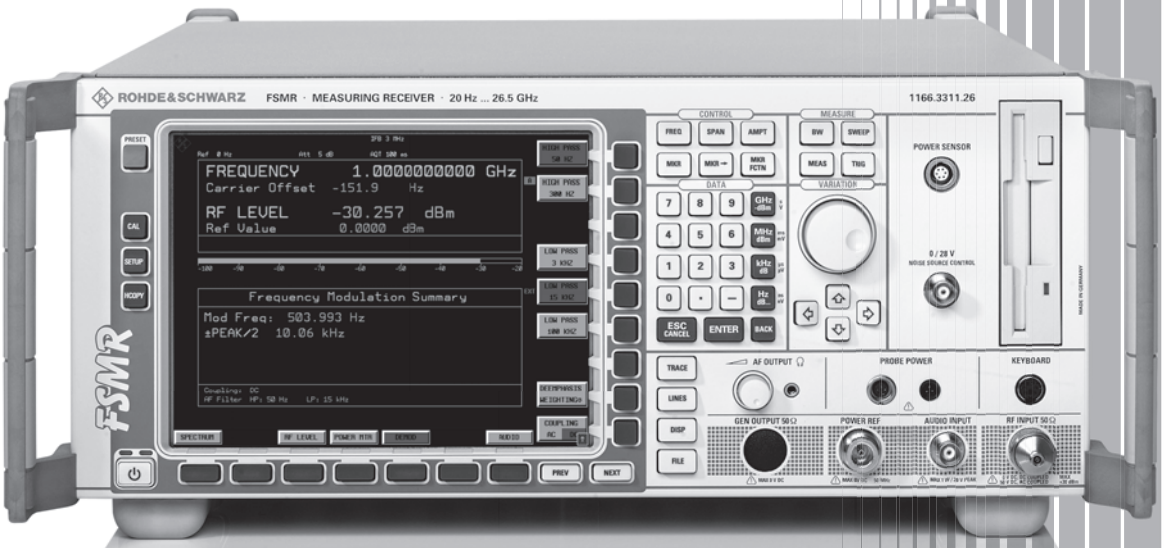
R&S®FSMR
Measuring Receiver
Specifications



75 Years of Driving Innovation

ROHDE&SCHWARZ

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Specifications

Specifications apply under the following conditions: 30 minutes warm-up time at ambient temperature (60 minutes for RF level), specified environmental conditions met, calibration cycle adhered to, and total calibration performed. Data without tolerance limit is not binding. Data designated 'nominal' applies to design parameters and is not tested. Accuracy does not include mismatch error and errors due to standard deviation of the measurement readings, which are influenced by the number of averages.

Frequency

Frequency range	R&S®FSMR3:	DC coupled	20 Hz to 3.6 GHz
		AC coupled	1 MHz to 3.6 GHz
	R&S®FSMR26:	DC coupled	20 Hz to 26.5 GHz
		AC coupled	10 MHz to 26.5 GHz
	R&S®FSMR43:	DC coupled	20 Hz to 43 GHz
	R&S®FSMR50:	DC coupled	20 Hz to 50 GHz
Internal timebase			
Reference frequency, internal, nominal	**standard OCXO**		
Aging per day	after 30 days of continuous operation		1×10^{-9}
Aging per year	after 30 days of continuous operation		1×10^{-7}
Temperature drift	+5 °C to +45 °C		8×10^{-8}
Total error	per year		1.8×10^{-7}
Reference frequency, internal, nominal	**R&S®FSU-B4 option**		
Aging per day	after 30 days of continuous operation		2×10^{-10}
Aging per year	after 30 days of continuous operation		3×10^{-8}
Temperature drift	+5 °C to +45 °C		1×10^{-9}
Total error	per year		5×10^{-8}
External reference frequency			1 MHz to 20 MHz, 1 Hz steps

Measuring receiver

Frequency counter

Frequency range	R&S®FSMR3	20 Hz to 3.6 GHz
	R&S®FSMR26	20 Hz to 26.5 GHz
	R&S®FSMR43	20 Hz to 43 GHz
	R&S®FSMR50	20 Hz to 50 GHz
Frequency display		frequency offset
Sensitivity	10 kHz to 26.5 GHz	–120 dBm
	26.5 GHz to 50 GHz	–100 dBm
Maximum frequency counter resolution		0.001 Hz
Count accuracy	S/N >25 dB	±(frequency × reference accuracy + 0.1 Hz)

RF power

The R&S®FSMR performs absolute RF power measurements with the R&S®NRP-Zxx power sensors connected to the R&S®FSMR. The R&S®NRP-Z27 and R&S®NRP-Z37 power sensor modules include a power splitter. All specifications in this section describe a setup where the RF output of the R&S®NRP-Z27/-Z37 power sensor module is connected to the RF input of the R&S®FSMR. For further specifications of the R&S®NRP-Z27/-Z37, see the "Accessories" section and the R&S®NRP-Z27/-Z37 technical information. For further specifications of the other R&S®NRP power sensors, see the R&S®NRP data sheet (PD 0757.7023).

RF frequency range, level range	power sensor type and connector thermoelectric power sensors		frequency range	level range
	R&S®NRP-Z27	N male with int. splitter	DC to 18 GHz	–24 dBm to +26 dBm
	R&S®NRP-Z37	3.5 mm male with int. splitter	DC to 26.5 GHz	–24 dBm to +26 dBm
	R&S®NRP-Z51	N (male)	DC to 18 GHz	–30 dBm to +20 dBm
	R&S®NRP-Z55	2.92 mm (male)	DC to 40 GHz	–30 dBm to +20 dBm
	diode power sensors			
	R&S®NRP-Z11	N (male)	10 MHz to 8 GHz	–67 dBm to +23 dBm
	R&S®NRP-Z21	N (male)	10 MHz to 18 GHz	–67 dBm to +23 dBm
	R&S®NRP-Z22	N (male) int. attenuator	10 MHz to 18 GHz	–57 dBm to +33 dBm
	R&S®NRP-Z23	N (male) int. attenuator	10 MHz to 18 GHz	–47 dBm to +42 dBm
	R&S®NRP-Z24	N (male) int. attenuator	10 MHz to 18 GHz	–42 dBm to +45 dBm
	R&S®NRP-Z81	N (male)	50 MHz to 18 GHz	–60 dBm to +20 dBm
	R&S®NRP-Z91	N (male)	9 kHz to 6 GHz	–67 dBm to +23 dBm
RF power accuracy	R&S®FSMR with R&S®NRP-Z27/-Z37 power sensor module, input level: –10 dBm to +26 dBm		temperature range +15 °C to +35 °C	 0 °C to +50 °C
	DC to 4.2 GHz		0.083 dB	0.107 dB
	>4.2 GHz to 8 GHz		0.099 dB	0.123 dB
	>8 GHz to 12.4 GHz		0.107 dB	0.135 dB
	>12.4 GHz to 18 GHz		0.130 dB	0.159 dB
	>18 GHz to 26.5 GHz		0.167 dB	0.212 dB
	without numeric isolation correction (VSWR correction OFF):			
	DC to 4.2 GHz		0.120 dB	0.138 dB
	>4.2 GHz to 8 GHz		0.166 dB	0.181 dB
	>12.4 GHz to 18 GHz		0.187 dB	0.207 dB
	>18 GHz to 26.5 GHz		0.235 dB	0.269 dB
RF power resolution			0.001 dB	
Instrumentation accuracy			does not apply	
RF range-to-range error			does not apply	
Max. power	average		0.5 W (+27 dBm) continuous	
			1.0 W (+30 dBm) for max. 10 minutes	
	pulse energy		30 µWs	
Input VSWR	RF signal output of R&S®NRP-Z27/-Z37 connected to R&S®FSMR RF input		R&S®NRP-Z27	R&S®NRP-Z37
	DC to 2 GHz		<1.15	<1.15
	>2 GHz to 4.2 GHz		<1.18	<1.18
	>4.2 GHz to 8 GHz		<1.23	<1.23
	>8 GHz to 12.4 GHz		<1.25	<1.25
	>12.4 GHz to 18 GHz		<1.38	<1.30
	>18 GHz to 26.5 GHz			<1.45
Zero offset	expanded uncertainty (k = 2) after zeroing		<400 nW (typ. 160 nW)	
Zero drift of meter			does not apply	
Display noise	two standard deviations, 10.24 s integration time		<240 nW (typ. 120 nW)	
Zero drift of sensor	within 1 hour after zeroing, permissible temperature change ±1 °C, following two-hour warm-up of power sensor		<160 nW	
Power range of R&S®FSMR with R&S®NRP-Z27/-Z37 power sensor module			–24 dBm (4 µW) to +26 dBm (400 mW); –24 dBm to +30 dBm (1 W) for max. 10 minutes, one range without subranges	
Response time			100 ms × number of averages (nom.)	
Display units	absolute mode		dBm, W	
	relative mode		dB, %	

RF level (tuned receiver)

Frequency range	R&S®FSMR3	100 kHz to 3.6 GHz
	R&S®FSMR26	100 kHz to 26.5 GHz
	R&S®FSMR43	100 kHz to 43 GHz
	R&S®FSMR50	100 kHz to 50 GHz
Display resolution		0.001 dB in absolute and relative mode
Display units	absolute mode	dBm
	relative mode	dB
Input VSWR	connected with R&S®NRP-Z27/-Z37	see “RF power” section
	base instrument without power sensor module	see “Inputs and outputs” section
Measurement time		500 ms nominal for single measurement

Relative level measurement

Frequency range	R&S®FSMR3	100 kHz to 3.6 GHz
	R&S®FSMR26	100 kHz to 26.5 GHz
	R&S®FSMR43	100 kHz to 43 GHz
	R&S®FSMR50	100 kHz to 50 GHz
Level range	RF frequency, R&S®FSMR RF input	
	100 kHz to 10 MHz	+30 dBm to –120 dBm
	10 MHz to 3.6 GHz	
	without preamplifier	+30 dBm to –130 dBm
	with preamplifier (R&S®FSU-B25 option)	+30 dBm to –140 dBm
	3.6 GHz to 26.5 GHz	+30 dBm to –130 dBm
	26.5 GHz to 50 GHz	+30 dBm to –120 dBm
Linearity	input level +20 dBm to –140 dBm	±0.01 dB ± 0.005 dB per 10 dB step
Range-to-range error	range-to-range error applies to RF range changes; the R&S®FSMR performs RF range changes at input levels of approx. –40 dBm and 0 dBm RF frequency:	
	100 kHz to 22 GHz	0.005 dB
	22 GHz to 40 GHz	0.015 dB
	40 GHz to 50 GHz	0.045 dB

Absolute level measurement

The R&S®FSMR performs absolute RF level measurements with the R&S®NRP-Zxx power sensors connected to the R&S®FSMR. The R&S®NRP-Z27 and R&S®NRP-Z37 power sensor modules include a power splitter. All specifications in this section describe a setup where the RF output of the R&S®NRP-Z27/-Z37 power sensor module is connected to the RF input of the R&S®FSMR. For further specifications of the R&S®NRP-Z27/-Z37, see the “Accessories" section and the R&S®NPP-Z27/-Z37 technical information.

Level range	RF frequency, R&S®NRP-Z27/37 RF input	
	100 kHz to 10 MHz	+30 dBm to –110 dBm
	10 MHz to 3.6 GHz	
	without preamplifier	+30 dBm to –120 dBm
	with preamplifier (R&S®FSU-B25 option)	+30 dBm to –130 dBm
	3.6 GHz to 26.5 GHz	+30 dBm to –120 dBm
	26.5 GHz to 50 GHz	+30 dBm to –110 dBm
Accuracy	R&S®FSMR with R&S®NRP-Z27/-Z37 power sensor module, temperature range +15 °C to +35 °C	
	RF frequency: 100 kHz to 4.2 GHz	
	–130 dBm to +26 dBm	±0.083 dB ± 0.005 dB per 10 dB step
	+26 dBm to +30 dBm	±0.102 dB ± 0.005 dB per 10 dB step
	RF frequency: 4.2 GHz to 8 GHz	
	–120 dBm to +26 dBm	±0.099 dB ± 0.005 dB per 10 dB step
	+26 dBm to +30 dBm	±0.144 dB ± 0.005 dB per 10 dB step
	RF frequency: 8 GHz to 12.4 GHz	
	–120 dBm to +26 dBm	±0.107 dB ± 0.005 dB per 10 dB step
	+26 dBm to +30 dBm	±0.144 dB ± 0.005 dB per 10 dB step
	RF frequency: 12.4 GHz to 18 GHz	
	–120 dBm to +26 dBm	±0.130 dB ± 0.005 dB per 10 dB step
	+26 dBm to +30 dBm	±0.144 dB ± 0.005 dB per 10 dB step
	RF frequency: 18 GHz to 26.5 GHz	
	–120 dBm to +26 dBm	±0.167 dB ± 0.005 dB per 10 dB step
	+26 dBm to +30 dBm	±0.178 dB ± 0.005 dB per 10 dB step
Range-to-range error	range-to-range error applies to RF range changes; the R&S®FSMR performs RF range changes at input levels of approximately –40 dBm and 0 dBm RF frequency:	
	100 kHz to 22 GHz	0.005 dB
	22 GHz to 40 GHz	0.015 dB
	40 GHz to 50 GHz	0.045 dB

Modulation

Amplitude modulation (AM)

Input level range	RF frequency	100 kHz to 50 GHz	–40 dBm to +30 dBm
Modulation depth range	RF frequency	100 kHz to 50 GHz	0 % to 100 %
Modulation depth uncertainty			
Absolute	depth of modulation: 5 % to 99 %		(residual AM not included)
	RF 100 kHz to 10 MHz: ≥10 MHz:	modulation rates: 10 Hz to 10 kHz [1] 10 Hz to 50 kHz [2] 50 kHz to 100 kHz 90 Hz to 150 Hz	 <1.5 % of reading <1 % of reading <1.5 % of reading <0.4 % of reading
Flatness, referenced to 1 kHz	RF 100 kHz to 10 MHz: ≥10 MHz:	modulation rates: 10 Hz to 10 kHz [1] 10 Hz to 50 kHz [2] 50 kHz to 100 kHz	 <0.3 % of reading <0.3 % of reading <0.8 % of reading
FM rejection			
	modulation rates: 400 Hz/1 kHz, measurement bandwidth: 3 kHz		
	RF 100 kHz to 10 MHz: ≥10 MHz	FM deviation: 5 kHz 50 kHz	 <0.2 % nominal <0.2 % nominal
Residual AM			
	measuring bandwidth: 3 kHz detector: RMS RF ≥100 kHz mixer level ≥–15 dBm		 <0.01 %
Harmonic distortion			
Total harmonic distortion of demodulated signal	measurement bandwidth: 250 kHz or 10th harmonic, whichever is lower; depth of modulation: 5 % to 99 %		
	RF: 100 kHz to 10 MHz: ≥10 MHz:	modulation rates: 50 Hz to 10 kHz 50 Hz to 100 kHz	 <0.3 % (–50.5 dB) <0.3 % (–50.5 dB)
Distortion measurement			see “Audio: Distortion and noise” section
Detectors			+Peak, –Peak, ±Peak/2, RMS, AVG (RMS sinewave calibrated)

[1] Modulation rates ≥50 Hz with default settings, ≥10 Hz with meas. time ≥ 400 ms.

[2] Modulation rates ≥50 Hz with default settings, ≥10 Hz with meas. time = 400 ms and demodulation bandwidth = 800 kHz.

Frequency modulation (FM)

Input level range	RF frequency		
	100 kHz to 50 GHz		–40 dBm to +30 dBm
Modulation rate range	RF frequency		
	100 kHz to <10 MHz		10 Hz to 10 kHz [3]
	10 MHz to 50 GHz		10 Hz to 5 MHz [4]
Modulation deviation range	RF frequency		
	100 kHz to <10 MHz		max. 50 kHz peak
	10 MHz to 50 GHz		max. 5 MHz peak
FM deviation uncertainty			
	RF	deviation (peak):	
	200 kHz to 10 MHz:	50 kHz	
	≥10 MHz:	500 kHz	
	(residual FM not included)		
	RF	modulation rates:	
	200 kHz to 10 MHz:	10 Hz to 10 kHz	<1 %
	≥10 MHz:	10 Hz to 100 kHz	<1 %
		100 kHz to 200 kHz	<3 %
AM rejection	modulation rates: 400 Hz/1 kHz measurement bandwidth: 3 kHz AM modulation depth: 50 % RF ≥200 kHz		<20 Hz nominal

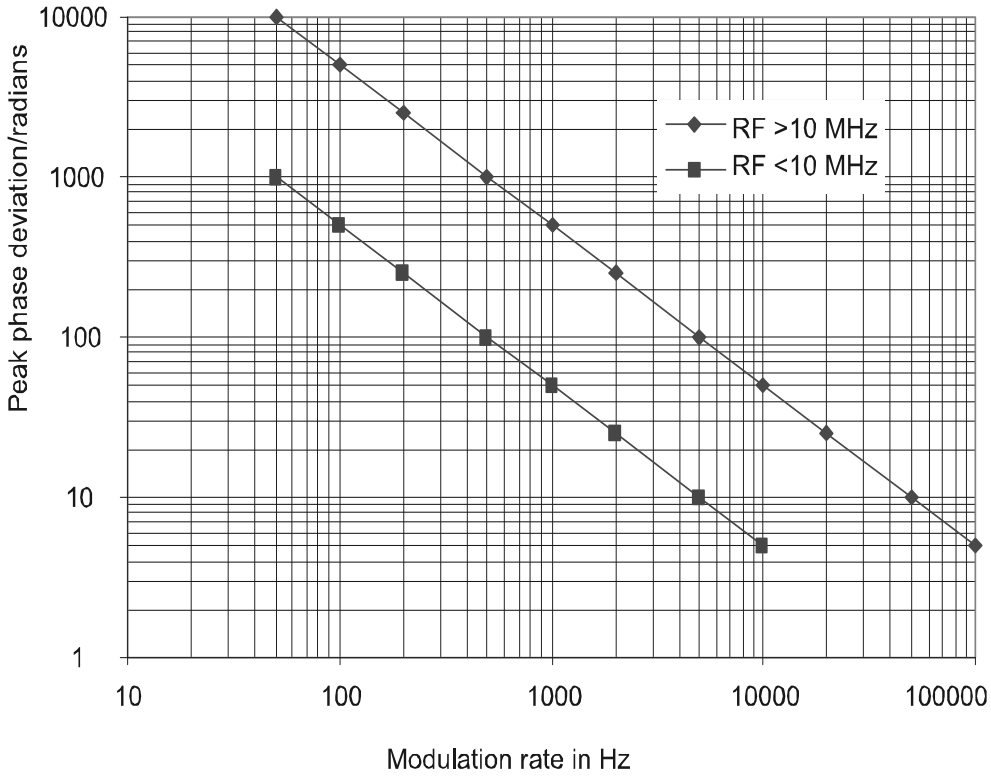
Residual FM			
	measurement bandwidth: 3 kHz, detector: RMS		
	RF:		
	300 kHz to 1 GHz		<1 Hz
	1 GHz to 18 GHz		<(0.25 + 0.75 × RF/GHz) Hz
Harmonic distortion			
Total harmonic distortion of demodulated signal	measurement bandwidth: 250 kHz or 10th harmonic, whichever is lower		
	RF = 200 kHz to 10 MHz		
	modulation rates: 50 Hz to 10 kHz		
	deviation:	<10 kHz	<0.1 % (–60 dB)
		<50 kHz	<0.3 % (–50.5 dB)
	RF ≥10 MHz:		
	modulation rates: 50 Hz to 100 kHz:		
	deviation	<100 kHz	<0.1 % (–60 dB)
		<500 kHz	<0.3 % (–50.5 dB)
Distortion measurement			see “Audio: Distortion and noise” section
Detectors			+Peak, –Peak, ±Peak/2, RMS, AVG (RMS sinewave calibrated)

[3] Modulation rates ≥50 Hz with default settings, ≥10 Hz with meas. time ≥400 ms.

[4] Modulation rates ≥50 Hz with default settings, ≥10 Hz with meas. time = 400 ms and demodulation bandwidth = 800 kHz; deviation max. 250 kHz.

Phase modulation (φM)

Input level range	RF frequency	
	100 kHz to 50 GHz	–40 dBm to +30 dBm
Modulation rate range	RF frequency	
	100 kHz to <10 MHz	10 Hz to 10 kHz
	10 MHz to 50 GHz	10 Hz to 5 MHz
φM deviation range	RF	
	200 kHz to 10 MHz:	max. 1000 rad, depends on mod. rate
	≥10 MHz:	max. 10000 rad, depends on mod. rate



Maximum phase deviation

φM deviation uncertainty	RF	modulation rates:	(residual PM not included)
	200 kHz to 10 MHz:	50 Hz to 10 kHz	<1 %
	≥10 MHz:	50 Hz to 100 kHz	<1 %
AM rejection			
	modulation rates: 400 Hz/1 kHz measurement bandwidth: 3 kHz AM modulation depth: 50 % RF ≥200 kHz		<0.02 rad nominal
Residual PM			
	measurement bandwidth: 100 kHz detector: RMS RF = 1 GHz		typ. 0.003 rad
Harmonic distortion			
Total harmonic distortion of demodulated signal	measurement bandwidth: 250 kHz or 10th harmonic, whichever is lower		
	RF: 200 kHz to 10 MHz:		
	modulation rates:	50 Hz to 10 kHz	<0.1 % (–60 dB)
	RF ≥10 MHz:		
	modulation rates:	50 Hz to 100 kHz	<0.1 % (–60 dB)
Distortion measurement			see “Audio: Distortion and noise” section
Detectors			+Peak, –Peak, ±Peak/2, RMS, AVG (RMS sinewave calibrated)

Audio

Audio input characteristics

Input impedance	selectable	50 Ω/1 MΩ nominal
Maximum ratings	input impedance 50 Ω, max. power	<1 W
	input impedance 1 MΩ, max. peak voltage	<20 V
Ranges		2
Full scale rms voltage (sinewave)	range 4 V	>3 V (typ. 4 V)
	range 0.4 V	>300 mV (typ. 400 mV)
Accuracy, DC voltage		
	range 4 V	<0.5 % of reading ±5 mV
	range 0.4 V	<0.5 % of reading ±1 mV
Accuracy, AC voltage		
Sinewave, RMS reading	specifications apply from full scale to 10 % of full scale, min. 100 mV	
	20 Hz to 100 kHz	<1 % of reading
	100 kHz to 300 kHz	<2 % of reading
	300 kHz to 1 MHz	<5 %, typ. <3 % of reading
Residual noise	measurement bandwidth 100 kHz, RMS detector	
	range 4 V	<250 µV
	range 0.4 V	<25 µV
Harmonic distortion		
Inherent total harmonic distortion	measurement bandwidth: 250 kHz or 10th harmonic, whichever is lower; fundamental frequency 100 Hz to 100 kHz	
	range 4 V: from full scale to 300 mV	<0.1 % (–60 dB)
	range 0.4 V: from full scale to 100 mV	<0.1 % (–60 dB)
	with R&S®FSMR-B73 option: range 4 V: from full scale to 600 mV 600 mV to 300 mV	 <0.1 % (–60 dB) <0.2 % (–54 dB)

Distortion and noise

The distortion and noise measurement is applicable to the demodulated signal and signals fed into the audio input.

Distortion measurement		
Distortion display range		0.001 % to 100 % (–100 dB to 0 dB)
THD measurement uncertainty	measurement bandwidth: 250 kHz or 10th harmonic, whichever is lower; fundamental frequency: 100 Hz to 100 kHz	<0.5 dB , typ. 0.2 dB
SINAD measurement		
SINAD display range		100 dB to 0 dB
SINAD measurement uncertainty	measurement bandwidth: 100 Hz to 250 kHz, number of harmonics ≤10	<0.5 dB

Audio frequency counter

The AF counter is applicable to the demodulated signal and signals fed into the audio input.

Frequency range		20 Hz to 250 kHz
Sensitivity	audio input signal	5 mV
Resolution		6 digits
Uncertainty	input RMS voltage >100 mV	
	f < 1 kHz	±0.02 Hz ± f × reference oscillator uncertainty
	f ≥ 1 kHz	±3 counts of least significant digit ± f × reference oscillator uncertainty

Audio filters

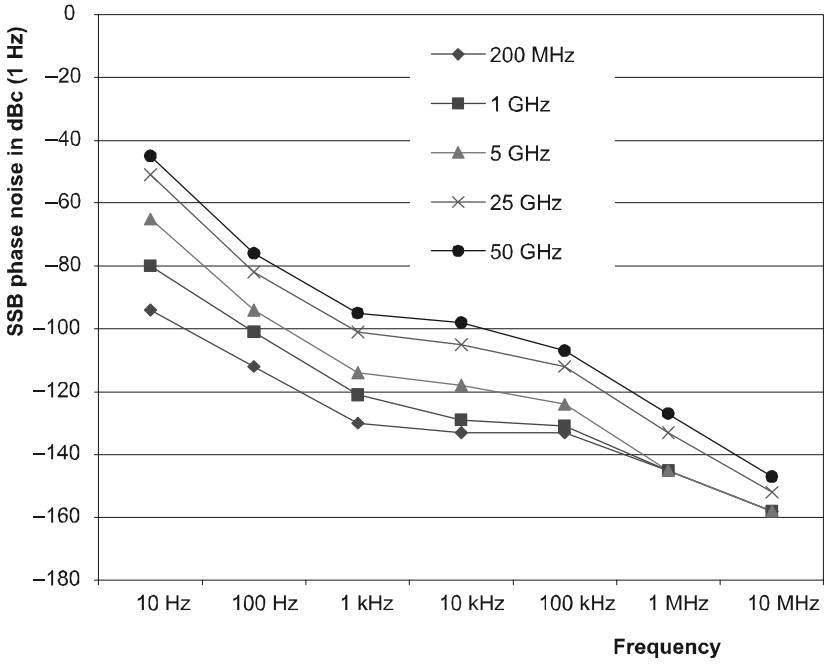
The audio filters are applicable to the demodulated signal and signals fed into the audio input.

Lowpass filters		
3 kHz	flatness ≤1 kHz	<1 %
	–3 dB roll-off	3 kHz nominal
	slope	30 dB/octave
15 kHz	flatness ≤10 kHz	<1 %
	–3 dB roll-off	15 kHz nominal
	slope	30 dB/octave
23 kHz	flatness ≤15 kHz	<1 %
	–3 dB roll-off	23 kHz nominal
	slope	30 dB/octave
100 kHz	flatness ≤10 kHz	<1 %
	–3 dB roll-off	100 kHz nominal
	filter type	9-pole Bessel
Highpass filters		
20 Hz	flatness ≥50 Hz	<1 %
	–3 dB roll-off	20 Hz nominal
	slope	18 dB/octave
50 Hz	flatness ≥200 Hz	<1 %
	–3 dB roll-off	50 Hz nominal
	slope	12 dB/octave
300 Hz	flatness ≥1 kHz	<1 %
	–3 dB roll-off	300 Hz nominal
	slope	12 dB/octave
Weighting filters		
Deemphasis	1-pole lowpass	25 µs, 50 µs, 75 µs, 750 µs nominal
CCIR (unweighted)	23 kHz (5th order), combined with 20 Hz highpass filter	corresponds to ITU-R 468-4 (unweighted)
CCITT (weighted)	CCITT P53 filter	corresponds to ITU-T rec. O.41

Spectrum analyzer

Frequency

Frequency range	R&S®FSMR3:	DC coupled	20 Hz to 3.6 GHz
		AC coupled	1 MHz to 3.6 GHz
	R&S®FSMR26:	DC coupled	20 Hz to 26.5 GHz
		AC coupled	10 MHz to 26.5 GHz
	R&S®FSMR43:	DC coupled	20 Hz to 43 GHz
	R&S®FSMR50:	DC coupled	20 Hz to 50 GHz
Frequency resolution			0.01 Hz
Frequency display			with marker or frequency counter
Marker resolution			1 Hz
Uncertainty			±(marker frequency × reference uncertainty + 10 % × resolution bandwidth + ½ (span / (sweep points -1)) + 1Hz)
Marker tuning frequency step size	default marker step size = sweep points		span / 624 span / (sweep points – 1)
Frequency counter resolution	selectable		0.1 Hz to 10 kHz
Count accuracy	S/N >25 dB		±(frequency × reference error + ½ (last digit))
Display range for frequency axis			0 Hz, 10 Hz to max. frequency
Resolution			0.1 Hz
Max. span deviation			1 %
Spectral purity, SSB phase noise (1 Hz)	f = 640 MHz		
Residual FM	RBW 10 kHz, RMS		<1 Hz, nominal
Carrier offset	10 Hz		<–73 dBc, nominal
	10 Hz with R&S®FSU-B4 option fitted		<–86 dBc, nominal
	100 Hz		<–98 dBc, typ. –104 dBc (<–90 dBc [5])
	1 kHz		<–116 dBc, typ. –124 dBc (<–112 dBc [5])
	10 kHz		<–128 dBc, typ. –133 dBc (<–120 dBc [5])
	100 kHz		<–128 dBc, typ. –133 dBc (<–120 dBc [5])
	1 MHz		<–140 dBc, typ. –146 dBc (<–138 dBc [5])
	10 MHz		typ. –160 dBc



R&S®FSMR center frequency

[5] Valid as of serial number <200 000.

Sweep

Sweep time	time sweep, span = 0 Hz	1 µs to 16000 s in 5 % steps
	frequency sweep, span ε10 Hz	2.5 ms to 16000 s in steps ≤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	R&S®FSMR3, R&S®FSMR26, R&S®FSMR50	10 Hz to 20 MHz in 1/2/3/5 sequence, 50 MHz
	R&S®FSMR43	10 Hz to 10 MHz in 1/2/3/5 sequence
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 ≤ 3.6 GHz	–20 % to +20 %
	50 MHz, f > 3.6 GHz	–30 % to +100 %
Shape factor 60 dB:3 dB	≤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
Channel filters		
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
Video bandwidths		1 Hz to 10 MHz in 1/2/3/5 sequence

Level

Display range		displayed noise floor to +30 dBm
Intermodulation		
1 dB compression of input mixer	0 dB RF attenuation	
	≤3.6 GHz	+13 dBm, nominal
	>3.6 GHz	+7 dBm, nominal
Third-order intercept point (TOI)	level 2 × –10 dBm, Δf > 5 × RBW or 10 kHz, whichever is larger	
	R&S®FSMR3:	
	10 MHz ≤ f_{in} < 300 MHz	>17 dBm, typ. 20 dBm
	300 MHz ≤ f_{in} ≤ 3.6 GHz	>19 dBm, typ. 25 dBm
	R&S®FSMR26:	
	10 MHz ≤ f_{in} < 300 MHz	>17 dBm, typ. 20 dBm
	300 MHz ≤ f_{in} < 3.6 GHz	>22 dBm, typ. 27 dBm
	3.6 GHz ≤ f_{in} < 4 GHz	>6 dBm, typ. 9 dBm
	4 GHz ≤ f_{in} ≤ 26.5 GHz	>8 dBm, typ. 11 dBm
	R&S®FSMR43:	
	10 MHz ≤ f_{in} < 300 MHz	>17 dBm, typ. 20 dBm
	300 MHz ≤ f_{in} < 3.6 GHz	>20 dBm, typ. 25 dBm
	3.6 GHz ≤ f_{in} < 4 GHz	>6 dBm, typ. 9 dBm
	4 GHz ≤ f_{in} < 26.5 GHz	>8 dBm, typ. 11 dBm
	26.5 GHz$_{in}$ ≤ f < 28 GHz	>4 dBm, typ. 7 dBm
	28 GHz ≤ f_{in} < 40 GHz	>8 dBm, typ. 11 dBm
	40 GHz ≤ f_{in} ≤ 43 GHz	8 dBm, nominal
	R&S®FSMR50:	
	10 MHz ≤ f_{in} < 300 MHz	>17 dBm, typ. 20 dBm
	300 MHz ≤ f_{in} < 3.6 GHz	>20 dBm, typ. 25 dBm
	3.6 GHz ≤ f_{in} < 4 GHz	>6 dBm, typ. 9 dBm
	4 GHz ≤ f_{in} < 26.5 GHz	>8 dBm, typ. 11 dBm
	26.5 GHz ≤ f_{in} < 28 GHz	>4 dBm, typ. 7 dBm
	28 GHz ≤ f_{in} < 40 GHz	>8 dBm, typ. 11 dBm
	40 GHz ≤ f_{in} ≤ 50 GHz	8 dBm, nominal
Second harmonic intercept (SHI)	f_{in} < 100 MHz	>35 dBm
	100 MHz < f_{in} ≤ 400 MHz	>45 dBm, typ. 55 dBm
	400 MHz < f_{in} ≤ 500 MHz	>52 dBm, typ. 60 dBm
	500 MHz < f_{in} ≤ 1 GHz	>45 dBm, typ. 55 dBm
	1 GHz < f_{in} ≤ 1.8 GHz	>35 dBm
	f_{in} > 1.8 GHz	20 dBm, nominal
Displayed average noise level	0 dB RF attenuation, termination 50 Ω, log. scaling, normalized to 1 Hz RBW f < 10 kHz: 10 Hz FFT filter, trace average, sweep count = 20 f ≥ 10 kHz: RBW = 1 kHz, VBW = 3 kHz, span = 0 Hz, sweep time 50 ms, trace average, sample detector, sweep count = 20, mean marker	
	20 Hz	<–90 dBm
	100 Hz	<–110 dBm
	1 kHz	<–120 dBm
	10 kHz	<–130 dBm
	100 kHz	<–130 dBm
	1 MHz	<–140 dBm
	10 MHz	<–153 dBm
	R&S®FSMR3	
	20 MHz ≤ f < 2 GHz	<–155 dBm, typ. –158 dBm
	2 GHz ≤ f < 3 GHz	<–153 dBm, typ. –157 dBm
	3 GHz ≤ f ≤ 3.6 GHz	<–152 dBm, typ. –157 dBm
	R&S®FSMR26	
	20 MHz ≤ f < 2 GHz	<–152 dBm, typ. –156 dBm
	2 GHz ≤ f < 3.6 GHz	<–150 dBm, typ. –153 dBm
	3.6 GHz ≤ f < 8 GHz	<–152 dBm, typ. –155 dBm
	8 GHz ≤ f < 13 GHz	<–151 dBm, typ. –154 dBm
	13 GHz ≤ f < 18 GHz	<–150 dBm, typ. –153 dBm
	18 GHz ≤ f < 22 GHz	<–149 dBm, typ. –152 dBm
	22 GHz ≤ f < 26.5 GHz	<–148 dBm, typ. –151 dBm

	R&S®FSMR43	
	20 MHz ≤ f < 2 GHz	<–152 dBm, typ. –156 dBm
	2 GHz ≤ f < 3.6 GHz	<–150 dBm, typ. –153 dBm
	3.6 GHz ≤ f < 8 GHz	<–152 dBm, typ. –155 dBm
	8 GHz ≤ f < 13 GHz	<–151 dBm, typ. –154 dBm
	13 GHz ≤ f < 18 GHz	<–150 dBm, typ. –153 dBm
	18 GHz ≤ f < 22 GHz	<–149 dBm, typ. –152 dBm
	22 GHz ≤ f < 26.5 GHz	<–148 dBm, typ. –151 dBm
	26.5 GHz ≤ f < 32 GHz	<–141 dBm, typ. –144 dBm
	32 GHz ≤ f ≤ 43 GHz	<–136 dBm, typ. –140 dBm
	R&S®FSMR50	
	20 MHz ≤ f < 2 GHz	<–152 dBm, typ. –156 dBm
	2 GHz ≤ f < 3.6 GHz	<–150 dBm, typ. –153 dBm
	3.6 GHz ≤ f < 8 GHz	<–152 dBm, typ. –155 dBm
	8 GHz ≤ f < 13 GHz	<–151 dBm, typ. –154 dBm
	13 GHz ≤ f < 18 GHz	<–150 dBm, typ. –153 dBm
	18 GHz ≤ f < 22 GHz	<–149 dBm, typ. –152 dBm
	22 GHz ≤ f < 26.5 GHz	<–148 dBm, typ. –151 dBm
	26.5 GHz ≤ f < 32 GHz	<–141 dBm, typ. –144 dBm
	32 GHz ≤ f < 46 GHz	<–136 dBm, typ. –140 dBm
	46 GHz ≤ f ≤ 50 GHz	<–130 dBm, typ. –133 dBm

Immunity to interference		
Image frequency	f ≤ 3.6 GHz, f = receive frequency	>90 dB, typ. >110 dB
Intermediate frequency	f ≤ 3.6 GHz, f = receive frequency	>90 dB, typ. >110 dB
Spurious response	f > 1 MHz, without input signal, 0 dB RF attenuation	<–103 dBm
Other interfering signals	Δf > 100 kHz	
	mixer level <–10 dBm	
	f_{in} ≤ 2.3 GHz	<–80 dBc
	mixer level <–35 dBm	
	2.3 GHz < f_{in} < 4 GHz	<–70 dBc
	mixer level <–10 dBm	
	4 GHz ≤ f < 8 GHz	<–70 dBc
	8 GHz ≤ f < 16 GHz	<–64 dBc
	16 GHz ≤ f < 26 GHz	<–58 dBc
	26.5 GHz ≤ f < 40 GHz	<–52 dBc
	40 GHz ≤ f ≤ 50 GHz	<–52 dBc, nominal
	f = receive frequency	

Level display		
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 remote measurement, display OFF:	80 per second
	zero span/sweep time 1 ms	70 per second
	span = 10 MHz, sweep time 2.5 ms	50 per second
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 linear level display	dBm, dBµV, dBmV, dBµA, dBpW µV, mV, µA, mA, pW, nW

Level measurement uncertainty		
Absolute level uncertainty at 128 MHz	RBW = 10 kHz, level –30 dBm, reference level –30 dBm, RF attenuation 10 dB	<0.2 dB (σ = 0.07 dB)
Frequency response referenced to 128 MHz	DC coupling, RF attenuation ≥10 dB	
	+20 °C to +30 °C	
	20 Hz ≤ f < 10 MHz	<0.5 dB (σ = 0.2 dB)
	10 MHz ≤ f < 3.6 GHz	<0.3 dB (σ = 0.1 dB)
	3.6 GHz ≤ f < 8 GHz	<1 dB (σ = 0.3 dB)
	8 GHz ≤ f < 22 GHz	<1.5 dB (σ = 0.5 dB)
	22 GHz ≤ f < 40 GHz	<2 dB (σ = 0.7 dB)
	40 GHz ≤ f ≤ 50 GHz	<2.5 dB (σ = 0.8 dB)
	RF attenuation >40 dB	
	3.6 GHz ≤ f < 40 GHz	add 0.5 dB to above values
	40 GHz ≤ f ≤ 50 GHz	add 1 dB to above values
	+5 °C to +45 °C	
	20 Hz ≤ f < 3.6 GHz	<0.6 dB (σ = 0.2 dB)
	3.6 GHz ≤ f < 8 GHz	<1.5 dB (σ = 0.3 dB)
	8 GHz ≤ f < 22 GHz	<2 dB (σ = 0.5 dB)
	22 GHz ≤ f < 40 GHz	<2.5 dB (σ = 0.7 dB)
	40 GHz ≤ f < 50 GHz	<3 dB (σ = 0.8 dB)
	RF attenuation >40 dB	
	3.6 GHz ≤ f < 40 GHz	add 0.5 dB to above values
	40 GHz ≤ f ≤ 50 GHz	add 1.5 dB to above values
Attenuator switching uncertainty	f = 128 MHz 0 dB to 70 dB, referenced to 10 dB attenuation	<0.2 dB (σ = 0.07 dB)
Uncertainty of reference level setting	RF attenuation 10 dB, referenced to –10 dBm reference level setting	<0.15 dB (σ = 0.05 dB)
Display nonlinearity	+20 °C to +30 °C, mixer level ≤–10 dBm)	
Logarithmic level display	RBW ≤ 100 kHz or channel filters, S/N >20 dB	
	0 dB to –70 dB	<0.1 dB (σ = 0.03 dB)
	–70 dB to –90 dB	<0.3 dB (σ =0.1 dB)
	200 kHz ≤ RBW ≤10 MHz, S/N >16 dB	
	0 dB to –50 dB	<0.2 dB (σ =0.07 dB)
	–50 dB to –70 dB	<0.5 dB (σ =0.17 dB)
	RBW >10 MHz, S/N >16 dB	
	0 dB to –50 dB	<0.5 dB (σ =0.17 dB)
Linear level display		5 % of reference level
Bandwidth switching error	referenced to RBW = 10 kHz	
	1 Hz to 100 kHz	<0.1 dB (σ =0.03 dB)
	200 kHz to 3 MHz	<0.2 dB (σ =0.07 dB)
	5 MHz to 50 MHz	<0.5 dB (σ =0.15 dB)
	FFT filter 1 Hz to 3 kHz	<0.2 dB (σ =0.07 dB)
Total measurement uncertainty		
	signal level 0 dB to –70 dB below reference level, S/N >20 dB, 10 dB ≤ RF attenuation ≤ 40 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	0.9 dB
	8 GHz ≤ f < 22 GHz	1.2 dB
	22 GHz ≤ f < 40 GHz	1.5 dB
	40 GHz ≤ f < 50 GHz	1.8 dB

I/Q data

Base instrument		
Interface		GPIB or LAN interface
Memory length		max. 512 ksample each for I and Q
Sample length		24 bit, each I and Q
Sample rate	settable in steps of 0.5 (32 MHz × 2^{-n}, n = 0 to 11)	15.625 kHz to 32 MHz
Max. signal bandwidth	sample rate ≤2 MHz	0.8 × sample rate
	4 MHz	2.8 MHz
	8 MHz	4.8 MHz
	16 MHz	7 MHz
	32 MHz	9 MHz
IF prefilter bandwidth		300 kHz to 10 MHz, 1/2/3/5 steps

With R&S®FSMR-B73 option		
Interface		GPIB or LAN interface
Sampling rate	programmable in 0.1 Hz steps	10 kHz to 81.6 MHz
ADC resolution		14 bit
I/Q memory		16 Msample each for I and Q data
Max. information bandwidth	R&S®FSMR3, R&S®FSMR26, R&S®FSMR50	28 MHz
	R&S®FSMR43	7 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 MHz – f_{center} mixer level = –10 dBm	typ.<–65 dBfs
Aliased DC offset	$f_{I/Q}$ = 20.4 MHz; within ±10 K temperature change after I/Q or total calibration	typ.<–65 dBfs
Equalized bandwidth	RBW setting	equalized bandwidth
	3 MHz	2 MHz
	5 MHz	3 MHz
	10 MHz	7 MHz
	20 MHz, not available with R&S®FSMR43	17 MHz
	50 MHz, not available with R&S®FSMR43	28 MHz
Amlitude 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

General

Trigger functions

Trigger		
Trigger source		free run, video, external, IF level (mixer level 10 dBm to –50 dBm)
Trigger offset	span ≥10 Hz	125 ns to 100 s, resolution 125 ns min. (or 1 % of offset)
	span = 0 Hz	± (125 ns to 100 s), resolution 125 ns min., depending on sweep time
Max. deviation of trigger offset		± (31.25 ns + (0.1 % × trigger offset))
Gated sweep		
Gate source		external, IF level, video
Gate delay		1 µs to 100 s
Gate length		125 ns to 100 s, resolution min. 125 ns or 1 % of gate length
Max. deviation of gate length		±(31.25 ns + (0.05 % × gate length))

Inputs and outputs (front panel)

RF input		
Maximum input level		
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 dB µV/MHz
Max. pulse voltage	RF attenuation ≥10 dB	150 V
Max. pulse energy	RF attenuation ≥10 dB, 10 µs	1 mWs
Impedance		50 Ω
Connector	R&S®FSMR3	N female
	R&S®FSMR26	test port adapter APC 3.5 mm/N female
	R&S®FSMR43	test port adapter 2.92 mm (K)/N female
	R&S®FSMR50	test port adapter 2.4 mm/2.92 mm (K)/N female
VSWR	measuring receiver, RF level autorange, DC coupled, 10 dB min. attenuation= ON	
	f < 2.5 GHz	<1.2, typ. 1.1
	2.5 GHz ≤ f ≤ 3.6 GHz	<1.3, typ. 1.2
	R&S®FSMR26, R&S®FSMR43, R&S®FSMR50	
	3.6 GHz < f < 5 GHz	<1.3, typ. 1.2
	5 GHz ≤ f < 11 GHz	<1.5, typ. 1.3
	11 GHz ≤ f < 18 GHz	<1.6, typ. 1.4
	18 GHz ≤ f < 21 GHz	<1.7, typ. 1.5
	21 GHz ≤ f < 24 GHz	<1.8, typ. 1.6
	24 GHz ≤ f ≤ 26.5 GHz	<1.9, typ. 1.7
	R&S®FSMR43, R&S®FSMR50:	
	26.5 GHz ≤ f < 36 GHz	<2.0, typ. 1.8
	36 GHz ≤ f < 40 GHz	<2.3, typ. 2.0
	40 GHz ≤ f ≤ 50 GHz	<3.0 nom., typ. <2.5
	RF attenuation 0 dB, DC coupled	
	f < 3 GHz	<1.8
	f ≤ 3.6 GHz	<2
	R&S®FSMR26, R&S®FSMR43, R&S®FSMR50	
	3.6 GHz < f ≤ 26.5 GHz	<2.5
	R&S®FSMR43, R&S®FSMR50	
	26 GHz < f ≤ 40 GHz	<3
	RF attenuation 10 dB, 20 dB, 30 dB, 40 dB, 50 dB, DC coupled f = 30 MHz	<1.06

	RF attenuation manual ≥10 dB, DC coupled	
	f ≤ 3.6 GHz	<1.5
	R&S®FSMR26, R&S®FSMR43, R&S®FSMR50:	
	3.6 GHz < f < 18 GHz	<1.8
	18 GHz ≤ f ≤ 26.5 GHz	<2.0
	R&S®FSMR43, R&S®FSMR50:	
	26.5 GHz < f < 40 GHz	<2.5
	40 GHz ≤ f ≤ 50 GHz	<3, nominal
	RF attenuation <10 dB or AC coupling	typ. 1.5
Setting range of attenuator		0 dB to 75 dB, in 5 dB steps
Power reference		
Frequency		50 MHz
Connector		N female
Impedance		50 Ω
Level		1 mW
Max. deviation		<1.2 %
Audio input		BNC female
Input impedance	selectable	50 Ω/1 MΩ nominal
Maximum ratings	input imp. 50 Ω, max. power	<1 W
	input imp. 1 MΩ, max. peak voltage	<20 V
Probe power supply		
Supply voltages		+15 V DC, –12.6 V DC and ground, max. 150 mA, nominal
Power supply for antennas etc		5-pin connector
Supply voltages		± 10 V and ground, max. 100 mA, nominal
Keyboard connector		PS/2 female for MF-2 keyboard
AF output		
Connector		3.5 mm mini jack
Output impedance		10 Ω
Open-circuit voltage		up to 1.5 V, adjustable
Power supply for noise source		BNC female
Output voltage		0 V and 28 V, switchable, nominal

Inputs and outputs (rear panel)

IF 20.4 MHz		BNC female
Impedance		50 Ω
Bandwidth	RBW ≤30 kHz	1.67 × resolution bandwidth, min. 2.6 kHz
	RBW = 50 kHz, 100 kHz	400 kHz
	200 kHz ≤ RBW ≤ 10 MHz	equal to resolution bandwidth
Level	RBW ≤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

IF 404.4 MHz	not available with R&S®FSMR43, active only if RBW >10 MHz	BNC female
Impedance		50 Ω
Bandwidth	RBW >10 MHz	equal to resolution bandwidth
Level	mixer level ≤0 dBm	typ. 10 dB below mixer level

Video output		BNC female
Impedance		50 Ω
Output voltage	RBW ≥200 kHz, logarithmic scaling, full scale	0 V to 1 V (EMF)

Reference output		BNC female
Impedance		50 Ω
Output frequency	internal reference	10 MHz
	external reference	same as reference input signal
Level		>0 dBm, nominal

Reference input		BNC female
Impedance		50 Ω
Input frequency range		1 MHz ≤ f_{in} ≤ 20 MHz, in 1 Hz steps
Required level		>0 dBm from 50 Ω

Sweep output		BNC female
Output voltage		0 V to 5 V, proportional to displayed frequency

External trigger/gate input		BNC female
Trigger voltage		0.5 V to 3.5 V
Input impedance		≥10 kΩ

IEC/IEEE bus control		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

LAN interface		10/100BaseT, RJ-45
USB interface		type A plug, version 1.1
Serial interface		RS-232-C (COM), 9-pin female connectors
Printer interface		parallel (Centronics-compatible)
Mouse interface		PS/2-compatible
Connector for external monitor (VGA)		15-pin D-Sub

General data

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

Mass memory		
Mass memory		1.44 Mbyte 3½" disk drive, hard disk, USB flash disk (not supplied)
Data storage		>500 instrument settings and traces

Temperature		
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 (EN 60068-2-30: 2000-02)

Mechanical resistance		
Vibration		
Sinusoidal		5 Hz to 150 Hz, max. 2 g at 55 Hz; 0.5 g from 55 Hz to 150 Hz; in line with EN 60068-2-6: 1996-05, EN 60068-2-30: 2000-02, EN 61010-1, MIL-T-28800D, class 5
Random		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 internal reference	1 year
RFI suppression		in line with European EMC Directive 89/336/EEC and the new EMC Directive 2004/108/EC including: IEC/EN 61326 Class B (Emission) CISPR 11/EN 55011/ Group 1 Class B (Emission) IEC/EN 61326 Table A.1 (Immunity, Industrial)

Power supply		
AC supply		100 V to 240 V, 3.1 A to 1.3 A; 50 Hz to 400 Hz, class of protection I in line with VDE 411
Power consumption	R&S®FSMR3	typ. 130 VA
	R&S®FSMR26, R&S®FSMR50	typ. 150 VA
Safety		in line with EN 61010-1, UL 3111-1, CSA C22.2 No. 1010-1, EN 61010-1
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, without options, nominal	R&S®FSMR3	14.6 kg
		32.19 lb
	R&S®FSMR26	16.5 kg
		36.38 lb
	R&S®FSMR43, R&S®FSMR50	16.8 kg
		37.04 lb

Options

R&S®FSMR-B2 YIG preselection (for R&S®FSMR26/43/50), R&S®FSMR-B223 YIG preselection with 20 dB preamplifier (for R&S®FSMR26 only, requires R&S®FSU-B25 option)

Intermodulation		
Third-order intercept point (TOI)	YIG filter = OFF	
	R&S®FSMR26	
	3.6 GHz ≤ f_{in} ≤ 26.5 GHz	>8 dBm, typ. 11 dBm
	R&S®FSMR43, R&S®FSMR50	
	26.5 GHz < f_{in} ≤ 50 GHz	>8 dBm, typ. 11 dBm
	YIG filter = ON	
	R&S®FSMR26	
	3.6 GHz ≤ f_{in} ≤ 26.5 GHz	>12 dBm, typ. 15 dBm
	R&S®FSMR43, R&S®FSMR50	
	26.5 GHz < f_{in} ≤ 50 GHz	>12 dBm, typ. 15 dBm
Second-order intercept (SHI)	R&S®FSMR26, R&S®FSMR43, R&S®FSMR50	
	YIG filter = OFF, f_{in} > 1.8 GHz	25 dBm, nominal
	YIG filter = ON, f_{in} > 1.8 GHz	80 dBm, nominal
Displayed average noise level with R&S®FSMR-B2 (spectrum analyzer mode)		
	0 dB RF attenuation, termination 50 Ω, log. scaling, normalized to 1 Hz RBW RBW = 1 kHz, VBW = 3 kHz, span = 0 Hz, sweep time 50 ms, trace average, sample detector, sweep count = 20, mean marker	
	YIG filter = OFF	
	R&S®FSMR26	
	3.6 GHz ≤ f < 8 GHz	<–151 dBm, typ. –154 dBm
	8 GHz ≤ f < 13 GHz	<–150 dBm, typ. –153 dBm
	13 GHz ≤ f < 18 GHz	<–149 dBm, typ. –152 dBm
	18 GHz ≤ f < 22 GHz	<–147 dBm, typ. –151 dBm
	22 GHz ≤ f ≤ 26.5 GHz	<–145 dBm, typ. –150 dBm
	R&S®FSMR43	
	3.6 GHz ≤ f < 8 GHz	<–151 dBm, typ. –154 dBm
	8 GHz ≤ f < 13 GHz	<–150 dBm, typ. –153 dBm
	13 GHz ≤ f < 18 GHz	<–149 dBm, typ. –152 dBm
	18 GHz ≤ f < 22 GHz	<–148 dBm, typ. –151 dBm
	22 GHz ≤ f < 26.5 GHz	<–147 dBm, typ. –150 dBm
	26.5 GHz ≤ f < 32 GHz	<–141 dBm, typ. –144 dBm
	32 GHz ≤ f < 40 GHz	<–136 dBm, typ. –140 dBm
	40 GHz ≤ f < 43 GHz	<–133 dBm, typ. –136 dBm
	R&S®FSMR50	
	3.6 GHz ≤ f < 8 GHz	<–151 dBm, typ. –154 dBm
	8 GHz ≤ f < 13 GHz	<–150 dBm, typ. –153 dBm
	13 GHz ≤ f < 18 GHz	<–149 dBm, typ. –152 dBm
	18 GHz ≤ f < 22 GHz	<–148 dBm, typ. –151 dBm
	22 GHz ≤ f < 26.5 GHz	<–147 dBm, typ. –150 dBm
	26.5 GHz ≤ f < 32 GHz	<–141 dBm, typ. –144 dBm
	32 GHz ≤ f < 40 GHz	<–136 dBm, typ. –140 dBm
	40 GHz ≤ f < 46 GHz	<–133 dBm, typ. –136 dBm
	46 GHz ≤ f ≤ 50 GHz	<–130 dBm, typ. –133 dBm
	YIG filter = ON	
	R&S®FSMR26	
	3.6 GHz ≤ f < 8 GHz	<–151 dBm, typ. –155 dBm
	8 GHz ≤ f < 13 GHz	<–149 dBm, typ. –153 dBm
	13 GHz ≤ f < 18 GHz	<–147 dBm, typ. –151 dBm
	18 GHz ≤ f < 22 GHz	<–145 dBm, typ. –148 dBm
	22 GHz ≤ f ≤ 26.5 GHz	<–143 dBm, typ. –146 dBm

	R&S®FSMR43	
	3.6 GHz ≤ f < 13 GHz	<–148 dBm, typ. –151 dBm
	13 GHz ≤ f < 18 GHz	<–146 dBm, typ. –150 dBm
	18 GHz ≤ f < 22 GHz	<–145 dBm, typ. –148 dBm
	22 GHz ≤ f < 26.5 GHz	<–143 dBm, typ. –145 dBm
	26.5 GHz ≤ f < 32 GHz	<–135 dBm, typ. –138 dBm
	32 GHz ≤ f < 40 GHz	<–130 dBm, typ. –133 dBm
	40 GHz ≤ f < 43 GHz	<–128 dBm, typ. –131 dBm
	R&S®FSMR50	
	3.6 GHz ≤ f < 13 GHz	<–148 dBm, typ. –151 dBm
	13 GHz ≤ f < 18 GHz	<–146 dBm, typ. –150 dBm
	18 GHz ≤ f < 22 GHz	<–145 dBm, typ. –148 dBm
	22 GHz ≤ f < 26.5 GHz	<–143 dBm, typ. –145 dBm
	26.5 GHz ≤ f < 32 GHz	<–135 dBm, typ. –138 dBm
	32 GHz ≤ f < 40 GHz	<–130 dBm, typ. –133 dBm
	40 GHz ≤ f < 46 GHz	<–128 dBm, typ. –131 dBm
	46 GHz ≤ f ≤ 50 GHz	<–125 dBm, typ. –128 dBm
Displayed average noise level with R&S®FSMR-B223 (spectrum analyzer mode)		
	preamplifier = OFF	
	3.6 GHz to 8 GHz	R&S®FSMR-B2 specifications + 2 dB
	8 GHz to 26.5 GHz	R&S®FSMR-B2 specifications + 3 dB
	preamplifier = ON, YIG filter = OFF	
	3.6 GHz to 8 GHz	<–160 dBm, typ. –163 dBm
	8 GHz to 13 GHz	<–157 dBm, typ. –160 dBm
	13 GHz to 18 GHz	<–155 dBm, typ. –158 dBm
	18 GHz to 22 GHz	<–152 dBm, typ. –157 dBm
	22 GHz to 26.5 GHz	<–148 dBm, typ. –153 dBm
	preamplifier = ON, YIG filter = ON	YIG filter = OFF specifications –2 dB, nominal
Immunity to interference		
Image frequency	YIG filter = ON	
	R&S®FSMR26	
	f_{in} > 3.6 GHz	>70 dB, typ. >100 dB
	R&S®FSMR43, R&S®FSMR50	
	3.6 GHz < f_{in} < 12 GHz	>70 dB, typ. >80 dB
	12 GHz < f_{in} < 14 GHz	>65 dB, typ. >75 dB
	14 GHz < f_{in} < 32 GHz	>55 dB, typ. >60 dB
	f_{in} > 32 GHz	>70 dB, typ. >80 dB
Intermediate frequency	YIG filter = ON	
	R&S®FSMR26, R&S®FSMR43, R&S®FSMR50	
	3.6 GHz < f ≤ 4.2 GHz	typ. 70 dB
	f > 4.2 GHz	>70 dB, typ. >90 dB

Level measurement uncertainty (spectrum analyzer mode)		
	YIG filter = OFF, DC coupling, RF attenuation ≥10 dB	
	+20 °C to +30 °C	
	3.6 GHz ≤ f < 8 GHz	<1 dB (σ = 0.3 dB)
	8 GHz ≤ f < 22 GHz	<1.5 dB (σ = 0.5 dB)
	22 GHz ≤ f < 40 GHz	<2 dB (σ = 0.7 dB)
	40 GHz ≤ f < 50 GHz	<2.5 dB (σ = 0.8 dB)
	RF attenuation > 40 dB	
	3.6 GHz ≤ f < 40 GHz	add 0.5 dB to above values
	40 GHz ≤ f ≤ 50 GHz	add 1 dB to above values
	+5 °C to +45 °C	
	3.6 GHz ≤ f < 8 GHz	<1.5 dB (σ = 0.5 dB)
	8 GHz ≤ f < 22 GHz	<2 dB (σ = 0.7 dB)
	22 GHz ≤ f < 40 GHz	<2.5 dB (σ = 0.8 dB)
	40 GHz ≤ f < 50 GHz	<3 dB (σ = 1.0 dB)
	RF attenuation > 40 dB	
	3.6 GHz ≤ f < 40 GHz	add 0.5 dB to above values
	40 GHz ≤ f ≤ 50 GHz	add 1.5 dB to above values
	YIG filter = ON, DC coupling, RF attenuation ≥10 dB	
	+20 °C to +30 °C	
	3.6 GHz ≤ f < 8 GHz, span < 1 GHz	<1.5 dB (σ = 0.5 dB)
	8 GHz ≤ f < 22 GHz, span < 1 GHz	<2 dB (σ = 0.7 dB)
	22 GHz ≤ f < 40 GHz, span < 1 GHz	<2.5 dB (σ = 0.8 dB)
	40 GHz ≤ f < 50 GHz, span < 1 GHz	<3 dB (σ = 1.0 dB)
	RF attenuation > 40 dB or span ≥ 1 GHz	
	3.6 GHz ≤ f < 40 GHz	add 0.5 dB to above values
	40 GHz ≤ f ≤ 50 GHz	add 1 dB to above values
	+5 °C to +45 °C	
	3.6 GHz ≤ f < 8 GHz, span < 1 GHz	<2 dB (σ = 0.7 dB)
	8 GHz ≤ f < 22 GHz, span < 1 GHz	<2.5 dB (σ = 0.8 dB)
	22 GHz ≤ f < 40 GHz, span < 1 GHz	<3 dB (σ = 1.0 dB)
	40 GHz ≤ f < 50 GHz, span < 1 GHz	<3.5 dB (σ = 1.2 dB)
	RF attenuation > 40 dB or span ≥ 1 GHz	
	3.6 GHz ≤ f < 40 GHz	add 0.5 dB to above values
	40 GHz ≤ f ≤ 50 GHz	add 1.5 dB to above values

R&S®FSU-B9 tracking generator,
R&S®FSU-B12 step attenuator for tracking generator

Unless specified otherwise, specifications do not apply for frequency range from –3 × RBW to +3 × RBW, however at least not from –100 kHz to +100 kHz. Maximum output level +5 dBm (peak modulation in the case of amplitude-modulated signals).

Frequency		
Frequency range		100 kHz to 3.6 GHz
Resolution		1 Hz
Frequency offset		
Setting range		±200 MHz
Resolution		1 Hz
Spectral purity		
SSB phase noise	f = 500 MHz, carrier offset 10 kHz	
	normal mode	typ. –120 dBc (1 Hz)
	with frequency offset	typ. –110 dBc (1 Hz)
	with FM modulation ON	typ. –110 dBc (1 Hz)
Level		
Level setting range		–30 dBm to +5 dBm in steps of 0.1 dB
	with R&S®FSU-B12 option	–100 dBm to +5 dBm in steps of 0.1 dB
Max. deviation of output level		
Absolute	f = 128 MHz, output level –20 dBm to 0 dBm	<1 dB (σ = 0.34 dB)
Frequency response	referenced to level at 128 MHz, sweep time >100 ms, +5 °C to +45 °C	
	output level –20 dBm to 0 dBm	
	100 kHz to 3.6 GHz	<3 dB, typ. 1.9 dB
	output level –30 dBm to –20 dBm	
	f = 100 kHz to 3.6 GHz	3 dB
	additional deviation with R&S®FSU-B12	
	100 kHz to 3.6 GHz	<1 dB
Dynamic range		
Attenuation measurement range	RBW = 1 kHz, f > 10 MHz	100 dB
Harmonics Spurious, nonharmonics	output level –10 dBm output level 0 dBm	typ. –30 dBc typ. –30 dBc
Modulation		
Modulation format	external	I/Q, AM, FM
Input voltage	full scale	
	AM, FM, V_{pp}	1 V
	I/Q	$\sqrt{V_i^2 + V_q^2}$ = 0.5 V
AM	$f_{center} > f_{mod}$, 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
FM	$f_{center} > f_{mod}$, 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 ≤1 MHz	0 Hz to 100 kHz
Modulation frequency response	0 kHz to 100 kHz	1 dB
I/Q modulation	$f_{center} > f_{mod}$, span = 0 Hz	
Modulation frequency response	0 Hz to 5 MHz	1 dB
	0 Hz to 30 MHz	3 dB

Modulation deviation of tracking generator	I/Q modulation, typical values, baseband signals generated by the R&S®AMIQ	
EVM	NADC/TETRA/PDC	
	RMS	2 %
	peak	4 %
	PHS	
	RMS	2 %
	peak	5 %
Phase error	GSM/DCS1800/PCS1900	
	RMS	1.5°
	peak	5°
Rho factor	IS-95 CDMA	0.997
Inputs and outputs (front panel)		
RF output		N female, 50 Ω
VSWR	100 kHz ≤ f ≤ 2 GHz	1.2
	2 GHz ≤ f ≤ 3.6 GHz	1.5
Inputs and outputs (rear panel)		
TG I/AM IN		BNC female
Impedance		50 Ω
Input voltage	V_{pp}	1 V
TG Q/FM IN		BNC female
Impedance		50 Ω
Input voltage	V_{pp}	1 V

R&S®FSMR-B23 RF preamplifier (for R&S®FSMR26 only, requires R&S®FSU-B25 option)

Frequency		
Frequency range	R&S®FSMR26	3.6 GHz to 26.5 GHz
Level measurement uncertainty (spectrum analyzer mode)		
Frequency response	preamplifier = ON	
	3.6 GHz to 8 GHz	<2.0 dB (σ = 0.7 dB)
	8 GHz to 22 GHz	<2.5 dB (σ = 0.8 dB)
	22 GHz to 26.5 GHz	<3.0 dB (σ = 1 dB)
Displayed average noise level (spectrum analyzer mode)		
	0 dB RF attenuation, termination 50 Ω, log. scaling, normalized to 1 Hz RBW RBW = 1 kHz, VBW = 3 kHz, span = 0 Hz, sweep time 50 ms, trace average, sample detector, sweep count = 20, mean marker	
	preamplifier = OFF	
	3.6 GHz to 8 GHz	R&S®FSMR26 specifications + 2 dB
	8 GHz to 26.5 GHz	R&S®FSMR26 specifications + 3 dB
	preamplifier = ON	
	3.6 GHz to 8 GHz	<–160 dBm, typ. –163 dBm
	8 GHz to 13 GHz	<–157 dBm, typ. –160 dBm
	13 GHz to 18 GHz	<–155 dBm, typ. –158 dBm
	18 GHz to 22 GHz	<–152 dBm, typ. –157 dBm
	22 GHz to 26.5 GHz	<–148 dBm, typ. –153 dBm

R&S®FSU-B24 30 dB RF preamplifier (for R&S®FSMR26/43/50)

Frequency		
Frequency range	R&S®FSMR26	100 kHz to 26.5 GHz
	R&S®FSMR43	100 kHz to 43 GHz
	R&S®FSMR50	100 kHz to 50 GHz
Nominal gain		30 dB
Intermodulation (spectrum analyzer mode)		
Second-order intercept (SHI)	with R&S®FSMR-B2 option	
	YIG filter OFF, f_{in} > 1.8 GHz	25 dBm, nominal
	YIG filter ON, 1.8 GHz ≤ f_{in} ≤ 2.4 GHz	65 dBm, nominal
	YIG filter OFF, f_{in} < 1.8 GHz	80 dBm, nominal
Displayed average noise level		
	0 dB RF attenuation, termination 50 Ω, log. scaling, normalized to 1 Hz RBW, preamplifier = OFF, without R&S®FSMR-B2 option f < 10 kHz: 10 Hz FFT filter, trace average, sweep count = 20 f ≥ 10 kHz: RBW = 1 kHz, VBW = 3 kHz, span = 0 Hz, sweep time 50 ms, trace average, sample detector, sweep count = 20, mean marker	
	20 Hz	<–90 dBm
	100 Hz	<–110 dBm
	1 kHz	<–120 dBm
	10 kHz	<–130 dBm
	100 kHz	<–130 dBm
	1 MHz	<–140 dBm
	10 MHz	<–150 dBm
	R&S®FSMR26	
	20 MHz ≤ f < 2 GHz	<–151 dBm, typ. –154 dBm
	2 GHz ≤ f < 3.6 GHz	<–149 dBm, typ. –152 dBm
	3.6 GHz ≤ f < 8 GHz	<–150 dBm, typ. –153 dBm
	8 GHz ≤ f < 13 GHz	<–148 dBm, typ. –151 dBm
	13 GHz ≤ f < 18 GHz	<–147 dBm, typ. –150 dBm
	18 GHz ≤ f < 22 GHz	<–146 dBm, typ. –149 dBm
	22 GHz ≤ f < 26.5 GHz	<–145 dBm, typ. –148 dBm
	R&S®FSMR43	
	20 MHz ≤ f < 2 GHz	<–151 dBm, typ. –154 dBm
	2 GHz ≤ f < 3.6 GHz	<–149 dBm, typ. –152 dBm
	3.6 GHz ≤ f < 8 GHz	<–150 dBm, typ. –153 dBm
	8 GHz ≤ f < 18 GHz	<–147 dBm, typ. –150 dBm
	18 GHz ≤ f < 22 GHz	<–143 dBm, typ. –146 dBm
	22 GHz ≤ f < 32 GHz	<–140 dBm, typ. –143 dBm
	32 GHz ≤ f < 40 GHz	<–137 dBm, typ. –140 dBm
	40 GHz ≤ f < 43 GHz	<–128 dBm, typ. –131 dBm
	R&S®FSMR50	
	20 MHz ≤ f < 2 GHz	<–151 dBm, typ. –154 dBm
	2 GHz ≤ f < 3.6 GHz	<–149 dBm, typ. –152 dBm
	3.6 GHz ≤ f < 8 GHz	<–150 dBm, typ. –153 dBm
	8 GHz ≤ f < 18 GHz	<–147 dBm, typ. –150 dBm
	18 GHz ≤ f < 22 GHz	<–143 dBm, typ. –146 dBm
	22 GHz ≤ f < 32 GHz	<–140 dBm, typ. –143 dBm
	32 GHz ≤ f < 40 GHz	<–137 dBm, typ. –140 dBm
	40 GHz ≤ f < 46 GHz	<–128 dBm, typ. –131 dBm
	46 GHz ≤ f ≤ 50 GHz	<–125 dBm, typ. –128 dBm
	RF attenuation = 0 dB, termination = 50 Ω, log. scaling, normalized to 1 Hz RBW, preamplifier = ON, without R&S®FSMR-B2 option RBW = 1 kHz, VBW = 3 kHz, span = 0 Hz, sweep time = 50 ms, trace average, sample detector, sweep count = 20, mean marker	
	100 kHz	<–140 dBm
	1 MHz	<–150 dBm
	10 MHz	<–161 dBm
	20 MHz ≤ f < 2 GHz	<–163 dBm, typ. –166 dBm
	2 GHz ≤ f < 3.6 GHz	<–161 dBm, typ. –164 dBm
	3.6 GHz ≤ f < 22 GHz	<–160 dBm, typ. –163 dBm
	22 GHz ≤ f < 26.5 GHz	<–157 dBm, typ. –160 dBm
	26.5 GHz ≤ f < 40 GHz	<–155 dBm, typ. –158 dBm
	40 GHz ≤ f < 46 GHz	<–147 dBm, typ. –150 dBm
	46 GHz ≤ f ≤ 50 GHz	<–142 dBm, typ. –145 dBm

	0 dB RF attenuation, termination 50 Ω, log. scaling, normalized to 1 Hz RBW, with R&S®FSMR-B2 option, YIG filter = OFF, preamplifier = OFF f < 10 kHz: 10 Hz FFT filter, trace average, sweep count = 20 f ≥ 10 kHz: RBW = 1 kHz, VBW = 3 kHz, span = 0 Hz, sweep time 50 ms, trace average, sample detector, sweep count = 20, mean marker	
	all models	
	20 Hz	<–90 dBm
	100 Hz	<–110 dBm
	1 kHz	<–120 dBm
	10 kHz	<–130 dBm
	100 kHz	<–130 dBm
	1 MHz	<–140 dBm
	10 MHz	<–150 dBm
	R&S®FSMR26	
	20 MHz ≤ f < 2 GHz	<–151 dBm, typ. –154 dBm
	2 GHz ≤ f < 8 GHz	<–149 dBm, typ. –152 dBm
	8 GHz ≤ f < 13 GHz	<–146 dBm, typ. –149 dBm
	13 GHz ≤ f < 18 GHz	<–144 dBm, typ. –147 dBm
	18 GHz ≤ f < 22 GHz	<–142dBm, typ. –145 dBm
	22 GHz ≤ f < 26.5 GHz	<–140 dBm, typ. –143 dBm
	R&S®FSMR43	
	20 MHz ≤ f < 2 GHz	<–150 dBm, typ. –153 dBm
	2 GHz ≤ f < 3.6 GHz	<–147 dBm, typ. –150 dBm
	3.6 GHz ≤ f < 13 GHz	<–145 dBm, typ. –148 dBm
	13 GHz ≤ f < 18 GHz	<–142 dBm, typ. –145 dBm
	18 GHz ≤ f < 25 GHz	<–140 dBm, typ. –143 dBm
	25 GHz ≤ f < 32 GHz	<–132 dBm, typ. –135 dBm
	32 GHz ≤ f < 40 GHz	<–127 dBm, typ. –130 dBm
	40 GHz ≤ f < 43 GHz	<–120 dBm, typ. –123 dBm
	R&S®FSMR50	
	20 MHz ≤ f < 2 GHz	<–150 dBm, typ. –153 dBm
	2 GHz ≤ f < 3.6 GHz	<–147 dBm, typ. –150 dBm
	3.6 GHz ≤ f < 13 GHz	<–145 dBm, typ. –148 dBm
	13 GHz ≤ f < 18 GHz	<–142 dBm, typ. –145 dBm
	18 GHz ≤ f < 25 GHz	<–140 dBm, typ. –143 dBm
	25 GHz ≤ f < 32 GHz	<–132 dBm, typ. –135 dBm
	32 GHz ≤ f < 40 GHz	<–127 dBm, typ. –130 dBm
	40 GHz ≤ f < 46 GHz	<–120 dBm, typ. –123 dBm
	46 GHz ≤ f ≤ 50 GHz	<–115 dBm, typ. –118 dBm
	RF attenuation = 0 dB, termination = 50 Ω, log. scaling, normalized to 1 Hz RBW, with R&S®FSMR-B2 option, YIG filter = OFF, preamplifier = ON RBW = 1 kHz, VBW = 3 kHz, span = 0 Hz, sweep time = 50 ms, trace average, sample detector, sweep count = 20, mean marker	
	all models	
	100 kHz	<–140 dBm
	1 MHz	<–150 dBm
	10 MHz	<–161 dBm
	20 MHz ≤ f < 2 GHz	<–163 dBm, typ. –165 dBm
	2 GHz ≤ f < 3.6 GHz	<–161 dBm, typ. –164 dBm
	3.6 GHz ≤ f < 22 GHz	<–160 dBm, typ. –163 dBm
	22 GHz ≤ f < 26.5 GHz	<–157 dBm, typ. –160 dBm
	26.5 GHz ≤ f < 40 GHz	<–155 dBm, typ. –158 dBm
	40 GHz ≤ f < 46 GHz	<–145 dBm, typ. –148 dBm
	46 GHz ≤ f ≤ 50 GHz	<–142 dBm, typ. –145 dBm

	0 dB RF attenuation, termination 50 Ω, log. scaling, normalized to 1 Hz RBW, with R&S®FSMR-B2 option, YIG filter = ON, preamplifier = OFF f < 10 kHz: 10 Hz FFT filter, trace average, sweep count = 20 f ≥ 10 kHz: RBW = 1 kHz, VBW = 3 kHz, span = 0 Hz, sweep time 50 ms, trace average, sample detector, sweep count = 20, mean marker	
	all models	
	20 Hz	<–90 dBm
	100 Hz	<–110 dBm
	1 kHz	<–120 dBm
	10 kHz	<–130 dBm
	100 kHz	<–130 dBm
	1 MHz	<–140 dBm
	10 MHz	<–150 dBm
	R&S®FSMR26	
	20 MHz ≤ f < 2 GHz	<–151 dBm, typ. –154 dBm
	2 GHz ≤ f < 3.6 GHz	<–149 dBm, typ. –152 dBm
	3.6 GHz ≤ f < 8 GHz	<–148 dBm, typ. –151 dBm
	8 GHz ≤ f < 13 GHz	<–145 dBm, typ. –148 dBm
	13 GHz ≤ f < 18 GHz	<–144 dBm, typ. –147 dBm
	18 GHz ≤ f < 22 GHz	<–142 dBm, typ. –145 dBm
	22 GHz ≤ f < 26.5 GHz	<–138 dBm, typ. –141 dBm
	R&S®FSMR43	
	20 MHz ≤ f < 2 GHz	<–150 dBm, typ. –153 dBm
	2 GHz ≤ f < 3.6 GHz	<–147 dBm, typ. –150 dBm
	3.6 GHz ≤ f < 8 GHz	<–145 dBm, typ. –148 dBm
	8 GHz ≤ f < 18 GHz	<–142 dBm, typ. –145 dBm
	18 GHz ≤ f < 25 GHz	<–138 dBm, typ. –141 dBm
	25 GHz ≤ f < 32 GHz	<–130 dBm, typ. –133 dBm
	32 GHz ≤ f < 40 GHz	<–125 dBm, typ. –128 dBm
	40 GHz ≤ f < 43 GHz	<–115 dBm, typ. –118 dBm
	R&S®FSMR50	
	20 MHz ≤ f < 2 GHz	<–150 dBm, typ. –153 dBm
	2 GHz ≤ f < 3.6 GHz	<–147 dBm, typ. –150 dBm
	3.6 GHz ≤ f < 8 GHz	<–145 dBm, typ. –148 dBm
	8 GHz ≤ f < 18 GHz	<–142 dBm, typ. –145 dBm
	18 GHz ≤ f < 25 GHz	<–138 dBm, typ. –141 dBm
	25 GHz ≤ f < 32 GHz	<–130 dBm, typ. –133 dBm
	32 GHz ≤ f < 40 GHz	<–125 dBm, typ. –128 dBm
	40 GHz ≤ f < 46 GHz	<–115 dBm, typ. –118 dBm
	46 GHz ≤ f ≤ 50 GHz	<–110 dBm, typ. –115 dBm
	RF attenuation = 0 dB, termination = 50 Ω, log. scaling, normalized to 1 Hz RBW, with option R&S®FSMR-B2, YIG filter = ON, preamplifier = ON RBW = 1 kHz, VBW = 3 kHz, span = 0 Hz, sweep time = 50 ms, trace average, sample detector, sweep count = 20, mean marker	
	all models	
	100 kHz	<–140 dBm
	1 MHz	<–150 dBm
	10 MHz	<–161 dBm
	20 MHz ≤ f < 2 GHz	<–163 dBm, typ. –165 dBm
	2 GHz ≤ f < 3.6 GHz	<–161 dBm, typ. –164 dBm
	3.6 GHz ≤ f < 26.5 GHz	<–162 dBm, typ. –165 dBm
	26.5 GHz ≤ f < 40 GHz	<–155 dBm, typ. –158 dBm
	40 GHz ≤ f < 46 GHz	<–145 dBm, typ. –148 dBm
	46 GHz ≤ f ≤ 50 GHz	<–142 dBm, typ. –145 dBm

Level measurement uncertainty (spectrum analyzer mode)		
Absolute level uncertainty at 128 MHz	RBW = 10 kHz, level –30 dBm, reference level –30 dBm, RF attenuation 10 dB	
	preamplifier = OFF	<0.2 dB (σ = 0.07 dB)
	preamplifier = ON	<0.3 dB (σ = 0.1 dB)
Frequency response referenced to 128 MHz	without R&S®FSMR-B2 option or YIG filter = OFF DC coupling, RF attenuation ≥10 dB, preamplifier = ON	
	+20 °C to +30 °C	
	10 MHz ≤ f < 3.6 GHz	<0.6 dB (σ = 0.2 dB)
	3.6 GHz ≤ f < 8 GHz	<2 dB (σ = 0.7 dB)
	8 GHz ≤ f < 22 GHz	<2.5 dB (σ = 0.8 dB)
	22 GHz ≤ f < 40 GHz	<3 dB (σ = 1.0 dB)
	40 GHz ≤ f < 50 GHz	<3.5 dB (σ = 1.2 dB)
	RF attenuation > 40 dB	
	3.6 GHz ≤ f < 40 GHz	add 0.5 dB to above values
	40 GHz ≤ f ≤ 50 GHz	add 1 dB to above values
	+5 °C to +45 °C	
	10 MHz ≤ f < 3.6 GHz	<0.8 dB (σ = 0.3 dB)
	3.6 GHz ≤ f < 8 GHz	<2.5 dB (σ = 0.8 dB)
	8 GHz ≤ f < 22 GHz	<3 dB (σ = 1.0 dB)
	22 GHz ≤ f < 26.5 GHz	<3.5 dB (σ = 1.2 dB)
	26.5 GHz ≤ f < 40 GHz	<4 dB (σ = 1.3 dB)
	40 GHz ≤ f < 50 GHz	<4.5 dB (σ = 1.5 dB)
	RF attenuation > 40 dB	
	3.6 GHz ≤ f < 40 GHz	add 0.5 dB to above values
	40 GHz ≤ f ≤ 50 GHz	add 1.5 dB to above values
	with R&S®FSMR-B2 option, YIG filter = ON DC coupling, RF attenuation ≥10 dB, preamplifier = ON	
	+20 °C to +30 °C	
	10 MHz ≤ f < 3.6 GHz	<0.6 dB (σ = 0.2 dB)
	3.6 GHz ≤ f < 8 GHz, span < 1 GHz	<2.5 dB (σ = 0.8 dB)
	8 GHz ≤ f < 22 GHz, span < 1 GHz	<3 dB (σ = 1.0 dB)
	22 GHz ≤ f < 40 GHz, span < 1 GHz	<3.5 dB (σ = 1.2 dB)
	40 GHz ≤ f < 50 GHz, span < 1 GHz	<4 dB (σ = 1.3 dB)
	RF attenuation > 40 dB or span ≥ 1 GHz	
	3.6 GHz ≤ f < 40 GHz	add 0.5 dB to above values
	40 GHz ≤ f ≤ 50 GHz	add 1 dB to above values
	+5 °C to +45 °C	
	10 MHz ≤ f < 3.6 GHz	<0.8 dB (σ = 0.3 dB)
	3.6 GHz ≤ f < 8 GHz, span < 1 GHz	<3 dB (σ = 1.0 dB)
	8 GHz ≤ f < 22 GHz, span < 1 GHz	<3.5 dB (σ = 1.2 dB)
	22 GHz ≤ f < 26.5 GHz, span < 1 GHz	<4 dB (σ = 1.3 dB)
	26.5 GHz ≤ f < 40 GHz, span < 1 GHz	<4.5 dB (σ = 1.5 dB)
	40 GHz ≤ f < 50 GHz, span < 1 GHz	<5 dB (σ = 1.7 dB)
	RF attenuation > 40 dB or span ≥ 1 GHz	
	3.6 GHz ≤ f < 40 GHz	add 0.5 dB to above values
	40 GHz ≤ f ≤ 50 GHz	add 1.5 dB to above values

R&S®FSU-B25 electronic attenuator and preamplifier

Frequency		
Frequency range		100 kHz[6], 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 (spectrum analyzer mode)		
Frequency response	with preamplifier or electronic attenuator	
	10 MHz to 50 MHz	<1 dB (σ = 0.34 dB)
	50 MHz to 3.6 GHz	<0.6 dB (σ = 0.2 dB)
Reference error	at 128 MHz, RBW ≤100 kHz, reference level –30 dBm, RF attenuation 10 dB	
	electronic attenuator	<0.3 dB (σ = 0.1 dB)
	preamplifier	<0.3 dB (σ = 0.1 dB)
Displayed average noise level (spectrum analyzer mode)		
	0 dB RF attenuation, termination 50 Ω, log. scaling, normalized to 1 Hz RBW RBW = 1 kHz, VBW = 3 kHz, span = 0 Hz, sweep time 50 ms, trace average, sample detector, sweep count = 20, mean marker	
	preamplifier = ON	
	R&S®FSMR3, R&S®FSMR26	
	10 MHz to 2.0 GHz	<–162 dBm
	2.0 GHz to 3.6 GHz	<–160 dBm
	R&S®FSMR43, R&S®FSMR50	
	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:	
	preamplifier = OFF, electronic attenuator = OFF	
	20 Hz to 3.6 GHz	1 dB
	preamplifier = OFF, electronic attenuator 0 dB	
	20 Hz to 3.6 GHz	typ. 2.5 dB
Intermodulation (spectrum analyzer mode)		
Third-order intercept point (TOI)	electronic attenuator = ON, Δf >5 × RBW or 10 kHz	
	10 MHz ≤ f_{in} ≤ 300 MHz	>17 dBm
	300 MHz < f_{in} ≤ 3.6 GHz	>20 dBm

[6] Valid as of electronic attenuator board, stock number 1137.0724.02 (see instrument hardware information).

Accessories

R&S®NRP-Z27/-Z37 power sensor modules

This section contains information about the R&S®NRP-Z27 and -Z37 power sensor modules when used alone or with an R&S®NRP power meter base unit. For further data of the power sensors, see the R&S®NRP data sheet (PD 0757.7023) and R&S®NRP-Z27/-Z37 technical information.

Sensor type		thermoelectric power sensor with RF signal output (power splitter)		
Frequency range	R&S®NRP-Z27 R&S®NRP-Z37	DC to 18 GHz DC to 26.5 GHz		
Power range		–24 dBm (4 µW) to +26 dBm (400 mW) without subranges		
Max. power	average pulse energy	0.5 W (+27 dBm) continuous 1.0 W (+30 dBm) for max. 10 minutes 30 µWs		
Input VSWR	RF signal output connected to R&S®FSMR	R&S®NRP-Z27	R&S®NRP-Z37	
	DC to 2 GHz	<1.15	<1.15	
	>2 GHz to 4.2 GHz	<1.18	<1.18	
	>4.2 GHz to 8 GHz	<1.23	<1.23	
	>8 GHz to 12.4 GHz	<1.25	<1.25	
	>12.4 GHz to 18 GHz	<1.35	<1.30	
	>18 GHz to 26.5 GHz	–	<1.45	
Display noise	two standard deviations, 10.24 s integration time	< 240 nW (typ. 120 nW)		
Zero offset	expanded uncertainty (k = 2) after zeroing	< 400 nW (typ. 200 nW)		
Zero drift	within 1 hour after zeroing, permissible temperature change ±1 °C, following two-hour warm-up of power sensor	< 160 nW		
Linearity	for relative measurements referenced to 0 dBm			
	input power			
	<0.1 W	< 0.02 dB		
	>0.1 W	< 0.03 dB		
Calibration uncertainty	calibration level 0 dBm; at calibration frequencies from 100 MHz to upper frequency limit, temperature +20 °C to +25 °C; specifications include zero offset and display noise (up to a 2 σ value of 0.004 dB); the RF signal output must be terminated with a precision load (VSWR <1.05); expanded uncertainty (k = 2); calibration frequencies: 0.1/0.5/1/3/5/10/50/100 MHz; from 100 MHz to the upper frequency limit in increments of 100 MHz			
	DC to 100 MHz	0.063 dB		
	>100 MHz to 4 GHz	0.070 dB		
	>4 GHz to 8 GHz	0.082 dB		
	>8 GHz to 12.4 GHz	0.088 dB		
	>12.4 GHz to 18 GHz	0.109 dB		
	>18 GHz to 26.5 GHz	0.118 dB		
Uncertainty for absolute power measurement with matched load on RF output connector (VSWR <1.05)	RF level –10 dBm to +26 dBm At the calibration frequencies, the effects of calibration uncertainty, linearity, zero offset and drift, temperature and display noise (up to a value of 0.01 dB) as well as mismatch of the load on the RF signal output are included. For power levels below –10 dBm, the effect of zero offset must be calculated separately.	expanded uncertainty (k = 2) +20 °C to +25 °C	 +15 °C to +35 °C	 0 °C to +50 °C
	DC to 100 MHz	0.070 dB	0.077 dB	0.103 dB
	>100 MHz to 4.2 GHz	0.075 dB	0.082 dB	0.106 dB
	>4.2 GHz to 8 GHz	0.087 dB	0.094 dB	0.119 dB
	>8 GHz to 12.4 GHz	0.093 dB	0.101 dB	0.130 dB
	>12.4 GHz to 18 GHz	0.112 dB	0.121 dB	0.151 dB
	>18 GHz to 26.5 GHz	0.122 dB	0.137 dB	0.190 dB

Averaging filter	modes	AUTO OFF (fixed averaging factor)
		AUTO ON (continuously auto-adapted)
	normal operating mode	setting of filter depends on power to be measured and resolution
	resolution	1 dB, 0.1 dB, 0.01 dB, 0.001 dB
	fixed noise operating mode	filter set to specified noise content
	noise content	0.0001 dB to 1 dB
	max. measurement time	0.01 s to 1000 s
	averaging factor N	1 to 2^{16} (number of averages)
	result output	
	moving average	continuous with every newly evaluated measurement window
	repeat	only final result (in case of remote control)
Measurement window	duration	2 × (1 ms to 300 ms)
	shape	rectangular (integrating behavior) Von Hann (smoothing filter, for efficient suppression of result variations due to modulation)
Measurement time	for single measurement mode	N × (duration of measurement window + 0.5 ms) + 82 ms
Isolation	between RF signal output and input of the power sensor; values in parentheses represent effective isolation, which can be achieved after numeric isolation correction of the measurement result inside the sensor (VSWR correction active in R&S®FSMR)	
	DC to 2 GHz	>23 (51) dB
	>2 GHz to 12.4 GHz	>25 (37) dB
	>12.4 GHz to 18 GHz	>26 (35) dB
	>18 GHz to 26.5 GHz	>26 (32) dB
Insertion loss from input to RF output	DC to 2 GHz	<14 dB (typ. 12.5 dB)
	>2 GHz to 4.2 GHz	<15 dB (typ. 13.5 dB)
	>4.2 GHz to 8 GHz	<16 dB (typ. 14.0 dB)
	>8 GHz to 12.4 GHz	<17 dB (typ. 14.5 dB)
	>12.4 GHz to 18 GHz	<18 dB (typ. 15.5 dB)
	>18 GHz to 26.5 GHz	<19 dB (typ. 16.5 dB)
Impedance		50 Ω
RF input connector	R&S®NRP-Z27	N (male)
	R&S®NRP-Z37	3.5 mm (male)
RF output connector (cable to R&S®FSMR)		3.5 mm (male)

General data

Temperature	operating temperature range	0° C to +55 °C
	storage temperature range	–40°C to +70 °C
Climatic resistance		in line with IEC 60068 with restrictions: non-condensing, +25 °C/+40 °C cyclic at 95 % relative humidity
Mechanical resistance		
Vibration, sinusoidal		in line with IEC 60068 5 Hz to 55 Hz, max. 2 g 55 Hz to 150 Hz, 0.5 g constant
Vibration, random		in line with IEC 60068 10 Hz to 500 Hz, 1.9 g (rms)
Shock		in line with IEC 60068; 40 g shock spectrum
Air pressure	operation	795 hPa (2000 m) to 1060 hPa
	transport	566 hPa (4500 m) to 1060 hPa
Electromagnetic compatibility		in line with EN 61326, EN 55011
Safety		in line with EN 61010-1
Test mark		VDE, GS, CSA, CSA-NRTL
Dimensions (W × H × D)	sensor dimensions	48 mm × 50 mm × 250 mm 1.89 in. × 1.97 in × 9.84 in
	connecting cable length	1.5 m 59.06 in
Weight	R&S®NRP-Z27/-Z37	0.7 kg 1.54 lb

R&S®FSMR-Z2 attenuation calibration kit

Coaxial attenuators with calibration certificate of Physikalisch-Technische Bundesanstalt (PTB) in Braunschweig. The calibration covers the unit attenuation for four attenuators with nominal values of 6 dB, 10 dB, 20 dB and 20 dB.

Two additional attenuators with 6 dB nominal each are included. These attenuators have equal quality but are not certified.

Connector (input/output)		N male/N female
Impedance		50 Ω
Frequency range		DC to 18 GHz
Maximum load	T = +25 °C	0.5 W
Attenuation		
Number of pieces		nominal attenuation value:
1		6 dB
2		10 dB
3		20 dB
Maximum deviation from nominal value	f = 30.02 MHz	±0.5 dB
Reproducibility		
Maximum attenuation error from average due to connector rotation	f = 30.02 MHz	≤0.003 dB
VSWR	f = 30.02 MHz	typ. ≤1.01
Uncertainty of calibration		
Expanded uncertainty (k=2) of attenuation values stated in calibration certificate	T = +25 °C; f = 30.02 MHz	
	attenuator 6 dB, 10 dB	0.002 dB
	attenuator 20 dB	0.003 dB

Ordering information

Designation	Type	Order No.
Measuring Receiver 20 Hz to 3.6 GHz	R&S®FSMR3	1166.3311.03
Measuring Receiver 20 Hz to 26.5 GHz	R&S®FSMR26	1166.3311.26
Measuring Receiver 20 Hz to 43 GHz	R&S®FSMR43	1166.3311.43
Measuring Receiver 20 Hz to 50 GHz	R&S®FSMR50	1166.3311.50
Accessories supplied		
Power cable, operating manual, service manual R&S®FSMR3: SMA adapter (4012.5837.00) R&S®FSMR26: test port adapter with 3.5 mm female (1021.0512.00) and N female (1021.0535.00) connector R&S®FSMR43: test port adapter with 2.92 mm (K) female (1036.4790.00) and N female (1036.4777.00) connector R&S®FSMR50: test port adapter with 2.4 mm female (1088.1627.02), 2.92 mm (K) female (1036.4790.00) and N female (1036.4777.00) connector		

Options

Designation	Type	Order No.	Retrofittable	Remarks
Options				
YIG Preselection 3.6 GHz to 26.5 GHz	R&S®FSMR-B2	1157.1903.26	no	for R&S®FSMR26 only, excludes R&S®FSMR-B23 and R&S®FSMR-B223
20 dB Preamplifier, 3.6 GHz to 26.5 GHz	R&S®FSMR-B23	1157.0907.05	no	for R&S®FSMR26 only, requires R&S®FSU-B25, excludes R&S®FSMR-B2, R&S®FSMR-B223 and R&S®FSU-B24
YIG Preselection 3.6 GHz to 26.5 GHz with 20 dB Preamplifier 3.6 GHz to 26.5 GHz	R&S®FSMR-B223	1157.1955.26	no	for R&S®FSMR26 only, requires R&S®FSU-B25, excludes R&S®FSMR-B2, R&S®FSMR-B23 and R&S®FSU-B24
YIG Preselection 3.6 GHz to 43 GHz	R&S®FSMR-B2	1157.1903.43	no	for R&S®FSMR43 only
YIG Preselection 3.6 GHz to 50 GHz	R&S®FSMR-B2	1157.1903.50	no	for R&S®FSMR50 only
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	
Attenuator, 0 dB to 70 dB	R&S®FSU-B12	1142.9349.02	yes	for R&S®FSU-B9
Removable Hard Disk	R&S®FSMR-B18	1145.0242.06	no	
Second Hard Disk	R&S®FSMR-B19	1145.0394.06		requires R&S®FSMR-B18
30 dB RF Preamplifier 100 kHz to 50 GHz	R&S®FSU-B24	1157.2100.50	yes	not available for R&S®FSMR3, excludes R&S®FSU-B25, R&S®FSMR-B23 and R&S®FSMR-B223
Electronic Attenuator, 0 dB to 30 dB, and 20 dB Preamplifier (3.6 GHz)	R&S®FSU-B25	1144.9298.02	yes	
Vector Signal Analysis Extension	R&S®FSMR-B73	1169.5696.02	no	

Firmware/Software				
Application Firmware for Noise Figure and Gain Measurements	R&S®FS-K30	1300.6508.02	only for ser. no. >200 000	preamplifier recommended (e.g. R&S®FSU-B25)
Application Firmware for Phase Noise Measurement	R&S®FS-K40	1161.8138.02		
GSM/EDGE Application Firmware	R&S®FS-K5	1141.1496.02		
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® BTS Application Firmware	R&S®FS-K82	1157.2316.02		
CDMA2000® MS Application Firmware (incl. 1xEV-DV)	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		

Accessories

Designation	Type	Order No.
Power sensor modules with integrated splitter		
DC to 18 GHz, N connector	R&S®NRP-Z27	0358.5414.02
DC to 26.5 GHz, PC3.5 mm connector	R&S®NRP-Z27	1169.3206.02
Power sensors, thermoelectric		
DC to 18 GHz, N connector	R&S®NRP-Z51	1138.0005.02
DC to 40 GHz, K connector	R&S®NRP-Z55	1138.2008.02
Power sensors, diode		
10 MHz to 8 GHz	R&S®NRP-Z11	1138.3004.02
10 MHz to 18 GHz	R&S®NRP-Z21	1137.6000.02
10 MHz to 18 GHz, medium power	R&S®NRP-Z22	1137.7506.02
10 MHz to 18 GHz, medium power	R&S®NRP-Z23	1137.8002.02
10 MHz to 18 GHz, medium power	R&S®NRP-Z24	1137.8502.02
9 kHz to 6 GHz	R&S®NRP-Z91	1168.8004.02

(for further power sensors, see also R&S®NRP data sheet, PD 0757.7023)

Accessories for calibrating the RF level uncertainty of the R&S®FSMR		
Attenuation Calibration Kit	R&S®FSMR-Z2	1169.4954.02

Recommended extras

Designation	Type	Order No.
Headphones		0708.9010.00
US Keyboard with trackball	R&S®PSP-Z2	1091.4100.02
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	R&S®ZZA-411	1096.3283.00
Adapter for mounting on telescopic rails (only with R&S®ZZA-411 19" Rack Adapter)	R&S®ZZA-T45	1109.3774.00
Matching pads, 50/75 Ω		
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
SWR bridges, 50 Ω		
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
High power attenuators		
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
Connectors and cables		
Probe power connector, 3 pin		1065.9480.00
DC blocks		
DC Block, 10 kHz to 18 GHz (type N)	R&S®FSE-Z4	1084.7443.02
For R&S®FSMR26 only		
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
For R&S®FSMR43, R&S®FSMR50 only		
Test port adapter N male		1036.4783.00
Test port adapter K female		1036.4790.00
Test port adapter K male		1036.4802.00

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