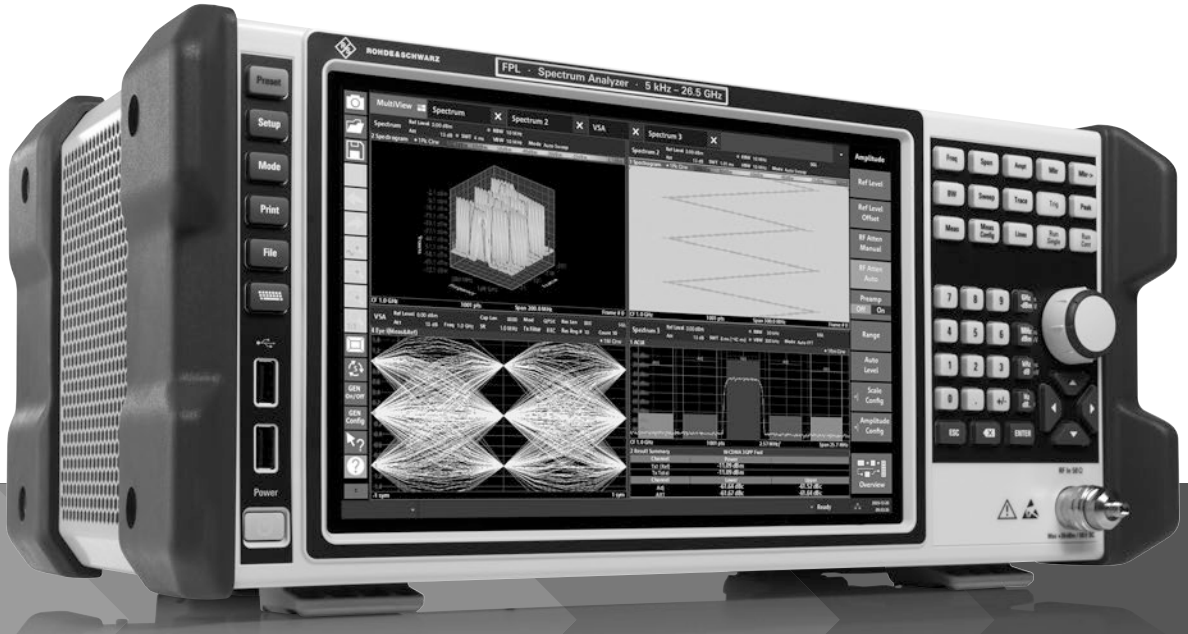
# R&S®FPL1000 SIGNAL AND SPECTRUM ANALYZER

## Specifications






Specifications
Version 13.00

ROHDE&SCHWARZ
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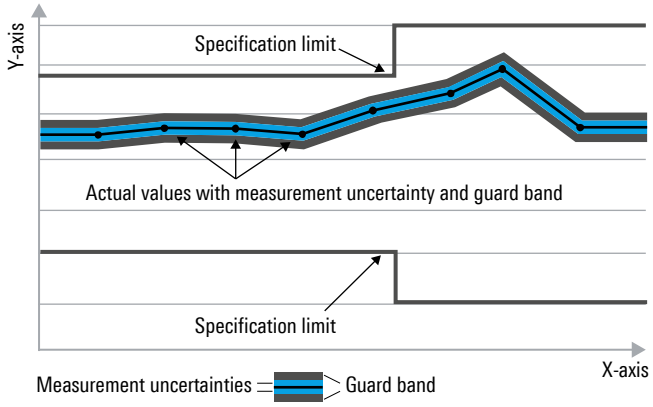
# Definitions

**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 <, ≤, >, ≥, ±, 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

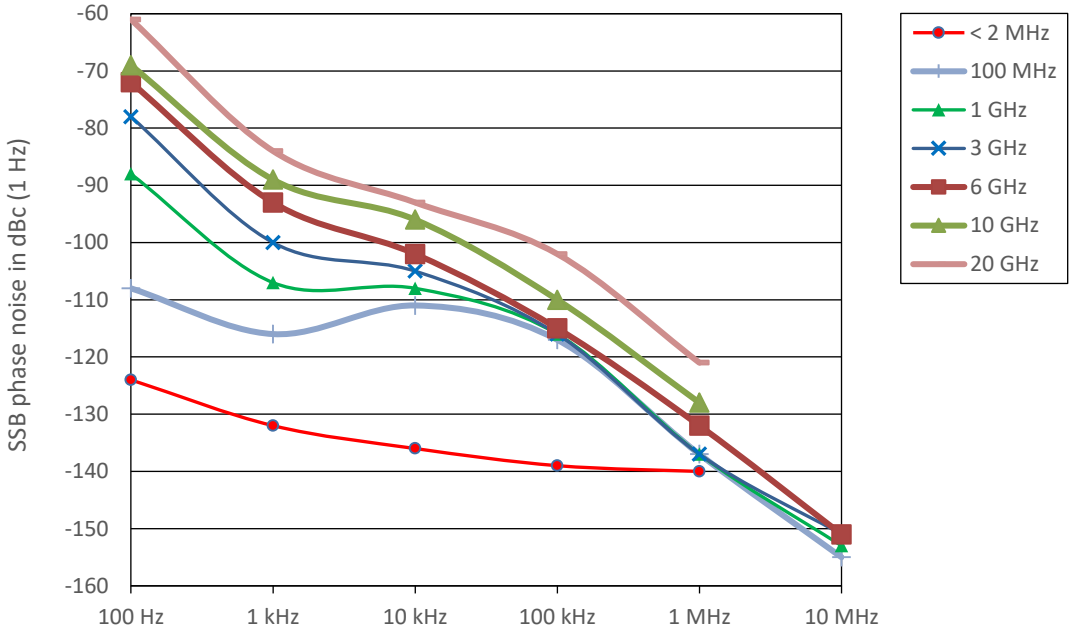
## Frequency

| | | |
|---|---|---|
| **Frequency range** | R&S®FPL1003 | 5 kHz to 3 GHz |
| | R&S®FPL1007 | 5 kHz to 7.5 GHz |
| | R&S®FPL1014 | 5 kHz to 14 GHz |
| | R&S®FPL1026 | 5 kHz to 26.5 GHz |
| **Frequency resolution** | | 0.01 Hz |
| **Scaling** | standard | linear |
| | with R&S®FPL1-K54,<br>RBW ≤ 1 MHz | linear, logarithmic |

| **Reference frequency, internal, nominal** | | |
|---|---|---|
| Accuracy | | (time since last adjustment × aging rate) + temperature drift + calibration accuracy |
| Aging per year | standard | $1 \times 10^{-6}$ |
| | with R&S®FPL1-B4 OCXO reference frequency option | $1 \times 10^{-7}$ |
| Temperature drift (0 °C to +50 °C) | standard | $1 \times 10^{-6}$ |
| | with R&S®FPL1-B4 OCXO reference frequency option | $1 \times 10^{-7}$ |
| Achievable initial calibration accuracy | standard | $5 \times 10^{-7}$ |
| | with R&S®FPL1-B4 OCXO reference frequency option | $5 \times 10^{-8}$ |

| **Frequency readout** | | |
|---|---|---|
| Marker resolution | | 0.01 Hz |
| Uncertainty | | ±(marker frequency × reference uncertainty + 10 % × resolution bandwidth + ½ (span / (sweep points – 1)) + 1 Hz) |
| Number of sweep (trace) points | default value | 1001 |
| | range | 101 to 100001 |
| Number of measurement points | with R&S®FPL1-K54,<br>active EMI measurement | 101 to 200001 |
| Marker tuning frequency step size | marker step size = sweep points | span / (sweep points – 1) |
| | marker step size = standard | span / (default sweep points – 1) |
| Frequency counter resolution | | 1 Hz |
| Count accuracy | | ±(frequency × reference uncertainty + ½ (last digit)) |
| Display range for frequency axis | | 0 Hz, 10 Hz to max. frequency |
| Resolution | | 0.1 Hz |
| Maximum span deviation | | 0.1 % |

| Spectral purity | | |
|---|---|---|
| SSB phase noise | frequency = 1000 MHz, carrier offset | |
| | 100 Hz | –88 dBc (1 Hz) (nom.) |
| | 1 kHz | < –99 dBc (1 Hz) |
| | 10 kHz | < –105 dBc (1 Hz), –108 dBc (1 Hz) (typ.) |
| | 100 kHz | < –110 dBc (1 Hz), –115 dBc (1 Hz) (typ.) |
| | 1 MHz | < –130 dBc (1 Hz), –135 dBc (1 Hz) (typ.) |
| | 10 MHz | –152 dBc (1 Hz) (nom.) |




*Measured SSB phase noise at different center frequencies.*

## Sweep time

| | | |
|---|---|---|
| Range | span = 0 Hz | 1 µs to 8000 s |
| | span ≥ 10 Hz, RBW ≥ 100 kHz | 1 ms to 8000 s [1] |
| | span ≥ 10 Hz, RBW < 100 kHz | 75 µs to 8000 s [2] |
| Sweep time accuracy | span = 0 Hz | 0.1 % (nom.) |
| | span ≥ 10 Hz, RBW ≥ 100 kHz | 3 % (nom.) |

## Resolution bandwidths

| Sweep filters and FFT filters | | |
|---|---|---|
| Resolution bandwidths (–3 dB) | sweep filters | 100 kHz to 10 MHz, in 1/2/3/5 sequence |
| | FFT filters | 1 Hz to 50 kHz, in 1/2/3/5 sequence |
| Bandwidth uncertainty | | < 3 % (nom.) |
| Shape factor 60 dB:3 dB | | < 5 (nom.) |

[1] Net sweep time without additional hardware settling time.
[2] Time for data acquisition for FFT calculation.

| Channel filters | | |
|---|---|---|
| Bandwidths (–3 dB) | | 100/200/300/500 Hz |
| | | 1/1.5/2/2.4/2.7/3/3.4/4/4.5/5/6/7.5/8.5/9/10/12.5/14/15/16/20/21/25/30/50/100/150/192/200/300/500 kHz |
| | | 1/1.228/1.5/2/3/3.75/5/10 MHz |
| Bandwidth uncertainty | | < 2 % (nom.) |
| Shape factor 60 dB:3 dB | | < 2 (nom.) |

| EMI filters (with R&S®FPL1-K54 option) | | |
|---|---|---|
| Bandwidths (–6 dB) | | 10/100/200 Hz |
| | | 1/9/10/100/120 kHz |
| | | 1 MHz |
| Bandwidth uncertainty | | < 3 % (nom.) |
| Shape factor 60 dB:6 dB | | < 4 (nom.) |

| Video bandwidths | | 1 Hz to 10 MHz, in 1/2/3/5 sequence |
|---|---|---|

| Signal analysis bandwidth (equalized) | R&S®FPL1003, R&S®FPL1007 ≤ 7.5 GHz; R&S®FPL1014, R&S®FPL1026 < 6 GHz | |
|---|---|---|
| | standard | 10 MHz (nom.) |
| | with R&S®FPL1-B40 option | 40 MHz (nom.) |
| | R&S®FPL1014, R&S®FPL1026 ≥ 6 GHz | |
| | standard | 10 MHz (nom.) |
| | with R&S®FPL1-B40 and R&S®FPL1-B11 options, YIG preselector: off | 40 MHz (nom.) |

# Level

| Display range | | displayed noise floor up to +30 dBm |
|---|---|---|

| Maximum input level | | |
|---|---|---|
| DC voltage | | 50 V |
| CW RF power | RF preamplifier: off | |
| | RF attenuation: 0 dB | 20 dBm (= 0.1 W) |
| | RF attenuation ≥ 10 dB | 30 dBm (= 1 W) |
| | with R&S®FPL1-B22 option, RF preamplifier: on | |
| | RF attenuation: 0 dB | 13 dBm (= 20 mW) |
| | RF attenuation ≥ 10 dB | 23 dBm (= 200 mW) |
| Pulse spectral density | RF attenuation: 0 dB, RF preamplifier: off | 97 dBµV/MHz |
| Maximum pulse voltage | RF attenuation ≥ 10 dB, RF preamplifier: off | 150 V |
| Maximum pulse energy | RF attenuation ≥ 10 dB, pulse duration: 10 µs, RF preamplifier: off | 1 mWs |

| Intermodulation | | |
|---|---|---|
| 1 dB compression of input mixer (two tone) | RF attenuation: 0 dB, RF preamplifier: off | +7 dBm (nom.) |
| Third-order intercept point (TOI) | RF attenuation: 0 dB, level = –20 dBm (both), $\Delta f > 5 \times$ RBW or 10 kHz, whichever is larger, RF preamplifier: off | |
| | 10 MHz ≤ $f_{in}$ < 300 MHz | > 13 dBm, 16 dBm (typ.) |
| | 300 MHz ≤ $f_{in}$ < 3 GHz | > 17 dBm, 20 dBm (typ.) |
| | 3 GHz ≤ $f_{in}$ < 6 GHz | > 15 dBm, 18 dBm (typ.) |
| | 6 GHz ≤ $f_{in}$ ≤ 14 GHz | > 13 dBm, 18 dBm (typ.) |
| | 14 GHz ≤ $f_{in}$ ≤ 20 GHz | > 12 dBm, 18 dBm (typ.) |
| | 20 GHz ≤ $f_{in}$ ≤ 26.5 GHz | 13 dBm (nom.) |
| | with R&S®FPL1-B22 option, RF attenuation: 0 dB, level = –40 dBm (both), $\Delta f > 5 \times$ RBW or 10 kHz, whichever is larger, RF preamplifier: on | |
| | 5 MHz ≤ $f_{in}$ < 6 GHz | 0 dBm (nom.) |
| | 6 GHz ≤ $f_{in}$ < 26.5 GHz | –6 dBm (nom.) |
| Second-harmonic intercept (SHI) | RF attenuation: 0 dB, level = –13 dBm, RF preamplifier: off | |
| | 1 MHz < $f_{in}$ ≤ 900 MHz | 45 dBm (nom.) |
| | 900 MHz < $f_{in}$ ≤ 13.25 GHz | 70 dBm (nom.) |

| **Displayed average noise level (DANL)** | | |
|---|---|---|
| RF preamplifier off | RF attenuation: 0 dB, termination: 50 Ω, log. scaling, normalized to 1 Hz RBW, RBW = 1 kHz, VBW = 1 Hz, sample detector, +20 °C to +30 °C | |
| | R&S®FPL1003, R&S®FPL1007 | |
| | 5 kHz ≤ f < 100 kHz | –143 dBm (typ.) |
| | 100 kHz ≤ f < 5 MHz | < –140 dBm, –143 dBm (typ.) |
| | 5 MHz ≤ f < 3 GHz | < –149 dBm, –152 dBm (typ.) |
| | 3 GHz ≤ f < 5 GHz | < –143 dBm, –146 dBm (typ.) |
| | 5 GHz ≤ f ≤ 7.5 GHz | < –140 dBm, –143 dBm (typ.) |
| | R&S®FPL1014, R&S®FPL1026 | |
| | 5 kHz ≤ f < 100 kHz | –143 dBm (typ.) |
| | 100 kHz ≤ f < 5 MHz | < –140 dBm, –143 dBm (typ.) |
| | 5 MHz ≤ f < 3 GHz | < –147 dBm, –150 dBm (typ.) |
| | 3 GHz ≤ f < 6 GHz | < –143 dBm, –146 dBm (typ.) |
| | 6 GHz ≤ f ≤ 14 GHz | < –141 dBm, –144 dBm (typ.) |
| | 14 GHz < f < 20 GHz | < –135 dBm, –140 dBm (typ.) |
| | 20 GHz ≤ f ≤ 26.5 GHz | < –132 dBm, –135 dBm (typ.) |
| RF preamplifier on (gain: nom. 20 dB) | RF attenuation: 0 dB, termination: 50 Ω, log. scaling, normalized to 1 Hz RBW, RBW = 1 kHz, VBW = 1 Hz, sample detector, +20 °C to +30 °C | |
| | R&S®FPL1003, R&S®FPL1007 | |
| | 3 MHz ≤ f < 10 MHz | < –155 dBm, –158 dBm (typ.) |
| | 10 MHz ≤ f < 2 GHz | < –163 dBm, –166 dBm (typ.) |
| | 2 GHz ≤ f < 3 GHz | < –162 dBm, –165 dBm (typ.) |
| | 3 GHz ≤ f < 5 GHz | < –158 dBm, –161 dBm (typ.) |
| | 5 GHz ≤ f < 7 GHz | < –156 dBm, –159 dBm (typ.) |
| | 7 GHz ≤ f < 7.5 GHz | < –155 dBm, –158 dBm (typ.) |
| | R&S®FPL1014, R&S®FPL1026 | |
| | 10 MHz ≤ f < 2 GHz | < –160 dBm, –163 dBm (typ.) |
| | 2 GHz ≤ f < 6 GHz | < –158 dBm, –161 dBm (typ.) |
| | 6 GHz ≤ f ≤ 14 GHz | < –158 dBm, –163 dBm (typ.) |
| | 14 GHz < f < 18 GHz | < –158 dBm, –161 dBm (typ.) |
| | 18 GHz ≤ f ≤ 26.5 GHz | < –156 dBm, –158 dBm (typ.) |

| **Spurious responses** | mixer level ≤ –13 dBm, sweep optimization: auto or dynamic, scaling linear | |
|---|---|---|
| Image response | 10 MHz ≤ f ≤ 3 GHz | |
| | $f_{in}$ – 2 × 4020.4 MHz (1st IF) | < –90 dBc (typ.) |
| | $f_{in}$ – 2 × 820.4 MHz (2nd IF) | < –80 dBc |
| | $f_{in}$ – 2 × 20.4 MHz (3rd IF), RBW ≤ 3 MHz | < –80 dBc |
| | 3 GHz < f ≤ 14 GHz, RBW ≤ 3 MHz | < –70 dBc (typ.) |
| | 14 GHz < f ≤ 26.5 GHz, RBW ≤ 3 MHz | < –65 dBc (typ.) |
| Intermediate frequency response | 2 MHz ≤ f ≤ 3 GHz | |
| | 1st IF (4020.4 MHz) | < –80 dBc (typ.) |
| | 2nd IF (820.4 MHz) | < –80 dBc |
| | 3rd IF (20.4 MHz) | < –80 dBc |
| | 3 GHz < f ≤ 26.5 GHz | < –70 dBc |
| Residual spurious response | RF attenuation: 0 dB | |
| | f ≤ 1 MHz | < –90 dBm (nom.) |
| | f > 1 MHz | < –90 dBm |
| Local oscillator related spurious | f < 3 GHz | |
| | 1 kHz ≤ carrier offset ≤ 10 MHz | < –70 dBc |
| | carrier offset > 10 MHz | < –80 dBc |
| | 3 GHz ≤ f < 14 GHz | < –70 dBc (typ.) |
| | 14 GHz ≤ f < 26.5 GHz | < –67 dBc (typ.) |
| Other interfering signals | | |
| Subharmonic of 1st LO | 20 MHz ≤ f < 3 GHz, spurious at 4020.4 MHz – 2 × $f_{in}$ | < –80 dBc (nom.) |
| Harmonic of 1st LO | 20 MHz ≤ f < 3 GHz, mixer level < –25 dBm, spurious at $f_{in}$ – 2010.2 MHz | < –80 dBc (nom.) |

| **Level display** | | |
|---|---|---|
| Logarithmic level axis | | 1 dB to 200 dB, in 1 dB steps |
| Linear level axis | | 10 % of reference level per level division, 10 divisions or logarithmic scaling |
| Number of traces | | 6 |
| Trace detector | | max. peak, min. peak, auto peak (normal), sample, RMS, average |
| Trace functions | | clear/write, max. hold, min. hold, average, view |
| EMI detectors (with option R&S®FPL1-K54) | | quasi-peak, RMS-average, CISPR-average |
| Measurement marker detector (with option R&S®FPL1-K54) | | max. peak, average, quasi-peak, RMS-average, CISPR-average |
| Setting range of reference level | | –130 dBm to (–13 dBm + RF attenuation – RF preamplifier gain), in steps of 0.01 dB |
| Units of level axis | | dBm, dBµV, dBmV, dBµA, dBpW, V, A, W |

| **Level measurement uncertainty** | | |
|---|---|---|
| Absolute level uncertainty at 50 MHz | RBW = 10 kHz, level = –10 dBm, reference level = –10 dBm, RF attenuation: 10 dB | |
| | +20 °C to +30 °C | < 0.3 dB (σ = 0.1 dB) |
| | 0 °C to +50 °C | < 0.5 dB (σ = 0.17 dB) |
| Frequency response referenced to 50 MHz | RF attenuation: 10/20/30/40 dB, RF preamplifier: off, +20 °C to +30 °C | |
| | 5 kHz ≤ f < 3 MHz | < 1 dB (nom.) |
| | 3 MHz ≤ f < 3 GHz | < 0.3 dB (σ = 0.1 dB) |
| | 3 GHz ≤ f < 7.5 GHz | < 0.6 dB (σ = 0.2 dB) |
| | 7.5 GHz ≤ f < 14 GHz | < 1.5 dB (σ = 0.5 dB) |
| | 14 GHz ≤ f < 26.5 GHz | < 2.0 dB (σ = 0.66 dB) |
| | any setting of RF attenuation, RF preamplifier: off, 0 °C to +50 °C | |
| | 5 kHz ≤ f < 3 GHz | < 1 dB (nom.) |
| | 3 GHz ≤ f < 7.5 GHz | < 1.5 dB (nom.) |
| | 7.5 GHz ≤ f < 14 GHz | < 2.5 dB (nom.) |
| | 14 GHz ≤ f < 26.5 GHz | < 3.0 dB (nom.) |
| | RF attenuation ≤ 20 dB, RF preamplifier: on, +20 °C to +30 °C | |
| | 3 MHz ≤ f < 3 GHz | < 0.6 dB (σ = 0.2 dB) |
| | 3 GHz ≤ f < 7.5 GHz | < 1.0 dB (σ = 0.33 dB) |
| | 7.5 GHz ≤ f < 14 GHz | < 2.5 dB (σ = 0.83 dB) |
| | 14 GHz ≤ f < 26.5 GHz | < 3.0 dB (σ = 1.0 dB) |
| Attenuator switching uncertainty | f = 50 MHz, 0 dB to 45 dB, referenced to 10 dB attenuation | < 0.2 dB (σ = 0.07 dB) |
| Uncertainty of reference level setting | | 0 dB [3] |
| Bandwidth switching uncertainty | referenced to RBW = 10 kHz and sweep type: FFT | |
| | sweep type: FFT, RBW < 100 kHz | < 0.1 dB (nom.) |
| | sweep type: sweep, RBW ≥ 100 kHz | < 0.2 dB (nom.) |

| **Nonlinearity of displayed level** | | |
|---|---|---|
| Logarithmic level display | S/N > 16 dB, 0 dB to –50 dB | < 0.1 dB (σ = 0.07 dB) |
| Linear level display | S/N > 16 dB, 0 dB to –70 dB | 5 % of reference level (nom.) |

| **Total measurement uncertainty** | signal level: 0 dB to –50 dB below reference level, S/N > 20 dB, sweep time: auto, sweep type: FFT, RF attenuation: 10/20/30/40 dB, RF preamplifier: off, span / RBW < 100, confidence level: 95 %, +20 °C to +30 °C | |
|---|---|---|
| | 1 MHz ≤ f < 3 GHz | 0.5 dB |
| | 3 GHz ≤ f < 7.5 GHz | 0.8 dB |
| | 7.5 GHz ≤ f < 14 GHz | 1.2 dB |
| | 14 GHz ≤ f < 26.5 GHz | 1.8 dB |

[3] The setting of the reference level affects only the graphical representation of the measurement result on the display, not the measurement itself. Therefore, the reference level setting causes no additional uncertainty in measurement results.

## Measurement speed

| | | |
|---|---|---|
| Local measurement and display update rate | 1001 sweep points, sweep optimization set to “speed” | 1 ms (1000/s) (nom.) |
| Maximum sweep rate, remote operation [4, 5] | trace average: on | 0.9 ms (1100/s) (nom.) |
| Remote measurement and LAN transfer [4] | | 3.2 ms (357/s) (nom.) |
| Marker peak search [4] | | 1.9 ms (nom.) |
| Center frequency tune + sweep + sweep data transfer [4] | | 16 ms (nom.) |

## Trigger functions

| | | |
|---|---|---|
| **Trigger** | | |
| Trigger source | | free run, video, external, IF power, I/Q power |
| Trigger offset | span ≥ 10 Hz | 0 s to 20 s |
| | span = 0 Hz | (–sweep time) to 20 s |
| Maximum deviation of trigger offset | | ±10 ns |
| **IF power trigger** | | |
| Sensitivity | minimum signal power | –60 dBm + RF attenuation – RF preamplifier gain |
| | maximum signal power | –15 dBm + RF attenuation – RF preamplifier gain |
| IF power trigger bandwidth | RBW > 5 MHz | 40 MHz (nom.) |
| | RBW ≤ 5 MHz | 6 MHz (nom.) |
| **Gated sweep** | | |
| Gate source | | video, external, IF power, I/Q power |
| Gate delay | | 0 s to 20 s, min. resolution 10 ns |
| Gate length | | 10 ns to 20 s, min. resolution 10 ns |
| Maximum deviation of gate length | | ±10 ns |

## I/Q data

| | | |
|---|---|---|
| Interface | | GPIB or LAN interface |
| Memory length | | max. 25 Msample I and Q |
| Word length of I/Q samples | | 14 bit |
| Sampling rate | standard | 100 Hz to 16 MHz |
| | with R&S®FPL1-B40 option | 100 Hz to 100 MHz |
| Maximum signal analysis bandwidth (equalized) | standard | 12.8 MHz |
| | with R&S®FPL1-B40 option | 40 MHz |
| Signal analysis bandwidth ≤ 10 MHz, R&S®FPL1003 and R&S®FPL1007 | | |
| Amplitude flatness | $f_{center}$ ≥ 12 MHz and (1.25 × signal analysis bandwidth) | ±0.3 dB (nom.) |
| Deviation from linear phase | $f_{center}$ ≥ 12 MHz and (1.25 × signal analysis bandwidth) | ±1° (nom.) |
| Signal analysis bandwidth ≤ 10 MHz, R&S®FPL1014 and R&S®FPL1026 | | |
| Amplitude flatness | $f_{center}$ ≥ 30 MHz and (1.25 × signal analysis bandwidth) | ±1.0 dB (nom.) |
| Deviation from linear phase | $f_{center}$ ≥ 30 MHz and (1.25 × signal analysis bandwidth) | ±2° (nom.) |
| Signal analysis bandwidth ≤ 40 MHz, R&S®FPL1003 and R&S®FPL1007 | | |
| Amplitude flatness | $f_{center}$ ≥ 12 MHz and (1.25 × signal analysis bandwidth) | ±0.5 dB (nom.) |
| Deviation from linear phase | $f_{center}$ ≥ 12 MHz and (1.25 × signal analysis bandwidth) | ±1.5° (nom.) |
| Signal analysis bandwidth ≤ 40 MHz, R&S®FPL1014 and R&S®FPL1026, $f_{center}$ ≤ 6 GHz | | |
| Amplitude flatness | $f_{center}$ ≥ 30 MHz and (1.25 × signal analysis bandwidth) | ±0.5 dB (nom.) |
| Deviation from linear phase | $f_{center}$ ≥ 30 MHz and (1.25 × signal analysis bandwidth) | ±1.5° (nom.) |

[4] Measured with a PC equipped with Intel® Core™ i7 2.8 GHz and 1 Gigabit LAN interface.

[5] Measurement is performed with a sweep count of 1000. The indicated speed is the average speed of 1 sweep.

| | | |
|---|---|---|
| Signal analysis bandwidth ≤ 40 MHz, R&S®FPL1014 and R&S®FPL1026, $f_{center}$ > 6 GHz, YIG preselector: off [6] | | |
| Amplitude flatness | | ±1.5 dB (nom.) |
| Deviation from linear phase | | ±3° (nom.) |

# Inputs and outputs

| | | |
|---|---|---|
| **RF input** | | |
| Impedance | | 50 Ω |
| Connector | R&S®FPL1003, R&S®FPL1007, R&S®FPL1014 | N female |
| | R&S®FPL1026 | test port adapter, PC 2.92 mm female (interchangeable port connector system) |
| VSWR | RF attenuation ≥ 10 dB | |
| | 10 MHz ≤ f < 3 GHz | < 1.5 (nom.) |
| | 3 GHz ≤ f < 7.5 GHz | < 2 (nom.) |
| | 7.5 GHz ≤ f < 26.5 GHz | < 2 (nom.) |
| Setting range of attenuator | standard | 0 dB to 45 dB, in 5 dB steps |
| | with R&S®FPL1-B25 option | 0 dB to 45 dB, in 1 dB steps |
| RF preamplifier gain | with R&S®FPL1-B22 option | 20 dB (nom.) |

| | | |
|---|---|---|
| **USB interface** | | 4 ports, type A plug, version 2.0 |

| | | |
|---|---|---|
| **Reference output** | | |
| Connector | | BNC female |
| Impedance | | 50 Ω |
| Output frequency | internal reference | 10 MHz |
| | external reference | same as reference input signal |
| Level | | > 0 dBm (nom.) |

| | | |
|---|---|---|
| **Reference input** | | |
| Connector | | BNC female |
| Impedance | | 50 Ω |
| Input frequency range | | 10 MHz ± 5 ppm |
| Required level | | > 0 dBm into 50 Ω |

| | | |
|---|---|---|
| **External trigger/gate input** | | |
| Connector | | BNC female |
| Trigger voltage | | 0.5 V to 3.5 V |
| Input impedance | | 10 kΩ |

| | | |
|---|---|---|
| **LAN interface** | | 10/100/1000BASE-T |
| Connector | | RJ-45 |

| | | |
|---|---|---|
| **External monitor** | | |
| Connector | | DVI-D |

[6] R&S®FPL1-B11 option required.

# General data

| | | |
|---|---|---|
| **Display** | | 21 cm LC TFT color display (10.1") |
| Resolution | | 1280 × 800 pixel (WXGA resolution) |
| Pixel failure rate | | < 1 × $10^{-5}$ |

| **Data storage** | | |
|---|---|---|
| Internal | standard | solid-state drive (SSD), 32 Gbyte |
| External | | supports USB 2.0 compatible memory devices |

| **Environmental conditions** | | |
|---|---|---|
| Temperature | operating temperature range | 0 °C to +50 °C |
| | storage temperature range | –20 °C to +70 °C |
| Damp heat | without condensation | +40 °C at 85 % rel. humidity, in line with EN 60068-2-30 |

| **Mechanical resistance** | | |
|---|---|---|
| Vibration | sinusoidal | 5 Hz to 55 Hz,<br>0.15 mm constant amplitude<br>(1.8 g at 55 Hz);<br>55 Hz to 150 Hz,<br>acceleration: 0.5 g constant;<br>in line with EN 60068-2-6 |
| | random | 8 Hz to 500 Hz,<br>acceleration: 1.2 g (RMS),<br>in line with EN 60068-2-64 |
| Shock | | 40 g shock spectrum, in line with MIL-STD-810E, method no. 516.4, procedure I, MIL-PRF-28800F |

| | | |
|---|---|---|
| **EMC** | | in line with EMC Directive 2014/30/EU including<br>• IEC/EN 61326-1 [7, 8]<br>• IEC/EN 61326-2-1<br>• CISPR 11/EN 55011 [7]<br>• IEC/EN 61000-3-2<br>• IEC/EN 61000-3-3 |

| | | |
|---|---|---|
| **Recommended calibration interval** | | 1 year |

| **Power supply** | | |
|---|---|---|
| AC supply | | 100 V to 240 V ± 10 %,<br>50 Hz to 60 Hz ± 5 % |
| Current consumption | without options | 1.7 A to 0.8 A (nom.) |
| | with internal battery (R&S®FPL1-B31 option) in charge mode | 3 A to 1.5 A (nom.) |
| Power consumption | without options, device in standby | 8 W (nom.) |
| | with internal battery (R&S®FPL1-B31 option) in charge mode, device in standby | 110 W (nom.) |
| | R&S®FPL1003, R&S®FPL1007 | 65 W to 75 W (nom.) [9] |
| | R&S®FPL1014, R&S®FPL1026 | 80 W to 95 W (nom.) [9] |
| Safety | | in line with<br>• EN 61010-1<br>• IEC 61010-1<br>• UL 61010-1<br>• CAN/CSA-C22.2 No. 61010-1 |
| Test marks | | CE, $_{C}$CSA$_{US}$, KCC |

[7] Emission limits for class A equipment.

[8] Immunity test requirement for industrial environment (EN 61326, table 2).

[9] Power consumption varies depending on mode of operation and options installed. If R&S®FPL1-B31 option is installed, maximum power consumption is only valid if both batteries are fully charged.

| **Dimensions and weight** | | |
|---|---|---|
| Dimensions | W × H × D | 408 mm × 186 mm × 235 mm<br>(16.06 in × 7.32 in × 9.25 in) |
| Net weight without options, nominal | R&S®FPL1003, R&S®FPL1007 | 6 kg (13.22 lb) |
| | R&S®FPL1014, R&S®FPL1026 | 7 kg (15.43 lb) |
| Net weight with internal battery, nominal | R&S®FPL1003, R&S®FPL1007 | 7.3 kg (16 lb) |
| | R&S®FPL1014, R&S®FPL1026 | 8.3 kg (17.64 lb) |

# Options

## R&S®FPL1-B5 additional interfaces

| | | |
|---|---|---|
| **User port** | | |
| Connector | | 25-pin D-Sub female |
| Output | | TTL-compatible, 0 V/5 V, max. 15 mA |
| Input | | TTL-compatible, max. 5 V |

| | | |
|---|---|---|
| **Noise source control and power sensor** | | |
| Connectors | for R&S®FS-SNSxx smart noise sources and R&S®NRP-Zxx power sensors | 7-pin LEMOSA female |
| | for noise source control | BNC female |
| Noise source control output voltage | | 0 V/28 V, switchable, max. 100 mA (nom.) |

| | | |
|---|---|---|
| **IF/Video/Demod Out** | | |
| Connector | | BNC female, 50 Ω |
| **IF Out** | | |
| Bandwidth | | equal to RBW setting |
| IF frequency | | 25 MHz |
| Output level | center frequency > 10 MHz, span = 0 Hz, signal at reference level and center frequency | 0 dBm (nom.) |
| **Video Out** | | |
| Bandwidth | | equal to VBW setting |
| Output scaling | log. display scale | logarithmic |
| | lin. display scale | linear |
| Output level | center frequency > 10 MHz, span = 0 Hz, signal at reference level and center frequency | 1 V, open-circuit (nom.) |

| | | |
|---|---|---|
| **Audio output** | | |
| Loudspeaker | | built-in, adjustable |
| **AF out** | | |
| Connector | | 3.5 mm mini jack |
| Output impedance | | 10 Ω |
| Open-circuit voltage | | up to 1.5 V, adjustable |

# R&S®FPL1-B9 internal generator

| **Frequency** | | |
|---|---|---|
| Frequency range | R&S®FPL1003 | 5 kHz to 3 GHz |
| | R&S®FPL1007, R&S®FPL1014, R&S®FPL1026 | 5 kHz to 7.5 GHz |
| Setting resolution | independent CW source | 0.01 Hz |

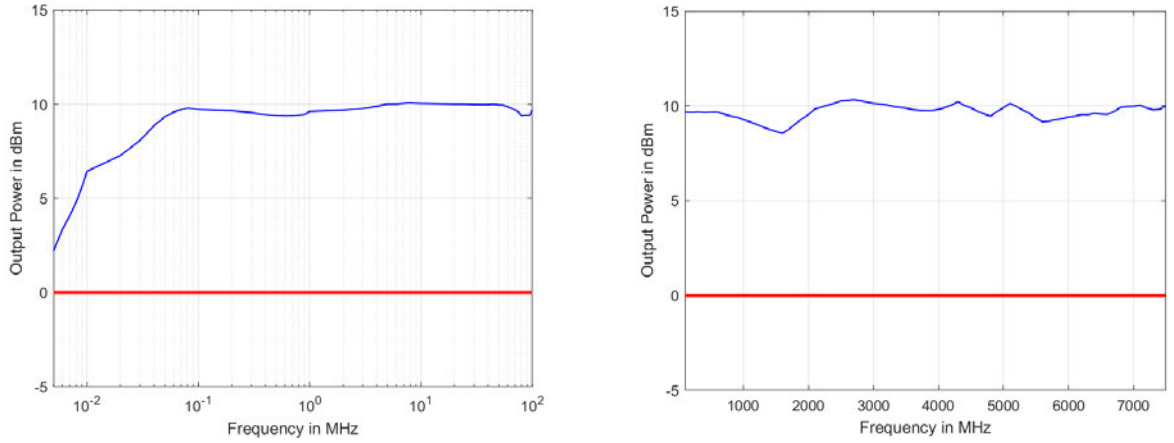
| **Frequency offset** | | |
|---|---|---|
| Setting range | | 0 Hz to $f_{max}$ [10] |
| Setting resolution | | 0.01 Hz |

| **Spectral purity** | | |
|---|---|---|
| SSB phase noise | frequency = 1 GHz, output level = 0 dBm | |
| | carrier offset = 10 kHz | < –102 dBc (1 Hz), –108 dBc (1 Hz) (typ.) |
| | carrier offset = 100 kHz | < –105 dBc (1 Hz), –111 dBc (1 Hz) (typ.) |
| | carrier offset = 1 MHz | < –117 dB (1 Hz), –130 dBc (1 Hz) (typ.) |
| Harmonics | output level = 0 dBm, +20 °C to +30 °C | |
| | 5 kHz ≤ f < 100 kHz | < –30 dBc (nom.) |
| | 100 kHz ≤ f ≤ 7.5 GHz [11] | < –30 dBc |
| Non-harmonic spurious | output level = 0 dBm | |
| | 1 kHz < offset from carrier ≤ 4 MHz | –35 dBc (nom.) |
| | offset from carrier > 4 MHz | < –35 dBc, –45 dBc (typ.) |

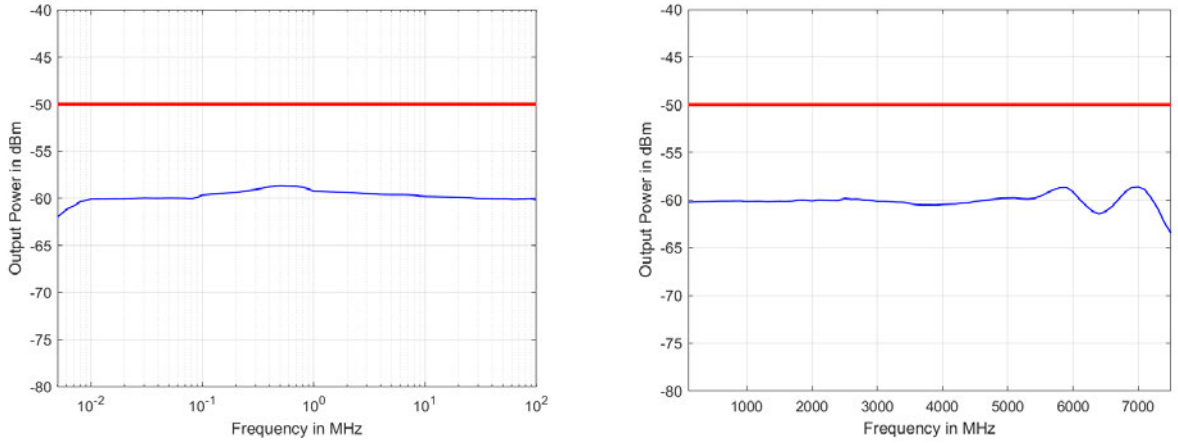
| **Level** | | |
|---|---|---|
| Specified level range | | –50 dBm to 0 dBm |
| Setting resolution | | 0.1 dB |
| Setting range | | –60 dBm to +10 dBm |
| Absolute level uncertainty | frequency = 50 MHz, +20 °C to +30 °C, output level = –10 dBm, frequency offset = 0 Hz | < 0.5 dB |
| Frequency response | output level = –10 dBm, referenced to level at 50 MHz, +20 °C to +30 °C, frequency offset = 0 Hz | |
| | 100 kHz ≤ f ≤ 3 GHz | < 1 dB, |
| | 3 GHz < f ≤ 7.5 GHz | < 1.5 dB, < 1 dB (typ.) |
| Level nonlinearity | for specified level range, referenced to –10 dBm output level, +20 °C to +30 °C, f ≥ 100 kHz | ≤ 2 dB, < 0.5 dB (typ.) |

[10] $f_{max}$ depends on frequency range.

[11] Limit is nominal for harmonics at frequencies > 20 GHz.




*Maximum output power versus frequency, level in dBm (meas.)*




*Minimum output power versus frequency, level in dBm (meas.)*

| | | |
|---|---|---|
| **Dynamic range** | RBW = 1 kHz, f = 1 GHz | 115 dB (nom.) |

| **Power sweep** | | |
|---|---|---|
| Specified level range | | –50 dBm to 0 dBm |
| Setting resolution | | 0.1 dB |
| Setting range | | –60 dBm to +10 dBm |

| **GEN output** | | |
|---|---|---|
| Connector | | N female, 50 Ω |
| VSWR | | 1.5 (nom.) |

| **Reverse power** | | |
|---|---|---|
| DC voltage | | 50 V |
| CW RF power | | 30 dBm (= 1 W) |
| Maximum pulse voltage | | 150 V |
| Maximum pulse energy | pulse duration: 10 µs | 1 mWs |

## R&S®FPL1-B10 GPIB interface

| | | |
|---|---|---|
| IEC/IEEE bus control | | interface in line with IEC 625-2 (IEEE-488.2) |
| Command set | | SCPI 1997.0 |
| Connector | | 24-pin Amphenol female |
| Interface functions | | SH1, AH1, T6, L4, SR1, RL1, PP1, DC1, DT1, C0 |

## R&S®FPL1-B30 DC power input 12 V/24 V

| | | |
|---|---|---|
| Input voltage range | DC | 12 V to 24 V (nom.),<br>10.4 V to 28 V,<br>switch-on voltage > 11 V (meas.) |
| Input current | $V_{in}$ = 12 V/24 V | 15 A/7.5 A (nom.) |
| | $V_{in}$ = 12 V/24 V, operating mode, without internal batteries (R&S®FPL1-B31); R&S®FPL1003, R&S®FPL1007 | 5.5 A/2.7 A (meas.) |
| | $V_{in}$ = 12 V/24 V, operating mode, without internal batteries (R&S®FPL1-B31); R&S®FPL1014, R&S®FPL1026 | 6.8 A/3.5 A (meas.) |
| | $V_{in}$ = 12 V/24 V, operating mode, internal batteries in charge mode; R&S®FPL1003, R&S®FPL1007 | 11 A/5 A (meas.) |
| | $V_{in}$ = 12 V/24 V, operating mode, internal batteries in charge mode; R&S®FPL1014, R&S®FPL1026 | 11.8 A/5.4 A (meas.) |
| | $V_{in}$ = 12 V/24 V, instrument standby mode, internal batteries in charge mode | 6.5 A/3 A (meas.) |
| Temperature | operating temperature range | 0 °C to +40 °C |
| | storage temperature range | –20 °C to +70 °C |

## R&S®FPL1-B31 internal lithium-ion battery

| | | |
|---|---|---|
| Operating time | R&S®FPL1003, R&S®FPL1007 | 3.5 h (nom.) |
| | R&S®FPL1014, R&S®FPL1026 | 2.0 h (nom.) |
| Charge time | standby mode, AC supply | < 2 h (nom.) |
| | standby mode, external DC supply (R&S®FPL1-B30) | < 2 h (nom.) |
| | operating mode | < 4 h (nom.) |
| Temperature | operating temperature range, discharge | 0 °C to +50 °C |
| | operating temperature range, charge | 0 °C to +40 °C |
| | storage temperature range | –20 °C to +60 °C [12] |

## R&S®FSV-B34 charger (only needed for charging spare batteries)

| | | |
|---|---|---|
| AC input voltage range | | 100 V to 240 V ± 10 % (nom.) |
| AC supply frequency | | 50 Hz to 60 Hz (nom.) |
| Power consumption | | max. 300 W (nom.) |
| Number of charger bays | | 4 |
| Dimensions | W × H × D | 400 mm × 127 mm × 203 mm<br>(15.75 in × 5 in × 8 in) |
| Net weight | | 3.1 kg (6.9 lb) |

[12] The battery packs should be stored in an environment with low humidity, free from corrosive gas at a recommended temperature range < +21 °C. Extended exposure to temperatures above +45°C could degrade battery performance and life.

# Ordering information

| Designation | Type | Order No. |
|---|---|---|
| Signal and spectrum analyzer | R&S®FPL1003 | 1304.0004.03 |
| Signal and spectrum analyzer | R&S®FPL1007 | 1304.0004.07 |
| Signal and spectrum analyzer | R&S®FPL1014 | 1304.0004.14 |
| Signal and spectrum analyzer | R&S®FPL1026 | 1304.0004.26 |
| **Accessories supplied** | | |
| Power cable and quick start guide | | |

## Options

| Designation | Type | Order No. | Retrofittable | Remarks |
|---|---|---|---|---|
| OCXO reference frequency | R&S®FPL1-B4 | 1323.1902.02 | yes | retrofit in service center |
| Additional interfaces | R&S®FPL1-B5 | 1323.1883.02 | yes | user-retrofittable<br>IF/Video/Demod Out, user port, noise source control, power sensor, AF output, loudspeaker |
| Internal generator | R&S®FPL1-B9 | 1323.1925.03 | no | for R&S®FPL1003 |
| Internal generator | R&S®FPL1-B9 | 1323.1925.07 | no | for R&S®FPL1007, R&S®FPL1014 and R&S®FPL1026 |
| GPIB interface | R&S®FPL1-B10 | 1323.1890.02 | yes | user-retrofittable |
| YIG preselector bypass | R&S®FPL1-B11 | 1323.1619.02 | yes | user-retrofittable |
| Second hard disk (SSD) | R&S®FPL1-B19 | 1304.0427.02 | yes | user-retrofittable<br>mounted on PC board, including analyzer firmware |
| RF preamplifier (3 GHz/7.5 GHz) | R&S®FPL1-B22 | 1323.1719.02 | yes | user-retrofittable |
| RF preamplifier (14 GHz) | R&S®FPL1-B22 | 1323.1702.02 | yes | user-retrofittable |
| RF preamplifier (26.5 GHz) | R&S®FPL1-B22 | 1323.1777.02 | yes | user-retrofittable |
| 1 dB steps for electronic attenuator | R&S®FPL1-B25 | 1323.1990.02 | yes | user-retrofittable |
| DC power supply 12 V/24 V | R&S®FPL1-B30 | 1323.1877.02 | yes | user-retrofittable |
| Internal lithium-ion battery | R&S®FPL1-B31 | 1323.1725.02 | yes | retrofit in service center; including 2 battery packs and internal charging unit |
| 40 MHz analysis bandwidth | R&S®FPL1-B40 | 1323.1931.02 | yes | user-retrofittable |
| **Firmware** | | | | |
| AM/FM/PM measurement demodulator | R&S®FPL1-K7 | 1323.1731.02 | | |
| Power sensor measurement with R&S®NRPxx power sensors | R&S®FPL1-K9 | 1323.1754.02 | | supports R&S®NRPxx power sensors |
| Noise figure and gain measurements | R&S®FPL1-K30 | 1323.1760.02 | | requires R&S®FPL1-B5 |
| Phase noise measurement application | R&S®FPL1-K40 | 1323.1831.02 | | |
| EMI measurement application | R&S®FPL1-K54 | 1323.1783.02 | | |
| Vector signal analysis | R&S®FPL1-K70 | 1323.1748.02 | | |
| Multi-modulation analysis | R&S®FPL1-K70M | 1323.1625.02 | | requires R&S®FPL1-K70 |
| BER measurements with PRBS data | R&S®FPL1-K70P | 1323.1631.02 | | requires R&S®FPL1-K70 |
| **Software** | | | | |
| License dongle | R&S®FSPC | 1310.0002.03 | | |
| Vector signal explorer base software | R&S®VSE | 1320.7500.06 | | |
| Vector signal analysis | R&S®VSE-K70 | 1320.7522.06 | | |
| EUTRA/LTE NB-IoT | R&S®VSE-K106 | 1320.7900.06 | | |

## Upgrades

| Designation | Type | Order No. | Retrofittable | Remarks |
|---|---|---|---|---|
| Upgrade to Windows IoT Enterprise LTSC 2021 | R&S®FPL1-U10 | 1353.5393.21 | yes | contact the Rohde & Schwarz service center |

## Recommended extras

| Designation | Type | Order No. |
|---|---|---|
| Protective hard cover | R&S®FPL1-Z1 | 1323.1960.02 |
| Soft carrying bag for transport and outdoor operation | R&S®FPL1-Z2 | 1323.1977.02 |
| H-style shoulder harness (requires R&S®FPL1-Z2 option) | R&S®FPL1-Z3 | 1323.1683.02 |
| Spare lithium-ion battery pack | R&S®FPL1-Z4 | 1323.1677.02 |
| Anti-glare display film for outdoor operation | R&S®FPL1-Z5 | 1323.1690.02 |
| Lithium-ion battery charger for charging spare batteries | R&S®FSV-B34 | 1321.3950.02 |
| 19" rackmount kit (RAL 5014) [13] | R&S®FPL1-Z6 | 1323.1954.02 |
| 19" rackmount kit (RAL 5000) [13] | R&S®FPL1-Z6B | 1323.1954.03 |
| Headphone | | 0708.9010.00 |
| **Matching pads, 50 Ω/75 Ω** | | |
| L section, matching at both ends | R&S®RAM | 0358.5414.02 |
| Series resistor, 25 Ω, matching at one end<br>(taken into account in instrument function RF INPUT 75 Ω) | R&S®RAZ | 0358.5714.02 |
| **Smart noise sources for noise figure and gain measurements (R&S®FPL1-K30 required)** | | |
| 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 |
| **High-power attenuators** | | |
| Attenuator 100 W, 3/6/10/20/30 dB, 1 GHz | R&S®RBU100 | 1073.8495.xx<br>(xx = 03/06/10/20/30) |
| Attenuator 50 W, 3/6/10/20/30 dB, 2 GHz | R&S®RBU50 | 1073.8695.xx<br>(xx = 03/06/10/20/30) |
| Attenuator 50 W, 20 dB, 6 GHz | R&S®RDL50 | 1035.1700.52 |
| **Cables** | | |
| IEC/IEEE bus cable, length: 1 m | R&S®PCK | 0292.2013.10 |
| IEC/IEEE bus cable, length: 2 m | R&S®PCK | 0292.2013.20 |
| **DC block** | | |
| DC block, 10 kHz to 18 GHz (type N) | R&S®FSE-Z4 | 1084.7443.03 |

## Power sensors supported by the R&S®FPL1-K9 option [14]

| Designation | Type | Order No. |
|---|---|---|
| **Universal power sensors** | | |
| 1 nW to 100 mW, 10 MHz to 8 GHz, two-path | R&S®NRP-Z211 | 1417.0409.02 |
| 200 pW to 200 mW, 10 MHz to 8 GHz [15] | R&S®NRP-Z11 | 1138.3004.02 |
| 1 nW to 100 mW, 10 MHz to 18 GHz, two-path | R&S®NRP-Z221 | 1417.0309.02 |
| 200 pW to 200 mW, 10 MHz to 18 GHz [15] | R&S®NRP-Z21 | 1137.6000.02 |
| 2 nW to 2 W, 10 MHz to 18 GHz [15] | R&S®NRP-Z22 | 1137.7506.02 |
| 20 nW to 15 W, 10 MHz to 18 GHz [15] | R&S®NRP-Z23 | 1137.8002.02 |
| 60 nW to 30 W, 10 MHz to 18 GHz [15] | R&S®NRP-Z24 | 1137.8502.02 |
| **Power sensor modules with power splitter** | | |
| 4 µW to 400 mW, DC to 18 GHz | R&S®NRP-Z27 | 1169.4102.02 |
| 4 µW to 400 mW, DC to 26.5 GHz | R&S®NRP-Z37 | 1169.3206.02 |
| **Thermal power sensors** | | |
| 300 nW to 100 mW, DC to 18 GHz | R&S®NRP18T | 1424.6115.02 |
| 300 nW to 100 mW, DC to 18 GHz, LAN version | R&S®NRP18TN | 1424.6121.02 |
| 300 nW to 100 mW, DC to 33 GHz | R&S®NRP33T | 1424.6138.02 |
| 300 nW to 100 mW, DC to 33 GHz, LAN version | R&S®NRP33TN | 1424.6144.02 |
| 300 nW to 100 mW, DC to 40 GHz, | R&S®NRP40T | 1424.6150.02 |
| 300 nW to 100 mW, DC to 40 GHz, LAN version | R&S®NRP40TN | 1424.6167.02 |
| 300 nW to 100 mW, DC to 50 GHz, | R&S®NRP50T | 1424.6173.02 |
| 300 nW to 100 mW, DC to 50 GHz, LAN version | R&S®NRP50TN | 1424.6180.02 |
| 300 nW to 100 mW, DC to 67 GHz | R&S®NRP67T | 1424.6196.02 |
| 300 nW to 100 mW, DC to 67 GHz, LAN version | R&S®NRP67TN | 1424.6209.02 |
| 300 nW to 100 mW, DC to 110 GHz | R&S®NRP110T | 1424.6215.02 |

[13] R&S®FPL1-Z6B is available for instruments in the current corporate design color RAL 5000 (violet blue), while R&S®FPL1-Z6 is available for the legacy color RAL 5014 (pigeon blue).

[14] For average power measurement only. LAN connection not supported.

[15] Product discontinued.

| | | |
|---|---|---|
| **Average power sensors** | | |
| 100 pW to 200 mW, 8 kHz to 6 GHz | R&S®NRP6A | 1424.6796.02 |
| 100 pW to 200 mW, 8 kHz to 6 GHz, LAN version | R&S®NRP6AN | 1424.6809.02 |
| 100 pW to 200 mW, 9 kHz to 6 GHz [15] | R&S®NRP-Z91 | 1168.8004.02 |
| 100 pW to 200 mW, 8 kHz to 18 GHz | R&S®NRP18A | 1424.6815.02 |
| 100 pW to 200 mW, 8 kHz to 18 GHz, LAN version | R&S®NRP18AN | 1424.6821.02 |
| **Three-path diode power sensors** | | |
| 100 pW to 200 mW, 10 MHz to 8 GHz | R&S®NRP8S | 1419.0006.02 |
| 100 pW to 200 mW, 10 MHz to 8 GHz, LAN version | R&S®NRP8SN | 1419.0012.02 |
| 100 pW to 200 mW, 10 MHz to 18 GHz | R&S®NRP18S | 1419.0029.02 |
| 100 pW to 200 mW, 10 MHz to 18 GHz, LAN version | R&S®NRP18SN | 1419.0035.02 |
| 1 nW to 2 W, 10 MHz to 18 GHz | R&S®NRP18S-10 | 1424.6721.02 |
| 10 nW to 15 W, 10 MHz to 18 GHz | R&S®NRP18S-20 | 1424.6738.02 |
| 30 nW to 30 W, 10 MHz to 18 GHz | R&S®NRP18S-25 | 1424.6744.02 |
| 100 pW to 200 mW, 10 MHz to 33 GHz | R&S®NRP33S | 1419.0064.02 |
| 100 pW to 200 mW, 10 MHz to 33 GHz, LAN version | R&S®NRP33SN | 1419.0070.02 |
| 100 pW to 200 mW, 10 MHz to 33 GHz, LAN version, TVAC-compliant | R&S®NRP33SN-V | 1419.0129.02 |
| 100 pW to 100 mW, 50 MHz to 40 GHz | R&S®NRP40S | 1419.0041.02 |
| 100 pW to 100 mW, 50 MHz to 40 GHz, LAN version | R&S®NRP40SN | 1419.0058.02 |
| 100 pW to 100 mW, 50 MHz to 50 GHz | R&S®NRP50S | 1419.0087.02 |
| 100 pW to 100 mW, 50 MHz to 50 GHz, LAN version | R&S®NRP50SN | 1419.0093.02 |
| **Wideband power sensors** | | |
| 1 nW to 100 mW, 50 MHz to 18 GHz [16] | R&S®NRP-Z81 | 1137.9009.02 |
| 1 nW to 100 mW, 50 MHz to 40 GHz, 2.92 mm [16] | R&S®NRP-Z85 | 1411.7501.02 |
| 1 nW to 100 mW, 50 MHz to 40 GHz, 2.40 mm [16] | R&S®NRP-Z86 | 1417.0109.40 |
| 1 nW to 100 mW, 50 MHz to 44 GHz, 2.40 mm [16] | R&S®NRP-Z86 | 1417.0109.44 |

| | | |
|---|---|---|
| **Warranty** | | |
| Base unit | | 3 years |
| All other items [17] | | 1 year |
| Service options | | |
| Extended warranty, one year | R&S®WE1 | Contact your local Rohde & Schwarz sales office. |
| Extended warranty, two years | R&S®WE2 | |
| Extended warranty with calibration coverage, one year | R&S®CW1 | |
| Extended warranty with calibration coverage, two years | R&S®CW2 | |
| Extended warranty with accredited calibration coverage, one year | R&S®AW1 | |
| Extended warranty with accredited calibration coverage, two years | R&S®AW2 | |

**Extended warranty with a term of one to two years (WE1 and WE2)**
Repairs carried out during the contract term are free of charge [18]. Necessary calibration and adjustments carried out during repairs are also covered. Simply contact the forwarding agent we name; your product will be picked up free of charge and returned to you in top condition a couple of days later.

**Extended warranty with calibration (CW1 and CW2)**
Enhance your extended warranty by adding calibration coverage at a package price. This package ensures that your Rohde & Schwarz product is regularly calibrated, inspected and maintained during the term of the contract. It includes all repairs [18] and calibration at the recommended intervals as well as any calibration carried out during repairs or option upgrades.

**Extended warranty with accredited calibration (AW1 and AW2)**
Enhance your extended warranty by adding accredited calibration coverage at a package price. This package ensures that your Rohde & Schwarz product is regularly calibrated under accreditation, inspected and maintained during the term of the contract. It includes all repairs [18] and accredited calibration at the recommended intervals as well as any accredited calibration carried out during repairs or option upgrades.



[16] Product discontinued.

[17] For options that are installed, the remaining base unit warranty applies if longer than 1 year. Exception: all batteries have a 1 year warranty.

[18] Excluding defects caused by incorrect operation or handling and force majeure. Wear-and-tear parts are not included.

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