R&S®FSW-K30
Noise Figure Measurement Application
Specifications

ROHDE&SCHWARZ

Test & Measurement

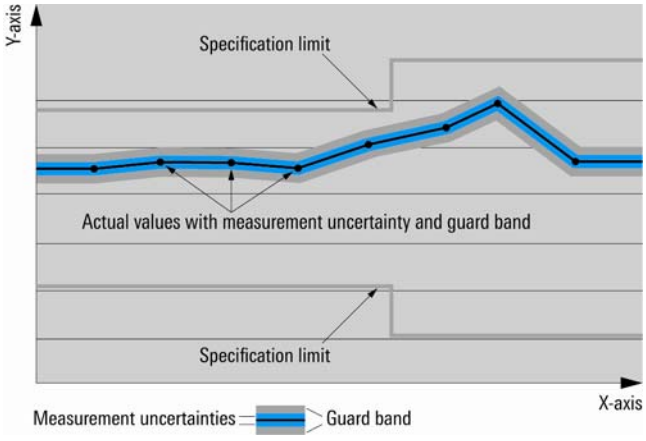
Data Sheet | 03.00

Definitions

General
Product data applies under the following conditions:

- Three hours storage at ambient temperature followed by 30 minutes 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 <, ≤, >, ≥, ±, 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.



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 indicated as follows: “parameter: value”.

Typical data as well as nominal and measured values are not warranted by Rohde & Schwarz.

Specifications

The specifications of the R&S®FSW-K30 noise figure measurement application are based on the specifications of the R&S®FSW signal and spectrum analyzer data sheet, 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 ratio (S/N), 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 range	RF input	same as R&S®FSW [1]
	external mixer IF input	depending on the external mixer range [5]
Noise figure measurement range	noise source ENR	measurement range
	4 dB to 7 dB	0 dB to 20 dB (nom.)
	12 dB to 17 dB	0 dB to 30 dB (nom.)
	20 dB to 22 dB	0 dB to 35 dB (nom.)
Resolution		0.01 dB
Instrument noise figure uncertainty	frequency range from 100 kHz to 50 GHz [2]	± 0.05 dB (nom.) [3]
Gain measurement range		–20 dB to +60 dB (nom.)
Resolution		0.01 dB
Accuracy	frequency range from 100 kHz to 50 GHz [2]	± 0.15 dB (nom.) [3]

Noise figure and gain measurements		
Input		RF input
DUT configuration	non frequency converting devices (amplifiers)	mode: direct
	frequency converting devices (mixer devices)	mode:
		fixed LO, upconverter
		fixed LO, downconverter
		fixed IF, upconverter [4]
		fixed IF, downconverter [4]
	frequency converting and non-converting devices (using the external mixer IF-input)	mode:
		direct [5]
		fixed LO, upconverter [5]
		fixed LO, downconverter [5]
		fixed IF, upconverter [4, 5]
		fixed IF, downconverter [4, 5]

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

[2] The upper frequency limit depends on the instrument model.

[3] Measurement with the R&S®FSW-B24 option, gain 30 dB, sweep time > 300 ms, input attenuator = 0 dB, measured Y factor > 10 dB.

[4] R&S®FSW-B10 option and remote controlled signal generator are required.

[5] R&S®FSW26, R&S®FSW43, R&S®FSW50 with R&S®FSW-B21 option and external mixer are required.

Measurement configuration	sweep mode	frequency sweep
		frequency table (user defined)
	ENR	constant, user defined table
	input loss	constant, user defined table
	output loss	constant, user defined table
	frequency settings	start frequency, stop frequency, number of frequency points
		center frequency, span, stepsize
	measurement settings	RBW
		sweep time
		settling time
		average
	level and range settings	reference level (auto, manual)
		auto reference level range
		RF attenuator (manual)
	preamplifier (R&S®FSW-B24 option required)	
	R&S®FSW8	off/30 dB (nom.)
	R&S®FSW13	off/30 dB (nom.)
	R&S®FSW26	off/30 dB (nom.)
	R&S®FSW43	off/30 dB (nom.)
	R&S®FSW50	off/30 dB (nom.)
	2nd stage correction (calibration)	on or off
Result display	result table	frequency
		and selectable noise figure, noise temperature, gain, power (hot), power (cold), Y factor
	marker table	marker reference, frequency
		and selectable noise figure, noise temperature, gain, power (hot), power (cold), Y factor
	graph results	noise figure, noise temperature, gain, power (hot), power (cold), Y factor
		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

Remote control		GPIB
		LAN (VXI-11)
		control via SCPI command set and application-specific extensions

Recommended hardware			
Noise source [6] 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

[6] Noise sources supplied by NoiseCom; specifications from NoiseCom.

Ordering information

Designation	Type	Order No.
Noise Figure Measurement Application	R&S®FSW-K30	1313.1380.02
RF Preamplifier, 100 kHz to 8 GHz	R&S®FSW-B24	1313.0832.08
RF Preamplifier, 100 kHz to 13.6 GHz	R&S®FSW-B24	1313.0832.13
RF Preamplifier, 100 kHz to 26.5 GHz	R&S®FSW-B24	1313.0832.26
RF Preamplifier, 100 kHz to 43.5 GHz	R&S®FSW-B24	1313.0832.43
RF Preamplifier, 100 kHz to 50 GHz	R&S®FSW-B24	1313.0832.50
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®FSW-B21	1313.1100.43
LO/IF Connections for external mixers (R&S®FSW50)	R&S®FSW-B21	1313.1100.50
External Generator Control	R&S®FSW-B10	1313.1622.02

For R&S®FSW product brochure, see PD 5214.5984.12 and www.rohde-schwarz.com

Service you can rely on

- Worldwide
- Local and personalized
- Customized and flexible
- Uncompromising quality
- Long-term dependability

About Rohde&Schwarz

Rohde&Schwarz is an independent group of companies specializing in electronics. It is a leading supplier of solutions in the fields of test and measurement, broadcasting, radiomonitoring and radiolocation, as well as secure communications. Established more than 75 years ago, Rohde&Schwarz has a global presence and a dedicated service network in over 70 countries. Company headquarters are in Munich, Germany.

Environmental commitment

- Energy-efficient products
- Continuous improvement in environmental sustainability
- ISO 14001-certified environmental management system

Certified Quality System
ISO 9001

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