

R&S®FSMR3-K40 PHASE NOISE MEASUREMENT APPLICATION

Specifications

For R&S®FSMR3000AF Measuring Receiver



Data Sheet
Version 01.00

ROHDE & SCHWARZ

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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 $<$, \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/3GPP2 standard, chip rates are specified in million chips per second (Mcps), whereas bit rates and symbol rates are specified in billion bits per second (Gbps), million bits per second (Mbps), thousand bits 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®FSMR3-K40 phase noise measurement application are based on the data sheet specifications of the R&S®FSMR3000AF measuring receiver (PD 3608.9130.22).

They have not been checked separately and are not verified during instrument calibration. Measurement uncertainties are given as 95 % confidence intervals. The specified level measurement errors do not take into account systematic errors due to reduced signal to noise (S/N) ratio.

Frequency range	RF input	same as R&S®FSMR3000AF
Offset frequency range		1 Hz to 1 GHz (9 decades)

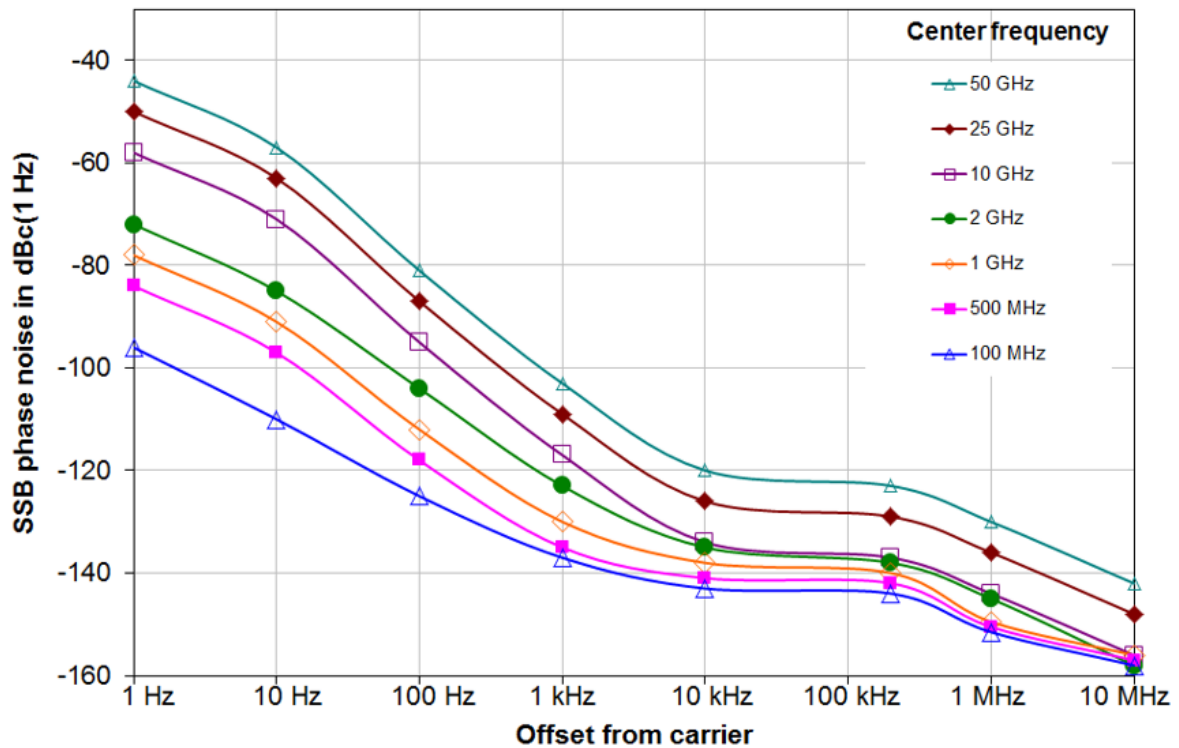
Configuration

Measurement settings	frontend configuration	<ul style="list-style-type: none"> nominal frequency and level attenuator control (auto/manual) electronic attenuator control (auto/manual) coupling (AC/DC)
	verification and tracking functions	<ul style="list-style-type: none"> frequency verification and tracking level verification and tracking frequency and level tolerance values
	phase noise measurement	<ul style="list-style-type: none"> measurement range sweep direction sweep type (normal, fast, AVG, manual) <p>for sweep type manual: setting of RBW, average count and mode individually for each half decade or globally</p>
Result configuration	phase noise limit line	up to 5 ranges, configuration using: <ul style="list-style-type: none"> thermal noise range corner frequency and range slope
	limit lines	as in base instrument
	graphical	x-axis and y-axis scaling: automatic (once/always) or user-defined
	smoothing and spur removal	<ul style="list-style-type: none"> trace smoothing factor smoothing type (linear/logarithmic) spur removal on/off, spur threshold
	trace configuration	<ul style="list-style-type: none"> up to 6 traces clear/write, max., min., average, view smoothing on/off
	numeric: residual noise	residual FM, residual PM, RMS jitter four measurement ranges: <ul style="list-style-type: none"> one complete measurement range or user-definable range three user-definable ranges with assignable trace
	numeric: spot noise	<ul style="list-style-type: none"> measurement on all 10^x Hz offset five user-definable offset frequencies
Display	markers	four markers (normal/delta) with assignable trace
		<ul style="list-style-type: none"> phase noise plot (dBc (1 Hz) versus logarithmic frequency) residual noise table spot noise table
Remote control		<ul style="list-style-type: none"> GPIB LAN (VXI-11) control via SCPI command set and application-specific extensions

Results

R&S®FSMR3-K40 for FSMR3000AF: phase noise sensitivity (typical values) without noise correction, input level > 0 dBm, operating mode: averaged, with R&S®FSMR3-B4 OCXO precision frequency reference option

Input frequency	Frequency offset, values in dBc (1 Hz)							
	1 Hz	10 Hz	100 Hz	1 kHz	10 kHz	200 kHz	1 MHz	10 MHz
100 MHz	-96	-110	-125	-137	-143	-144	-151.5	-158
500 MHz	-84	-97	-118	-135	-141	-142	-150.5	-157
1 GHz	-78	-91	-112	-130	-138	-140	-149.5	-156
2 GHz	-72	-85	-104	-123	-135	-138	-145	-158
10 GHz	-58	-71	-95	-117	-134	-137	-144	-156
25 GHz	-50	-63	-87	-109	-126	-129	-136	-148
50 GHz	-44	-57	-81	-103	-120	-123	-130	-142



R&S®FSMR3-K40 for FSMR3000AF: typical phase noise at different center frequencies (with the R&S®FSMR3-B4 option for offsets ≤ 10 Hz)

Ordering information

Designation	Type	Order No.
Phase noise measurement application	R&S®FSMR3-K40	1345.3620.02

For R&S®FSMR3000AF data sheet, see PD 3608.9130.22 and www.rohde-schwarz.com

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