

# R&S® FSV-K40

## Phase Noise Measure- ment Application Specifications

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**ROHDE & SCHWARZ**

The specifications of R&S®FSV-K40 are based on the data sheet specifications of the R&S®FSV signal and spectrum analyzer. Specifications apply under the following conditions: 30 minutes warm-up time at ambient temperature, specified environmental conditions met, calibration cycle adhered to, and all internal automatic adjustments performed.

Data without tolerances: typical values. Data designated "nominal" applies to design parameters and is not tested. Data without tolerance limits is not binding.

The level measurement accuracy is mainly determined by the characteristic of the R&S®FSV analyzer. For relevant specifications refer to the R&S®FSV data sheet. The measurement sensitivity is mainly determined by the analyzer's inherent phase noise. The diagram and the table below show the typical phase noise characteristics of the R&S®FSV analyzers, which represent the minimum phase noise measurement sensitivity. The specified values do not take into account systematic errors due to reduced input level.

# Specifications

|  |   |   |
|--|---|---|
| <b>Frequency range<sup>1</sup></b>         | R&S®FSV3  | 1 MHz to 3.6 GHz                          |
|  | R&S®FSV7  | 1 MHz to 7 GHz                            |
|  | R&S®FSV13   | 10 MHz to 13.6 GHz                        |
|  | R&S®FSV30   | 10 MHz to 30 GHz                          |
|  | R&S®FSV40   | 10 MHz to 40 GHz                          |
| <b>Offset frequency range</b>              |   | 1 Hz up to 1 GHz <sup>2</sup> (9 decades) |
| <b>RF level input</b>                      | RF attenuation ≥ 10 dB,<br>RF preamplifier = OFF  | > -20 dBm to 30 dBm                       |
|  | RF attenuation = 0 dB,<br>RF preamplifier = OFF   | > -20 dBm to 20 dBm                       |
| <b>Phase noise measurement uncertainty</b> | input level > 0 dBm<br>signal harmonics and spurs < -30 dBc<br>signal to noise ratio ≥ 10 dB<br>return loss of source > 14 dB<br>(VSWR < 1.5:1) |   |
|  | 100 Hz to 10 MHz offset   | typ. < 2 dB                               |
|  | 1 Hz to 100 Hz or >10 MHz offset  | typ. < 3 dB                               |

|  |  |   |
|--|--|---|
| <b>Phase noise measurement</b>                       |  |   |
| Sweep settings                                       |  | measurement range<br>resolution bandwidths<br>filter types (sweep, FFT)<br>averaging<br>smoothing factors |
| Phase noise display                                  |  | logarithmic plot<br>up to three traces<br>comprehensive marker functions                                  |
| Integrated phase noise<br>(settable frequency range) |  | residual frequency modulation<br>residual phase modulation<br>RMS jitter                                  |
| Tracking and verifying functions                     |  | center frequency tracking<br>verify frequency and level   |
| Noise correction                                     |  | subtracts the instrument's inherent noise   |
| Checks   |  | limit line  |
| Remote control                                       |  | GPIB<br>LAN   |

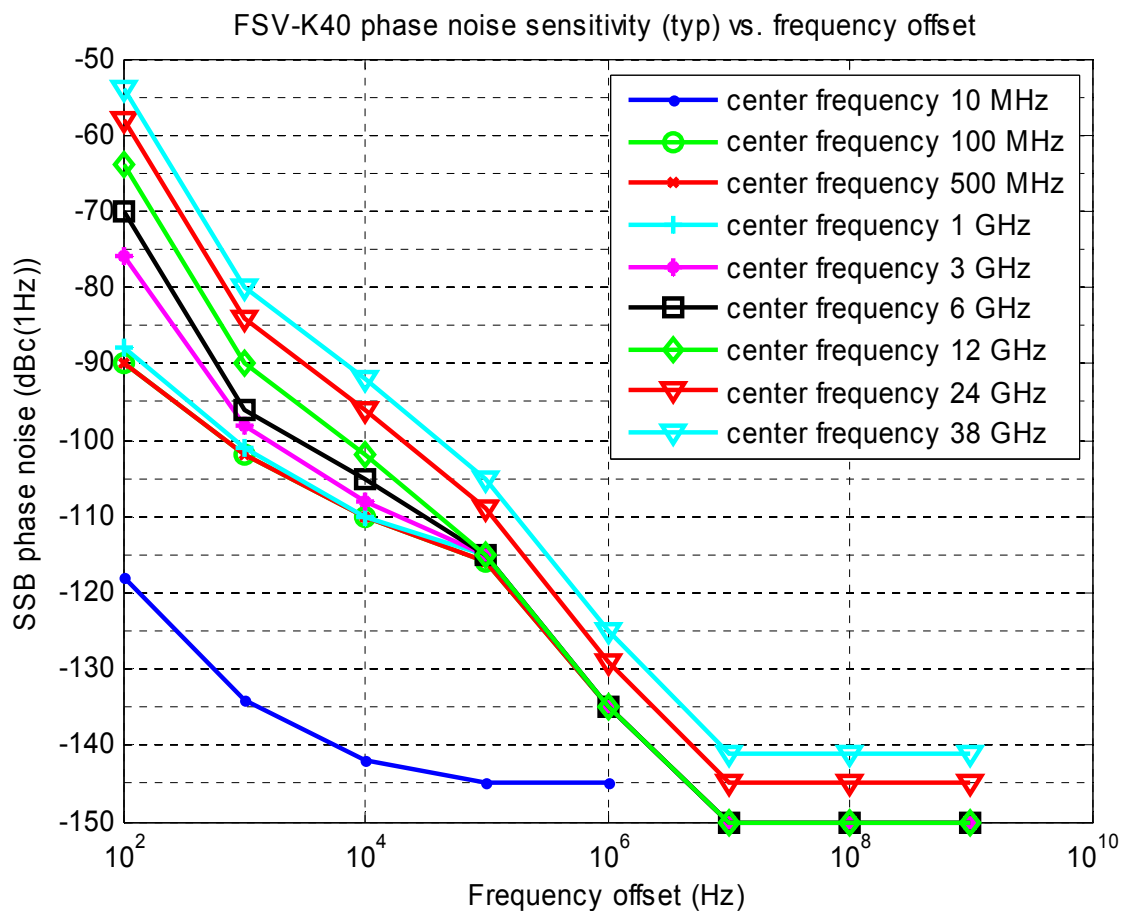
<sup>1</sup> The R&S®FSV-K40 frequency range can be extended up to 9 kHz if the instrument is set to DC coupling.

<sup>2</sup> The upper offset frequency is limited by the center frequency.

**Phase noise sensitivity (typical values)<sup>3</sup> without noise correction**  
**Input level > 0 dBm, input signal harmonics and signal spurs < -30 dBc, operating mode "averaged", +20 °C to +30 °C.**

| Frequency offset | Input frequency, values in dBc (1 Hz) |         |         |       |       | R&S®FSV 7/13/30/40 | R&S®FSV 13/30/40 | R&S®FSV 30/40 | R&S®FSV 40 |
|------------------|---------------------------------------|---------|---------|-------|-------|--------------------|------------------|---------------|------------|
|                  | 10 MHz                                | 100 MHz | 500 MHz | 1 GHz | 3 GHz | 6 GHz              | 12 GHz           | 24 GHz        | 38 GHz     |
| 100 Hz           | -118                                  | -90     | -90     | -88   | -76   | -70                | -64              | -58           | -54        |
| 1 kHz            | -134                                  | -102    | -102    | -101  | -98   | -96                | -90              | -84           | -80        |
| 10 kHz           | -142                                  | -110    | -110    | -110  | -108  | -105               | -102             | -96           | -92        |
| 100 kHz          | -145                                  | -116    | -116    | -115  | -115  | -115               | -115             | -109          | -105       |
| 1 MHz            | -145                                  | -135    | -135    | -135  | -135  | -135               | -135             | -129          | -125       |
| 10 MHz           |                                       | -150    | -150    | -150  | -150  | -150               | -150             | -145          | -141       |
| 100 MHz          |                                       |         | -150    | -150  | -150  | -150               | -150             | -145          | -141       |
| 1 GHz            |                                       |         |         |       | -150  | -150               | -150             | -145          | -141       |

By correcting the inherent phase noise of the analyzer, the measurement result may be improved by up to 6 dB (noise subtraction).



<sup>3</sup> The instrument selects the input attenuation automatically depending on the input signal level and the permissible attenuator settings. Due to the influence of the attenuator step size, the phase noise floor may increase. The R&S®FSV-B25 electronic attenuator option (attenuator step size = 1 dB) is recommended in order to get optimum performance for input frequencies up to 7 GHz.

## Ordering information

| Designation   | Type        | Order No.    |
|---|-------------|--------------|
| Phase Noise Measurement Application for the R&S®FSV3/R&S®FSV7/R&S®FSV13/R&S®FSV30/R&S®FSV40 | R&S®FSV-K40 | 1310.8403.02 |
| Signal Analyzer   | R&S®FSV3    | 1307.9002.03 |
| Signal Analyzer   | R&S®FSV7    | 1307.9002.07 |
| Signal Analyzer   | R&S®FSV13   | 1307.9002.13 |
| Signal Analyzer   | R&S®FSV30   | 1307.9002.30 |
| Signal Analyzer   | R&S®FSV40   | 1307.9002.40 |

## Options

| Designation                       | Type        | Order No.    | Retrofittable | Remarks            |
|-----------------------------------|-------------|--------------|---------------|--------------------|
| OCXO Reference Frequency          | R&S®FSV-B4  | 1310.9522.02 | yes           | user-retrofittable |
| RF Preamplifier (9 kHz to 7 GHz)  | R&S®FSV-B22 | 1310.9600.02 | yes           | user-retrofittable |
| Electronic Attenuator, 1 dB steps | R&S®FSV-B25 | 1310.9622.02 | yes           | user-retrofittable |

## Related data sheet

R&S®FSV Signal and Spectrum Analyzer data sheet (PD 5214.0499.22).

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Certified Quality System

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For product brochure,  
see PD 5214.0499.12  
and [www.rohde-schwarz.com](http://www.rohde-schwarz.com)

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\*0.14 €/min within German wireline network; rates may vary in other networks (wireline and mobile) and countries.