



Version
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Spectrum Analyzer R&S® FSP38-B86

Data sheet



ROHDE & SCHWARZ

Specifications

Specifications apply 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" apply to design parameters and are not tested.

Frequency

Frequency range	9 kHz to 40 GHz	
Frequency resolution	0.01 Hz	
Reference frequency, internal nominal		
Aging per year (after 30 days of operation)	1×10^{-7}	
Temperature drift (0 °C to +50 °C)	1×10^{-8}	
External reference frequency	10 MHz	
Frequency display	with marker or frequency counter	
Marker resolution	span/500	
Max deviation (sweep time > 3 × auto sweep time)	$\pm (\text{frequency} \times \text{reference accuracy} + 0.5\% \times \text{span} + 10\% \times \text{RBW} + 1/2 \text{ LSD})$	
Frequency counter resolution	0.1 Hz to 10 kHz (selectable)	
Count accuracy (S/N > 25 dB)	$\pm (\text{frequency} \times \text{reference error} + 1/2 \text{ (last digit)})$	
Frequency span	0 Hz, 10 Hz to 30 GHz	
Max span deviation	0.1%	
Spectral purity (dBc(1Hz)), SSB phase noise, $f \leq 500$ MHz, for $f > 500$ MHz see table below		
Carrier offset	100 Hz 1 kHz 10 kHz 100 kHz (span > 100 kHz) 1 MHz (span > 100 kHz) 10 MHz	<-84, typ -90 <-100, typ. -108 <-106, typ. -113 <-110, typ. -113 <-120, typ. -125 typ. -145
Residual FM	$f \leq 500$ MHz, RBW 1 kHz, SWT 100 ms	typ. 3 Hz
Sweep time		
Span ≥ 10 Hz	2.5 ms to 16000 s	
Max deviation	1 %	
Span 0 Hz	1 μ s to 16000 s	
Resolution	125 ns	
Resolution bandwidths		
Bandwidths	10 Hz to 10 MHz (-3 dB) in 1-, 3- steps	
EMI-Bandwidths	200 Hz, 9 kHz, 120 kHz (-6 dB)	
Bandwidth accuracy		
≤ 100 kHz	<3 %	
300 kHz to 3 MHz	<10 %	
10 MHz	+10 %, -30 %	
Shape factor -60dB/-3 dB		
≤ 100 kHz	$\leq 5:1$ (gaussian filters)	
300 kHz to 3 MHz	<15 :1 (4-pole synchronous tuned filters)	
10 MHz	< 7:1	
Shape factor -60 dB/-6 dB		
EMI bandwidths	$\leq 5 : 1$	
Video bandwidths	1 Hz to 10 MHz in 1-, 3-steps	
FFT filter		
Bandwidths	1 Hz to 30 kHz (-3 dB) in 1-, 3-steps	
Bandwidth accuracy	5 %, nominal	
Shape factor -60 dB/-3 dB	2.5 : 1 nominal	

Level	
Display range	displayed average noise level to 30 dBm
Maximum input level	
DC voltage	0 V
RF attenuation 0 dB	
CW RF power	20 dBm
Pulse spectral density	97 dB μ V (1 MHz)
RF attenuation \geq 10 dB	
CW RF power	30 dBm
Max. pulse voltage	50 V
Max. pulse energy (10 μ s)	0.5 mWs
1-dB compression of input mixer	
0-dB RF attenuation, f > 200 MHz	0 dBm nominal
Intermodulation	
3rd-order intermodulation, Intermodulation free dynamic range, level 2 \times -30 dBm, Δ f > 5 \times RBW or 10 kHz, whichever is larger	
Frequency	>70 dBc, T.O.I. >5 dBm
20 MHz to 200 MHz	>74 dBc, T.O.I. >7 dBm
200 MHz to 3 GHz	>70 dBc, T.O.I. >5 dBm
3 GHz to 40 GHz	>70 dBc, T.O.I. >5 dBm
Second harmonic Intercept point (S.H.I)	
Frequency	
<100 MHz	25 dBm
100 MHz to 3 GHz	35 dBm
3 GHz to 40 GHz	45 dBm
Displayed average noise level	
(0-dB RF attenuation, RBW 100 Hz, VBW 1 Hz, 20 averages, trace average, span 0 Hz, termination 50 Ω)	
Frequency:	
9 kHz	typ. -90 dBm
100 kHz	<-90 dBm
1 MHz	<-100, typ. -125 dBm
10 MHz to 7 GHz	<-120, typ. -143 dBm
7 GHz to 13 GHz	<-115, typ. -138 dBm
13 GHz to 26.5 GHz	<-100, typ. -110 dBm
26.5 GHz to 40 GHz	<-95, typ. -100 dBm
Immunity to interference	
Image frequency (f < 26.5 GHz)	> 70 dB
Intermediate frequency f < 3 GHz	> 70 dB
Spurious response (f >200 kHz, without input signal, 0-dB attenuation)	<-100 dBm
Spurious response (with input signal, f < 7 GHz (mixer level <-10 dBm, Δ f > 100 kHz)	<-70 dBc
Spurious response (with 400 Hz mains supply frequency, with input signal, Δ f 400 Hz)	<-90 dBc nominal
Level display	
Screen	501 \times 400 pixel (one diagram), max. 2 diagrams with independent settings
Log level axis	10 dB to 200 dB, in steps of 10 dB
Linear level axis	10% of reference level per level division, 10 divisions or logarithmic scaling
Trace	max. 3, with two diagrams on screen max 3 per diagram
Trace detector	Max. Peak, Min. Peak, Auto Peak, Sample, Quasi-Peak, Average, RMS
Trace functions	Clear/Write, Max. Hold, Min. Hold, Average
Setting range of reference level	
Logarithmic level display	-130 dBm to 30 dBm, in steps of 0.1 dB
Linear level display	70.71 nV to 7.07 V in steps of 1%
Units of level axis	dBm, dBmV, dB μ V, dB μ A, dBpW (log level display) mV, μ V, mA, μ A, pW, nW (linear level display)
Max uncertainty of Level measurement	
Absolute level at 128 MHz, -30 dBm (RF attenuation 10 dB, RBW 10 kHz Ref. level -20 dBm, room temperature)	<0.2 dB
Frequency response	
9 kHz to 3 GHz	<0.5 dB
3 GHz to 26.5 GHz	<2 dB
Attenuator	<0.2 dB

Reference level setting	<0.2 dB
Display nonlinearity Log/Lin (S/N >16 dB)	
RBW ≤ 100 kHz 0 dB to -70 dB -70 dB to -90 dB	<0.2 dB <0.5 dB
RBW ≥ 300 kHz 0 dB to -50 dB -50 dB to -70 dB	<0.2 dB <0.5 dB
Bandwidth switching (ref.: RBW = 10 kHz)	
10 Hz to 100 kHz 300 kHz to 10 MHz	<0.1 dB <0.2 dB
Trigger functions	
Trigger	
Span ≥ 10 Hz	
Trigger source	free run, video, external, IF-level
Trigger offset	125 ns to 100 s, resolution 125 ns min. (or 1% of offset)
Span = 0 Hz	
Trigger source	free run, video, external, IF-level
Trigger offset	± 125 ns to 100 s, resolution 125 ns min., dependent on sweep time
Delay time accuracy	± (125 ns + (0.1% × delay time))
Gated sweep	
Trigger source	external, IF-level, Video
Gate delay	1 us to 100 s
Gate length	125 ns to 100 s, resolution min. 125 ns or 1% of gate length
Gate length accuracy	± (125 ns + (0.05% × gate length))
Inputs & outputs (front panel)	
RF input	
	Test port system, N female and K female, 50 Ω
VSWR (RF attenuation >0 dB)	
f < 3 GHz	Max . 1.5 : 1
f < 7 GHz	2.0 : 1
f < 26.5 GHz	2.3 : 1
Input attenuator	0 dB to 70 dB in 10-dB steps
Probe power supply	+15 V DC, -12.6 V DC and ground, max. 150 mA
Keyboard Connector	PS/2 female for MF-2 keyboard
AF output (only with option R&S®FSP-B3)	3.5 mm mini jack
Output impedance	10 Ω
Open-circuit voltage	adjustable, up to 1.5 V
Inputs & outputs (rear panel)	
IF 20.4 MHz	Z _{out} = 50 Ω, BNC female
Level RBW ≤ 30 kHz, FFT RBW ≥ 100 kHz	-10 dBm at reference level, mixer level > -60 dBm 0 dBm at reference level, mixer level > -60 dBm
Reference frequency	
Output	
Output frequency	BNC female
Level	10 MHz
Input	0 dBm nominal
Required level	10 MHz
	0 dBm into 50 Ω
Others	
External trigger/gate input	BNC female, >10 kΩ
Trigger Voltage	1.4 V, TTL
IEC/IEEE-bus control	
Command set	interface to IEC-625-2 (IEEE 488.2)
Connector	SCPI 1997.0
Interface functions	24-pin Amphenol female
Serial interface	SH1, AH1, T6, L4, SR1, RL1, PP1, DC1, DT1, C0
Printer interface	RS-232-C (COM), 9-pin D-Sub connector
Mouse connector	parallel (Centronics compatible)
Connector for external monitor (VGA)	PS/2 female
	15-pin D-Sub connector

General data	
Display	21-cm TFT color display (8.4")
Resolution	640 × 480 pixel (VGA resolution)
Pixel failure rate	$<2 \times 10^{-5}$
Mass memory	1.44-Mbyte 3 1/2" diskette (built-in disk drive), harddisk
Data storage	>500 instrument settings and traces
Temperature range	
Nominal temperature range	+ 0 °C to +50 °C
Storage temperature range	– 40 °C to +70 °C
Damp heat	+40°C at 95% relative humidity (EN 60068–2–30)
Mechanical stress	
Sinusoidal vibration	5 Hz to 150 Hz, max. 2 g at 55 Hz; 0.5 g from 55 Hz to 150 Hz; to EN 60068-2-6, EN 60068-2-30, EN 61010-1, MIL-T-28800D, class 5
Random vibration	10 Hz to 300 Hz, acceleration 1.9 g rms
Shock	40 g shock spectrum, to MIL-STD-810C and MIL-T-28800D, classes 3 and 5
Recommended calibration interval	2 years for operation with external reference, internal reference 1 year
Power supply	
AC supply	100 V to 240 V AC, 50 Hz to 400 Hz, 3.1 A to 1.3 A, Protection class I
typical power consumption	150 VA
Safety	to EN 61010-1, UL 3111-1, CSA C22.2 No. 1010-1, IEC 1010-1
Test mark	VDE, GS, CSA, CSA-NRTL/C
RFI suppression	complies to the EMC rules of the EU (89/336/EWG)
Dimensions (W × H × D)	412 mm × 197mm × 417 mm 16.22 in × 7.76 in × 16.42
Weight (without options)	14 kg 30.86 lb

Ordering Information

Designation	Type	Order No.
Spectrum Analyzer, 9 kHz to 40 GHz	R&S®FSP38-B86	1164.4391.86



For product brochure, see PD 0758.1206.12
and www.rohde-schwarz.com
(search term: FSP)



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