

NOISE FIGURE MEASUREMENT APPLICATION

Specifications

R&S®FSW3-KM125/-KM126

R&S®FSW-K30

R&S®FSWP-K30

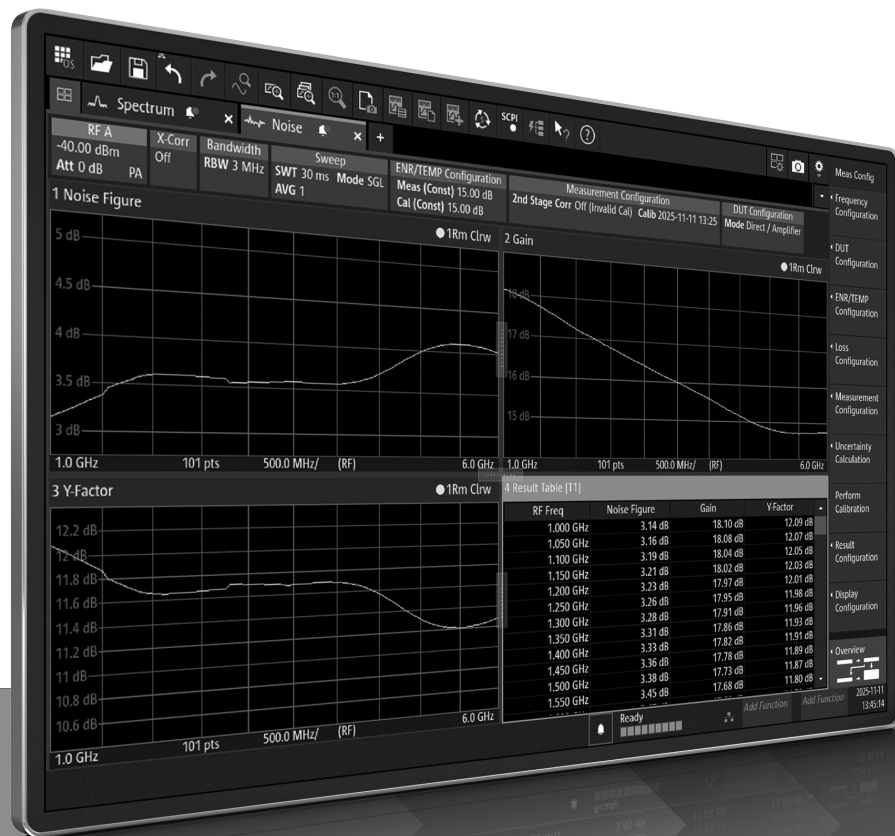
R&S®FSMR3-K30

R&S®FSV3-K30

R&S®FPS-K30

R&S®FSV-K30

R&S®FPL1-K30



Specifications
Version 01.00

ROHDE & SCHWARZ

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CONTENTS

Definitions	3
Specifications.....	4
Frequency	4
Configuration	5
Results	6
Measurement uncertainty (nominal).....	7
Smart noise sources.....	8
Ordering information	9
Noise figure measurement application	9
FSWX signal and spectrum analyzer	9
FSW signal and spectrum analyzer	9
R&S®FSWP phase noise analyzer and VCO tester.....	10
R&S®FSMR3000 measuring receiver	10
R&S®FSVA3000 and R&S®FSV3000 signal and spectrum analyzers	10
R&S®FPS signal and spectrum analyzer.....	11
FPL spectrum analyzer.....	11
R&S®ZNL vector network analyzer	11
Recommended extras.....	11

Definitions

General

Product data applies under the following conditions:

- Three hours of storage at ambient temperature followed by 30 minutes of warm-up operation
- Specified environmental conditions met
- Recommended calibration interval adhered to
- All internal automatic adjustments performed, if applicable

Specifications with limits

Represent warranted product performance by means of a range of values for the specified parameter. These specifications are marked with limiting symbols such as $<$, \leq , $>$, \geq , \pm , or descriptions such as maximum, limit of, minimum. Compliance is ensured by testing or is derived from the design. Test limits are narrowed by guard bands to take into account measurement uncertainties, drift and aging, if applicable.



Non-traceable specifications with limits (n. trc.)

Represent product performance that is specified and tested as described under “Specifications with limits” above. However, product performance in this case cannot be warranted due to the lack of measuring equipment traceable to national metrology standards. In this case, measurements are referenced to standards used in the Rohde & Schwarz laboratories.

Specifications without limits

Represent warranted product performance for the specified parameter. These specifications are not specially marked and represent values with no or negligible deviations from the given value, e.g. dimensions or resolution of a setting parameter. Compliance is ensured by design.

Typical data (typ.)

Characterizes product performance by means of representative information for the given parameter. When marked with $<$, $>$ or as a range, it represents the performance met by approximately 80 % of the instruments at production time. Otherwise, it represents the mean value.

Nominal values (nom.)

Characterize product performance by means of a representative value for the given parameter, e.g. nominal impedance. In contrast to typical data, a statistical evaluation does not take place and the parameter is not tested during production.

Measured values (meas.)

Characterize expected product performance by means of measurement results gained from individual samples.

Uncertainties

Represent limits of measurement uncertainty for a given measurand. Uncertainty is defined with a coverage factor of 2 and has been calculated in line with the rules of the Guide to the Expression of Uncertainty in Measurement (GUM), taking into account environmental conditions, aging, wear and tear.

Device settings and GUI parameters are designated with the format “parameter: value”.

Non-traceable specifications with limits, typical data as well as nominal and measured values are not warranted by Rohde & Schwarz.

In line with the 3GPP standard, chip rates are specified in million chips per second (Mcps), whereas bit rates and symbol rates are specified in billion bit per second (Gbps), million bit per second (Mbps), thousand bit per second (kbps), million symbols per second (Msps) or thousand symbols per second (ksps), and sample rates are specified in million samples per second (Msample/s). Gbps, Mcps, Mbps, Msps, kbps, ksps and Msample/s are not SI units.

Specifications

The specifications of the R&S®FSW3-KM125 and R&S®Fxx-K30 noise figure measurement application are based on the specification documents of:

- FSWX signal and spectrum analyzer (R&S®FSW3-KM125)
- FSW signal and spectrum analyzer
- R&S®FSWP phase noise analyzer and VCO tester
- R&S®FSMR3000 measuring receiver
- R&S®FSVA3000 signal and spectrum analyzer (R&S®FSV3-K30)
- R&S®FSV3000 signal and spectrum analyzer (R&S®FSV3-K30)
- R&S®FPS signal and spectrum analyzer
- FPL spectrum analyzer
- R&S®ZNL vector network analyzer

They have not been checked separately and are not verified during instrument calibration. Measurement uncertainties are given as 95 % confidence intervals. The specified errors, accuracies and uncertainties do not take into account systematic errors due to reduced signal-to-noise (S/N) ratio, uncertainties due to imperfect impedance matching, uncertainties of external measurement amplifiers and mixers, uncertainties due to a reduced measurement interval and uncertainties of the noise source. The specified errors, accuracies and uncertainties apply at calibrated measurement frequency points.

Frequency

Frequency range	RF input	
	R&S®FSW3-KM125	same as FSWX
	R&S®FSW-K30	same as FSW ¹
	R&S®FSWP-K30	same as R&S®FSWP ^{1, 2}
	R&S®FSMR3-K30	same as R&S®FSMR3000 ^{1, 3}
	R&S®FSV3-K30	same as R&S®FSVA3000/R&S®FSV3000
	R&S®FPS-K30	same as R&S®FPS
	R&S®FPL1-K30	same as FPL/R&S®ZNL
	external mixer IF input ⁴	
	R&S®FSW-K30	same as frequency range of used external mixer
	R&S®FSWP-K30	same as frequency range of used external mixer
	R&S®FSV3-K30	same as frequency range of used external mixer

¹ Restricted IF overload, IF power trigger and auto level functionality depend on carrier frequency and bandwidth at carrier frequencies < 50 MHz.

² R&S®FSWP-B1 option is a prerequisite for using R&S®FSWP-K30 option with the R&S®FSWP phase noise analyzer.

³ R&S®FSMR3-B1 option is a prerequisite for using R&S®FSMR3-K30 option with the R&S®FSMR3000 measuring receiver.

⁴ The R&S®FSW26/R&S®FSW43/R&S®FSW50/R&S®FSW67/R&S®FSW85 with R&S®FSW-B21 option and external mixer, the R&S®FSWP26/R&S®FSWP50 with R&S®FSWP-B1 and R&S®FSWP-B21 options and external mixer, the R&S®FSVA3030/R&S®FSVA3044/R&S®FSVA3050 with R&S®FSV3-B21 option and external mixer or the R&S®FSV3030/R&S®FSV3044/R&S®FSV3050 with R&S®FSV3-B21 option and external mixer are required. Not available for the FSWX, R&S®FSMR3000, R&S®FPS, FPL and R&S®ZNL.

Configuration

DUT configuration		mode	base unit	with -B10 ⁵ option	with -B21 ⁴ option	with -B21 and -B10 ⁶ options
	RF input	direct	•	•	•	•
		fixed LO, upconverter	•	•	•	•
		fixed LO, downconverter	•	•	•	•
		fixed LO, system downconverter	•	•	•	•
		fixed IF, upconverter		•		•
		fixed IF, downconverter		•		•
		fixed IF, system downconverter		•		•
	external mixer input ⁴	direct			•	•
		fixed LO, upconverter			•	•
		fixed LO, downconverter			•	•
		fixed LO, system downconverter			•	•
		fixed IF, upconverter				•
		fixed IF, downconverter				•
		fixed IF, system downconverter				•
Measurement configuration	sweep mode	frequency sweep frequency table (user-defined)				
	noise source type	noise diode, resistor, smart noise source				
	ENR	constant, user-defined table, smart noise source table				
	input loss	constant, user-defined table				
	output loss	constant, user-defined table				
	calibration loss	constant, user-defined table				
	frequency settings	start frequency, stop frequency, number of frequency points center frequency, span, step size				
	measurement settings	RBW				
		sweep time				
		settling time				
		average				
	level and range settings	reference level (auto, manual)				
		auto reference level range				
		RF attenuator (manual)				
	second stage correction (calibration)	on/off				
Remote control			GPIB		LAN (VXI-11)	
	control via SCPI command set and application-specific extensions	FSWX	• ⁷		•	
		FSW, R&S®FSWP and R&S®FSMR3000	•		•	
		R&S®FSVA3000 and R&S®FSV3000	• ⁸		•	
		R&S®FPS	•		•	
		FPL and R&S®ZNL	• ⁹		•	

⁵ The FSW with R&S®FSW-B10 option, the R&S®FSWP with R&S®FSWP-B1 and R&S®FSWP-B10 options, the R&S®FSMR3000 with R&S®FSMR3-B1 and R&S®FSMR3-B10 options, the R&S®FSVA3000 with R&S®FSV3-B10 option, the R&S®FSV3000 with R&S®FSV3-B10 option, the R&S®FPS with R&S®FPS-B10 option or the R&S®FSV with R&S®FSV-B10 option are required. Not available for the FPL and R&S®ZNL.

⁶ The R&S®FSW26/R&S®FSW43/R&S®FSW50/R&S®FSW67/R&S®FSW85 with R&S®FSW-B10 and R&S®FSW-B21 options and external mixer, the R&S®FSWP26/R&S®FSWP50 with R&S®FSWP-B1, R&S®FSWP-B10 and R&S®FSWP-B21 options and external mixer, the R&S®FSVA3030/R&S®FSVA3044/R&S®FSVA3050 with R&S®FSV3-B10 and R&S®FSV3-B21 options and external mixer, the R&S®FSV3030/R&S®FSV3044/R&S®FSV3050 with R&S®FSV3-B10 and R&S®FSV3-B21 options and external mixer or the R&S®FSV30/R&S®FSV40/R&S®R&S®FSVA30/R&S®FSVA40 with R&S®FSV-B10 and R&S®FSV-B21 options and external mixer are required. Not available for the R&S®FSMR3000, R&S®FPS, FPL and R&S®ZNL.

⁷ The R&S®FSWX3044 with R&S®FSW3-B5 option is required.

⁸ the R&S®FSVA3000 with R&S®FSV3-B5 option or the R&S®FSV3000 with R&S®FSV3-B5 option is required.

⁹ The FPL with R&S®FPL1-B10 option or the R&S®ZNL with R&S®FPL1-B10 option is required.

Uncertainty calculator and result uncertainty calculation	uncertainty dialog and trace uncertainty	on/off
Preamplifier ¹⁰	R&S®FSW3-K30	20 dB/off
	R&S®FSW-K30	30 dB/off
	R&S®FSWP-K30	30 dB/off
	R&S®FSMR3-K30	30 dB/off
	R&S®FSV3-K30	30 dB/off
	R&S®FPS-K30	on/off
	R&S®FPL1-K30	on/off

Results

R&S®FSW3-KM125, R&S®FSW-K30, R&S®FSWP-K30, R&S®FSMR3-K30, R&S®FSV3-K30 for R&S®FSVA3000/R&S®FSV3000, R&S®FPS-K30, R&S®FPL1-K30		
Result display	result table	frequency
		selectable: noise figure, gain, temperature, Y factor, P hot, P cold, ENR measured, level (hot), level (cold), cal Y factor, cal level (hot), cal level (cold)
	marker table	marker reference, frequency
		selectable: noise figure, gain, temperature, Y factor, P hot, P cold, ENR measured, level (hot), level (cold), cal Y factor, cal level (hot), cal level (cold)
	graph results	noise figure, gain, temperature, Y factor, P hot, P cold, ENR measured, level (hot), level (cold), cal Y factor, cal level (hot), cal level (cold)
		x-axis according to frequency settings y-axis scaling automatic or user-defined
Trace	trace configuration	up to 4 traces
		clear/write, view, blank
		copy trace
	markers	up to 4 markers (normal/delta)
	limit lines	noise figure, gain, temperature, Y factor, ENR measured, cal level (hot), cal level (cold)

¹⁰ The R&S®FSWX3044 (44 GHz, 1 RF) with R&S®FSW31-B24 option, the R&S®FSWX3044 (44 GHz, 2 RF) with R&S®FSW32-B24 option, the R&S®FSW8/R&S®FSW13/R&S®FSW26/R&S®FSW43/R&S®FSW50/R&S®FSW67 with R&S®FSW-B24 option, the R&S®FSWP8/R&S®FSWP26/R&S®FSWP50 with R&S®FSWP-B24 option, the R&S®FSMR3008/R&S®FSMR3026/R&S®FSMR3050 with R&S®FSMR3-B24 option, the R&S®FSVA3004/R&S®FSVA3007/R&S®FSVA3013/R&S®FSVA3030/R&S®FSVA3044/R&S®FSVA3050 with R&S®FSV3-B24 option, the R&S®FSV3004/R&S®FSV3007/R&S®FSV3013/R&S®FSV3030/R&S®FSV3044/R&S®FSV3050 with R&S®FSV3-B24 option, the R&S®FPS4/R&S®FPS7 with R&S®FPS-B22 option, the R&S®FPS13/R&S®FPS30/R&S®FPS40 the R&S®FPS-B24 option or the FPL with R&S®FPL1-B22 option are required.
Not available for the R&S®ZNL.

Measurement uncertainty (nominal)

Noise figure measurement range	noise source ENR	
	4 dB to 7 dB	0 dB to 20 dB
	12 dB to 17 dB	0 dB to 30 dB
	20 dB to 22 dB	0 dB to 35 dB
Resolution		0.01 dB
Instrument noise figure uncertainty	R&S®FSW-K30, R&S®FSWP-K30, R&S®FSMR3-K30	
	10 MHz to 50 GHz ¹¹	±0.05 dB ¹²
	R&S®FSV3-K30	
	10 MHz to 50 GHz ¹¹	±0.05 dB ¹³
	R&S®FPS-K30	
	10 MHz to 7 GHz ¹¹	±0.05 dB ¹⁴
	> 7 GHz ¹¹	±0.05 dB ¹⁵
	R&S®FPL1-K30	
	FPL: 10 MHz to 26 GHz ¹¹	±0.05 dB ¹⁶
	R&S®ZNL: 10 MHz to 3 GHz	
		±0.05 dB ¹⁷
Gain measurement range		–20 dB to +60 dB
Resolution		0.01 dB
Accuracy	R&S®FSW-K30, R&S®FSWP-K30, R&S®FSMR3-K30	
	10 MHz to 50 GHz ¹¹	±0.15 dB ¹²
	R&S®FSV3-K30	
	10 MHz to 50 GHz ¹¹	±0.15 dB ¹³
	R&S®FPS-K30	
	10 MHz to 7 GHz ¹¹	±0.15 dB ¹⁴
	> 7 GHz ¹¹	±0.15 dB ¹⁵
	R&S®FPL1-K30	
	FPL: 10 MHz to 26 GHz ¹¹	±0.15 dB ¹⁶
	R&S®ZNL: 10 MHz to 3 GHz	
		±0.15 dB ¹⁷

¹¹ The upper frequency limit depends on the instrument model.

¹² With internal preamplifier (R&S®FSW-B24/R&S®FSWP-B24/R&S®FSMR3-B24 option), gain: 30 dB, sweep time > 300 ms, input attenuator = 0 dB, measured Y factor > 10 dB.

¹³ With internal preamplifier (R&S®FSV3-B24 option), gain: 30 dB, sweep time > 300 ms, input attenuator = 0 dB, measured Y factor > 10 dB.

¹⁴ With internal preamplifier (R&S®FPS-B22 option), sweep time > 300 ms, input attenuator = 0 dB, measured Y factor > 10 dB.

¹⁵ With external gain: 30 dB, noise figure < 5 dB, sweep time > 300 ms, input attenuator = 0 dB, measured Y factor > 10 dB.

¹⁶ With internal preamplifier (R&S®FPL1-B22 option), sweep time > 300 ms, input attenuator = 0 dB, measured Y factor > 10 dB.

¹⁷ With external gain: 30 dB, noise figure < 5 dB, sweep time > 300 ms, input attenuator = 0 dB, measured Y factor > 10 dB.

Smart noise sources

Smart noise source	
10 MHz to 18 GHz	R&S®FS-SNS18
10 MHz to 26.5 GHz	R&S®FS-SNS26
100 MHz to 40 GHz	R&S®FS-SNS40
100 MHz to 55 GHz	R&S®FS-SNS55
100 MHz to 67 GHz	R&S®FS-SNS67
60 GHz to 90 GHz	R&S®FS-SNS90
75 GHz to 110 GHz	R&S®FS-SNS110
Accessories supplied with each R&S®FS-SNS	R&S®SNSCABLE interface cable, manual, carrying case
Option	R&S®SNSCABLE-Y Y adapter cable for legacy instruments

Noise source ¹⁸ (NoiseCom NC346)	RF connector	Frequency range	ENR
NC 346 A	SMA male	0.01 GHz to 18 GHz	5 dB to 7 dB
NC 346 A precision	APC 3.5 male	0.01 GHz to 18 GHz	5 dB to 7 dB
NC 346 A option1	N male	0.01 GHz to 18 GHz	5 dB to 7 dB
NC 346 A option 2	APC 7	0.01 GHz to 18 GHz	5 dB to 7 dB
NC 346 A option 4	N female	0.01 GHz to 18 GHz	5 dB to 7 dB
NC 346 B	SMA male	0.01 GHz to 18 GHz	14 dB to 16 dB
NC 346 B precision	APC 3.5 male	0.01 GHz to 18 GHz	14 dB to 16 dB
NC 346 B option 1	N male	0.01 GHz to 18 GHz	14 dB to 16 dB
NC 346 A option 2	APC 7	0.01 GHz to 18 GHz	14 dB to 16 dB
NC 346 A option 4	N female	0.01 GHz to 18 GHz	14 dB to 16 dB
NC 346 C	APC 3.5 male	0.01 GHz to 26.5 GHz	13 dB to 17 dB
NC 346 D	SMA male	0.01 GHz to 18 GHz	19 dB to 25 dB
NC 346 D precision	APC 3.5 male	0.01 GHz to 18 GHz	19 dB to 25 dB
NC 346 D option1	N male	0.01 GHz to 18 GHz	19 dB to 25 dB
NC 346 D option 2	APC 7	0.01 GHz to 18 GHz	19 dB to 25 dB
NC 346 D option 3	N female	0.01 GHz to 18 GHz	19 dB to 25 dB
NC 346 E	APC 3.5 male	0.01 GHz to 26.5 GHz	19 dB to 25 dB
NC 346 Ka	K male	0.1 GHz to 40 GHz	10 dB to 17 dB
NC 346 V	V male	0.1 GHz to 55 GHz	7 dB to 21 dB

¹⁸ Noise sources supplied by NoiseCom; specifications from NoiseCom.

Ordering information

Noise figure measurement application

Designation	Type	Order No.
Noise figure measurement application	R&S®FSW3-KM125	1347.7723.02
Cross-correlation for noise figure measurement application	R&S®FSW3-KM126	1347.7730.02
Noise figure measurement application	R&S®FSW-K30	1313.1380.02
Noise figure measurement application ¹⁹	R&S®FSWP-K30	1325.4244.02
Noise figure measurement application ²⁰	R&S®FSMR3-K30	1345.3637.02
Noise figure measurement application	R&S®FSV3-K30	1330.5045.02
Noise figure measurement application	R&S®FPS-K30	1321.4104.02
Noise figure measurement application	R&S®FSV-K30	1310.8355.02
Noise figure measurement application (for the FPL and the R&S®ZNL) ²¹	R&S®FPL1-K30	1323.1760.02

FSWX signal and spectrum analyzer

Designation	Type	Order No.
Base units		
Signal and spectrum analyzer, 2 Hz to 44 GHz, 1 RF	R&S®FSWX3044	1348.0000.41
Signal and spectrum analyzer, 2 Hz to 44 GHz, 2 RF	R&S®FSWX3044	1348.0000.42
Options		
RF preamplifier, 20 dB, for R&S®FSWX3044 (44 GHz, 1 RF)	R&S®FSW31-B24	1347.5595.41
RF preamplifier, 20 dB, for R&S®FSWX3044 (44 GHz, 2 RF)	R&S®FSW32-B24	1347.5595.42

FSW signal and spectrum analyzer

Designation	Type	Order No.
Base units		
Signal and spectrum analyzer, 2 Hz to 8 GHz	R&S®FSW8	1331.5003.08
Signal and spectrum analyzer, 2 Hz to 13.6 GHz	R&S®FSW13	1331.5003.13
Signal and spectrum analyzer, 2 Hz to 26.5 GHz	R&S®FSW26	1331.5003.26
Signal and spectrum analyzer, 2 Hz to 43.5 GHz	R&S®FSW43	1331.5003.43
Signal and spectrum analyzer, 2 Hz to 50 GHz	R&S®FSW50	1331.5003.50
Signal and spectrum analyzer, 2 Hz to 67 GHz	R&S®FSW67	1331.5003.67
Signal and spectrum analyzer, 2 Hz to 85 GHz	R&S®FSW85	1331.5003.85
Options		
External generator control	R&S®FSW-B10	1313.1622.02
LO/IF connections for external mixers (R&S®FSW26)	R&S®FSW-B21	1313.1100.26
LO/IF connections for external mixers (R&S®FSW43, R&S®FSW50, R&S®FSW67)	R&S®FSW-B21	1313.1100.43
LO/IF connections for external mixers (R&S®FSW85)	R&S®FSW-B21	1313.1100.85
RF preamplifier, 100 kHz to 13.6 GHz (R&S®FSW8, R&S®FSW13)	R&S®FSW-B24	1313.0832.13
RF preamplifier, 100 kHz to 26.5 GHz (R&S®FSW26)	R&S®FSW-B24	1313.0832.26
RF preamplifier, 100 kHz to 43.5 GHz (R&S®FSW43)	R&S®FSW-B24	1313.0832.43
RF preamplifier, 100 kHz to 50 GHz (R&S®FSW50)	R&S®FSW-B24	1313.0832.49
RF preamplifier, 100 kHz to 67 GHz (R&S®FSW67)	R&S®FSW-B24	1313.0832.66

¹⁹ R&S®FSWP-B1 option is a prerequisite for using R&S®FSWP-K30 option with the R&S®FSWP phase noise analyzer.

²⁰ R&S®FSMR3-B1 option is a prerequisite for using R&S®FSMR3-K30 option with the R&S®FSMR3000 measuring receiver.

²¹ R&S®FPL1-B5 option is a prerequisite for using R&S®FPL1-K30 option with the FPL spectrum analyzer.

R&S®ZNL3-B1 and R&S®FPL1-B5 options are prerequisites for using R&S®FPL1-K30 option with the R&S®ZNL vector network analyzer.

R&S®FSWP phase noise analyzer and VCO tester

Designation	Type	Order No.
Base units		
Phase noise analyzer and VCO tester, 1 MHz to 8 GHz	R&S®FSWP8	1322.8003.09
Phase noise analyzer and VCO tester, 1 MHz to 26.5 GHz	R&S®FSWP26	1322.8003.27
Phase noise analyzer and VCO tester, 1 MHz to 50 GHz	R&S®FSWP50	1322.8003.51
Options		
External generator control	R&S®FSWP-B10	1325.5463.02
LO/IF connections for external mixers (R&S®FSWP26, R&S®FSWP50)	R&S®FSWP-B21	1325.3848.02
RF preamplifier, 100 kHz to 8 GHz (R&S®FSWP8)	R&S®FSWP-B24	1325.3725.08
RF preamplifier, 100 kHz to 26.5 GHz (R&S®FSWP26)	R&S®FSWP-B24	1325.3725.26
RF preamplifier, 100 kHz to 50 GHz (R&S®FSWP50)	R&S®FSWP-B24	1325.3725.50
Mandatory options		
Spectrum analyzer, 10 Hz to 8 GHz (R&S®FSWP8)	R&S®FSWP-B1	1322.9997.08
Spectrum analyzer, 10 Hz to 26.5 GHz (R&S®FSWP26)	R&S®FSWP-B1	1322.9997.26
Spectrum analyzer, 10 Hz to 50 GHz (R&S®FSWP50)	R&S®FSWP-B1	1322.9997.50

R&S®FSMR3000 measuring receiver

Designation	Type	Order No.
Base units		
Measuring receiver, 100 kHz to 8 GHz	R&S®FSMR3008	1345.4004.08
Measuring receiver, 100 kHz to 26.5 GHz	R&S®FSMR3026	1345.4004.26
Measuring receiver, 100 kHz to 50 GHz	R&S®FSMR3050	1345.4004.50
Options		
External generator control	R&S®FSMR3-B10	1345.3089.02
RF preamplifier, 100 kHz to 8 GHz (R&S®FSMR3008)	R&S®FSMR3-B24	1345.3108.08
RF preamplifier, 100 kHz to 26.5 GHz (R&S®FSMR3026)	R&S®FSMR3-B24	1345.3108.26
RF preamplifier, 100 kHz to 50 GHz (R&S®FSMR3050)	R&S®FSMR3-B24	1345.3108.49
Mandatory options		
Spectrum analyzer, 10 Hz to 8 GHz (R&S®FSMR3008)	R&S®FSMR3-B1	1345.3050.08
Spectrum analyzer, 10 Hz to 26.5 GHz (R&S®FSMR3026)	R&S®FSMR3-B1	1345.3050.26
Spectrum analyzer, 10 Hz to 50 GHz (R&S®FSMR3050)	R&S®FSMR3-B1	1345.3050.50

R&S®FSVA3000 and R&S®FSV3000 signal and spectrum analyzers

Designation	Type	Order No.
R&S®FSVA3000 signal and spectrum analyzers		
Signal and spectrum analyzer, 10 Hz to 4 GHz	R&S®FSVA3004	1330.5000.05
Signal and spectrum analyzer, 10 Hz to 7.5 GHz	R&S®FSVA3007	1330.5000.08
Signal and spectrum analyzer, 10 Hz to 13.6 GHz	R&S®FSVA3013	1330.5000.14
Signal and spectrum analyzer, 10 Hz to 30 GHz	R&S®FSVA3030	1330.5000.31
Signal and spectrum analyzer, 10 Hz to 44 GHz	R&S®FSVA3044	1330.5000.44
Signal and spectrum analyzer, 10 Hz to 50/54 GHz	R&S®FSVA3050	1330.5000.51
R&S®FSV3000 signal and spectrum analyzers		
Signal and spectrum analyzer, 10 Hz to 4 GHz	R&S®FSV3004	1330.5000.04
Signal and spectrum analyzer, 10 Hz to 7.5 GHz	R&S®FSV3007	1330.5000.07
Signal and spectrum analyzer, 10 Hz to 13.6 GHz	R&S®FSV3013	1330.5000.13
Signal and spectrum analyzer, 10 Hz to 30 GHz	R&S®FSV3030	1330.5000.30
Signal and spectrum analyzer, 10 Hz to 44 GHz	R&S®FSV3044	1330.5000.43
Signal and spectrum analyzer, 10 Hz to 50/54 GHz	R&S®FSV3050	1330.5000.50
Options		
Noise source control via BNC (for use with legacy noise sources)	R&S®FSV3-B28V	1330.6664.02
Additional interfaces	R&S®FSV3-B5	1330.3820.02
External generator control	R&S®FSV3-B10	1330.3859.02
LO/IF connections for external mixers (R&S®FSVA3030, R&S®FSVA3044, R&S®FSV3030, R&S®FSV3044)	R&S®FSV3-B21	1330.4010.02
RF preamplifier (R&S®FSVA3004, R&S®FSVA3007, R&S®FSV3004, R&S®FSV3007)	R&S®FSV3-B24	1330.4049.07
RF preamplifier (R&S®FSVA3013, R&S®FSV3013)	R&S®FSV3-B24	1330.4049.13
RF preamplifier (R&S®FSVA3030, R&S®FSV3030)	R&S®FSV3-B24	1330.4049.30
RF preamplifier (R&S®FSVA3044, R&S®FSV3044)	R&S®FSV3-B24	1330.4049.44

R&S®FPS signal and spectrum analyzer

Designation	Type	Order No.
Base units		
Signal and spectrum analyzer, 10 Hz to 4 GHz	R&S®FPS4	1319.2008.04
Signal and spectrum analyzer, 10 Hz to 7 GHz	R&S®FPS7	1319.2008.07
Signal and spectrum analyzer, 10 Hz to 13.6 GHz	R&S®FPS13	1319.2008.13
Signal and spectrum analyzer, 10 Hz to 30 GHz	R&S®FPS30	1319.2008.30
Signal and spectrum analyzer, 10 Hz to 40 GHz	R&S®FPS40	1319.2008.40
Options		
RF preamplifier, 9 kHz to 7 GHz (R&S®FPS4, R&S®FPS7)	R&S®FPS-B22	1321.4027.02
RF preamplifier, 9 kHz to 13.6 GHz (R&S®FPS13)	R&S®FPS-B24	1321.4279.13
RF preamplifier, 9 kHz to 30 GHz (R&S®FPS30)	R&S®FPS-B24	1321.4279.30
RF preamplifier, 9 kHz to 40 GHz (R&S®FPS40)	R&S®FPS-B24	1321.4279.40
Mandatory option		
Noise source supply, BNC female, switched 28 V, max. 100 mA, not retrofittable (option noise source control connector on rear panel of R&S®FPS)	R&S®FPS-B28V	1326.5996.02
Recommended hardware: external preamplifier (for frequency range > 7 GHz; gain: approx. 20 dB; noise figure: max. 5 dB)		

FPL spectrum analyzer

Designation	Type	Order No.
Base units		
Spectrum analyzer, 5 kHz to 3 GHz	R&S®FPL1003	1304.0004.03
Spectrum analyzer, 5 kHz to 7.5 GHz	R&S®FPL1007	1304.0004.07
Spectrum analyzer, 5 kHz to 14 GHz	R&S®FPL1014	1304.0004.14
Spectrum analyzer, 5 kHz to 26.5 GHz	R&S®FPL1026	1304.0004.26
Options		
Additional interfaces	R&S®FPL1-B5	1323.1883.02
RF preamplifier (R&S®FPL1003, R&S®FPL1007)	R&S®FPL1-B22	1323.1719.02
RF preamplifier (R&S®FPL1014)	R&S®FPL1-B22	1323.1702.02
RF preamplifier (R&S®FPL1026)	R&S®FPL1-B22	1323.1777.02
GPIO interface	R&S®FPL1-B10	1323.1890.02

R&S®ZNL vector network analyzer

Designation	Type	Order No.
Base units		
Vector network analyzer, 5 kHz to 3 GHz	R&S®ZNL3	1323.0012.03
Vector network analyzer, 5 kHz to 4.5 GHz	R&S®ZNL4	1323.0012.04
Vector network analyzer, 5 kHz to 6 GHz	R&S®ZNL6	1323.0012.06
Vector network analyzer, 5 kHz to 14 GHz	R&S®ZNL14	1323.0012.14
Vector network analyzer, 5 kHz to 20 GHz	R&S®ZNL20	1323.0012.20
Options		
Additional interfaces	R&S®FPL1-B5	1323.1883.02
GPIO interface	R&S®FPL1-B10	1323.1890.02
Mandatory options		
Spectrum analyzer function (R&S®ZNL3)	R&S®ZNL3-B1	1323.1802.02
Spectrum analyzer function (R&S®ZNL4)	R&S®ZNL4-B1	1303.8099.02
Spectrum analyzer function (R&S®ZNL6)	R&S®ZNL6-B1	1323.2067.02
Recommended hardware: external preamplifier (gain: approx. 20 dB; noise figure: max. 5 dB)		

Recommended extras

Designation	Type	Order No.
Smart noise source, 10 MHz to 18 GHz	R&S®FS-SNS18	1338.8008.18
Smart noise source, 10 MHz to 26.5 GHz	R&S®FS-SNS26	1338.8008.26
Smart noise source, 100 MHz to 40 GHz	R&S®FS-SNS40	1338.8008.40
Smart noise source, 100 MHz to 55 GHz	R&S®FS-SNS55	1338.8008.55
Smart noise source, 100 MHz to 67 GHz	R&S®FS-SNS67	1338.8008.67
Smart noise source, 60 GHz to 90 GHz	R&S®FS-SNS90	1338.8008.90
Smart noise source, 75 GHz to 110 GHz	R&S®FS-SNS110	1338.8008.11
Accessories supplied with each R&S®FS-SNS:		
R&S®SNSCABLE interface cable (Order no.: 1338.8020.00), manual, carrying case		
Option		
Y adapter cable for legacy instruments	R&S®SNSCABLE-Y	1338.8066.00

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