

R&S® ZNL VECTOR NETWORK ANALYZER

Specifications

3
year
warranty



Data Sheet
Version 05.00

ROHDE & SCHWARZ

Make ideas real



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Definitions

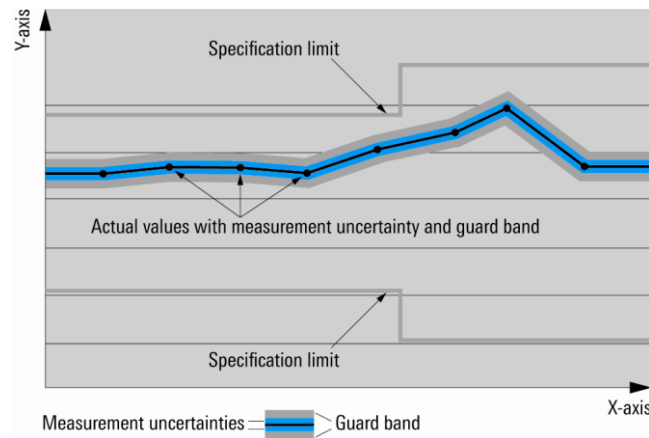
General

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.



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

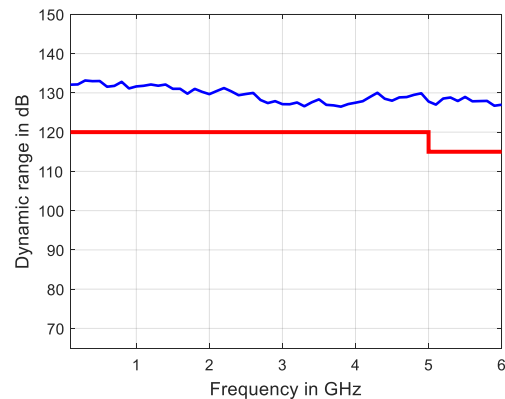
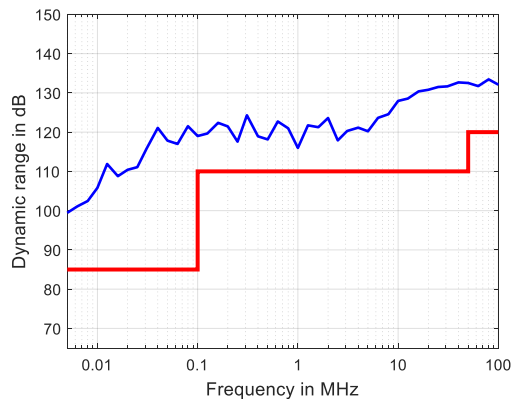
Measurement range

| | | |
|------------------------------|----------|------------------|
| Impedance | | 50 Ω |
| Test port connector | | N female |
| Number of test ports | | 2 |
| Frequency range ¹ | R&S®ZNL3 | 5 kHz to 3 GHz |
| | R&S®ZNL4 | 5 kHz to 4.5 GHz |
| | R&S®ZNL6 | 5 kHz to 6 GHz |

| | | |
|---|--|---|
| Static frequency accuracy | | (time since last adjustment \times aging rate) + temperature drift + calibration accuracy |
| Aging per year | standard | $\pm 1 \times 10^{-6}$ |
| | with R&S®FPL-B4 precision frequency reference option | $\pm 1 \times 10^{-7}$ |
| Temperature drift (+5 °C to +40 °C) | standard | $\pm 1 \times 10^{-6}$ |
| | with R&S®FPL-B4 precision frequency reference option | $\pm 1 \times 10^{-8}$ |
| Achievable initial calibration accuracy | standard | $\pm 5 \times 10^{-7}$ |
| | with R&S®FPL-B4 precision frequency reference option | $\pm 5 \times 10^{-8}$ |

| | | |
|------------------------------|---------------------|-----------------|
| Frequency resolution | | 1 Hz |
| Number of measurement points | per trace | 1 to 100 001 |
| Measurement bandwidth | 1/1.5/2/3/5/7 steps | 1 Hz to 500 kHz |

| | | specification | typical |
|-------------------------------|-------------------|---------------|---------|
| Dynamic range ^{1, 2} | 5 kHz to 100 kHz | > 85 dB | 110 dB |
| | 100 kHz to 10 MHz | > 100 dB | 120 dB |
| | 10 MHz to 50 MHz | > 110 dB | 120 dB |
| | 50 MHz to 4.5 GHz | > 120 dB | 130 dB |
| | 4.5 GHz to 6 GHz | > 115 dB | 125 dB |



Dynamic range in dB versus frequency for the R&S®ZNL

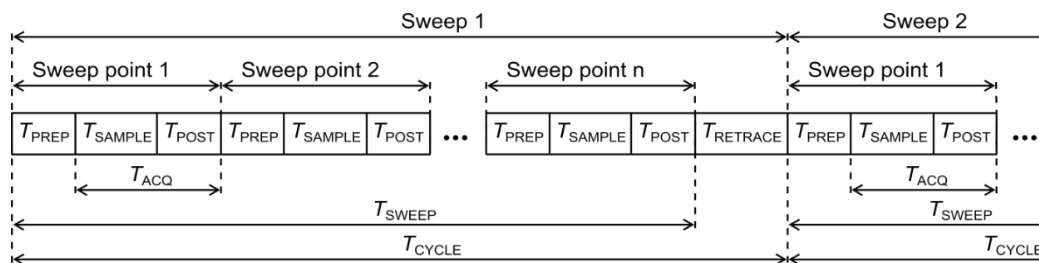
¹ Specified and typical data given in this data sheet applies to the R&S®ZNL3, R&S®ZNL4 and R&S®ZNL6; please note their respective frequency ranges.

² The dynamic range is defined as the difference between 0 dBm source power and the RMS value of the data trace of the transmission magnitude, which is produced by noise and crosstalk with the test ports short-circuited. The specification applies at 10 Hz measurement bandwidth, without system error correction. The dynamic range can be increased by using a measurement bandwidth of 1 Hz.

Measurement speed

Measured with firmware version 1.00 and Windows 10, 64 bit.

| | | | | |
|--|---|--------------------|--------------------|--------------|
| Measurement time | for 201 measurements points, with 200 MHz span, 500 kHz measurement bandwidth | T_{SWEEP} | T_{CYCLE} | |
| | with 900 MHz center frequency | < 4.0 ms | < 5.0 ms | |
| Acquisition time per point (T_{ACQ}) | 500 kHz measurement bandwidth, CW mode | < 10 μs | | |
| Sampling time per point (T_{SAMPLE}) IF filter: normal | at 500 kHz measurement bandwidth | 4.5 μs | | |
| Time for measurement and data transfer | for 201 measurements points, with 800 MHz start frequency, 1 GHz stop frequency, 500 kHz measurement bandwidth ³ | IEC/IEEE | VXI11 | HiSLIP |
| | | meas. 10 ms | over 1 Gbit/s LAN | |
| Data transfer time | for 201 measurements points (magnitude) | meas. 3 ms | meas. 2.5 ms | meas. 2.5 ms |
| Switching time between channels | with a maximum of 2001 points | < 5 ms | | |
| Switching time between two preloaded instrument settings | with a maximum of 2001 points | < 5 ms | | |



- T_{PREP} Preparation time required to set up the internal hardware components
- T_{SAMPLE} Sampling time (approximately equal to the settling time of the digital filters)
- T_{POST} Time required for hardware postprocessing
- T_{ACQ} Acquisition time ($T_{\text{SAMPLE}} + T_{\text{POST}}$)
- T_{SWEEP} Time required for one sweep
- T_{RETRACE} Time between two sweeps
- T_{CYCLE} Sweep cycle time ($T_{\text{SWEEP}} + T_{\text{RETRACE}}$)

Measurement sequence

| Typical sweep times versus number of measurement points ^{1, 4} | | | | | |
|--|--------|---------|---------|---------|----------|
| Number of measurement points | 51 | 201 | 401 | 1601 | 5001 |
| 800 MHz start frequency, 1 GHz stop frequency, 100 kHz measurement bandwidth | | | | | |
| With correction switched off | 2.4 ms | 4.9 ms | 8.7 ms | 31.2 ms | 94 ms |
| With 2-port TOSM calibration | 3.9 ms | 9.6 ms | 16.7 ms | 61.7 ms | 189 ms |
| 800 MHz start frequency, 1 GHz stop frequency, 1 kHz measurement bandwidth | | | | | |
| With correction switched off | 66 ms | 258 ms | 515 ms | 2055 ms | 6400 ms |
| With 2-port TOSM calibration | 132 ms | 515 ms | 1028 ms | 4100 ms | 12780 ms |
| 100 MHz start frequency, 3 GHz stop frequency, 100 kHz measurement bandwidth | | | | | |
| With correction switched off | 3.9 ms | 9.1 ms | 14.5 ms | 36.7 ms | 102 ms |
| With 2-port TOSM calibration | 7.3 ms | 17.7 ms | 28.8 ms | 73.3 ms | 206 ms |
| 100 MHz start frequency, 3 GHz stop frequency, 1 kHz measurement bandwidth | | | | | |
| With correction switched off | 68 ms | 262 ms | 519 ms | 2055 ms | 6390 ms |
| With 2-port TOSM calibration | 136 ms | 524 ms | 1040 ms | 4110 ms | 12800 ms |
| 100 MHz start frequency, 6 GHz stop frequency, 100 kHz measurement bandwidth | | | | | |
| With correction switched off | 3.9 ms | 9.5 ms | 15.4 ms | 47 ms | 104 ms |
| With 2-port TOSM calibration | 7.3 ms | 18.8 ms | 30.5 ms | 95 ms | 209 ms |
| 100 MHz start frequency, 6 GHz stop frequency, 1 kHz measurement bandwidth | | | | | |
| With correction switched off | 68 ms | 263 ms | 521 ms | 2070 ms | 6400 ms |
| With 2-port TOSM calibration | 136 ms | 525 ms | 1042 ms | 4120 ms | 12800 ms |

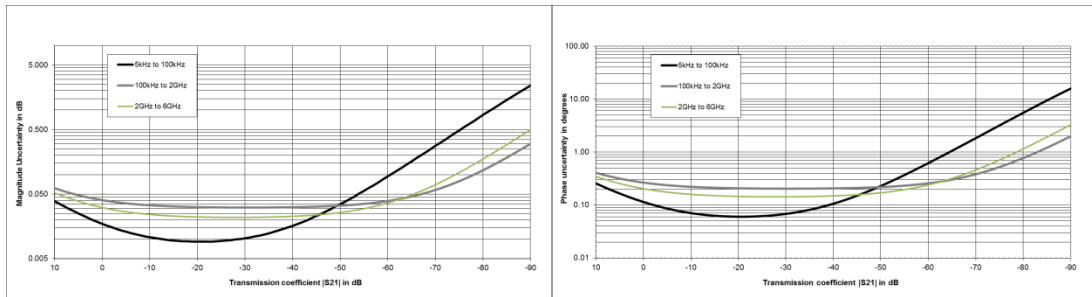
³ In continuous mode, no additional time for data transfer is needed as this occurs simultaneously during the measurement.

⁴ Sweep time is to be understood as cycle time; static frequency accuracy of the instrument applies; measured with firmware version 1.00, Windows 10.

Measurement accuracy

This data is valid between +18 °C and +28 °C, provided the temperature has not varied by more than 1 °C since calibration. Validity of the data is conditional on the use of an R&S®ZV-Z270 calibration kit and TOSM/SOLT calibration. This calibration kit is used to achieve the effective system data specified below. Frequency points, measurement bandwidth and sweep time have to be identical for measurement and calibration (no interpolation allowed).

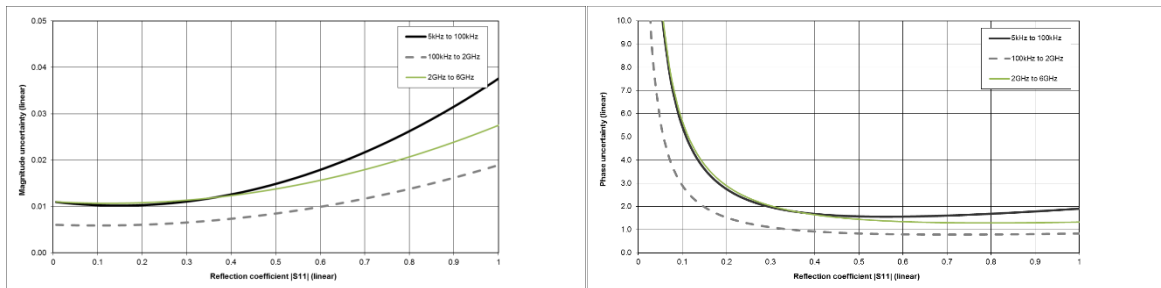
| Accuracy of transmission measurements | | |
|--|------------------|---------------------|
| Above 5 kHz | +5 dB to -35 dB | < 0.05 dB or < 0.5° |
| | -35 dB to -50 dB | < 0.1 dB or < 1° |
| | -50 dB to -65 dB | < 0.2 dB or < 2° |
| Specifications are based on a matched DUT, a measurement bandwidth of 10 Hz and a nominal source power of -10 dBm. | | |



Typical accuracy of transmission magnitude and transmission phase measurements for the R&S®ZNL 1; analysis conditions: $S_{11} = S_{22} = 0$, calibrated power -10 dBm, measured power -10 dBm

| Accuracy of reflection measurements | logarithmic | | | linear | |
|-------------------------------------|-------------|-----------|--------|--------------------|-----------|
| | | magnitude | phase | | magnitude |
| 100 kHz to 2 GHz | 0 dB | ≤ 0.12 dB | ≤ 0.8° | 0 dB to -3 dB | 0.014 |
| | -3 dB | ≤ 0.12 dB | ≤ 0.8° | < -3 dB to -6 dB | 0.009 |
| | -6 dB | ≤ 0.12 dB | ≤ 0.8° | < -6 dB to -15 dB | 0.007 |
| | -15 dB | ≤ 0.30 dB | ≤ 2.0° | < -15 dB to -25 dB | 0.006 |
| | -25 dB | ≤ 0.90 dB | ≤ 6.0° | < -25 dB to -35 dB | 0.006 |
| 2 GHz to 6 GHz | 0 dB | ≤ 0.20 dB | ≤ 1.3° | 0 dB to -3 dB | 0.024 |
| | -3 dB | ≤ 0.20 dB | ≤ 1.3° | < -3 dB to -6 dB | 0.016 |
| | -6 dB | ≤ 0.23 dB | ≤ 1.5° | < -6 dB to -15 dB | 0.013 |
| | -15 dB | ≤ 0.60 dB | ≤ 4.0° | < -15 dB to -25 dB | 0.012 |
| | -25 dB | ≤ 1.70 dB | ≤ 13° | < -25 dB to -35 dB | 0.012 |
| | -35 dB | ≤ 4.50 dB | ≤ 42° | | |

Specifications are based on an isolating DUT, a measurement bandwidth of 10 Hz and a nominal source power of -10 dBm.



Typical accuracy of reflection magnitude and reflection phase measurements for the R&S®ZNL 1; analysis conditions: $S_{12} = S_{21} = 0$, calibrated power -10 dBm, measured power -10 dBm

Effective system data

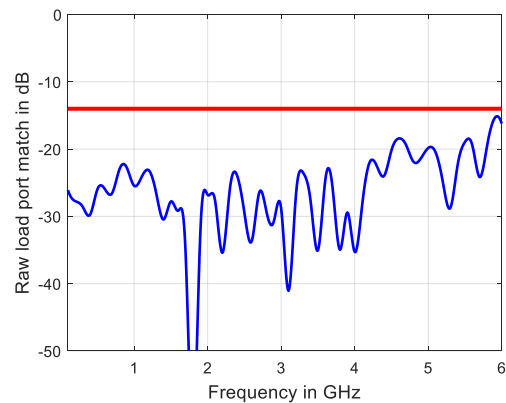
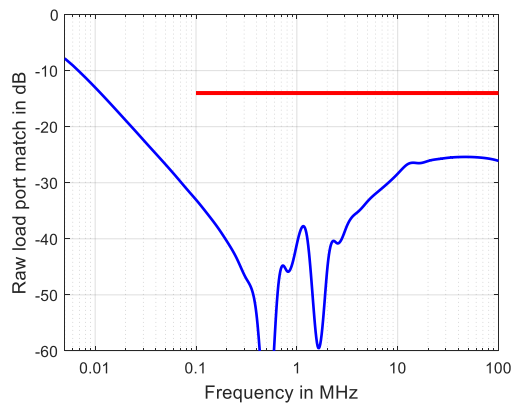
This data is valid between +18 °C and +28 °C, provided the temperature has not varied by more than 1 °C after calibration. Frequency points, measurement bandwidth and sweep time have to be identical for measurement and calibration (no interpolation allowed). The data is based on a measurement bandwidth of 10 Hz and system error calibration using TOSM/SOLT with an R&S®ZV-Z270 calibration kit.

| R&S®ZNL | 100 kHz to 2 GHz | >2 GHz to 6 GHz |
|-----------------------|------------------|-----------------|
| Directivity | ≥ 46 dB | ≥ 40 dB |
| Source match | ≥ 40 dB | ≥ 36 dB |
| Load match | ≥ 46 dB | ≥ 40 dB |
| Reflection tracking | ≤ 0.03 dB | ≤ 0.05 dB |
| Transmission tracking | ≤ 0.03 dB | ≤ 0.05 dB |

Factory-calibrated system data

This data is valid between +18 °C and +28 °C. It is based on a source power of -10 dBm and a measurement bandwidth of 1 kHz.

| | | specification | typical |
|---------------------------------|------------------|---------------|---------|
| Directivity | 100 kHz to 6 GHz | ≥ 20 dB | 35 dB |
| Source match | 100 kHz to 6 GHz | ≥ 20 dB | 35 dB |
| Reflection tracking | 100 kHz to 6 GHz | ≤ 1 dB | 0.1 dB |
| Transmission tracking | 100 kHz to 3 GHz | ≤ 1 dB | 0.1 dB |
| Transmission tracking | 3 GHz to 6 GHz | ≤ 1.5 dB | 0.2 dB |
| Load match (raw testport match) | 100 kHz to 3 GHz | ≥ 14 dB | 20 dB |
| Load match (raw testport match) | 3 GHz to 6 GHz | ≥ 12 dB | 16 dB |



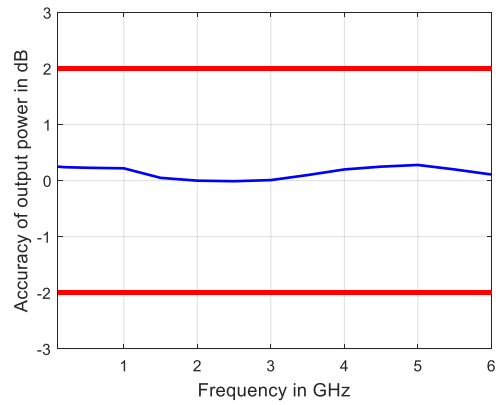
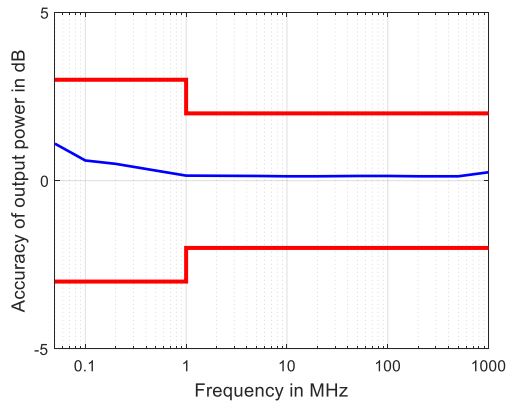
Raw load port match versus frequency for the R&S®ZNL

| Trace stability | | specification | typical | |
|-----------------------------|---|---------------|-------------|-----------|
| Trace noise magnitude (RMS) | at 0 dBm source power, 0 dB reflection | IF bandwidth | | |
| | 100 kHz to 10 MHz | 10 kHz | < 0.0035 dB | 0.0005 dB |
| | 10 MHz to 6 GHz | 10 kHz | < 0.0025 dB | 0.0005 dB |
| Trace noise phase (RMS) | at 0 dBm source power, 0 dB reflection | IF bandwidth | | |
| | 100 kHz to 10 MHz | 10 kHz | < 0.05 | |
| | 10 MHz to 6 GHz | 10 kHz | < 0.03 | 0.005° |
| Temperature dependence | at 0 dB transmission or reflection | | | |
| | 100 kHz to 6 GHz | magnitude | | 0.03 dB/K |
| | | phase | | 0.8°/K |

Test port output

This data is valid from +18 °C to +28 °C.

| | | specification | typical |
|--|--|-------------------|--------------|
| Power range of the R&S®ZNL ¹ | without R&S®ZNL-B22 extended power range option ¹ | | |
| | 5 kHz to 100 kHz | -10 dBm to -3 dBm | up to +3 dBm |
| | 100 kHz to 6 GHz | -10 dBm to 0 dBm | up to +3 dBm |
| | with R&S®ZNL-B22 extended power range option ¹ | | |
| | 5 kHz to 100 kHz | -40 dBm to -3 dBm | up to +3 dBm |
| | 100 kHz to 6 GHz | -40 dBm to 0 dBm | up to +3 dBm |
| Power accuracy of the R&S®ZNL ¹ | source power -10 dBm | | |
| | 5 kHz to 100 kHz | ≤ 3 dB | |
| | 100 kHz to 6 GHz | ≤ 2 dB | 0.5 dB |
| Power linearity | referenced to -10 dBm | | |
| | 100 kHz to 6 GHz | ≤ 1 dB | 0.25 dB |
| Power resolution | | 0.01 dB | |
| Harmonics | source power -10 dBm | | |
| | 100 kHz to 6 GHz | ≤ -25 dBc | -40 dBc |

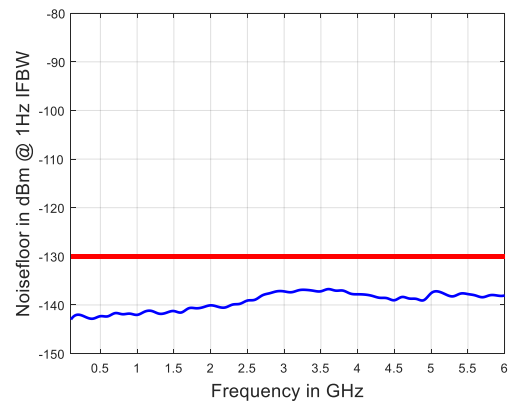
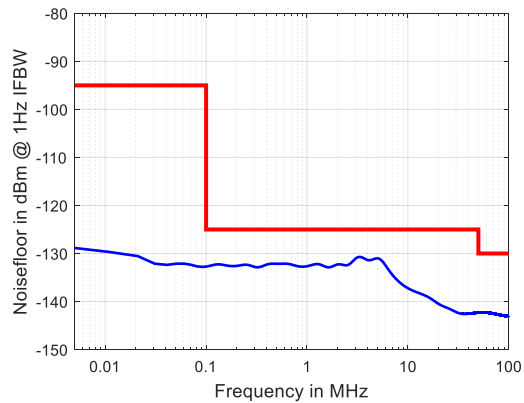


Output power accuracy in dB versus frequency for the R&S®ZNL base unit

Test port input

| | | specification | typical |
|--|--------------------------------------|-------------------|-----------------|
| Maximum nominal input level | | 0 dBm | |
| Power measurement accuracy | at -10 dBm without power calibration | | |
| | 9 kHz to 100 kHz | ≤ 2 dB | 0.3 dB |
| | 100 kHz to 6 GHz | ≤ 1.5 dB | 0.3 dB |
| Receiver linearity referenced to -10 dBm | +10 dB to +5 dB | ≤ 0.25 dB | 0.1 dB |
| | +5 dB to -40 dB | ≤ 0.15 dB | 0.05 dB |
| Damage level | | +27 dBm | |
| Damage DC voltage | | 30 V | |
| Noise level at 1 kHz measurement bandwidth, normalized to 1 Hz | 5 kHz to 100 kHz | < -95 dBm (1 Hz) | -120 dBm (1 Hz) |
| | 100 kHz to 50 MHz | < -120 dBm (1 Hz) | -130 dBm (1 Hz) |
| | 50 MHz to 4.5 GHz | < -130 dBm (1 Hz) | -140 dBm (1 Hz) |
| | 4.5 GHz to 6 GHz | < -125 dBm (1 Hz) | -135 dBm (1 Hz) |

The noise level is defined as the RMS value of the specified noise floor.



Noise level in dBm (1 Hz) versus frequency for the R&S®ZNL

Display

| | |
|--------------------|--|
| Screen | 26.4 cm (10.1") diagonal WXGA color LCD with touchscreen |
| Resolution | 1280 × 800 × 262144 (high color, 125 dpi) |
| Pixel failure rate | $< 1 \times 10^{-5}$ |

Front panel connectors

| | |
|-----|--|
| USB | two universal serial bus connectors for connecting USB devices (USB 2.0); two additional USB 3.0 connectors on rear panel |
|-----|--|

Rear panel connectors

| | |
|-----|---|
| LAN | local area network connector, 10/100/1000BASE-T, 8-pin, RJ-45 |
|-----|---|

| | |
|-----|---|
| USB | two universal serial bus connectors for connecting USB devices (USB 3.0); two additional USB 2.0 connectors on front panel |
|-----|---|

| | |
|---------|--|
| MONITOR | DVI-D connector (for external monitor) |
|---------|--|

| | | |
|-------------------------------|---|----------------------------|
| REF IN | input for external frequency reference signal | |
| Connector type | | BNC, female |
| Input frequency | | 10 MHz |
| Maximum permissible deviation | | 1 kHz |
| Input power | | -10 dBm to +15 dBm at 50 Ω |
| Input impedance | | > 10 kΩ |

| | | |
|---------------------------|--|-----------------------|
| REF OUT | output for external frequency reference signal | |
| Connector type | | BNC, female |
| Output frequency | | 10 MHz |
| Output frequency accuracy | | 80 Hz |
| Output power | | +6 dBm ± 4 dB at 50 Ω |

| | | |
|--|----------------------------|----------------------|
| EXT TRIG IN | trigger input for analyzer | |
| Connector type | | BNC, female |
| TTL signal (edge-triggered or level-triggered) | | 3 V, 5 V tolerant |
| Polarity (selectable) | | positive or negative |
| Minimum pulse width | | 1 μs |
| Input impedance | | > 10 kΩ |

Options

R&S®ZNL3-B1, R&S®ZNL4-B1 and R&S®ZNL6-B1 spectrum analysis

Input

| RF input | | |
|-----------------------------|--------------------|-------------------------------|
| Impedance | | 50 Ω |
| Connector | | N female |
| VSWR | 10 MHz ≤ f ≤ 3 GHz | < 1.5 (nom.) |
| | 3 GHz < f ≤ 6 GHz | < 1.7 (nom.) |
| Setting range of attenuator | | 0 dB to 30 dB, in 10 dB steps |

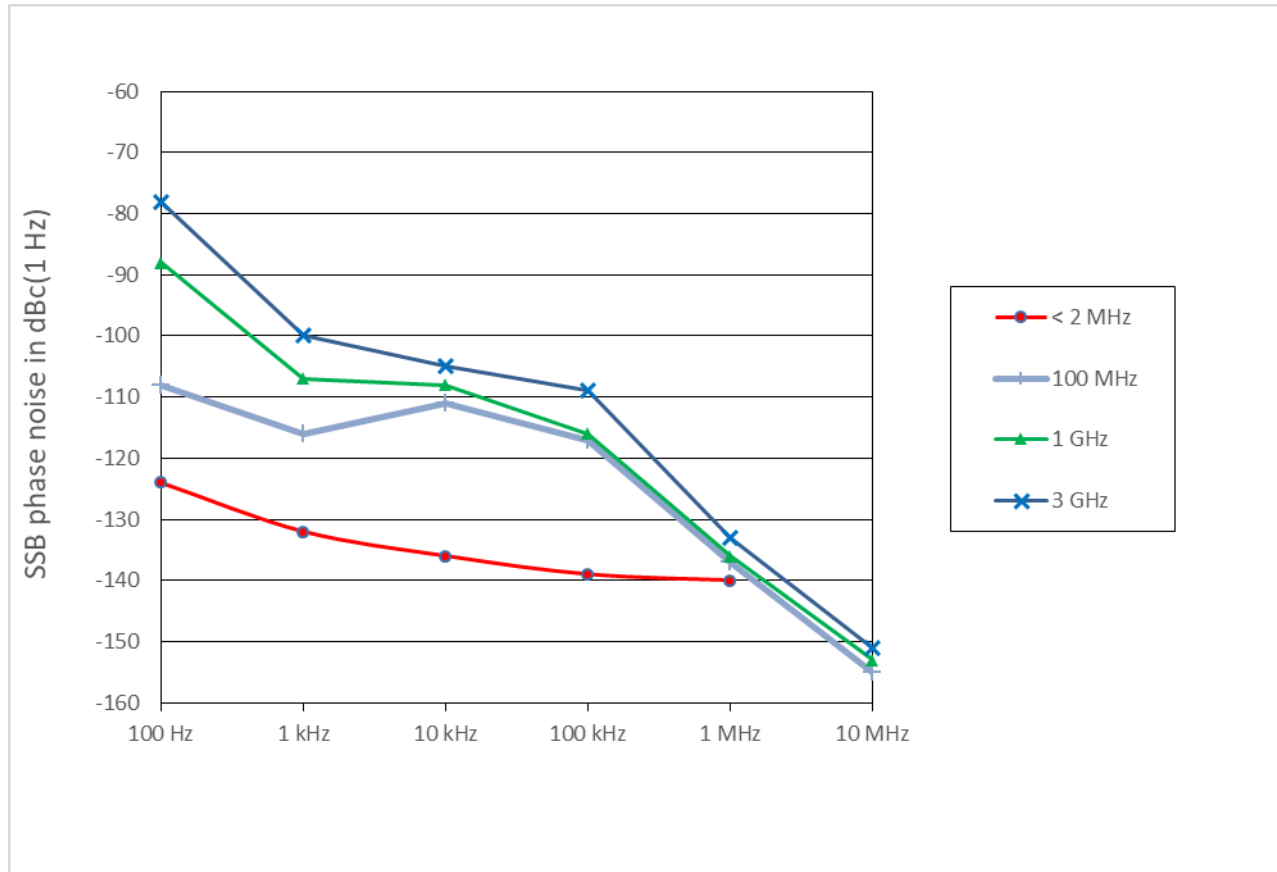
Frequency

| | | |
|----------------------|-------------|------------------|
| Frequency range | R&S®ZNL3-B1 | 5 kHz to 3 GHz |
| | R&S®ZNL4-B1 | 5 kHz to 4.5 GHz |
| | R&S®ZNL6-B1 | 5 kHz to 6 GHz |
| Frequency resolution | | 0.01 Hz |

| | |
|-------------------------------|--------------------------------|
| Reference frequency, internal | see section: Measurement range |
|-------------------------------|--------------------------------|

| 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 |
| 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 | specification | typical | nominal |
|------------------------------------|--------------------------------------|-------------------|-----------------|-----------------|
| | 100 Hz | | | |
| 1 kHz | | | | -107 dBc (1 Hz) |
| 10 kHz | | < -103 dBc (1 Hz) | -108 dBc (1 Hz) | |
| 100 kHz | | < -110 dBc (1 Hz) | -115 dBc (1 Hz) | |
| 1 MHz | | < -128 dBc (1 Hz) | -133 dBc (1 Hz) | |
| 10 MHz | | | | -153 dBc (1 Hz) |



Typical phase noise at different center frequencies

Sweep time

| | | |
|---------------------|---------------------------------------|-----------------------------------|
| Range | span = 0 Hz | 1 μ s to 8000 s |
| | span \geq 10 Hz, RBW \geq 100 kHz | 1 ms to 8000 s ⁵ |
| | span \geq 10 Hz, RBW < 100 kHz | 75 μ s to 8000 s ⁶ |
| Sweep time accuracy | span = 0 Hz | 0.1 % (nom.) |
| | span \geq 10 Hz, RBW \geq 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.) |

⁵ Net sweep time without additional hardware settling time.

⁶ Time for data acquisition for FFT calculation.

| Channel filters | | |
|--|--------------------------|--|
| Bandwidths (-3 dB) | | 100 Hz, 200 Hz, 300 Hz, 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.) |
| Video bandwidths | | |
| | standard | 1 Hz to 10 MHz in 1/2/3/5 sequence |
| Signal analysis bandwidth (equalized) | | |
| | standard | 10 MHz (nom.) |
| | with R&S®FPL1-B40 option | 40 MHz (nom.) |

Level

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

| Intermodulation | | |
|-----------------------------------|---|-------------------------|
| Third order intercept point (TOI) | RF attenuation 0 dB, level 2×-20 dBm, $\Delta f > 5 \times$ RBW or 10 kHz, whichever is larger | |
| | $10 \text{ MHz} \leq f_{in} < 300 \text{ MHz}$ | > 13 dBm, 20 dBm (typ.) |
| | $300 \text{ MHz} \leq f_{in} < 3 \text{ GHz}$ | > 16 dBm, 22 dBm (typ.) |
| | $3 \text{ GHz} \leq f_{in} < 6 \text{ GHz}$ | > 13 dBm, 18 dBm (typ.) |
| Second harmonic intercept (SHI) | RF attenuation 0 dB, level -13 dBm | |
| | $1 \text{ MHz} < f_{in} \leq 900 \text{ MHz}$ | 45 dBm (nom.) |
| | $900 \text{ MHz} < f_{in} \leq 1.5 \text{ GHz}$ | 70 dBm (nom.) |

| Displayed average noise level (DANL) | | |
|--|--|-----------------------------|
| termination 50 Ω , log. scaling, normalized to 1 Hz RBW, RBW = 1 kHz, VBW = 1 Hz, sample detector, +18 °C to +28 °C | | |
| RF attenuation 0 dB | $5 \text{ kHz} \leq f < 100 \text{ kHz}$ | -130 dBm (typ.) |
| | $100 \text{ kHz} \leq f < 5 \text{ MHz}$ | < -135 dBm, -145 dBm (typ.) |
| | $5 \text{ MHz} \leq f < 4.5 \text{ GHz}$ | < -140 dBm, -150 dBm (typ.) |
| | $4.5 \text{ GHz} \leq f < 6 \text{ GHz}$ | < -137 dBm, -147 dBm (typ.) |

| | | |
|-----------------------------------|---|------------------|
| Spurious responses | RF attenuation 0 dB, sweep optimization: auto or dynamic | |
| Image response | $10 \text{ MHz} \leq f \leq 3 \text{ GHz}$ | |
| | $f_{in} - 2 \times 4020.4 \text{ MHz}$ (1st IF) | < -90 dBc (nom.) |
| | $f_{in} - 2 \times 820.4 \text{ MHz}$ (2nd IF) | < -80 dBc |
| | $f_{in} - 2 \times 20.4 \text{ MHz}$ (3rd IF), RBW $\leq 5 \text{ MHz}$ | < -80 dBc |
| | $3 \text{ GHz} < f \leq 6 \text{ GHz}$ | < -70 dBc (nom.) |
| Intermediate frequency response | $2 \text{ MHz} \leq f \leq 3 \text{ GHz}$ | |
| | 1st IF (4020.4 MHz) | < -80 dBc (nom.) |
| | 2nd IF (820.4 MHz) | < -80 dBc |
| | 3rd IF (20.4 MHz) | < -80 dBc |
| | $3 \text{ GHz} < f \leq 6 \text{ GHz}$ | < -70 dBc (nom.) |
| Residual spurious response | RF attenuation 0 dB, | |
| | $f \leq 1 \text{ MHz}$ | < -90 dBm (nom.) |
| | $f > 1 \text{ MHz}$ | < -90 dBm |
| Local oscillator related spurious | $f < 3 \text{ GHz}$, RF attenuation 10 dB, RF input -10 dBm | |
| | $1 \text{ kHz} \leq$ carrier offset $\leq 10 \text{ MHz}$ | < -70 dBc (nom.) |
| | carrier offset $> 10 \text{ MHz}$ | < -80 dBc (nom.) |
| | $3 \text{ GHz} < f \leq 6 \text{ GHz}$ | < -70 dBc (nom.) |
| Other interfering signals | | |
| Subharmonic of 1st LO | $20 \text{ MHz} \leq f < 3 \text{ GHz}$, spurious at $4020.4 \text{ MHz} - 2 \times f_{in}$ | < -80 dBc (nom.) |
| Harmonic of 1st LO | mixer level $< -25 \text{ dBm}$, spurious at $f_{in} - 2010.2 \text{ MHz}$ | < -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 |
| Setting range of reference level | | -130 dBm to (-10 dBm + RF attenuation) 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 | |
| | +18 °C to +28 °C | < 0.5 dB ($\sigma = 0.1$ dB) |
| | +5 °C to +40 °C | < 1 dB ($\sigma = 0.17$ dB) |
| R&S®ZNL3 | RF attenuation 0 dB, 10 dB, 20 dB, 30 dB, +18 °C to +28 °C | |
| Frequency response referenced to 50 MHz | 5 kHz ≤ f ≤ 3 MHz | < 1 dB (nom.) |
| | 3 MHz < f ≤ 10 MHz | < 0.8 dB (nom.) |
| | 10 MHz < f ≤ 3 GHz | < 0.8 dB ($\sigma = 0.1$ dB) |
| R&S®ZNL4 and R&S®ZNL6 | RF attenuation 0 dB, 10 dB, 20 dB, 30 dB, +18 °C to +28 °C | |
| Frequency response referenced to 50 MHz | 5 kHz ≤ f ≤ 3 MHz | < 1 dB (nom.) |
| | 3 MHz < f ≤ 10 MHz | < 0.8 dB (nom.) |
| | 10 MHz < f ≤ 2.9 GHz | < 0.8 dB ($\sigma = 0.1$ dB) |
| | 2.9 GHz < f ≤ 6 GHz | < 1.3 dB ($\sigma = 0.1$ dB) |
| Attenuator switching uncertainty | f = 50 MHz, 0 dB to 30 dB, referenced to 10 dB attenuation | < 0.3 dB ($\sigma = 0.07$ dB) |
| Uncertainty of reference level setting | | 0 dB ⁷ |
| Bandwidth switching uncertainty | referenced to RBW = 10 kHz | |
| | RBW ≥ 1 MHz | < 0.3 dB (nom.) |
| | 100 kHz ≤ RBW < 1 MHz | < 0.2 dB (nom.) |
| | RBW < 100 kHz | < 0.1 dB (nom.) |

| Nonlinearity of displayed level | | |
|--|-----------------------------|--------------------------------|
| Logarithmic level display | S/N > 16 dB, 0 dB to -50 dB | < 0.2 dB ($\sigma = 0.07$ 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 = sweep, RF attenuation 10 dB, 20 dB, 30 dB, span/RBW < 100, 95 % confidence level, +18 °C to +28 °C | |
| R&S®ZNL3 | 3 MHz < f ≤ 3 GHz | 1 dB |
| R&S®ZNL4 and R&S®ZNL6 | 3 MHz < f ≤ 2.9 GHz | 1 dB |
| | 2.9 GHz < f ≤ 6 GHz | 1.5 dB |

Measurement speed

| | | |
|--|--|------------------------|
| Local measurement and display update rate | 1001 sweep points, sweep optimization set to "speed" | 1 ms (1000/s) (nom.) |
| Max. sweep rate, remote operation ^{8,9} | trace average = on | 0.9 ms (1100/s) (nom.) |
| Remote measurement and LAN transfer ⁸ | | 2.8 ms (357/s) (nom.) |
| Marker peak search ⁸ | | 1.3 ms (nom.) |
| Center frequency tune + sweep + sweep data transfer ⁸ | | 15 ms (nom.) |

⁷ 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.

⁸ Measured with personal computer equipped with Intel® Core™ i7 2.8 GHz and Gbit LAN interface.

⁹ Measurement is performed with a sweep count of 1000. The indicated speed is the average speed of 1 sweep.

Trigger functions

| Trigger | | |
|-------------------------------------|-------------------|---|
| Trigger source | | free run, video, external, IF power |
| Trigger offset | span \geq 10 Hz | 50 ns to 40 s, min. resolution 50 ns (or 0.5 % of offset) |
| | span = 0 Hz | (–sweep time) to 40 s, min. resolution 50 ns (or 0.5 % of offset) |
| Maximum deviation of trigger offset | | $\pm(7.8125 \text{ ns} + (0.1 \% \times \text{trigger offset}))$ |
| IF power trigger | | |
| Sensitivity | min. signal power | –60 dBm + RF attenuation |
| | max. signal power | –15 dBm + RF attenuation |
| IF power trigger bandwidth | RBW > 5 MHz | 40 MHz (nom.) |
| | RBW \leq 5 MHz | 6 MHz (nom.) |
| Gated sweep | | |
| Gate source | | video, external, IF power |
| Gate delay | | 50 ns to 30 s, min. resolution 50 ns (or 0.5 % of delay) |
| Gate length | | 125 ns to 30 s, min. resolution 50 ns (or 0.5 % of gate length) |
| Maximum deviation of gate length | | $\pm(7.8125 \text{ ns} + (0.1 \% \times \text{gate length}))$ |

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 45 MHz |
| | with R&S®FPL-B40 option | 100 Hz to 100 MHz |
| Maximum signal analysis bandwidth (equalized) | standard | 10 MHz |
| | with R&S®FPL-B40 option | 40 MHz |
| Signal analysis bandwidth \leq 10 MHz | | |
| Amplitude flatness | | $\pm 0.3 \text{ dB (nom.)}$ |
| Deviation from linear phase | | $\pm 1^\circ \text{ (nom.)}$ |
| Signal analysis bandwidth \leq 40 MHz | | |
| Amplitude flatness | | $\pm 0.5 \text{ dB (nom.)}$ |
| Deviation from linear phase | | $\pm 1.5^\circ \text{ (nom.)}$ |

R&S®ZNL3-B22, R&S®ZNL4-B22 and R&S®ZNL6-B22 extended power range

| Extended power range | | specification | typical |
|--|-----------------|-------------------|--------------|
| Frequency range | R&S®ZNL3-B22 | 5 kHz to 3 GHz | |
| | R&S®ZNL4-B22 | 5 kHz to 4.5 GHz | |
| | R&S®ZNL6-B22 | 5 kHz to 6 GHz | |
| Power range for the R&S®ZNL ¹ | 5 kHz to 50 kHz | –40 dBm to –3 dBm | up to +3 dBm |
| | 50 kHz to 6 GHz | –40 dBm to +0 dBm | up to +3 dBm |

R&S®ZNL3-B31/-B32, R&S®ZNL4-B31/-B32 and R&S®ZNL6-B31/-B32 receiver step attenuators

| Receiver step attenuators | | |
|---------------------------|---------------------------|------------------------------|
| Frequency range | R&S®ZNL3-B31/R&S®ZNL3-B32 | 5 kHz to 3 GHz |
| | R&S®ZNL4-B31/R&S®ZNL4-B32 | 5 kHz to 4.5 GHz |
| | R&S®ZNL6-B31/R&S®ZNL6-B32 | 5 kHz to 6 GHz |
| Attenuation | | 0 dB to 30 dB in 10 dB steps |

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 | | |
|-----------------------------|--|--|
| Connector | | BNC female |
| Output | | 0 V/28 V, max. 100 mA, switchable, supply for noise source |

| Power sensor | | |
|---------------------|--|---|
| Connector | | 6-pin LEMOSA female for supported R&S®NRP-Zxx power sensors |

| 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 lin. display scale | logarithmic linear |
| Output level | center frequency > 10 MHz, span = 0 Hz, signal at reference level and center frequency | 1 V (nom.), open circuit |

| 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-B4 precision frequency reference (OCXO)

| | | |
|---|---|--|
| Static frequency accuracy | | (time since last adjustment × aging rate) + temperature drift + calibration accuracy |
| Aging per year | with R&S®FPL-B4 precision frequency reference option | $\pm 1 \times 10^{-7}$ |
| Temperature drift (+5 °C to +40 °C) | with R&S® FPL-B4 precision frequency reference option | $\pm 1 \times 10^{-8}$ |
| Achievable initial calibration accuracy | with R&S® FPL-B4 precision frequency reference option | $\pm 5 \times 10^{-8}$ |

R&S®FPL1-B10 GPIB interface

| | |
|-----------------------|---|
| GPIB interface | remote control interface in line with IEEE 488, IEC 60625; 24-pin |
|-----------------------|---|

R&S®FPL1-B30 DC power input 12 V/24 V

| | | |
|---------------------|---|--|
| Input voltage range | | 10.4 V to 28 V, switch-on voltage > 11 V |
| Input current | $V_{in} = 12\text{ V}/24\text{ V}$, operating mode, without internal batteries (R&S®FPL1-B31) | 5.5 A/2.7 A (nom.) |
| | $V_{in} = 12\text{ V}/24\text{ V}$, operating mode, internal batteries in charge mode | 11 A/5 A (nom.) |
| | $V_{in} = 12\text{ V}/24\text{ V}$, instrument standby mode, internal batteries in charge mode | 6.5 A/3 A (nom.) |
| Temperature | operating temperature range | +5 °C to +40 °C |
| | storage temperature range | -20 °C to +70 °C |

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

| | | |
|----------------|---|--------------------------------|
| Operating time | | 3.5 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 | +5 °C to +40 °C |
| | storage temperature range | -20 °C to +60 °C ¹⁰ |

R&S®FSV-B34 charger (only necessary to charge 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 x H x D | 400 mm x 127 mm x 203 mm (15.75 in x 5 in x 8 in) |
| Net weight | | 3.1 kg (6.9 lb) |

¹⁰ 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 +40°C could degrade battery performance and life.

General data

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

| Environmental conditions | | |
|--------------------------|-----------------------------|--|
| Temperature | operating temperature range | +5 °C to +40 °C |
| | storage temperature range | –20 °C to +70 °C |
| Climatic loading | | +40 °C at 85 % rel. humidity, in line with EN 60068-2-30, without condensation |

| Mechanical resistance | | |
|-----------------------|------------|--|
| Vibration | sinusoidal | 5 Hz to 55 Hz 0.15 mm constant amplitude (1.8 g at 55 Hz); 55 Hz to 150 Hz acceleration: 0.5 g constant; in line with EN 60068-2-6 |
| | random | 10 Hz to 300 Hz, acceleration 1.2 g (RMS); 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 IEC/EN 61326-1 ^{11, 12} , IEC/EN 61326-2-1, CISPR 11/EN 55011 ¹¹ , IEC/EN 61000-3-2, IEC/EN 61000-3-3 |
|-----|--|---|

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

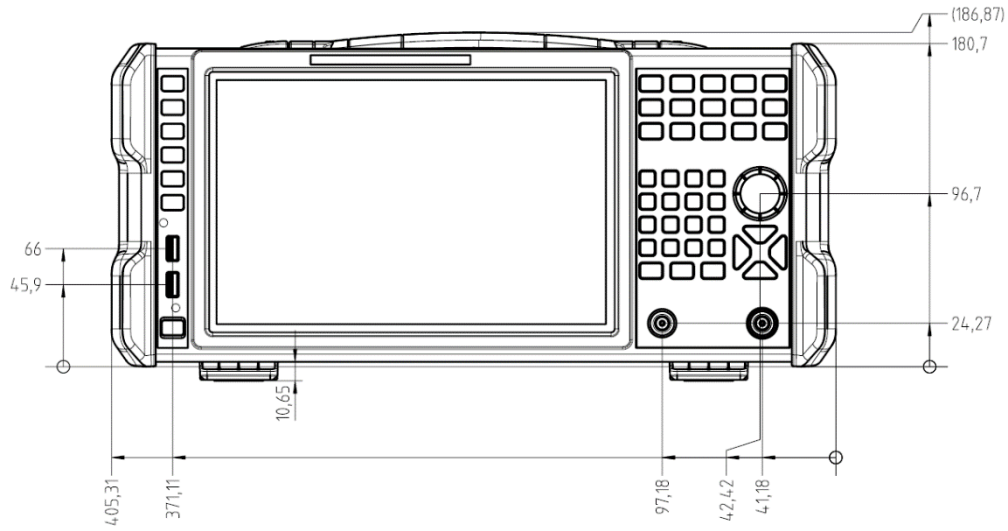
| Power supply | | |
|---------------------|--|--|
| AC supply | without battery option | 100 V to 240 V ± 10 %, 50 Hz to 60 Hz ± 5 %, 400 Hz ± 5% class of protection I; in line with VDE 411 |
| | with battery option | 100 V to 240 V ± 10 %, 50 Hz to 60 Hz ± 5 % |
| Current consumption | without options | 1.7 A to 0.8 A |
| | with internal battery (R&S®FPL1-B31 option) in charge mode | 3 A to 1.5 A |
| Power consumption | | max. 300 W, 90 W (typ.) |
| Safety | | in line with EN 61010-1, IEC 61010-1, UL 61010-1, CAN/CSA-C22.2 No. 61010-1 |
| Test mark | | CSA, CSA-NRTL |

| Dimensions and weight | | |
|-----------------------|-----------------------|---|
| Dimensions | W x H x D | 408 mm x 186 mm x 235 mm (16.06 in x 7.32 in x 9.25 in) |
| Net weight, nominal | without options | 6 kg (13.22 lb) |
| | with internal battery | 7.3 kg (16 lb) |

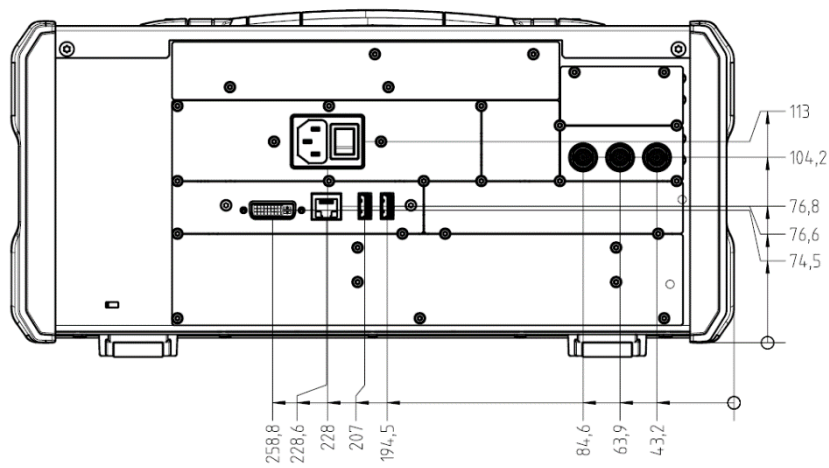
¹¹ Emission limits for class A equipment.

¹² Immunity test requirement for industrial environment (EN 61326 table 2).

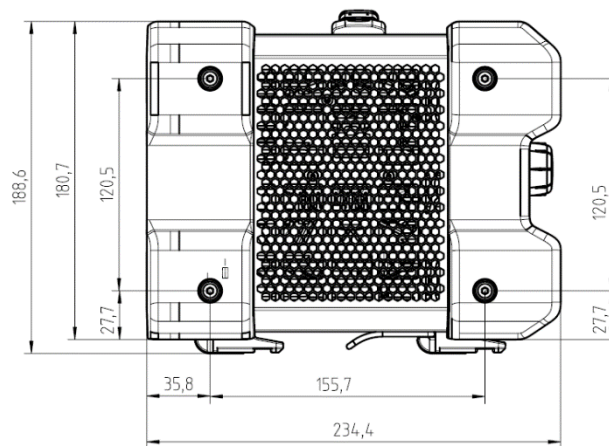
Dimensions (in mm)



Front view of the R&S®ZNL



Rear view of the R&S®ZNL



Side view of the R&S®ZNL

Ordering information

| Designation | Type | Retrofit ¹³ | On Site ¹⁴ | Order No. |
|--|--------------|------------------------|-----------------------|--------------|
| Base unit | | | | |
| Vector network analyzer, two ports, 3 GHz, N | R&S®ZNL3 | | | 1323.0012K03 |
| Vector network analyzer, two ports, 4.5 GHz, N | R&S®ZNL4 | | | 1323.0012K04 |
| Vector network analyzer, two ports, 6 GHz, N | R&S®ZNL6 | | | 1323.0012K06 |
| Options | | | | |
| Spectrum analysis for R&S®ZNL3 | R&S®ZNL3-B1 | • | | 1323.1802.02 |
| Spectrum analysis for R&S®ZNL4 | R&S®ZNL4-B1 | • | | 1303.8099.02 |
| Spectrum analysis for R&S®ZNL6 | R&S®ZNL6-B1 | • | | 1323.2067.02 |
| Extended power range | | | | |
| Extended power range for two-port R&S®ZNL3 | R&S®ZNL3-B22 | • | | 1323.1860.02 |
| Extended power range for two-port R&S®ZNL4 | R&S®ZNL4-B22 | • | | 1303.8118.02 |
| Extended power range for two-port R&S®ZNL6 | R&S®ZNL6-B22 | • | | 1323.2021.02 |
| Receiver step attenuators | | | | |
| Receiver step attenuator, port 1, for R&S®ZNL3 | R&S®ZNL3-B31 | • | | 1323.1848.02 |
| Receiver step attenuator, port 2, for R&S®ZNL3 | R&S®ZNL3-B32 | • | | 1323.1854.02 |
| Receiver step attenuator, port 1, for R&S®ZNL4 | R&S®ZNL4-B31 | • | | 1303.8124.02 |
| Receiver step attenuator, port 2, for R&S®ZNL4 | R&S®ZNL4-B32 | • | | 1303.8130.02 |
| Receiver step attenuator, port 1, for R&S®ZNL6 | R&S®ZNL6-B31 | • | | 1323.2038.02 |
| Receiver step attenuator, port 2, for R&S®ZNL6 | R&S®ZNL6-B32 | • | | 1323.2044.02 |
| Precision frequency reference (OCXO) | R&S®FPL1-B4 | • | | 1323.1902.02 |
| Additional interface | R&S®FPL1-B5 | • | • | 1323.1883.02 |
| GPIB interface | R&S®FPL1-B10 | • | • | 1323.1890.02 |
| Second hard disk (SSD) Remark: mounted on PC board, including analyzer firmware | R&S®ZNL-B19 | • | • | 1323.2938.02 |
| DC-power supply 12 V/24 V | R&S®FPL1-B30 | • | | 1323.1877.02 |
| Internal lithium-ion battery | R&S®FPL1-B31 | • | | 1323.1725.02 |
| 40 MHz analysis bandwidth ¹⁵ | R&S®FPL1-B40 | • | • | 1323.1931.02 |
| Firmware/software | | | | |
| Time domain analysis | R&S®ZNL-K2 | • | • | 1323.1819.02 |
| Distance-to-fault measurement | R&S®ZNL-K3 | • | • | 1323.1825.02 |
| AM/FM/φM measurement demodulator ¹⁵ | R&S®FPL1-K7 | • | • | 1323.1731.02 |
| Power sensor measurement with R&S®NRP power sensors ¹⁵ | R&S®FPL1-K9 | • | • | 1323.1754.02 |
| Noise figure and gain measurements ¹⁶ | R&S®FPL1-K30 | • | • | 1323.1760.02 |

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 |
| Carrying vest holster (requires R&S®FPL1-Z2) | R&S®FPL1-Z3 | 1323.1683.02 |
| Spare lithium-ion battery pack ¹⁷ | 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 ¹⁴ | R&S®FSV-B34 | 1321.3950.02 |
| 19" rackmount kit | R&S®FPL1-Z6 | 1323.1954.02 |
| Broadband limiter, N(m to f), 50 Ω, 50 MHz to 6 GHz | R&S®ZN-B13 | 1303.7840.02 |
| Headphones | | 0708.9010.00 |
| Matching pads, 50/75 Ω | | |
| L section, matching at both ends | R&S®RAM | 0358.5414.02 |
| Series resistor, 25 Ω, matching at one end (taken into account in instrument function RF INPUT 75 Ω) | R&S®RAZ | 0358.5714.02 |
| Smart noise source | | |
| Smart noise source for noise figure and gain measurements (requires R&S® FPL1-K30) | R&S®FS-SNS26 | 1338.8008.26 |

¹³ Option may also be ordered at a later stage, upgrade in service.

¹⁴ Option may be installed by the customer on site.

¹⁵ Requires R&S®ZNL3-B1, R&S®ZNL4-B1 or R&S®ZNL6-B1 spectrum analysis option.

¹⁶ Requires R&S®ZNL3-B1, R&S®ZNL4-B1 or R&S®ZNL6-B1 spectrum analysis option + R&S®FPL1-B5 additional interface.

¹⁷ Requires R&S®FPL1-B31 internal lithium-ion battery.

| Designation | Type | Order No. |
|--|------------|---------------------------------------|
| High-power attenuators | | |
| Attenuator 100 W, 3/6/10/20/30 dB, 1 GHz | R&S®RBU100 | 1073.8495.xx (xx = 03/06/10/20/30) |
| Attenuator 50 W, 3/6/10/20/30 dB, 2 GHz | R&S®RBU50 | 1073.8695.xx (xx = 03/06/10/20/30) |
| Attenuator 50 W, 20 dB, 6 GHz | R&S®RDL50 | 1035.1700.52 |
| Connectors and cables | | |
| N-type adapter for R&S®RT-Zx probes | R&S®RT-ZA9 | 1417.0909.02 |
| 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 | 1084.7443.02 |

Power sensors supported by the R&S®FPL1-K9 option ¹⁸

| Designation | Type | Order No. |
|---|--------------|--------------|
| Universal power sensor, 10 MHz to 8 GHz, 200 mW | R&S®NRP-Z11 | 1138.3004.02 |
| Universal power sensor, 10 MHz to 18 GHz, 200 mW | R&S®NRP-Z21 | 1137.6000.02 |
| Universal power sensor, 10 MHz to 18 GHz, 2 W | R&S®NRP-Z22 | 1137.7506.02 |
| Universal power sensor, 10 MHz to 18 GHz, 15 W | R&S®NRP-Z23 | 1137.8002.02 |
| Universal power sensor, 10 MHz to 18 GHz, 30 W | R&S®NRP-Z24 | 1137.8502.02 |
| Power sensor module with power splitter, DC to 18 GHz, 500 mW | R&S®NRP-Z27 | 1169.4102.02 |
| Power sensor module with power splitter, DC to 26.5 GHz, 500 mW | R&S®NRP-Z37 | 1169.3206.02 |
| Thermal power sensor, 0 Hz to 18 GHz, 100 mW | R&S®NRP-Z51 | 1138.0005.02 |
| Thermal power sensor, 0 Hz to 40 GHz, 100 mW | R&S®NRP-Z55 | 1138.2008.02 |
| Thermal power sensor, 0 Hz to 50 GHz, 100 mW | R&S®NRP-Z56 | 1171.8201.02 |
| Thermal power sensor, 0 Hz to 67 GHz, 100 mW | R&S®NRP-Z57 | 1171.8401.02 |
| Thermal power sensor, 0 Hz to 110 GHz, 100 mW | R&S®NRP-Z58 | 1173.7031.02 |
| Wideband power sensor, 50 MHz to 18 GHz, 100 mW | R&S®NRP-Z81 | 1137.9009.02 |
| Average power sensor, 9 kHz to 6 GHz, 200 mW | R&S®NRP-Z91 | 1168.8004.02 |
| Average power sensor, 9 kHz to 6 GHz, 2 W | R&S®NRP-Z92 | 1171.7005.02 |
| Two-path diode power sensor, 10 MHz to 8 GHz, 100 mW | R&S®NRP-Z211 | 1417.0409.02 |
| Two-path diode power sensor, 10 MHz to 18 GHz, 100 mW | R&S®NRP-Z221 | 1417.0309.02 |
| Three-path diode power sensor, 100 pW to 200 mW, 10 MHz to 8 GHz | R&S®NRP8S | 1419.0006.02 |
| Three-path diode power sensor, 100 pW to 200 mW, 10 MHz to 8 GHz, LAN version | R&S®NRP8SN | 1419.0012.02 |
| Three-path diode power sensor, 100 pW to 200 mW, 10 MHz to 18 GHz | R&S®NRP18S | 1419.0029.02 |
| Three-path diode power sensor, 100 pW to 200 mW, 10 MHz to 18 GHz, LAN version | R&S®NRP18SN | 1419.0035.02 |
| Three-path diode power sensor, 100 pW to 200 mW, 10 MHz to 33 GHz | R&S®NRP33S | 1419.0064.02 |
| Three-path diode power sensor, 100 pW to 200 mW, 10 MHz to 33 GHz, LAN version | R&S®NRP33SN | 1419.0070.02 |

¹⁸ For average power measurement only.

| Warranty | | |
|---|----------------------|---|
| Base unit | | 3 years |
| All other items ¹⁹ | | 1 year |
| Options | | |
| Extended warranty, one year | R&S [®] WE1 | Please 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 and two years (WE1 and WE2)

Repairs carried out during the contract term are free of charge ²⁰. Necessary calibration and adjustments carried out during repairs are also covered.

Extended warranty with calibration coverage (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 ²⁰ 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 ²⁰ and accredited calibration at the recommended intervals as well as any accredited calibration carried out during repairs or option upgrades.

¹⁹ For options that are installed, the remaining base unit warranty applies if longer than 1 year. Exception: all batteries have a 1 year warranty.

²⁰ Excluding defects caused by incorrect operation or handling and force majeure. Wear-and-tear parts are not included.

Service that adds value

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

Rohde & Schwarz

The Rohde & Schwarz electronics group offers innovative solutions in the following business fields: test and measurement, broadcast and media, secure communications, cybersecurity, monitoring and network testing. Founded more than 80 years ago, the independent company which is headquartered in Munich, Germany, has an extensive sales and service network with locations in more than 70 countries.

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- ▶ Environmental compatibility and eco-footprint
- ▶ Energy efficiency and low emissions
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