCXO, low aging/improved phase noise at 10 Hz carrier offset	R&S®FSU-B4	1144.9000.02	yes	
Tracking Generator, 100 kHz to 3.6 GHz	R&S®FSU-B9	1142.8994.02	yes	
External Generator Control	R&S®FSP-B10	1129.7246.02	yes	
Output Attenuator, 0 dB to 70 dB, for R&S®FSU-B9	R&S®FSU-B12	1142.9349.02	yes	requires R&S®FSU-B9
Removable Hard Disk	R&S®FSQ-B18	1145.0242.05	no	
Second Hard Disk for R&S®FSQ-B18	R&S®FSQ-B19	1145.0394.05		requires R&S®FSU-B18
LO/IF ports for external mixers	R&S®FSU-B21	1157.1090.02	yes	only for R&S®FSQ26 and R&S®FSQ40
20 dB Preamplifier, 3.6 GHz to 26.5 GHz, for R&S®FSQ26	R&S®FSQ-B23		no	only for R&S®FSQ26, requires R&S®FSU-B25
Electronic Attenuator, 0 dB to 30 dB, and 20 dB Preamplifier (3.6 GHz)	R&S®FSU-B25	1144.9298.02	yes	
Analog Baseband Inputs	R&S®FSQ-B71	1157.0113.03	yes	
I/Q Bandwidth Extension	R&S®FSQ-B72	1157.0336.12	no	
I/Q memory extension to 235 Msample	R&S®FSQ-B100	1169.5244.02	no	
I/Q memory extension from 235 Msample to 705 Msample	R&S®FSQ-B102	1169.5444.04	no	requires R&S®FSQ-B100
<b>Firmware/Software</b>				
GSM/EDGE Application Firmware	R&S®FS-K5	1141.1496.02		
FM Measurement Demodulator	R&S®FS-K7	1141.1796.02		
Bluetooth® Application Firmware	R&S®FS-K8	1157.2568.02		
Power Sensor Measurements	R&S®FS-K9	1157.3006.02		
Application Firmware for Noise Figure and Gain Measurements	R&S®FS-K30	1300.6508.02		preamplifier recommended (e.g. R&S®FSU-B25)
Application Firmware for Phase Noise Measurement	R&S®FS-K40	1161.8138.02		
3GPP BTS/Node B FDD Application Firmware	R&S®FS-K72	1154.7000.02		
3GPP UE FDD Application Firmware	R&S®FS-K73	1154.7252.02		
3GPP HSDPA BTS Application Firmware	R&S®FS-K74	1300.7156.02		requires R&S®FS-K72
3GPP TD-SCDMA BTS Application Firmware	R&S®FS-K76	1300.7291.02		
3GPP TD-SCDMA UE Application Firmware	R&S®FS-K77	1300.8100.02		
CDMA2000®/1S-95 (cdmaOne)/1xEV-DV BTS Application Firmware	R&S®FS-K82	1157.2316.02		
CDMA2000®/1xEV-DV MS Application Firmware	R&S®FS-K83	1157.2416.02		
CDMA2000®/1xEV-DO BTS Application Firmware	R&S®FS-K84	1157.2851.02		
CDMA2000®/1xEV-DO MS Application Firmware	R&S®FS-K85	1300.6689.02		
Vector Signal Analysis	R&S®FSQ-K70	1161.8038.02		
WLAN 802.11a Application Firmware	R&S®FSQ-K90	1157.3064.02		
WLAN 802.11a/b/g/j Application Firmware	R&S®FSQ-K91	1157.3129.02		
Upgrade from R&S®FSQ-K90 to R&S®FSQ-K91	R&S®FSQ-K90U	1300.8000.02		
WiMAX 802.16-2004 OFDM Application Firmware	R&S®FSQ-K92	1300.7410.02		
WiMAX 802.16e, WiBro Application Firmware	R&S®FSQ-K93	1300.8600.02		
Upgrade from R&S®FSQ-K92 to R&S®FSQ-K93	R&S®FSQ-K92U	1300.8500.02		

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## 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	R&S®ZZA-411	1096.3283.00
Adapter for mounting on telescopic rails (only with 19" Adapter R&S®ZZA-411)	R&S®ZZA-T45	1109.3774.00
<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 (taken into account in instrument function RF INPUT 75 Ω)	R&S®RAZ	0358.5714.02
<b>SWR Bridges, 50 Ω</b>		
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
<b>High power attenuators</b>		
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
<b>Connectors and cables</b>		
Probe power connector, 3 pin		1065.9480.02
<b>DC blocks</b>		
DC Block, 10 kHz to 18 GHz (Type N)	R&S®FSE-Z4	1084.7443.02
<b>External harmonic mixers (for R&amp;S®FSQ26, R&amp;S®FSQ40 with option R&amp;S®FSU-B21)</b>		
Harmonic Mixer 40 GHz to 60 GHz	R&S®FS-Z60	1089.0799.02
Harmonic Mixer 50 GHz to 75 GHz	R&S®FS-Z75	1089.0847.02
Harmonic Mixer 60 GHz to 90 GHz	R&S®FS-Z90	1089.0899.02
Harmonic Mixer 90 GHz to 110 GHz	R&S®FS-Z110	1089.0976.02
<b>For R&amp;S®FSQ26 only:</b>		
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
<b>For R&amp;S®FSQ40 only:</b>		
<b>Test port adapter N male</b>		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







For product brochure, see PD 0758.0945.12  
and [www.rohde-schwarz.com](http://www.rohde-schwarz.com)  
(search term: FSQ)



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