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# Spectrum Analyzer R&S® FSP

Specifications



**ROHDE & SCHWARZ**

# Specifications

Specifications are valid under the following conditions:

15 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.

Data designated " $\sigma = xx \text{ dB}$ " is shown as standard deviation.

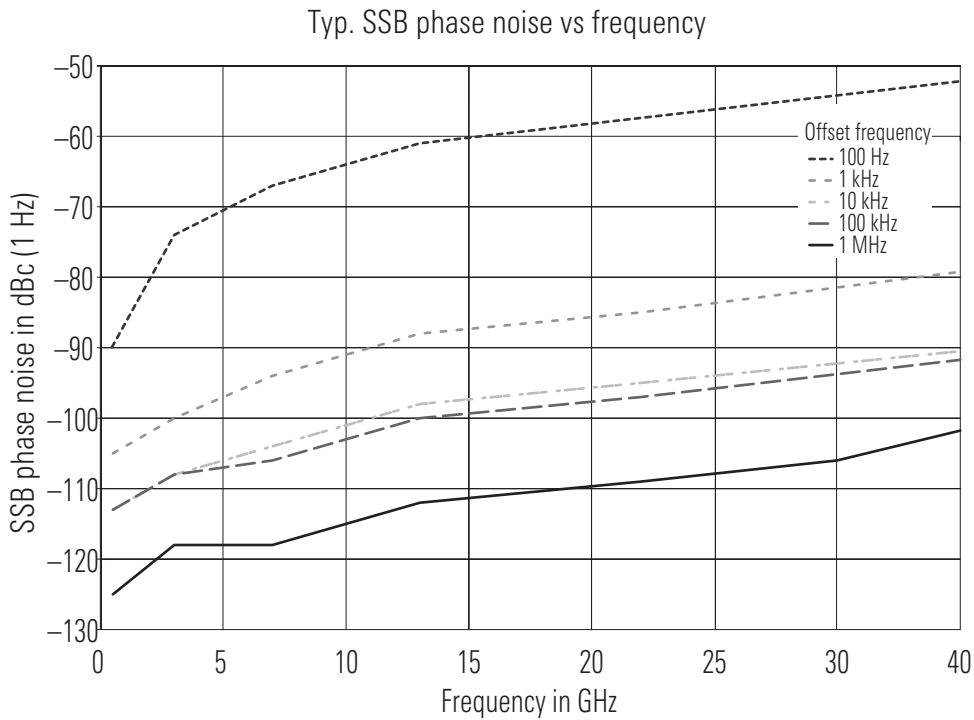
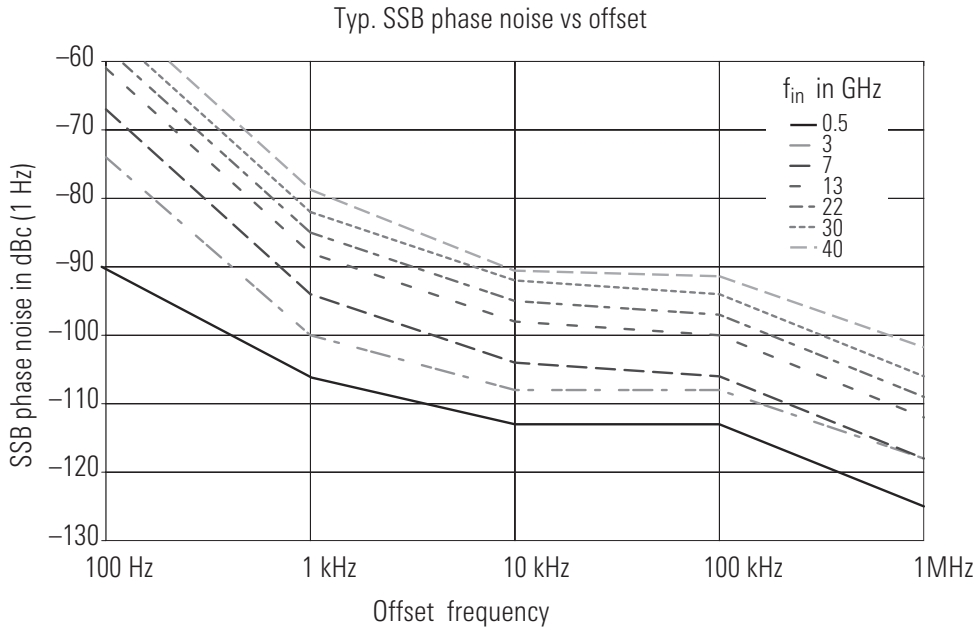
	R&S® FSP3	R&S® FSP7	R&S® FSP13	R&S® FSP30	R&S® FSP40
<b>Frequency</b>					
<b>Frequency range</b>	9 kHz to 3 GHz	9 kHz to 7 GHz	9 kHz to 13.6 GHz	9 kHz to 30 GHz	9 kHz to 40 GHz
Frequency resolution	0.01 Hz				
<b>Internal reference frequency (nominal)</b>					
Aging per year <sup>1)</sup>	$1 \times 10^{-6}$				
Temperature drift	$1 \times 10^{-6}$				
<b>With option R&amp;S® FSP-B4 (OCXO)</b>					
Aging per year <sup>1)</sup>	$1 \times 10^{-7}$				
Temperature drift	$1 \times 10^{-8}$				
<b>External reference frequency</b>					
	10 MHz				
<b>Frequency display</b>					
	with marker or frequency counter				
Marker resolution	span/500				
Max. deviation (sweep time >3 × auto sweep time)	$\pm(\text{frequency} \times \text{reference frequency} + 0.5\% \times \text{span} + 10\% \times \text{resolution bandwidth} + \frac{1}{2} \text{ (last digit)})$				
Frequency counter resolution	0.1 Hz to 10 kHz (selectable)				
Count accuracy (S/N >25 dB)	$\pm(\text{frequency} \times \text{reference frequency} + \frac{1}{2} \text{ (last digit)})$				
Frequency span	0 Hz, 10 Hz to 3 GHz	0 Hz, 10 Hz to 7 GHz	0 Hz, 10 Hz to 13.6 GHz	0 Hz, 10 Hz to 30 GHz	0 Hz, 10 Hz to 40 GHz
Max. span deviation	0.1%				
<b>Spectral purity (dBc (1 Hz)) SSB phase noise, f = 500 MHz, for f &gt; 500 MHz see diagrams below</b>					
Carrier offset					
100 Hz	<-84, typ.-90				
1 kHz	<-100, typ.-108				
10 kHz	<-106, typ. -113				
100 kHz <sup>2)</sup>	<-110, typ. -113				
1 MHz <sup>2)</sup>	<-120, typ.-125				
10 MHz	typ.-145				
Residual FM					
f = 500 MHz, RBW 1 kHz, sweep time 100 ms	typ. 3 Hz				

<sup>1)</sup> After 30 days of operation.

<sup>2)</sup> Valid for span >100 kHz.

Typical values for SSB phase noise (reference to 1 Hz bandwidth):

Offset	$f_{in} = 3 \text{ GHz}$	$f_{in} = 7 \text{ GHz}$	$f_{in} = 13 \text{ GHz}$	$f_{in} = 22 \text{ GHz}$	$f_{in} = 26 \text{ GHz}$	$f_{in} = 40 \text{ GHz}$
100 Hz	-74 dBc	-67 dBc	-61 dBc	-57 dBc	-55 dBc	-52 dBc
1 kHz	-100 dBc	-94 dBc	-88 dBc	-84 dBc	-82 dBc	-79 dBc
10 kHz	-108 dBc	-104 dBc	-98 dBc	-94 dBc	-92 dBc	-91 dBc
100 kHz	-108 dBc	-106 dBc	-100 dBc	-96 dBc	-94 dBc	-92 dBc
1 MHz	-118 dBc	-118 dBc	-112 dBc	-108 dBc	-106 dBc	-102 dBc



	R&S®FSP3	R&S®FSP7	R&S®FSP13	R&S®FSP30	R&S®FSP40
<b>Sweep time</b>					
Span ≥10 Hz	2.5 ms to 16000 s				
Max. deviation	1%				
Span 0 Hz	1 μs to 16000 s				
Resolution	125 ns				
<b>Resolution bandwidths</b>					
Bandwidths	10 Hz to 10 MHz (–3 dB) in 1, 3 sequence				
EMI bandwidths	200 Hz, 9 kHz, 120 kHz (–6 dB)				
<b>Bandwidth accuracy</b>					
≤100 kHz	<3%				
300 kHz to 3 MHz	<10%				
10 MHz	+10%, –30%				
<b>Shape factor –60 dB: –3 dB</b>					
≤100 kHz	<5:1 (Gaussian filters)				
300 kHz to 3 MHz	<15:1 (4-pole synchronously tuned filters)				
10 MHz	<7:1				
<b>Shape factor –60 dB: –6 dB</b>					
EMI bandwidths	<5:1				
Video bandwidths	1 Hz to 10 MHz in 1, 3 sequence				
<b>FFT filter</b>					
Bandwidths	1 Hz to 30 kHz (–3 dB) in 1, 3 sequence				
Bandwidth accuracy	5%, nominal				
Shape factor –60 dB: –3 dB	2.5:1 nominal				
<b>Channel filter</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; 1.228; 1.5; 2; 3; 5 MHz 1.28 (RRC), 3.84 (RRC), 4.096 (RRC)				
<b>Level</b>					
<b>Display range</b>	displayed average noise level to 30 dBm				
<b>Maximum input level</b>					
DC voltage	50 V		0 V		
<b>RF attenuation 0 dB</b>					
CW RF power	20 dBm				
Pulse spectral density	97 dBμV (1 MHz)				
<b>RF attenuation ≥10 dB</b>					
CW RF power	30 dBm				
Max. pulse voltage	150 V		50 V		
Max. pulse energy (10 μs)	1 mWs		0.5 mWs		
<b>1 dB compression of input mixer</b>					
0 dB RF attenuation, f > 200 MHz	0 dBm nominal				
<b>Intermodulation</b>					
3rd-order intermodulation					
Intermodulation-free dynamic range, level 2 × –30 dBm, Δf > 5 × RBW or 10 kHz, whichever is larger					
20 MHz to 200 MHz	>70 dBc, TOI >5 dBm				
200 MHz to 3 GHz	>74 dBc, TOI >7 dBm (typ. 10 dBm)				
3 GHz to 7 GHz	–	>80 dBc, TOI >10 dBm (typ. 15 dBm)			
7 GHz to 13.6 GHz	–	–	>80 dBc, TOI >10 dBm		
13.6 GHz to 30 GHz	–	–	–	>76 dBc, TOI >8 dBm	>80 dBc, TOI >10 dBm
30 GHz to 40 GHz	–	–	–	–	>80 dBc, TOI >10 dBm
With optional Electronic Attenuator R&S®FSP-B25 switched on					
20 MHz to 200 MHz	>74 dBc, TOI > 7 dBm		–		
200 MHz to 3 GHz	>80 dBc, TOI > 10 dBm		–		
3 GHz to 7 GHz	>84 dBc, TOI > 12 dBm		–		

	R&S® FSP3	R&S® FSP7	R&S® FSP13	R&S® FSP30	R&S® FSP40
<b>Second harmonic intercept point (SHI)</b>					
<100 MHz			typ. 25 dBm		
100 MHz to 1.5 GHz			typ. 35 dBm		
1.5 GHz to 7 GHz	–			typ. 80 dBm	
7 GHz to 13.6 GHz	–	–		typ. 80 dBm	
13.6 GHz to 30 GHz	–	–	–	typ. 80 dBm	
30 GHz to 40 GHz	–	–	–	–	typ. 80 dBm
<b>Displayed average noise level</b>					
(0 dB RF attenuation, RBW 10 Hz, VBW 1 Hz, 20 averages, trace average, span 0 Hz, termination 50 Ω)					
<b>Frequency</b>					
9 kHz			<–95 dBm		
100 kHz			<–100 dBm		
1 MHz			<–120 dBm, typ. –125 dBm		
10 MHz to 1 GHz	<–142 dBm, typ. –145 dBm		<–140 dBm, typ. –145 dBm		
1 GHz to 3 GHz	<–140 dBm, typ. –145 dBm		<–138 dBm, typ. –143 dBm		
3 GHz to 7 GHz	–	<–138 dBm, typ. –143 dBm		<–135 dBm, typ. –140 dBm	
7 GHz to 13.6 GHz	–	–		<–132 dBm, typ. –138 dBm	
13.6 GHz to 22 GHz	–	–	–	<–120 dBm, typ. –128 dBm	–
22 GHz to 30 GHz	–	–	–	<–115 dBm, typ. –123 dBm	–
13.6 GHz to 20 GHz	–	–	–	–	<–120 dBm, typ. –128 dBm
20 GHz to 30 GHz	–	–	–	–	<–120 dBm, typ. –128 dBm
30 GHz to 40 GHz	–	–	–	–	<–112 dBm, typ. –120 dBm
<b>Displayed average noise level with preamplifier on (option R&amp;S® FSP-B25)</b>					
10 MHz to 2 GHz		<–152 dBm		–	
2 GHz to 7 GHz		<–150 dBm		–	
<b>Immunity to interference</b>					
Image frequency				>70 dB	
Intermediate frequency (f <3 GHz)				>70 dB	
Spurious responses (f >1 MHz, without input signal, 0 dB attenuation)				<–103 dBm	
Other spurious (with input signal, mixer level <–10 dBm, Δf >100 kHz)				f <7 GHz: <–70 dBc f <13.6 GHz: <–64 dBc f <30 GHz: <–56 dBc	
<b>Level display</b>					
Screen				501 × 400 pixels (one diagram), max. two diagrams with independent settings	
Logarithmic level scale				10 dB to 200 dB, in steps of 10 dB	
Linear level scale				10% of reference level per level division (10 divisions)	
Traces				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	
Number of test points				501, selectable in steps of approx. factor 2, 125 to 8001	
<b>Setting range of reference level</b>					
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 scale				dBm, dBmV, dBμV, dBμA, dBpW (log level display), mV, μV, mA, μA, pW, nW (linear level display)	
<b>Max. uncertainty of level measurement</b>					
At 128 MHz, –30 dBm (RF attenuation 10 dB, RBW 10 kHz, ref. level –20 dBm)				<0.2 dB (σ = 0.07 dB)	

	R&S®FSP3	R&S®FSP7	R&S®FSP13	R&S®FSP30	R&S®FSP40	
<b>Frequency response</b>						
<50 kHz	<+0.5/- 1.0 dB					
50 kHz to 3 GHz	<0.5 dB ( $\sigma = 0.17$ dB)					
3 GHz to 7 GHz	–	<2 dB ( $\sigma = 0.7$ dB)				
7 GHz to 13.6 GHz	–	–	<2.5 dB <sup>1)</sup>			
13.6 GHz to 30 GHz	–	–	–	<3 dB <sup>1)</sup>		
30 GHz to 40 GHz	–	–	–	–	<4 dB <sup>1)</sup>	
Frequency response with option R&S®FSP-B25 switched on (preamplifier, electronic attenuator)						
10 MHz to 3 GHz	<1 dB ( $\sigma = 0.33$ dB)			–		
3 GHz to 7 GHz	–	<2 dB ( $\sigma = 0.7$ dB)		–		
Attenuator	<0.2 dB ( $\sigma = 0.07$ dB)					
Reference level switching	<0.2 dB ( $\sigma = 0.07$ dB)					
<b>Display nonlinearity LOG/LIN (S/N &gt;16 dB)</b>						
RBW $\leq$ 100 kHz						
0 dB to -70 dB	<0.2 dB ( $\sigma = 0.07$ dB)					
-70 dB to -90 dB	<0.5 dB ( $\sigma = 0.17$ dB)					
RBW $\geq$ 300 kHz						
0 dB to -50 dB	<0.2 dB ( $\sigma = 0.07$ dB)					
-50 dB to -70 dB	<0.5 dB ( $\sigma = 0.17$ dB)					
<b>Bandwidth switching uncertainty (ref. to RBW = 10 kHz)</b>						
10 Hz to 100 kHz	<0.1 dB ( $\sigma = 0.03$ dB)					
300 kHz to 10 MHz	<0.2 dB ( $\sigma = 0.07$ dB)					
1 Hz to 3 kHz, FFT	<0.2 dB ( $\sigma = 0.03$ dB)					
<b>Total measurement uncertainty</b>						
0 GHz to 3 GHz	0.5 dB					
<b>Trigger functions</b>						
<b>Trigger</b>						
<b>Span <math>\geq</math>10 Hz</b>						
Trigger source	free run, video, external, IF level					
Trigger offset	125 ns to 100 s, resolution 125 ns min. (or 1% of offset)					
<b>Span = 0 Hz</b>						
Trigger source	free run, video, external, IF level					
Trigger offset	$\pm$ 125 ns to 100 s, min. resolution 125 ns, dependent on sweep time					
Max. deviation of trigger offset	$\pm$ (125 ns + (0.1% $\times$ delay time))					
<b>Gated sweep</b>						
Trigger source	external, IF level, video					
Gate delay	1 $\mu$ s to 100 s					
Gate length	125 ns to 100 s, min. resolution 125 ns or 1% of gate length					
Max. deviation of gate length	$\pm$ (125 ns + (0.05% $\times$ gate length))					
<b>Inputs and outputs (front panel)</b>						
<b>RF input</b>	N female, 50 $\Omega$			test port system 50 $\Omega$ , N female, 3.5 mm female <sup>2)</sup>	test port system 50 $\Omega$ , N female, K female <sup>2)</sup>	
<b>VSWR (RF attenuation &gt;0 dB)</b>						
f <3 GHz	1.5:1					
f <7 GHz	–	2.0:1				
f <13 GHz	–	–	2.5:1			
f <30 GHz	–	–	–	3.0:1		
f <40 GHz	–	–	–	–	3.0:1	
Input attenuator	0 dB to 70 dB in 10 dB steps					
With option R&S®FSP-B25	0 dB to 75 dB in 5 dB steps			not available		
Probe power supply	+15 V DC, -12.6 V DC and ground, max. 150 mA					
Keyboard connector	PS/2 female for MF2 keyboard					
AF output (only with option R&S®FSP-B3)	3.5 mm mini-jack					
Output impedance	10 $\Omega$					
Open-circuit voltage	up to 1.5 V, adjustable					

	R&S® FSP3	R&S® FSP7	R&S® FSP13	R&S® FSP30	R&S® FSP40
<b>Inputs and outputs (rear panel)</b>					
IF 20.4 MHz	$Z_{out} = 50 \Omega$ , BNC female				
<b>Level</b>					
RBW $\leq 30$ kHz, FFT	-10 dBm at reference level, mixer level $> -60$ dBm				
RBW $\geq 100$ kHz	0 dBm at reference level, mixer level $> -60$ dBm				
<b>Reference frequency</b>					
<b>Output</b>	BNC female				
Output frequency	10 MHz				
Level	0 dBm, nominal				
<b>Input</b>	10 MHz				
Required level	0 dBm into $50 \Omega$				
<b>Others</b>					
Power supply for noise source	BNC female, 0 V and 28 V, switchable, max. 100 mA				
External trigger/gate input	BNC female, $> 10 \text{ k}\Omega$				
Trigger voltage	1.4 V (TTL)				
<b>IEC/IEEE bus remote control interface to IEC 625-2 (IEEE 488.2)</b>					
Command set	SCPI 1997.0				
Connector	24-pin Amphenol female				
Interface functions	SH1, AH1, T6, L4, SR1, RL1, PP1, DC1, DT1, C0				
Serial interface	RS-232-C (COM), 9-pin sub-D connector				
Printer interface	parallel (Centronics-compatible)				
Mouse connector	PS/2 female				
Connector for ext. monitor (VGA)	15-pin sub-D connector				
<b>General data</b>					
Display	21 cm TFT colour display (8.4")				
Resolution	$640 \times 480$ pixels (VGA resolution)				
Pixel failure rate	$< 2 \times 10^{-5}$				
Mass memory	1.44 MByte $3\frac{1}{2}$ " disk drive (built-in), hard disk				
Data storage	$> 500$ instrument settings and traces				
<b>Temperatures</b>					
Operating temperature range	$+5^\circ\text{C}$ to $+40^\circ\text{C}$				
Permissible temperature range	$+5^\circ\text{C}$ to $+45^\circ\text{C}$				
Storage temperature range	$-40^\circ\text{C}$ to $+70^\circ\text{C}$				
Damp heat	$+40^\circ\text{C}$ at 95% relative humidity (EN 60068-2-30)				
<b>Mechanical resistance</b>					
Vibration, sinusoidal	5 Hz to 150 Hz, max. 2 g at 55 Hz; 0.5 g from 55 Hz to 150 Hz; meets EN60068-2-6, EN60068-2-30, EN61010-1, MIL-T-28800D, class 5				
Vibration, random	10 Hz to 100 Hz, acceleration 1 g (rms)				
Shock test	40 g shock spectrum, meets MIL-STD-810C and MIL-T-28800D, classes 3 and 5				
Recommended calibration interval	2 years for operation with external reference, 1 year with internal reference				
<b>Power supply</b>					
AC supply	100 V AC to 240 V AC, 50 Hz to 400 Hz, 3.1 A to 1.3 A, class of protection I to VDE411				
Typical power consumption	70 VA	120 VA	150 VA		
Safety	meets EN 61010-1, UL3111-1, CSAC22.2 No. 1010-1,				
RFI suppression	meets EMC Directive of EU (89/336/EEC) and German EMC law				
Test mark	VDE, GS, CSA, CSA-NRTL/C				
Dimensions in mm (W $\times$ H $\times$ D)	$412 \times 197 \times 417$				
Weight	10.5 kg	11.3 kg	12 kg		

<sup>1)</sup> RF attenuation 10 dB, sweep time  $> 1\text{s}/1\text{GHz}$ .

<sup>2)</sup> See recommended extras for alternate connectors.

## Specifications of options

### Tracking Generator R&S®FSP-B9

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  $-9 \text{ kHz}$  to  $+9 \text{ kHz}$ . The specified level accuracy of the tracking generator is valid under the following conditions: RF attenuation  $\geq 20 \text{ dB}$  and sweep time  $\geq 2000 \text{ ms}$ .

<b>Frequency</b>	
Frequency range	9 kHz to 3 GHz
<b>Frequency offset</b>	
Setting range	$\pm 150 \text{ MHz}$
Resolution	1 Hz
Spectral purity (dBc (1 Hz)) SSB phase noise, $f = 500 \text{ MHz}$ , carrier offset 100 kHz	
Normal mode	typ. $-90$
With FM modulation on	typ. $-70$
<b>Level</b>	
Level setting range	$-30 \text{ dBm}$ to $0 \text{ dBm}$ in steps of $0.1 \text{ dB}$
Level setting range with AM	$-30 \text{ dBm}$ to $-6 \text{ dBm}$ in steps of $0.1 \text{ dB}$
Max. deviation of output level, 128 MHz, 0 dBm	$< 1 \text{ dB}$
Frequency response	
Output level 0 dBm, 100 kHz to 2 GHz	$< 1 \text{ dB}$
Output level 0 dBm to $-25 \text{ dBm}$ , 9 kHz to 3 GHz	$< 3 \text{ dB}$
<b>Dynamic range</b>	
Attenuation measurement range, RBW = 1 kHz, $f > 10 \text{ MHz}$	120 dB
<b>Spurious</b>	
Harmonics, output level $-10 \text{ dBm}$	typ. $-30 \text{ dBc}$
Nonharmonics, output level 0 dBm	typ. $-30 \text{ dBc}$
<b>Modulation</b>	
Modulation format (external)	I/Q, AM, FM, FM-DC, PM, ASK, FSK
<b>AM, <math>f &gt; 10 \text{ MHz}</math></b>	
Modulation depth	0% to 99%
Modulation frequency range	0 Hz to 1 MHz
<b>FM, <math>f &gt; 10 \text{ MHz}</math></b>	
Frequency deviation	0 Hz to 20 MHz
Modulation frequency range	0 Hz to 100 kHz
<b>I/Q modulation, <math>f &gt; 10 \text{ MHz}</math></b>	
0 Hz to 30 MHz	typ. 1 dB
<b>Inputs and outputs (front panel)</b>	
RF output	N female, $50 \Omega$
VSWR	typ. 2:1
<b>Inputs and outputs (rear panel)</b>	
TG/AM IN	$V_{\text{max(pp)}} = 1 \text{ V}$ ; $Z_{\text{in}} = 50 \Omega$ , BNC female
TG Q/FM IN	$V_{\text{max(pp)}} = 1 \text{ V}$ ; $Z_{\text{in}} = 50 \Omega$ , BNC female
<b>External Generator Control R&amp;S®FSP-B10</b>	
Supported signal generators	R&S®SME02/03/06, R&S®SMG, R&S®SMGL, R&S®SMGU, R&S®SMH, R&S®SMHU, R&S®SMIQ02B/02E/03B/03E/04B/06B R&S®SML, R&S®SMR20/27/30/40/60 R&S®SMP02/22/03/04, R&S®SMX, R&S®SMY R&S®SMT02/03/06
<b>LAN Interface R&amp;S®FSP-B16</b>	
Connector (rear panel)	RJ-45
Supported protocols	10Base-T (IEEE standard 10 Mbit/s 802.3) 100Base-TX (IEEE standard 100 Mbit/s 802.3u)
<b>Extended Environmental Specification R&amp;S®FSP-B20</b>	
<b>Temperature range (noncondensing)</b>	
Operating temperature range	$0^\circ\text{C}$ to $+50^\circ\text{C}$
Permissible temperature range	$0^\circ\text{C}$ to $+55^\circ\text{C}$
<b>Mechanical resistance</b>	
Vibration, random	10 Hz to 300 Hz, acceleration 1.9 g (rms)



LO/IF ports for external Mixers R&S®FSP-B21 (R&S®FSP40 only)

<b>LO level</b>	
Frequency range	7 GHz to 13.2 GHz
Level	+15.5 dBm ±3 dB

<b>IF input</b>	
IF frequency	404.4 MHz
Full scale level	
2 port mixer, LO output/IF input (front)	-20 dBm
Level deviation	
IF level -30 dBm, reference level -20 dBm, RBW 30 kHz, LO output/IF input (front)	<1dB
Full scale level	
3 port mixer, IF input (front)	-20 dBm
Level deviation	
IF level -30 dBm, reference level -20 dBm, RBW 30 kHz, IF input (front)	<1dB

<b>Inputs and outputs (front)</b>	
LO output/IF input	SMA female, 50 Ω
IF input	SMA female, 50 Ω

Electronic Attenuator R&S®FSP-B25 (only for R&S®FSP3 and R&S®FSP7)

<b>Frequency</b>	
Frequency range	10 MHz to 7 GHz
Input attenuator range (mechanical)	0 dB to 75 dB in 5 dB steps
Electronic attenuation range	0 dB to 30 dB in 5 dB steps
Preamplifier	20 dB, switchable

<b>Displayed average noise level with preamplifier on (0 dB RF attenuation, RBW 10 Hz, VBW 1 Hz, 20 averages, trace average, span 0 Hz, termination 50 Ω)</b>	
10 MHz to 2 GHz	<-152 dBm
2 GHz to 7 GHz	<-150 dBm

<b>Intermodulation with electronic attenuator on</b>	
3rd-order intermodulation, intermodulation-free dynamic range, level $2 \times -30$ dBm, $\Delta f > 5 \times$ RBW or 10 kHz, whichever is larger	
20 MHz to 200 MHz	>74 dBc, TOI >7 dBm
200 MHz to 3 GHz	>80 dBc, TOI >10 dBm
3 GHz to 7 GHz	>84 dBc, TOI >12 dBm

<b>Max. deviation of level measurement</b>	
128 MHz, -30 dBm (RF attenuation 10 dB, RBW 10 kHz, ref. level -20 dBm), preamplifier on	<0.2 dB ( $\sigma = 0.07$ dB)
Electronic attenuator	<0.2 dB ( $\sigma = 0.07$ dB)

<b>Frequency response with preamplifier, electronic attenuator</b>	
10 MHz to 3 GHz	<1.0 dB ( $\sigma = 0.33$ dB)
3 GHz to 7 GHz	<2 dB ( $\sigma = 0.7$ dB)

<b>Trigger Port R&amp;S®FSP-B28</b>	
Output voltage	high ≤1.4 V low ≥0.7 V
Trigger port connector	25-pin sub-D female

<b>Frequency range extension 20 Hz R&amp;S®FSP-B29</b>	
Frequency range	20 Hz to $f_{max}$
Frequency response <9 kHz	<1 dB

<b>Displayed average noise level</b>	
0 dB RF attenuation, RBW 10 Hz, VBW 1 Hz, 20 averages, trace average, span 0 Hz, termination 50 Ω	
20 Hz	<-58 dBm
100 Hz	<-75 dBm
1 kHz	<-85 dBm

<b>DC Power Supply R&amp;S®FSP-B30</b>	
Input voltage range	10 V to 28 V DC 25 A to 12.5 A
Output voltage	120 V to 360 V DC/300 W

<b>Current consumption (<math>V_{DC} = 12</math> V, R&amp;S®FSP without options, default settings)</b>	
R&S®FSP3	typ. 6 A
R&S®FSP30	typ. 8 A
Operating temperature range	0°C to +50°C
Storage temperature range	-40°C to +70°C
Dimensions in mm (W × H × D)	145 × 154 × 65
Weight	0.6 kg

## Battery Pack R&S®FSP-B31/-B32

NiMH battery pack with built-in load control for all R&S®FSP and R&S®ESPI models with options R&S®FSP-B1 and R&S®FSP-B30

Input voltage of battery pack	10 V to 28 V DC
Input voltage power supply (battery charge)	24 V DC/max. 3 A
Output voltage	
Battery operation	13.2 V DC/200 Wh
Bypass operation	10 V to 28 V DC/10 A

### Typical operating times (R&S®FSP without options)

R&S®FSP3	2 h
R&S®FSP30	1.5 h
Charging time	5 h at 25°C
Operating temperature range (discharging)	0°C to +50°C
Operating temperature range (charging)	+10°C to +40°C
Storage temperature range (<1 year)	-20°C to +35°C
Storage temperature range (<1 month)	-20°C to +55°C
Dimensions (W × H × D)	400 mm × 134 mm × 42 mm
Weight	3.7 kg

### AC adapter (R&S®FSP-B31 only)

Input voltage range	100 V to 240 V AC ±10%
Input frequency range	50 Hz to 60 Hz ±5%
Input power	140 VA
Output voltage	24 V
Output current	3 A
Operating temperature range	0°C to +50°C
Storage temperature range	-20°C to +70°C
Dimensions (W × H × D)	132 mm × 58 mm × 30 mm
Weight	0.3 kg

## Ordering information

Order designation	Type	Order No.
Spectrum Analyzer, 9 kHz to 3 GHz	R&S®FSP3	1164.4391.03
Spectrum Analyzer, 9 kHz to 7 GHz	R&S®FSP7	1164.4391.07
Spectrum Analyzer, 9 kHz to 13.6 GHz	R&S®FSP13	1164.4391.13
Spectrum Analyzer, 9 kHz to 30 GHz	R&S®FSP30	1164.4391.30
Spectrum Analyzer, 9 kHz to 40 GHz	R&S®FSP40	1164.4391.40

### Accessories supplied

Power cable, compact manual, CD-ROM with operating manual and service manual.

R&S®FSP30: test port adapter with 3.5 mm female (1021.0512.00) and N female (1021.0535.00) connector.

R&S®FSP40: test port adapter with K female (1036.4770.00) and N female (1036.4777.00) connector.

## Options

Order designation	Type	Order No.	Retrofittable	Remarks
<b>Options</b>				
Delete Manuals	R&S®FSP-B0	1129.8394.02		
Rugged Case, carrying handle (factory-fitted)	R&S®FSP-B1	1129.7998.02	no	
AM/FM Audio Demodulator	R&S®FSP-B3	1129.6491.02	yes	not with R&S®FSP-B15.
OCXO Reference Frequency	R&S®FSP-B4	1129.6740.02	yes	
TV Trigger/RF Power Trigger	R&S®FSP-B6	1129.859.4.02	yes	not with R&S®FSP-B21.
Internal Tracking Generator 9 kHz to 3 GHz, I/Q modulator, for all R&S®FSP models	R&S®FSP-B9	1129.6991.02	yes	
External Generator Control for all R&S®FSP models	R&S®FSP-B10	1129.7246.02	yes	
Pulse Calibrator for R&S®FSP	R&S®FSP-B15	1155.1006.02	yes	not with R&S®FSP-B3; required for R&S®FS-K72/-K73
LAN Interface 100BT for all R&S®FSP models with Windows XP (1164.4391.xx)	R&S®FSP-B16	1129.8042.03	yes	

Order designation	Type	Order No.	Retrofittable	Remarks
LAN Interface 100BT for all R&S®FSP models with Windows NT (1043.4495.xx)	R&S®FSP-B16	1129.8042.02	yes	
Extended Environmental Specification	R&S®FSP-B20	1155.1606.06	no	
LO/IF Ports for External Mixers	R&S®FSU-B21	1157.1090.02	yes	not with R&S®FSP-B6; only for R&S®FSP40
Electronic Attenuator, 0 dB to 30 dB, 5 dB steps, integrated preamplifier for R&S®FSP3 and R&S®FSP7	R&S®FSP-B25	1129.7746.02	yes	
Trigger Port for R&S®FSP for indication of trigger conditions	R&S®FSP-B28	1162.9915.02	yes	
Frequency Range Extension 20 Hz for R&S®FSP3/7	R&S®FSP-B29	1163.0663.07	no	
Frequency Range Extension 20 Hz for R&S®FSP 13/30	R&S®FSP-B29	1163.0663.30	no	
Frequency Range Extension 20 Hz for R&S®FSP40	R&S®FSP-B29	1163.0663.40	no	
DC Power Supply for Spectrum Analyzers R&S®FSP	R&S®FSP-B30	1155.1158.02	yes	
Battery Pack for Spectrum Analyzers R&S®FSP	R&S®FSP-B31	1155.1258.02	yes	R&S®FSP-B1 and R&S®FSP-B30 required
Spare Battery Pack for Spectrum Analyzers R&S®FSP	R&S®FSP-B32	1155.1506.02	yes	R&S®FSP-B31 required
Demodulation Hardware and Memory Extension	R&S®FSP-B70	1157.0559.02	yes	required for R&S®FS-K72/- K73; R&S®FSP-B15 required
<b>Software</b>				
Phase Noise Measurement Software	R&S®FS-K4	1108.0088.02		
GSM/EDGE Application Firmware, Mobile	R&S®FS-K5	1141.1496.02		
AM/FM/ϕM Measurement Demodulator	R&S®FS-K7	1141.1796.02		
Application Firmware for Bluetooth® Measurements	R&S®FS-K8	1157.2568.02		
Power Sensor Measurements	R&S®FS-K9	1157.3006.02		supports R&S®NRP-Z11/-Z21 with R&S®NRP-Z4 USB con- nector
Application Firmware for Noise Figure and Gain Measurements	R&S®FS-K30	1300.6508.02		Preamplifier R&S®FSP-B25 recommended
3GPP BTS/Node B FDD Application Firmware	R&S®FS-K72	1154.7000.02		R&S®FSP-B15 and -B70 required
3GPP UE FDD Application Firmware	R&S®FS-K73	1154.7252.02		R&S®FSP-B15 required, R&S®FSP-B70 recommended
3GPP HSDPA BTS Application Firmware	R&S®FS-K74	1300.7156.02		R&S®FS-K72 required
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® (IS-95) 1xEV-DV BTS FDD 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		
WLAN 802.11a TX Measurements Application Firmware	R&S®FSP-K90	1300.6650.02		

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## Recommended extras

Designation	Type	Order No.
Headphones		0708.9010.00
US Keyboard with Trackball	R&S®PSP-Z2	1091.4100.02
PS/2 Mouse	R&S®FSE-Z2	1084.7043.02
DC Block, 10 kHz to 18 GHz (type N)	R&S®FSE-Z4	1084.7443.02
Colour Monitor, 15", 230 V	R&S®PMC3	1082.6004.02
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®FSP-B1)	R&S®ZZA478	1096.3248.00
Soft Carrying Case, grey	R&S®ZZT473	1109.5048.00
Printed operating manual (German)	–	1093.4820.11
Printed operating manual (English)	–	1093.4820.12
Printed service manual (German)	–	1093.4820.81
Printed service manual (English)	–	1093.4820.82

### Matching Pads, 75 Ω

L Section	R&S®RAM	0358.5414.02
Series Resistor, 25 Ω <sup>1)</sup>	R&S®RAZ	0358.5714.02
SWR Bridge, 5 MHz to 3 GHz	R&S®ZRB2	0373.9017.52
SWR Bridge, 40 kHz to 4 GHz	R&S®ZRC	1039.9492.52

### High-Power Attenuators, 100 W

3/6/10/20/30 dB	R&S®RBU100	1073.8495.XX (XX=03/06/10/20/30)
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### High-Power Attenuators, 50 W

3/6/10/20/30 dB	R&S®RBU50	1073.8695.XX (XX=03/06/10/20/30)
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### For R&S® FSP 30

Test Port Adapter, 3.5 mm male	–	1021.0529.00
Test Port Adapter, N male	–	1021.0541.00
Microwave Measurement Cable and Adapter Set	R&S®FS-Z15	1046.2002.02

### For R&S® FSP 40

Test Port Adapter K male	–	1036.4802.00
Test Port Adapter N male	–	1036.4783.00
Test Port Adapter 2.4 mm female	R&S®FSE-Z5	1088.1627.02

<sup>1)</sup> Taken into account in device function RF INPUT 75 Ω.

## Related data sheets

Title	Order No.
TV Trigger/RF Power Trigger R&S®FSP-B6	PD 0757.6433
Noise Measurement Software R&S®FS-K3 for Spectrum Analyzers R&S®FSE, R&S®FSIQ and R&S®FSP	PD 0757.2380
Phase Noise Measurement Software R&S®FSE-K4	PD 0757.6727
GSM/EDGE Application Firmware R&S®FS-K5 for R&S®FSP	PD 0757.6185
FM Measurement Demodulator R&S®FS-K7	PD 0757.6685
Bluetooth Application Firmware R&S®FS-K8	PD 0757.7730
Application Firmware for Noise Figure and Amplifier Measurements R&S®FS-K30	PD 0758.0839.32
WCDMA 3GPP Application Firmware R&S®FS-K72/-K73/-K74	PD 0757.7246
TD-SCDMA Test Application Firmware R&S®FS-K76/-K77	PD 0758.0880.32
CDMA2000® Base Station Test Application Firmware 1xEV-DO Base Station Test Application Firmware R&S®FS-K82/-K84	PD 0758.1712.32
Mobile Station Test Application Firmware R&S®FS-K83/R&S®FS-K85	PD 0758.1729.32
WLAN Application Firmware R&S®FSQ-K91/ R&S®FSP-K90	PD 0758.1435.12

Product brochure see PD 0758.1206.12  
and at [www.rohde-schwarz.com](http://www.rohde-schwarz.com)  
(search term: FSP)



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