R&S®FSC
Spectrum Analyzer
Specifications

ROHDE&SCHWARZ

Test & Measurement

Data Sheet | 02.00

CONTENTS

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	10 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	10 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, f ≥ 3 MHz, 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, 130 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 61010-1, EN 61010-1, CAN/CSA C22.2 No. 61010-1-04, UL61010-1
Test mark		VDE - GS, $_{C}$CSA$_{US}$,

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		in line with EMC Directive 2004/108/EC including: IEC/EN 61326-1 [1, 2], IEC/EN 61326-2-1, CISPR 11/EN 55011 [1] IEC/EN 61000-3-2, IEC/EN 61000-3-3

Weight and dimensions		
Dimensions	W × H × D	233 mm × 158.1 mm × 350 mm (9.2 in × 6.2 in × 13.8 in)
Weight		4.5 kg (9.9 lb)

Recommended calibration interval		1 year

[1] RF emission in line with EN 55011 class A, 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 55011 class B is complied with.

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

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 for installing two R&S®FSC	R&S®ZZA-T33	1109.4458.00
19” Rack Adapter for installing one R&S®FSC	R&S®ZZA-T34	1109.4464.00
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

Supported Power Sensors [3]

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
Universal Power Sensor, 10 MHz to 33GHz, 200mW	R&S®NRP-Z31	1169.2400.02
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
Thermal Power Sensor, 0 Hz to 50 GHz, 100 mW	R&S®NRP-Z56	1171.8201.02
Thermal Power Sensor, 0 Hz to 67 GHz, 100 mW	R&S®NRP-Z57	1171.8401.02
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

All power sensors require the following adapter cable for operation on the FSC:

Passive USB adapter to connect NRP sensors on R&S®FSC	R&S®NRP-Z4	1146.8001.02

For product brochure, see PD 5214.3330.32 and at www.rohde-schwarz.com.

[3] For average power measurement only.

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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 more than 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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