R&S®FSC
Spectrum Analyzer
Specifications



75 Years of Driving Innovation

ROHDE&SCHWARZ

Test & Measurement

Data Sheet | 01.00

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Specifications apply under the following conditions:
15 minutes warm-up time at ambient temperature, specified environmental conditions met, calibration cycle adhered to.
Data without tolerances: typical values only. Data designated as “nominal” applies to design parameters and is not tested.

Base unit

Frequency

Frequency range	model .03/.13	9 kHz to 3 GHz
	model .06/.16	9 kHz to 6 GHz
Frequency resolution		1 Hz

Reference frequency, internal, nominal		
Aging per year		1×10^{-6}
Temperature drift	0 °C to +30 °C	1×10^{-6}
	+30 °C to +50 °C	3×10^{-6}
Achievable initial adjustment accuracy		5×10^{-7}
Total reference uncertainty		(time since last adjustment × aging rate) + temperature drift + calibration accuracy

Frequency readout		
Marker resolution		0.1 Hz
Uncertainty		±(marker frequency × reference uncertainty + 10 % × resolution bandwidth + ½ (span/(sweep points – 1)) + 1 Hz)
Number of sweep (trace) points		631
Marker tuning frequency step size		span/630
Frequency counter resolution		0.1 Hz
Count uncertainty	S/N > 25 dB	±(frequency × reference uncertainty + ½ (last digit))
Frequency span		0 Hz, 10 Hz to 3 GHz/6 GHz
Span setting uncertainty		±span/630

Spectral purity, SSB phase noise	f = 500 MHz, carrier offset	
	30 kHz	< –95 dBc (1 Hz), typ. –105 dBc (1 Hz)
	100 kHz	< –100 dBc (1 Hz), typ. –110 dBc (1 Hz)
	1 MHz	< –120 dBc (1 Hz), typ. –127 dBc (1 Hz)

Sweep time

Sweep time	span = 0 Hz	200 µs to 100 s
	10 Hz ≤ span ≤ 600 MHz	20 ms to 1000 s
	span > 600 MHz	20 ms × span/600 MHz to 1000 s
Uncertainty	span = 0 Hz	1 %, nominal
	span ≥ 10 Hz	3 %, nominal

Bandwidths

Resolution bandwidths		
Range	–3 dB bandwidth	1 Hz to 3 MHz in 1/3 sequence
Bandwidth accuracy	10 Hz ≤ RBW ≤ 300 kHz	< 5 %, nominal
	RBW > 300 kHz	< 10 %, nominal
Selectivity	60 dB:3 dB	< 5 (Gaussian type filters), nominal
Video filters		
Range	–3 dB bandwidth	1 Hz to 3 MHz in 1/3 sequence

Level

Display range		displayed noise floor to +30 dBm
Maximum rated input level with RF attenuation ≥ 10 dB		
DC voltage		50 V
CW RF power		30 dBm (= 1 W)
Peak RF power	< 3 s duration	33 dBm (= 2 W)
Max. pulse voltage		150 V
Max. pulse energy	pulse width 10 µs	10 mWs
Maximum rated input level with RF attenuation < 10 dB		
DC voltage		50 V
CW RF power		20 dBm (= 100 mW)
Peak RF power	< 3 s duration	23 dBm (= 200 mW)
Max. pulse voltage		50 V
Max. pulse energy	pulse width 10 µs	1 mWs
Intermodulation		
Third-order intermodulation (TOI), nominal values	intermodulation-free dynamic range, signal level 2 × –20 dBm, RF attenuation = 0 dB, without RF preamplifier (R&S®FSC-B22 option) or RF preamplifier = OFF	
	f_{in} < 300 MHz	> 54 dBc (TOI > +7 dBm, typ. +11 dBm)
	300 MHz ≤ f_{in} < 3.6 GHz	> 60 dBc (TOI > +10 dBm, typ. +15 dBm)
	3.6 GHz ≤ f_{in} ≤ 6 GHz	> 46 dBc (TOI > +3 dBm, typ. +10 dBm)
	signal level 2 × –40 dBm, RF attenuation = 0 dB, RF preamplifier (R&S®FSC-B22 option) = ON	
	f_{in} < 300 MHz	> 50 dBc (TOI –15 dBm)
	300 MHz ≤ f_{in} ≤ 6 GHz	> 56 dBc (TOI –12 dBm)
Second harmonic intercept (SHI), nominal values	RF attenuation = 0 dB, without RF preamplifier (R&S®FSC-B22 option) or RF preamplifier = OFF	
	f_{in} = 20 MHz to 1.5 GHz	+40 dBm
	f_{in} = 1.5 GHz to 3 GHz	+30 dBm
	RF attenuation 0 dB, RF preamplifier (R&S®FSC-B22 option) = ON	
	f_{in} = 100 MHz to 3 GHz	0 dBm
Displayed average noise level	RF attenuation 0 dB, termination 50 Ω, RBW = 100 Hz, VBW = 10 Hz, sample detector, log scaling, tracking generator = OFF, normalized to 1 Hz, without RF preamplifier (R&S®FSC-B22 option) or RF preamplifier = OFF	
	frequency	
	9 kHz to 100 kHz	< –108 dBm, typ. –118 dBm
	100 kHz to 1 MHz	< –115 dBm, typ. –125 dBm
	1 MHz to 10 MHz	< –136 dBm, typ. –144 dBm
	10 MHz to 2 GHz	< –141 dBm, typ. –146 dBm
	2 GHz to 3.6 GHz	< –138 dBm, typ. –143 dBm
	3.6 GHz to 5 GHz	< –142 dBm, typ. –146 dBm
	5 GHz to 6 GHz	< –140 dBm, typ. –144 dBm
	RF attenuation 0 dB, termination 50 Ω, RBW = 100 Hz, VBW = 10 Hz, sample detector, log scaling, tracking generator = OFF, normalized to 1 Hz, RF preamplifier (R&S®FSC-B22 option) = ON	
	frequency	
	100 kHz to 1 MHz	< –133 dBm, typ. –143 dBm
	1 MHz to 10 MHz	< –157 dBm, typ. –161 dBm
	10 MHz to 1 GHz	< –161 dBm, typ. –165 dBm
	1 GHz to 2 GHz	< –159 dBm, typ. –163 dBm
	2 GHz to 5 GHz	< –155 dBm, typ. –159 dBm
	5 GHz to 6 GHz	< –151 dBm, typ. –155 dBm

Immunity to interference, nominal values		
Image frequencies	f_{in} – 2 × 21.4 MHz	< –70 dBc, typ. –80 dBc
	f_{in} – 2 × 831.4 MHz	< –70 dBc, typ. –90 dBc
	f_{in} – 2 × 4881 MHz	–60 dBc
Intermediate frequencies	21.4 MHz, 831.4 MHz, 4881.4 MHz	–60 dBc, typ. –80 dBc
	8931.4 MHz	–50 dBc
Other interfering signals, signal level – RF attenuation < –20 dBm	f ≤ 3.6 GHz spurious at f_{in} – 2440.7 MHz	< –60 dBc
	3.6 GHz < f ≤ 6 GHz spurious at f_{in} – 4465.7 MHz	< –60 dBc
Other interfering signals, related to local oscillators	f ≤ 3.6 GHz	
	Δf < 300 kHz	–60 dBc
	Δf ≥ 300 kHz	< –60 dBc
	f > 3.6 GHz	
	Δf < 300 kHz	–54 dBc
	Δf ≥ 300 kHz	< –54 dBc
	f = receive frequency	
Residual spurious response	input matched with 50 Ω, without input signal, RBW ≤ 30 kHz, RF attenuation = 0 dB, tracking generator = OFF	< –90 dBm

Level display		
Logarithmic level axis		1/2/5/10/20/50/100 dB, 10 divisions
Linear level axis		0 % to 100 %, 10 divisions
Number of traces		2
Trace detectors		max peak, min peak, auto peak, sample, RMS
Trace functions		clear/write, max hold, min hold, average, view
Setting range of reference level		–80 dBm to +30 dBm
Units of level axis		dBm, dBmV, dBµV, V, W

Level measurement uncertainty		
Absolute level uncertainty at 100 MHz	+20 °C to +30 °C	±0.3 dB (σ = 0.1 dB)
Frequency response (+20 °C to +30 °C)	9 kHz ≤ f < 10 MHz	±1.5 dB, nominal
	10 MHz ≤ f ≤ 3.6 GHz	±1 dB (σ = 0.33 dB)
	3.6 GHz < f ≤ 6 GHz	±1.5 dB (σ = 0.5 dB)
Attenuator uncertainty		±0.3 dB (σ = 0.1 dB)
Uncertainty of reference level setting		±0.1 dB, nominal
Display nonlinearity	S/N > 16 dB, 0 dB to –50 dB, logarithmic level display	±0.2 dB (σ = 0.067 dB)
Bandwidth switching uncertainty	reference: RBW = 10 kHz	±0.1 dB, nominal
Total measurement uncertainty	95 % confidence level, +20 °C to +30 °C, S/N > 16 dB, 0 dB to –50 dB below reference level, RF attenuation auto	
	10 MHz < f ≤ 3.6 GHz	±1 dB, typ. ±0.5 dB
	3.6 GHz < f ≤ 6 GHz	±1.5 dB, typ. ±1 dB

Trigger functions

Trigger		
Trigger source		free run, video, external
External trigger level	low → high transition	2.4 V, nominal
	high → low transition	0.7 V, nominal

Tracking generator (model .13/.16 only)

Frequency range	model .13	100 kHz to 3 GHz
	model .16	100 kHz to 6 GHz
Connector		N female, 50 Ω
VSWR	100 kHz ≤ f ≤ 1 GHz	< 1.5, nominal
	1 GHz < f ≤ 3 GHz	< 2, nominal
	3 GHz < f ≤ 6 GHz (model .16 only)	< 2, nominal
Output level	tracking generator attenuation = 0 dB	0 dBm, nominal
Tracking generator attenuator		0 dB to 40 dB in 1 dB steps
Dynamic range	RF attenuation = 0 dB, tracking generator attenuation = 10 dB, RBW = 1 kHz	
	100 kHz ≤ f < 300 kHz	> 60 dB, typ. 80 dB
	300 kHz ≤ f < 3 GHz	> 70 dB, typ. 90 dB
	3 GHz ≤ f < 6 GHz (model .16 only)	> 70 dB, typ. 90 dB
Reverse power		
DC voltage		50 V
CW RF power		+20 dBm (= 0.1 W)
Max. pulse voltage		50 V
Max. pulse energy (10 µs)		1 mWs

Inputs and outputs

RF input		
Impedance		50 Ω
Connector		N female
VSWR	100 kHz ≤ f ≤ 1 GHz	< 1.5, nominal
	1 GHz < f ≤ 6 GHz	< 2, nominal
Setting range of input attenuator		0 dB to 40 dB in 5 dB steps
RF preamplifier gain	with R&S®FSC-B22 option	20 dB, nominal
AF output		
AF demodulation types		AM and FM
Connector		3.5 mm mini jack
Output impedance		32 Ω, nominal
Voltage (open circuit)		V_{RMS} adjustable from 0 V to > 100 mV
USB interface		
Front panel		USB host interface, version 1.1
Connector		USB type A plug, version 1.1
Memory sticks supported		≤ 4 Gbyte, USB version 1.1 or 2.0
Rear panel		USB device interface, version 1.1
Connector		USB type B plug, version 1.1
External reference, external trigger		
Connector		BNC female, 50 Ω
Mode	selectable	external reference, external trigger
External reference input	required level	0 dBm
	frequency	10 MHz
External trigger threshold	low → high transition	2.4 V, nominal
	high → low transition	0.7 V, nominal
IF out		
Connector		BNC female, 50 Ω
Frequency		21.4 MHz
DC supply input		
Connector		5 mm DIN 45323 female
Input voltage range		14 V to 16 V, nominal
Input current		0.9 A to 0.7 A

General data

Power supply		
AC supply	input specifications	100 V AC to 240 V AC, 50 Hz to 60 Hz, 400 Hz, 75 VA
DC supply	input specifications	14 V to 16 V, 0.9 A to 0.7 A, nominal
Power consumption		12 W, nominal
Safety		in line with IEC 1010-1, EN 61010-1, UL 3111-1, CSA C22.2 No. 1010-1
Test mark		VDE, GS, CSA, CSA-NRTL

Manual operation		
Languages		Chinese, English, French, German, Italian, Hungarian, Japanese, Korean, Portuguese, Russian, Spanish
Remote control		
Command set		SCPI 1997.0
LAN interface		10/100BaseT, RJ-45
USB interface	rear panel	USB device, type B
Display		
Type		14.5 cm (5,7") LCD TFT color
Resolution		640 × 480 pixel
Audio		
Speaker		internal
Mass memory		
Mass memory		flash memory (internal) USB memory stick (not supplied)
Data storage	internal	> 256 instrument settings and traces
	external, on 1 Gbyte USB memory stick	> 5000 instrument settings and traces
Temperature	operating temperature range	+0 °C to +50 °C
	permissible temperature range	+0 °C to +55 °C
	storage temperature range	–40 °C to +70 °C
Climatic loading	relative humidity	+25/+40 °C at 85 % relative humidity (IEC 60068-2-30)
Mechanical resistance		
Vibration	sinusoidal	IEC 60068-2-6
	random	IEC 60068-2-64
Shock		40 g shock spectrum, in line with MIL-STD-810E, method 516.4 procedure 1, IEC 60068-2-27
EMC		EMC Directive 2004/108/EC including: - IEC/EN 61326 class B (emission) - CISPR 11/EN 55011/group 1 class A (emission) [1] - IEC/EN 61326 Table A.1 (immunity, industrial)

Weight and dimensions		
Dimensions	W × H × D	272.5 mm × 158.1 mm × 350 mm (107 in × 62 in × 138 in)
Weight		4.3 kg (9.5 lb)

Recommended calibration interval		1 year

[1] **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 is not covered.
Thus, the instrument may not be operated in residential, commercial and business areas, unless additional measures are taken to ensure that EN 61000-6-3 is complied with.

Ordering information

Designation	Type	Order No.
Spectrum Analyzer, 9 kHz to 3 GHz	R&S®FSC3	1314.3006.03
Spectrum Analyzer, 9 kHz to 3 GHz, with tracking generator	R&S®FSC3	1314.3006.13
Spectrum Analyzer, 9 kHz to 6 GHz	R&S®FSC6	1314.3006.06
Spectrum Analyzer, 9 kHz to 6 GHz, with tracking generator	R&S®FSC6	1314.3006.16
Accessories supplied		
Power cable, USB cable for connection to PC, quick start guide and CD-ROM (with operating manual and service manual)		

Options

Designation	Type	Order No.
Preamplifier, 100 kHz to 3 GHz/6 GHz (for the R&S®FSC3/6)	R&S®FSC-B22	1314.3535.02

Recommended extras

Designation	Type	Order No.
Ethernet Cable	R&S®HA-Z210	1309.6152.00
Headphones	R&S®FSH-Z36	1145.5838.02
19” Rack Adapter	R&S®ZZA-T33	1109.4458.00
Matching pad 50/75 Ω, 0 Hz to 2700 MHz, matching at both ends, N-connectors	R&S®RAM	0358.5414.02
Matching pad 50/75 Ω, 0 Hz to 2700 MHz, matching at one end, N-connectors	R&S®RAZ	0358.5714.02
75 ohm matching pad N to BNC (female)	R&S®FSH-Z38	1300.7740.02
Near-Field Probe Set	R&S®HZ-15	1147.2736.02
Preamplifier for R&S®HZ-15	R&S®HZ-16	1147.2720.02

The product brochure containing further information is available under PD 5214. 3330.12 and at www.rohde-schwarz.com.

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Rohde&Schwarz is an independent group of companies specializing in electronics. It is a leading supplier of solutions in the fields of test and measurement, broadcasting, radiomonitoring and radiolocation, as well as secure communications. Established 75 years ago, Rohde&Schwarz has a global presence and a dedicated service network in over 70 countries. Company headquarters are in Munich, Germany.

Environmental commitment

- Energy-efficient products
- Continuous improvement in environmental sustainability
- ISO 14001-certified environmental management system

Certified Quality System
ISO 9001

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