# R&S®ZNA
# VECTOR NETWORK ANALYZER

## Specifications


Specifications
Version 20.00

ROHDE&SCHWARZ
Make ideas real

# CONTENTS

# Key performance

| | |
|---|---|
| Dynamic range | > 129 dB (specification, without options), 147 dB (typ., with options),<br>up to 170 dB (maximum attainable range, allowing full 2-port correction) |
| Sensitivity | > –120 dBm (1 Hz IF bandwidth) (spec., without options),<br>–162 dBm (1 Hz IF bandwidth) (meas., with options) [1] |
| Power sweep range | 100 dB (typ.) continuous electronic sweep range, can be shifted using<br>mechanical step attenuators |
| Source power linearity | 0.2 dB (typ., from –40 dBm to +10 dBm) |
| Receiver compression | 0.05 dB (typ., up to +8 dBm with reference to –10 dBm, at test port) |
| Trace noise | 0.005 dB (spec., RMS), 0.002 dB (typ., RMS)<br>(10 GHz, 100 kHz measurement bandwidth, 0 dB reflection) |
| Speed | 10 MHz to 43.5 GHz, 500 kHz measurement bandwidth, 1601 points,<br>2-port calibration, sweep time: 96 ms (nom.) |

**Four port instruments offering full flexibility [2]**

| | |
|---|---|
| Up to 4 sources (independently configurable, phase coherent, phase controlled), 5th source, e.g. for LO supply | allows complex measurement setups without external equipment on mixers and frequency convertors such as IM, group delay and deviation from linear phase;<br>mixer and frequency convertor measurements up to the terahertz range, phased array antenna testing, active load pull on fundamental and harmonic frequencies, etc. |
| Optional rear panel LO out | mmWave converter setups with up to 4 converters without external signal generator;<br>high-power (typ. +25 dBm) LO signal up to 26.5 GHz for mixer measurements as a 5th source |
| Optional second LO source | mixer and frequency convertor measurements with doubled speed and optimized trace noise, e.g. for mixer group delay and deviation from linear phase (K9 option) using 1 kHz measurement bandwidth;<br>group delay trace noise peak-to-peak: 200 ps reduced to 15 ps |
| 2 true receivers per port, resulting in 8 true receivers for 4-port model (no multiplexing) | true parallel and coherent data acquisition, e.g. for antenna array tests and antenna test systems, starting from 100 kHz;<br>infinite data point capture (K28 option) with circular buffer and continuous data transfer over LAN or USB |
| Up to 4 pulse modulators,<br>up to 8 pulse generators,<br>enhanced trigger/sync/ctrl/ I/O | versatile pulse generation and visualization in timing diagram combined with enhanced triggering capabilities;<br>timing control of external devices, e.g. pulse modulators, power supply, oscilloscopes or DUT, minimum pulse width: 40 ns |
| Optional direct IF access (in/out) | IF input for mmWave converter and antenna measurement systems, 1 GHz bandwidth available, IF output up to 2 GHz bandwidth for external pulse analysis |
| Selectable reference signal access (1 GHz external reference) | synchronization of external equipment (e.g. signal generators), resulting in improved performance for mmWave converters up to terahertz frequencies |
| Optional internal combiner, internal LNA, source monitor, direct receiver access, source attenuators, receiver attenuators, reverse coupler operation | various test set options for complex measurement setups |

[1] Measured at 1 kHz measurement bandwidth, normalized to 1 Hz.

[2] Respective options required.

**Two port instruments tailored for specific applications [2]**

| | |
|---|---|
| Up to 2 sources (independently configurable, phase coherent, phase controlled), 3rd source, e.g. for LO supply | allows complex measurement setups without external equipment on mixers and frequency convertors such as IM, group delay and deviation from linear phase; mixer and frequency convertor measurements up to the terahertz range, phased array antenna testing, active load pull on fundamental and harmonic frequencies, etc. |
| Optional rear panel LO out | mmWave converter setups with up to 2 converters without external signal generator; high-power (typ. +25 dBm) LO signal up to 26.5 GHz for mixer measurements as a 3rd source |
| Optional second LO source | mixer and frequency convertor measurements with doubled speed and optimized trace noise, e.g. for mixer group delay and deviation from linear phase (K9 option) using 1 kHz measurement bandwidth;<br>group delay trace noise peak-to-peak: 200 ps reduced to 15 ps |
| 2 true receivers per port, resulting in 4 true receivers for 2-port model (no multiplexing) | true parallel and coherent data acquisition, e.g. for antenna array tests and antenna test systems, starting from 100 kHz;<br>infinite data point capture (K28 option) with circular buffer and continuous data transfer over LAN or USB |
| Up to 2 pulse modulators, up to 4 pulse generators, enhanced trigger/sync/ctrl/ I/O | versatile pulse generation and visualization in timing diagram combined with enhanced triggering capabilities;<br>timing control of external devices, e.g. pulse modulators, power supply, oscilloscopes or DUT, minimum pulse width: 40 ns |
| Optional direct IF access (in/out) | IF input for mmWave converter and antenna measurement systems, 1 GHz bandwidth available, IF output up to 2 GHz bandwidth for external pulse analysis |
| Selectable reference signal access (1 GHz external reference) | synchronization of external equipment (e.g. signal generators), resulting in improved performance for mmWave converters up to terahertz frequencies |
| Optional internal combiner, internal LNA, source monitor, direct receiver access, source attenuators, receiver attenuators, reverse coupler operation | various test set options for complex measurement setups |

**Software options for comprehensive device characterization**

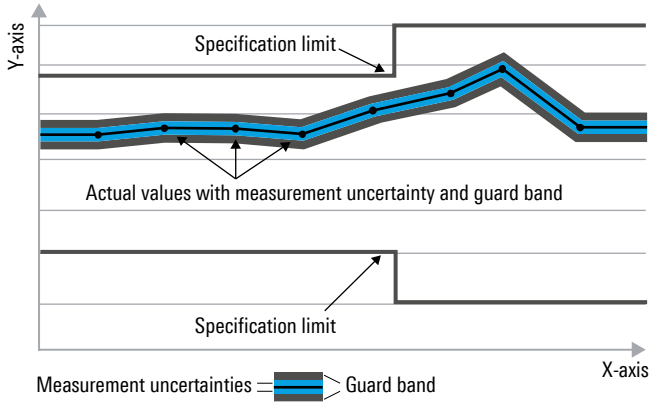
- Mixer phase measurements without external auxiliary mixer(s) and without phase reference
- Noise figure measurements on mixers and amplifiers up to 67 GHz: user guidance offering straight forward DUT setups
- Arbitrarily configurable sources and receivers, e.g. for frequency converting measurements, full flexibility
- Embedded LO converter (group delay and deviation from linear phase) characterization, including AM/AM and AM/PM conversion; intermodulation, source and load match correction, real-time LO tracking
- Phase-coherent stimulation and measurement with up to 4 sources; excellent phase accuracy of 0.1° at 10 GHz (meas.); supports arbitrary phase and amplitude control, e.g. create arbitrary phase fronts, balanced drive, quadrature drive
- True-differential measurements with full set of analysis capabilities, e.g. compression point, THD for amplifiers and I/Q mixers
- Spectrum analysis projected to calibration plane, noise level down to –162 dBm (1 Hz IF bandwidth, meas.) with optional low noise amplifier and reverse coupler operation; parallel sweeping of up to four receivers in spectrum sweep mode
- Wideband noise power ratio measurements based on trace statistics using an external signal generator
- Time domain measurements with increased time resolution for narrowband DUTs by resolution enhancement factor functionality
- Deembedding functions per the IEEE P370 standard, plus enhanced algorithms from industry-leading third parties for fixture characterization
- Real-time measurement uncertainty utilizing the traceability chain of METAS VNA Tools, integrated verification testing with traceability to various National Metrology Institutes

# Definitions

**General**
Product data applies under the following conditions:

- Three hours storage at ambient temperature followed by 90 minutes warm-up operation
- Specified environmental conditions met
- Recommended calibration interval adhered to
- All internal automatic adjustments performed, if applicable

**Specifications with limits**
Represent warranted product performance by means of a range of values for the specified parameter. These specifications are marked with limiting symbols such as <, ≤, >, ≥, ±, or descriptions such as maximum, limit of, minimum. Compliance is ensured by testing or is derived from the design. Test limits are narrowed by guard bands to take into account measurement uncertainties, drift and aging, if applicable.




**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.

# Measurement range

| | | |
|---|---|---|
| Impedance | | 50 Ω |
| Test port connector | R&S®ZNA26 | 3.5 mm, male, ruggedized |
| | R&S®ZNA43, 2.4 mm interface | 2.4 mm, male, ruggedized |
| | R&S®ZNA43, 2.92 mm interface | 2.92 mm, male, ruggedized |
| | R&S®ZNA50 | 2.4 mm, male, ruggedized |
| | R&S®ZNA67 | 1.85 mm, male, ruggedized |
| Number of test ports | R&S®ZNA26 | 2 or 4 |
| | R&S®ZNA43 | 2 or 4 |
| | R&S®ZNA50 | 2 or 4 |
| | R&S®ZNA67 | 2 or 4 |
| Frequency range [3] | R&S®ZNA26 | 10 MHz to 26.5 GHz |
| | R&S®ZNA43 | 10 MHz to 43.5 GHz |
| | R&S®ZNA50 | 10 MHz to 50 GHz |
| | R&S®ZNA67 | 10 MHz to 67 GHz |
| DC block | R&S®ZNA26, R&S®ZNA43, R&S®ZNA50 and R&S®ZNA67 | standard |

| | | |
|---|---|---|
| **Static frequency accuracy** | The static frequency accuracy is determined with the formula<br>*(time since last adjustment in years × aging per year) + temperature drift + achievable initial calibration accuracy*<br>using the values specified below. Depending on whether or not the R&S®ZNA-B4 precision frequency reference option is installed, the standard or the improved value have to be taken into account. | |
| Aging per year | standard | $\pm 1 \times 10^{-6}$ |
| | with R&S®ZNA-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®ZNA-B4 precision frequency reference option | $\pm 1 \times 10^{-8}$ |
| Achievable initial calibration accuracy | standard | $\pm 5 \times 10^{-7}$ |
| | with R&S®ZNA-B4 precision frequency reference option | $\pm 5 \times 10^{-8}$ |

| | | |
|---|---|---|
| Frequency resolution | | 1 Hz |
| Number of measurement points | per trace | 1 to 100001 |
| Measurement bandwidth | 1/1.5/2/3/5/7 steps | |
| | base unit | 1 Hz to 1.5 MHz |
| | with R&S®ZNA-K17 increased IF bandwidth (30 MHz) option | 1 Hz to 30 MHz |
| Analog frontend bandwidth | 10 MHz to 5 GHz | 50 MHz (nom.) |
| | 5 GHz to 67 GHz | 2 GHz (nom.) |

[3] Specified and typical data given in this data sheet applies to the R&S®ZNA26, R&S®ZNA43, R&S®ZNA50 and R&S®ZNA67; note the respective frequency ranges.

# Dynamic range

The receiver noise floor referred to in the following is defined as 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 user correction applied. The dynamic range can be increased by using a measurement bandwidth of 1 Hz. Crosstalk does not limit the dynamic range. Dynamic range performance is specified between port 1 and port 2 as well as between port 3 and port 4 (4-port model). Otherwise, dynamic range performance is typical.

| | | **Base unit** | | | **Base unit + R&S®ZNA-B3n [4, 5]** | | |
|---|---|---|---|---|---|---|---|
| | | **spec.** | **typ.** | **meas.** | **spec.** | **typ.** | **meas.** |
| **System dynamic range**<br><br>Difference between maximum output power and receiver noise floor (for data with additional step attenuator(s) or direct source and receiver access, refer to Options) | R&S®ZNA26, R&S®ZNA43, R&S®ZNA50 and R&S®ZNA67 | | | | | | |
| | 10 MHz to 30 MHz | > 86 dB | 96 dB | | > 86 dB | 96 dB | |
| | 30 MHz to 100 MHz | > 103 dB | 113 dB | | > 103 dB | 113 dB | |
| | 100 MHz to 500 MHz | > 117 dB | 127 dB | | > 117 dB | 127 dB | |
| | 500 MHz to 1 GHz | > 126 dB | 136 dB | | > 131 dB | 141 dB | |
| | 1 GHz to 16 GHz | > 129 dB | 139 dB | | > 137 dB | 147 dB | |
| | 16 GHz to 20 GHz | > 127 dB | 137 dB | | > 135 dB | 145 dB | |
| | 20 GHz to 30 GHz | > 123 dB | 133 dB | | > 131 dB | 141 dB | |
| | 30 GHz to 40 GHz | > 117 dB | 127 dB | | > 124 dB | 134 dB | |
| | R&S®ZNA43, 2.4 mm interface | | | | | | |
| | 40 GHz to 43.5 GHz | > 106 dB | 116 dB | | > 112 dB | 122 dB | |
| | R&S®ZNA43, 2.92 mm interface | | | | | | |
| | 40 GHz to 43.5 GHz | | | 116 dB | | | 122 dB |
| | R&S®ZNA50 and R&S®ZNA67 | | | | | | |
| | 40 GHz to 50 GHz | > 106 dB | 116 dB | | > 112 dB | 122 dB | |
| | R&S®ZNA67 | | | | | | |
| | 50 GHz to 67 GHz | > 102 dB | 112 dB | | > 107 dB | 117 dB | |

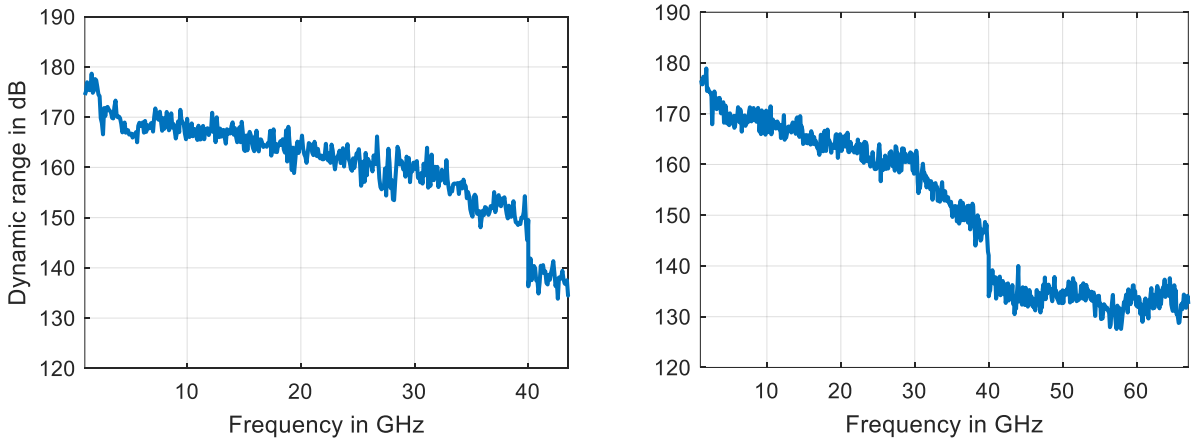
| | | **Base unit + R&S®ZNAxx-B16 [6]** | | | **Base unit + R&S®ZNAxx-B16 + R&S®ZNAxx-B2n + R&S®ZNAxx-B3n [4]** | | |
|---|---|---|---|---|---|---|---|
| | | **spec.** | **typ.** | **meas.** | **spec.** | **typ.** | **meas.** |
| **System dynamic range**<br><br>Difference between maximum output power and receiver noise floor (for data with additional step attenuator(s) or direct source and receiver access, refer to Options) | R&S®ZNA26, R&S®ZNA43, R&S®ZNA50 and R&S®ZNA67 | | | | | | |
| | 10 MHz to 30 MHz | > 86 dB | 96 dB | | > 85 dB | 95 dB | |
| | 30 MHz to 100 MHz | > 103 dB | 113 dB | | > 102 dB | 112 dB | |
| | 100 MHz to 500 MHz | > 117 dB | 127 dB | | > 116 dB | 126 dB | |
| | 500 MHz to 1 GHz | > 126 dB | 136 dB | | > 130 dB | 140 dB | |
| | 1 GHz to 16 GHz | > 127 dB | 137 dB | | > 134 dB | 144 dB | |
| | 16 GHz to 20 GHz | > 125 dB | 135 dB | | > 131 dB | 141 dB | |
| | 20 GHz to 30 GHz | > 121 dB | 131 dB | | > 127 dB | 137 dB | |
| | 30 GHz to 40 GHz | > 115 dB | 125 dB | | > 119 dB | 129 dB | |
| | R&S®ZNA43, 2.4 mm interface | | | | | | |
| | 40 GHz to 43.5 GHz | > 103 dB | 113 dB | | > 105 dB | 115 dB | |
| | R&S®ZNA43, 2.92 mm interface | | | | | | |
| | 40 GHz to 43.5 GHz | | | 113 dB | | | 115 dB |
| | R&S®ZNA50 and R&S®ZNA67 | | | | | | |
| | 40 GHz to 50 GHz | > 103 dB | 113 dB | | > 105 dB | 115 dB | |
| | R&S®ZNA67 | | | | | | |
| | 50 GHz to 67 GHz | > 98 dB | 108 dB | | > 98 dB | 108 dB | |

[4] Receiver step attenuator in 0 dB position.

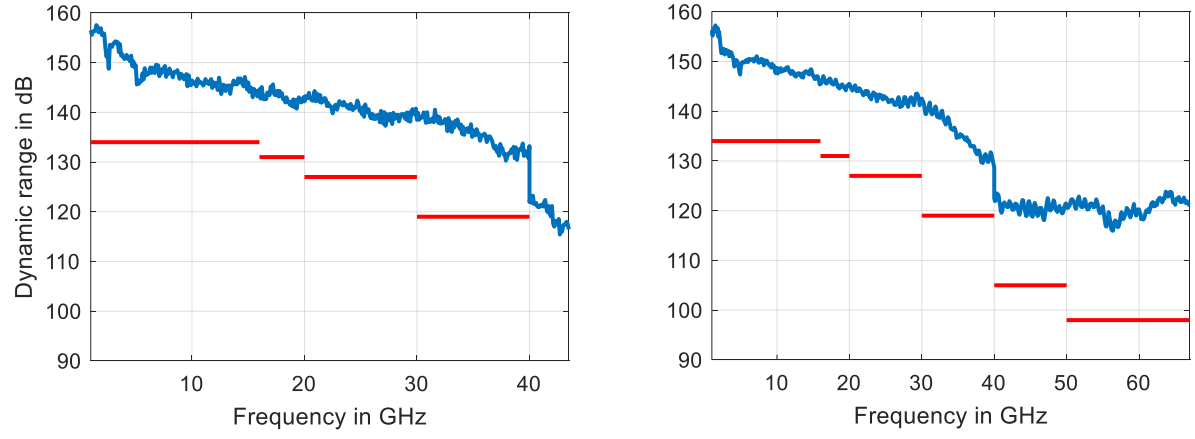
[5] n designates the port number (1/2/3/4).

[6] xx designates the R&S®ZNA model (R&S®ZNA26/R&S®ZNA43/R&S®ZNA50/R&S®ZNA67).

| | | Base unit + R&S®ZNAxx-B16 | Base unit + R&S®ZNAxx-B16 + R&S®ZNAxx-B2n + R&S®ZNAxx-B3n [7] |
|---|---|---|---|
| | | meas. | meas. |
| **Extended dynamic range at direct source and receiver access input**<br><br>Difference between maximum output power and receiver noise floor using the direct receiver access | R&S®ZNA26, R&S®ZNA43 | | |
| | 10 MHz to 30 MHz | 130 dB | 119 dB |
| | 30 MHz to 100 MHz | 136 dB | 125 dB |
| | 100 MHz to 500 MHz | 136 dB | 125 dB |
| | 500 MHz to 1 GHz | 145 dB | 139 dB |
| | 1 GHz to 16 GHz | 147 dB | 144 dB |
| | 16 GHz to 20 GHz | 145 dB | 141 dB |
| | 20 GHz to 30 GHz | 141 dB | 137 dB |
| | 30 GHz to 40 GHz | 135 dB | 129 dB |
| | R&S®ZNA43 | | |
| | 40 GHz to 43.5 GHz | 124 dB | 116 dB |
| | R&S®ZNA50 and R&S®ZNA67 | | |
| | 40 GHz to 50 GHz | 124 dB | 116 dB |
| | R&S®ZNA67 | | |
| | 50 GHz to 67 GHz | 120 dB | 110 dB |




*Exemplary measured dynamic range for R&S®ZNA43 (left) and R&S®ZNA67 (right) in reversed coupler configuration (-B16) at maximum output power, receiver step attenuator set to 0 dB at 1 Hz resolution bandwidth*




*Typical dynamic range in dB versus frequency for R&S®ZNA43 (left) and R&S®ZNA67 (right) [8]*

[7] Receiver step attenuator in 0 dB position.

[8] With R&S®ZNAxx-B16, R&S®ZNAxx-B2n and R&S®ZNAxx-B3n options.

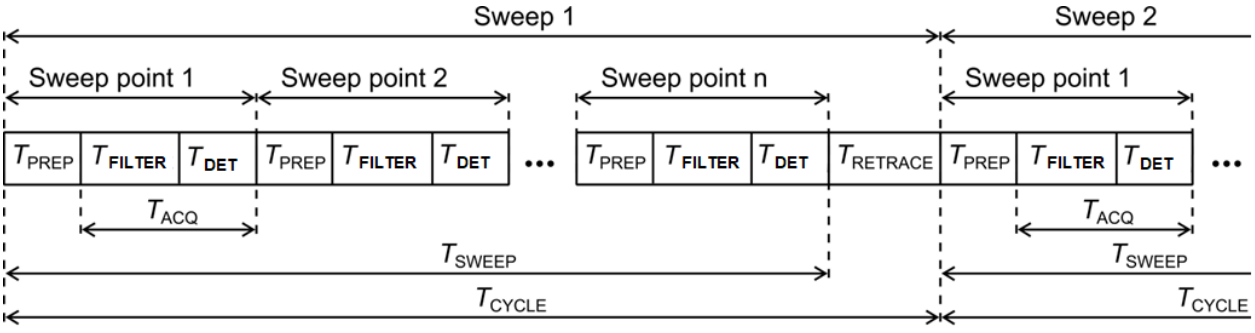
# Measurement speed

Measured with firmware version 1.80 and Windows 10 (64 bit).

| **Measurement time** | for 201 measurements points, 10 GHz center frequency, 200 MHz span | |
|---|---|---|
| Time per sweep ($T_{SWEEP}$) | 1 MHz measurement bandwidth, IF filter (analog) normal | < 2.5 ms |
| Sweep cycle time ($T_{CYCLE}$) | 1 MHz measurement bandwidth, IF filter (analog) normal | < 3.5 ms |
| Time per sweep point ($T_{POINT}$) | 1 MHz measurement bandwidth, IF filter (analog) normal, CW mode | 2.5 µs |
| | 1 MHz measurement bandwidth, IF filter (analog) wideband, CW mode | 1.4 µs |
| | 2 MHz measurement bandwidth, IF filter (analog) wideband, CW mode | 0.9 µs |
| Acquisition time per point ($T_{ACQ}$) | 1 MHz measurement bandwidth, IF filter (analog) wideband | 1 µs |
| | 30 MHz measurement bandwidth | 32 ns |

| | | IEC/ IEEE | VXI11 | RSIB | USB 2.0 |
|---|---|---|---|---|---|
| | | | over 1 Gbit/s LAN | | |
| Time for measurement and data transfer (typ.) | for 201 measurements points, 800 MHz start frequency, 1 GHz stop frequency, 1 MHz measurement bandwidth [9] | 14 ms | 13 ms | 13 ms | 14 ms |
| Data transfer time (typ.) | for 201 measurements points (magnitude) | 1.7 ms | 0.9 ms | 0.6 ms | 0.7 ms |

| | | |
|---|---|---|
| Switching time between channels | with a maximum of 2001 points | < 2 ms |
| Switching time between two preloaded instrument settings | with a maximum of 2001 points | < 2 ms |




*Measurement sequence*

$T_{PREP}$ Preparation time required to set up the internal hardware components
$T_{FILTER}$ Filter settling time (settling time of the digital filters)
$T_{DET}$ Detector time (additional time for averaging of detector sample, normally 0)
$T_{ACQ}$ Data acquisition time ($T_{ACQ} = T_{FILTER} + T_{DET}$)
$T_{POINT}$ Total time for one sweep point
$T_{SWEEP}$ Time required for one sweep
$T_{RETRACE}$ Time between two sweeps
$T_{CYCLE}$ Sweep cycle time ($T_{CYCLE} = T_{SWEEP} + T_{RETRACE}$)

[9] In continuous mode, no additional time for data transfer is needed, as data transfer takes place simultaneously with the measurement.

| **Nominal sweep times in ms versus number of measurement points [10]** | | | | | |
|---|---|---|---|---|---|
| **Number of measurement points** | **51** | **201** | **401** | **1601** | **5001** |
| **R&S®ZNA26, R&S®ZNA43, R&S®ZNA50 and R&S®ZNA67** | | | | | |
| 9 GHz start frequency, 10 GHz stop frequency, 500 kHz measurement bandwidth | | | | | |
| With correction switched off | 2.2 | 5.1 | 8.9 | 13.7 | 27.4 |
| With 2-port TOSM calibration | 4.1 | 9.9 | 17.3 | 27.2 | 54.1 |
| With 4-port TOSM calibration | 7.6 | 19.5 | 34.6 | 54.2 | 107 |
| 9 GHz start frequency, 10 GHz stop frequency, 100 kHz measurement bandwidth | | | | | |
| With correction switched off | 3.7 | 7.7 | 12.8 | 26.2 | 63.5 |
| With 2-port TOSM calibration | 6.7 | 14.4 | 24.9 | 51.4 | 126 |
| With 4-port TOSM calibration | 12.6 | 28.4 | 49.1 | 103 | 252 |
| 9 GHz start frequency, 10 GHz stop frequency, 1 kHz measurement bandwidth | | | | | |
| With correction switched off | 57.7 | 220 | 437 | 1724 | 5356 |
| With 2-port TOSM calibration | 115 | 440 | 873 | 3449 | 10716 |
| With 4-port TOSM calibration | 228 | 879 | 1746 | 6904 | 21433 |
| **R&S®ZNA26** | | | | | |
| 10 MHz start frequency, 26.5 GHz stop frequency, 500 kHz measurement bandwidth | | | | | |
| With correction switched off | 8.7 | 14.5 | 19.5 | 43.6 | 108 |
| With 2-port TOSM calibration | 16.9 | 28.8 | 39 | 87.4 | 216 |
| With 4-port TOSM calibration | 33.2 | 57.3 | 78.1 | 175 | 434 |
| 10 MHz start frequency, 26.5 GHz stop frequency, 100 kHz measurement bandwidth | | | | | |
| With correction switched off | 16.8 | 26.3 | 33.2 | 66.1 | 157 |
| With 2-port TOSM calibration | 31.9 | 51.2 | 65 | 131 | 312 |
| With 4-port TOSM calibration | 62 | 101 | 129 | 262 | 625 |
| 10 MHz start frequency, 26.5 GHz stop frequency, 1 kHz measurement bandwidth | | | | | |
| With correction switched off | 70.8 | 239 | 457 | 1758 | 5442 |
| With 2-port TOSM calibration | 140 | 476 | 913 | 3517 | 10889 |
| With 4-port TOSM calibration | 278 | 951 | 1826 | 7039 | 21780 |
| **R&S®ZNA43 and R&S®ZNA50** | | | | | |
| 10 MHz start frequency, 43.5 GHz (50 GHz for R&S®ZNA50) stop frequency, 500 kHz measurement bandwidth | | | | | |
| With correction switched off | 10.4 | 18.3 | 23.4 | 47.7 | 113 |
| With 2-port TOSM calibration | 20.4 | 35.8 | 46.7 | 95.5 | 227 |
| With 4-port TOSM calibration | 40.2 | 71 | 93.4 | 191 | 454 |
| 10 MHz start frequency, 43.5 GHz (50 GHz for R&S®ZNA50) stop frequency, 100 kHz measurement bandwidth | | | | | |
| With correction switched off | 19.7 | 30.6 | 38.8 | 72.2 | 162 |
| With 2-port TOSM calibration | 37.7 | 59.9 | 76.2 | 143 | 324 |
| With 4-port TOSM calibration | 73.6 | 118 | 151 | 286 | 648 |
| 10 MHz start frequency, 43.5 GHz (50 GHz for R&S®ZNA50) stop frequency, 1 kHz measurement bandwidth | | | | | |
| With correction switched off | 73.7 | 243 | 463 | 1764 | 5449 |
| With 2-port TOSM calibration | 146 | 485 | 924 | 3529 | 10902 |
| With 4-port TOSM calibration | 289 | 969 | 1848 | 7064 | 21806 |
| **R&S®ZNA67** | | | | | |
| 10 MHz start frequency, 67 GHz stop frequency, 500 kHz measurement bandwidth | | | | | |
| With correction switched off | 12.5 | 23.0 | 29.0 | 55.3 | 120 |
| With 2-port TOSM calibration | 24.2 | 45.1 | 57.1 | 109 | 239 |
| With 4-port TOSM calibration | 47.5 | 89.9 | 115 | 219 | 480 |
| 10 MHz start frequency, 67 GHz stop frequency, 100 kHz measurement bandwidth | | | | | |
| With correction switched off | 22.4 | 36.3 | 45.1 | 82.3 | 172 |
| With 2-port TOSM calibration | 42.7 | 70.3 | 87.9 | 162 | 341 |
| With 4-port TOSM calibration | 83.4 | 139 | 175 | 324 | 686 |
| 10 MHz start frequency, 67 GHz stop frequency, 1 kHz measurement bandwidth | | | | | |
| With correction switched off | 73.7 | 243 | 463 | 1764 | 5449 |
| With 2-port TOSM calibration | 146 | 485 | 924 | 3529 | 10902 |
| With 4-port TOSM calibration | 289 | 969 | 1848 | 7064 | 21806 |

[10] Sweep time is understood to be the cycle time; static frequency accuracy of the instrument applies; measured with firmware version 1.80, Windows 10 (64 bit).

# Measurement accuracy of the R&S®ZNA26

The data below is valid between +18 °C and +28 °C, provided the temperature has not varied by more than 1 °C after calibration. Validity of the data is conditional on using an R&S®ZN-Z235 calibration kit in order 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 of the calibration). Specifications are based on a matched DUT for transmission measurements and on an isolated DUT for reflection measurements. In both cases, a measurement bandwidth of 10 Hz and a nominal source power of 0 dBm apply for the base unit without options.

| **Uncertainty of transmission measurements** | | **Magnitude** | **Phase** |
|---|---|---|---|
| 10 MHz to 40 MHz | 0 dB to –20 dB | 0.04 dB | 0.5° |
| | –20 dB to –30 dB | 0.23 dB | 1.0° |
| | –30 dB to –40 dB | 0.60 dB | 3.0° |
| | –40 dB to –50 dB | 1.50 dB | 5.0° |
| | –50 dB to –60 dB | 4.50 dB | 25.0° |
| > 40 MHz to 200 MHz | 0 dB to –30 dB | 0.04 dB | 0.5° |
| | –30 dB to –40 dB | 0.05 dB | 0.6° |
| | –40 dB to –50 dB | 0.15 dB | 0.7° |
| | –50 dB to –60 dB | 0.45 dB | 3.0° |
| > 200 MHz to 10 GHz | 0 dB to –30 dB | 0.04 dB | 0.7° |
| | –30 dB to –40 dB | 0.05 dB | 0.8° |
| | –40 dB to –50 dB | 0.05 dB | 0.8° |
| | –50 dB to –60 dB | 0.09 dB | 1.0° |
| > 10 GHz to 26.5 GHz | 0 dB to –30 dB | 0.05 dB | 1.3° |
| | –30 dB to –40 dB | 0.06 dB | 1.4° |
| | –40 dB to –50 dB | 0.06 dB | 1.4° |
| | –50 dB to –60 dB | 0.13 dB | 1.5° |

| **Uncertainty of reflection measurements** | **Logarithmic** | | | **Linear** | |
|---|---|---|---|---|---|
| | **Reflection level** | **Magnitude** | **Phase** | **Reflection range** | **Magnitude** |
| 10 MHz to 10 GHz | 0 dB | 0.10 dB | 0.6° | 0 dB to –3 dB | 0.011 |
| | –3 dB | 0.10 dB | 0.6° | –3 dB to –6 dB | 0.008 |
| | –6 dB | 0.11 dB | 0.7° | –6 dB to –15 dB | 0.006 |
| | –15 dB | 0.25 dB | 1.7° | –15 dB to –25 dB | 0.005 |
| | –25 dB | 0.74 dB | 5.1° | –25 dB to –35 dB | 0.005 |
| | –35 dB | 2.16 dB | 16.0° | –35 dB | 0.005 |
| > 10 GHz to 20 GHz | 0 dB | 0.13 dB | 0.9° | 0 dB to –3 dB | 0.015 |
| | –3 dB | 0.13 dB | 0.8° | –3 dB to –6 dB | 0.010 |
| | –6 dB | 0.14 dB | 0.9° | –6 dB to –15 dB | 0.008 |
| | –15 dB | 0.31 dB | 2.1° | –15 dB to –25 dB | 0.007 |
| | –25 dB | 0.93 dB | 6.5° | –25 dB to –35 dB | 0.006 |
| | –35 dB | 2.64 dB | 20.0° | –35 dB | 0.006 |
| > 20 GHz to 26.5 GHz | 0 dB | 0.14 dB | 0.9° | 0 dB to –3 dB | 0.016 |
| | –3 dB | 0.14 dB | 1.0° | –3 dB to –6 dB | 0.012 |
| | –6 dB | 0.17 dB | 1.1° | –6 dB to –15 dB | 0.010 |
| | –15 dB | 0.39 dB | 2.6° | –15 dB to –25 dB | 0.008 |
| | –25 dB | 1.15 dB | 8.1° | –25 dB to –35 dB | 0.008 |
| | –35 dB | 3.21 dB | 26.0° | –35 dB | 0.008 |

# Measurement accuracy of the R&S®ZNA43, 2.92 mm interface

The data below is valid between +18 °C and +28 °C, provided the temperature has not varied by more than 1 °C after calibration. Validity of the data is conditional on using an R&S®ZN-Z229 calibration kit in order 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 of the calibration). Specifications are based on a matched DUT for transmission measurements and on an isolated DUT for reflection measurements. In both cases, a measurement bandwidth of 10 Hz and a nominal source power of 0 dBm apply for the base unit without options.

| **Uncertainty of transmission measurements** | | **Magnitude** | **Phase** |
|---|---|---|---|
| 10 MHz to 40 MHz | 0 dB to –20 dB | 0.04 dB | 0.5° |
| | –20 dB to –30 dB | 0.23 dB | 1.0° |
| | –30 dB to –40 dB | 0.60 dB | 3.0° |
| | –40 dB to –50 dB | 1.50 dB | 5.0° |
| | –50 dB to –60 dB | 4.50 dB | 25.0° |
| > 40 MHz to 200 MHz | 0 dB to –30 dB | 0.04 dB | 0.5° |
| | –30 dB to –40 dB | 0.05 dB | 0.6° |
| | –40 dB to –50 dB | 0.15 dB | 0.7° |
| | –50 dB to –60 dB | 0.45 dB | 3.0° |
| > 200 MHz to 10 GHz | 0 dB to –30 dB | 0.04 dB | 0.7° |
| | –30 dB to –40 dB | 0.05 dB | 0.8° |
| | –40 dB to –50 dB | 0.05 dB | 0.8° |
| | –50 dB to –60 dB | 0.09 dB | 1.0° |
| > 10 GHz to 26.5 GHz | 0 dB to –30 dB | 0.05 dB | 1.3° |
| | –30 dB to –40 dB | 0.06 dB | 1.4° |
| | –40 dB to –50 dB | 0.06 dB | 1.4° |
| | –50 dB to –60 dB | 0.13 dB | 1.5° |
| > 26.5 GHz to 40 GHz | 0 dB to –30 dB | 0.06 dB | 1.8° |
| | –30 dB to –40 dB | 0.07 dB | 2.0° |
| | –40 dB to –50 dB | 0.07 dB | 2.0° |
| | –50 dB to –60 dB | 0.19 dB | 2.0° |
| > 40 GHz to 43.5 GHz (meas.) | 0 dB to –30 dB | 0.07 dB | 2.0° |
| | –30 dB to –40 dB | 0.08 dB | 2.2° |
| | –40 dB to –50 dB | 0.15 dB | 2.2° |
| | –50 dB to –60 dB | 0.47 dB | 3.9° |

| **Uncertainty of reflection measurements** | **Logarithmic** | | | **Linear** | |
|---|---|---|---|---|---|
| | **Reflection level** | **Magnitude** | **Phase** | **Reflection range** | **Magnitude** |
| 10 MHz to 10 GHz | 0 dB | 0.11 dB | 0.8° | 0 dB to –3 dB | 0.013 |
| | –3 dB | 0.11 dB | 0.7° | –3 dB to –6 dB | 0.009 |
| | –6 dB | 0.12 dB | 0.8° | –6 dB to –15 dB | 0.007 |
| | –15 dB | 0.28 dB | 1.9° | –15 dB to –25 dB | 0.006 |
| | –25 dB | 0.83 dB | 5.7° | –25 dB to –35 dB | 0.006 |
| | –35 dB | 2.39 dB | 18.0° | –35 dB | 0.006 |
| > 10 GHz to 26.5 GHz | 0 dB | 0.14 dB | 0.9° | 0 dB to –3 dB | 0.016 |
| | –3 dB | 0.14 dB | 1.0° | –3 dB to –6 dB | 0.012 |
| | –6 dB | 0.17 dB | 1.1° | –6 dB to –15 dB | 0.010 |
| | –15 dB | 0.39 dB | 2.6° | –15 dB to –25 dB | 0.008 |
| | –25 dB | 1.15 dB | 8.1° | –25 dB to –35 dB | 0.008 |
| | –35 dB | 3.21 dB | 26.0° | –35 dB | 0.008 |
| > 26.5 GHz to 40 GHz | 0 dB | 0.22 dB | 1.4° | 0 dB to –3 dB | 0.025 |
| | –3 dB | 0.22 dB | 1.5° | –3 dB to –6 dB | 0.018 |
| | –6 dB | 0.26 dB | 1.7° | –6 dB to –15 dB | 0.015 |
| | –15 dB | 0.61 dB | 4.1° | –15 dB to –25 dB | 0.013 |
| | –25 dB | 1.76 dB | 13.0° | –25 dB to –35 dB | 0.013 |
| | –35 dB | 4.65 dB | 41.0° | –35 dB | 0.013 |
| > 40 GHz to 43.5 GHz (meas.) | 0 dB | 0.22 dB | 1.5° | 0 dB to –3 dB | 0.026 |
| | –3 dB | 0.23 dB | 1.5° | –3 dB to –6 dB | 0.019 |
| | –6 dB | 0.26 dB | 1.8° | –6 dB to –15 dB | 0.015 |
| | –15 dB | 0.61 dB | 4.2° | –15 dB to –25 dB | 0.013 |
| | –25 dB | 1.76 dB | 13.0° | –25 dB to –35 dB | 0.013 |
| | –35 dB | 4.65 dB | 41.0° | –35 dB | 0.013 |

# Measurement accuracy of the R&S®ZNA43, 2.4 mm interface

The data below is valid between +18 °C and +28 °C, provided the temperature has not varied by more than 1 °C after calibration. Validity of the data is conditional on using an R&S®ZV-Z224 calibration kit with accredited calibration in order 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 of the calibration). Specifications are based on a matched DUT for transmission measurements and on an isolated DUT for reflection measurements. In both cases, a measurement bandwidth of 10 Hz and a nominal source power of 0 dBm apply for the base unit without options.

| **Uncertainty of transmission measurements** | | **Magnitude** | **Phase** |
|---|---|---|---|
| 10 MHz to 40 MHz | 0 dB to –20 dB | 0.04 dB | 0.5° |
| | –20 dB to –30 dB | 0.23 dB | 1.0° |
| | –30 dB to –40 dB | 0.60 dB | 3.0° |
| | –40 dB to –50 dB | 1.50 dB | 5.0° |
| | –50 dB to –60 dB | 4.50 dB | 25.0° |
| > 40 MHz to 200 MHz | 0 dB to –30 dB | 0.04 dB | 0.5° |
| | –30 dB to –40 dB | 0.05 dB | 0.6° |
| | –40 dB to –50 dB | 0.15 dB | 0.7° |
| | –50 dB to –60 dB | 0.45 dB | 3.0° |
| > 200 MHz to 10 GHz | 0 dB to –30 dB | 0.04 dB | 0.7° |
| | –30 dB to –40 dB | 0.05 dB | 0.8° |
| | –40 dB to –50 dB | 0.05 dB | 0.8° |
| | –50 dB to –60 dB | 0.09 dB | 1.0° |
| > 10 GHz to 20 GHz | 0 dB to –30 dB | 0.05 dB | 1.3° |
| | –30 dB to –40 dB | 0.06 dB | 1.4° |
| | –40 dB to –50 dB | 0.06 dB | 1.4° |
| | –50 dB to –60 dB | 0.13 dB | 1.5° |
| > 20 GHz to 40 GHz | 0 dB to –30 dB | 0.06 dB | 1.8° |
| | –30 dB to –40 dB | 0.07 dB | 2.0° |
| | –40 dB to –50 dB | 0.07 dB | 2.0° |
| | –50 dB to –60 dB | 0.19 dB | 2.0° |
| > 40 GHz to 43.5 GHz | 0 dB to –30 dB | 0.07 dB | 2.0° |
| | –30 dB to –40 dB | 0.08 dB | 2.2° |
| | –40 dB to –50 dB | 0.15 dB | 2.2° |
| | –50 dB to –60 dB | 0.47 dB | 3.9° |

| **Uncertainty of reflection measurements** | **Logarithmic** | | | **Linear** | |
|---|---|---|---|---|---|
| | **Reflection level** | **Magnitude** | **Phase** | **Reflection range** | **Magnitude** |
| 10 MHz to 10 GHz | 0 dB | 0.10 dB | 0.6° | 0 dB to –3 dB | 0.011 |
| | –3 dB | 0.10 dB | 0.6° | –3 dB to –6 dB | 0.008 |
| | –6 dB | 0.11 dB | 0.7° | –6 dB to –15 dB | 0.006 |
| | –15 dB | 0.25 dB | 1.7° | –15 dB to –25 dB | 0.005 |
| | –25 dB | 0.74 dB | 5.1° | –25 dB to –35 dB | 0.005 |
| | –35 dB | 2.16 dB | 16.0° | –35 dB | 0.005 |
| > 10 GHz to 20 GHz | 0 dB | 0.13 dB | 0.9° | 0 dB to –3 dB | 0.015 |
| | –3 dB | 0.13 dB | 0.8° | –3 dB to –6 dB | 0.010 |
| | –6 dB | 0.14 dB | 0.9° | –6 dB to –15 dB | 0.008 |
| | –15 dB | 0.31 dB | 2.1° | –15 dB to –25 dB | 0.007 |
| | –25 dB | 0.93 dB | 6.5° | –25 dB to –35 dB | 0.006 |
| | –35 dB | 2.64 dB | 20.0° | –35 dB | 0.006 |
| > 20 GHz to 40 GHz | 0 dB | 0.16 dB | 1.2° | 0 dB to –3 dB | 0.019 |
| | –3 dB | 0.16 dB | 1.2° | –3 dB to –6 dB | 0.013 |
| | –6 dB | 0.17 dB | 1.3° | –6 dB to –15 dB | 0.010 |
| | –15 dB | 0.39 dB | 2.6° | –15 dB to –25 dB | 0.008 |
| | –25 dB | 1.15 dB | 8.1° | –25 dB to –35 dB | 0.008 |
| | –35 dB | 3.21 dB | 26.0° | –35 dB | 0.008 |
| > 40 GHz to 43.5 GHz | 0 dB | 0.20 dB | 1.6° | 0 dB to –3 dB | 0.024 |
| | –3 dB | 0.20 dB | 1.6° | –3 dB to –6 dB | 0.016 |
| | –6 dB | 0.22 dB | 1.7° | –6 dB to –15 dB | 0.013 |
| | –15 dB | 0.49 dB | 3.3° | –15 dB to –25 dB | 0.010 |
| | –25 dB | 1.43 dB | 10.0° | –25 dB to –35 dB | 0.010 |
| | –35 dB | 3.88 dB | 32.0° | –35 dB | 0.010 |

# Measurement accuracy of the R&S®ZNA50

The data below is valid between +18 °C and +28 °C, provided the temperature has not varied by more than 1 °C after calibration. Validity of the data is conditional on using an R&S®ZN-Z224 calibration kit in order 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 of the calibration). Specifications are based on a matched DUT for transmission measurements and on an isolated DUT for reflection measurements. In both cases, a measurement bandwidth of 10 Hz and a nominal source power of 0 dBm apply for the base unit without options.

| **Uncertainty of transmission measurements** | | **Magnitude** | **Phase** |
|---|---|---|---|
| 10 MHz to 40 MHz | 0 dB to –20 dB | 0.04 dB | 0.5° |
| | –20 dB to –30 dB | 0.23 dB | 1.0° |
| | –30 dB to –40 dB | 0.60 dB | 3.0° |
| | –40 dB to –50 dB | 1.50 dB | 5.0° |
| | –50 dB to –60 dB | 4.50 dB | 25.0° |
| > 40 MHz to 200 MHz | 0 dB to –30 dB | 0.04 dB | 0.5° |
| | –30 dB to –40 dB | 0.05 dB | 0.6° |
| | –40 dB to –50 dB | 0.15 dB | 0.7° |
| | –50 dB to –60 dB | 0.45 dB | 3.0° |
| > 200 MHz to 10 GHz | 0 dB to –30 dB | 0.04 dB | 0.7° |
| | –30 dB to –40 dB | 0.05 dB | 0.8° |
| | –40 dB to –50 dB | 0.05 dB | 0.8° |
| | –50 dB to –60 dB | 0.09 dB | 1.0° |
| > 10 GHz to 26.5 GHz | 0 dB to –30 dB | 0.05 dB | 1.3° |
| | –30 dB to –40 dB | 0.06 dB | 1.4° |
| | –40 dB to –50 dB | 0.06 dB | 1.4° |
| | –50 dB to –60 dB | 0.13 dB | 1.5° |
| > 26.5 GHz to 40 GHz | 0 dB to –30 dB | 0.06 dB | 1.8° |
| | –30 dB to –40 dB | 0.07 dB | 2.0° |
| | –40 dB to –50 dB | 0.07 dB | 2.0° |
| | –50 dB to –60 dB | 0.19 dB | 2.0° |
| > 40 GHz to 50 GHz | 0 dB to –30 dB | 0.07 dB | 2.0° |
| | –30 dB to –40 dB | 0.08 dB | 2.2° |
| | –40 dB to –50 dB | 0.17 dB | 2.2° |
| | –50 dB to –60 dB | 0.47 dB | 3.6° |

| **Uncertainty of reflection measurements** | **Logarithmic** | | | **Linear** | |
|---|---|---|---|---|---|
| | **Reflection level** | **Magnitude** | **Phase** | **Reflection range** | **Magnitude** |
| 0.01 GHz to 10 GHz | 0 dB | 0.10 dB | 0.6° | 0 dB to –3 dB | 0.011 |
| | –3 dB | 0.10 dB | 0.6° | –3 dB to –6 dB | 0.008 |
| | –6 dB | 0.11 dB | 0.7° | –6 dB to –15 dB | 0.006 |
| | –15 dB | 0.25 dB | 1.7° | –15 dB to –25 dB | 0.005 |
| | –25 dB | 0.74 dB | 5.1° | –25 dB to –35 dB | 0.005 |
| | –35 dB | 2.16 dB | 16.0° | –35 dB | 0.005 |
| > 10 GHz to 20 GHz | 0 dB | 0.13 dB | 0.9° | 0 dB to –3 dB | 0.015 |
| | –3 dB | 0.13 dB | 0.8° | –3 dB to –6 dB | 0.010 |
| | –6 dB | 0.14 dB | 0.9° | –6 dB to –15 dB | 0.008 |
| | –15 dB | 0.31 dB | 2.1° | –15 dB to –25 dB | 0.007 |
| | –25 dB | 0.93 dB | 6.5° | –25 dB to –35 dB | 0.006 |
| | –35 dB | 2.64 dB | 20.0° | –35 dB | 0.006 |
| > 20 GHz to 40 GHz | 0 dB | 0.17 dB | 1.2° | 0 dB to –3 dB | 0.019 |
| | –3 dB | 0.16 dB | 1.2° | –3 dB to –6 dB | 0.013 |
| | –6 dB | 0.18 dB | 1.3° | –6 dB to –15 dB | 0.011 |
| | –15 dB | 0.39 dB | 2.7° | –15 dB to –25 dB | 0.008 |
| | –25 dB | 1.15 dB | 8.1° | –25 dB to –35 dB | 0.008 |
| | –35 dB | 3.21 dB | 26.0° | –35 dB | 0.008 |
| > 40 GHz to 50 GHz | 0 dB | 0.20 dB | 1.6° | 0 dB to –3 dB | 0.024 |
| | –3 dB | 0.20 dB | 1.6° | –3 dB to –6 dB | 0.016 |
| | –6 dB | 0.22 dB | 1.7° | –6 dB to –15 dB | 0.013 |
| | –15 dB | 0.49 dB | 3.3° | –15 dB to –25 dB | 0.010 |
| | –25 dB | 1.43 dB | 10.0° | –25 dB to –35 dB | 0.010 |
| | –35 dB | 3.88 dB | 32.0° | –35 dB | 0.010 |

# Measurement accuracy of the R&S®ZNA67

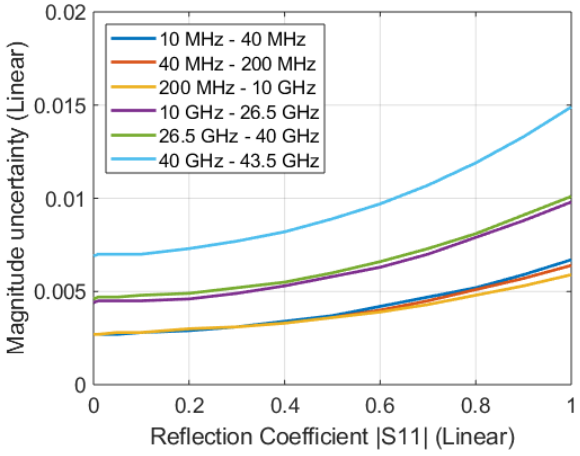
The data below is valid between +18 °C and +28 °C, provided the temperature has not varied by more than 1 °C after calibration. Validity of the data is conditional on using an R&S®ZN-Z218 calibration kit in order to achieve the effective system data specified below. Frequency points, measurement bandwidth and sweep time have to be identical for measurement and calibration (no interpolation of the calibration). Specifications are based on a matched DUT for transmission measurements and on an isolated DUT for reflection measurements. In both cases, a measurement bandwidth of 10 Hz and a nominal source power of 0 dBm apply for the base unit without options.

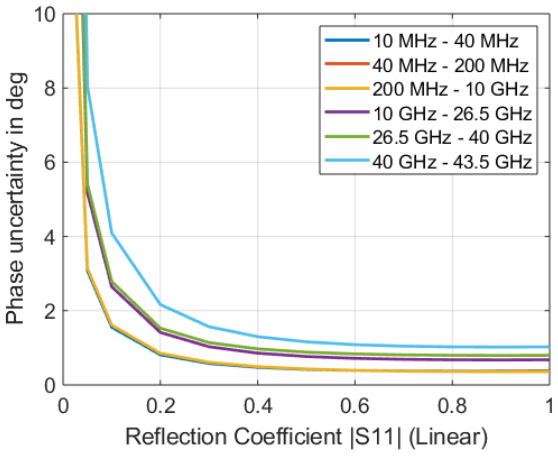
| **Uncertainty of transmission measurements** | | **Magnitude** | **Phase** |
|---|---|---|---|
| 10 MHz to 40 MHz | 0 dB to –20 dB | 0.04 dB | 0.5° |
| | –20 dB to –30 dB | 0.23 dB | 1.0° |
| | –30 dB to –40 dB | 0.60 dB | 3.0° |
| | –40 dB to –50 dB | 1.50 dB | 5.0° |
| | –50 dB to –60 dB | 4.50 dB | 25.0° |
| > 40 MHz to 200 MHz | 0 dB to –30 dB | 0.04 dB | 0.5° |
| | –30 dB to –40 dB | 0.05 dB | 0.6° |
| | –40 dB to –50 dB | 0.15 dB | 0.7° |
| | –50 dB to –60 dB | 0.45 dB | 3.0° |
| > 200 MHz to 10 GHz | 0 dB to –30 dB | 0.04 dB | 0.7° |
| | –30 dB to –40 dB | 0.05 dB | 0.8° |
| | –40 dB to –50 dB | 0.05 dB | 0.8° |
| | –50 dB to –60 dB | 0.09 dB | 1.0° |
| > 10 GHz to 26.5 GHz | 0 dB to –30 dB | 0.05 dB | 1.3° |
| | –30 dB to –40 dB | 0.06 dB | 1.4° |
| | –40 dB to –50 dB | 0.06 dB | 1.4° |
| | –50 dB to –60 dB | 0.13 dB | 1.5° |
| > 26.5 GHz to 40 GHz | 0 dB to –30 dB | 0.06 dB | 1.8° |
| | –30 dB to –40 dB | 0.07 dB | 2.0° |
| | –40 dB to –50 dB | 0.07 dB | 2.0° |
| | –50 dB to –60 dB | 0.19 dB | 2.0° |
| > 40 GHz to 50 GHz | 0 dB to –30 dB | 0.07 dB | 2.0° |
| | –30 dB to –40 dB | 0.08 dB | 2.2° |
| | –40 dB to –50 dB | 0.17 dB | 2.2° |
| | –50 dB to –60 dB | 0.47 dB | 3.6° |
| > 50 GHz to 67 GHz | 0 dB to –30 dB | 0.07 dB | 2.1° |
| | –30 dB to –40 dB | 0.08 dB | 2.3° |
| | –40 dB to –50 dB | 0.18 dB | 2.8° |
| | –50 dB to –60 dB | 0.47 dB | 4.3° |

| Uncertainty of reflection measurements | Logarithmic | | | Linear | |
|---|---|---|---|---|---|
| | Reflection level | Magnitude | Phase | Reflection range | Magnitude |
| 0.01 GHz to 10 GHz | 0 dB | 0.10 dB | 0.6° | 0 dB to –3 dB | 0.011 |
| | –3 dB | 0.10 dB | 0.6° | –3 dB to –6 dB | 0.008 |
| | –6 dB | 0.11 dB | 0.7° | –6 dB to –15 dB | 0.006 |
| | –15 dB | 0.25 dB | 1.7° | –15 dB to –25 dB | 0.005 |
| | –25 dB | 0.74 dB | 5.1° | –25 dB to –35 dB | 0.005 |
| | –35 dB | 2.16 dB | 16.0° | –35 dB | 0.005 |
| > 10 GHz to 20 GHz | 0 dB | 0.13 dB | 0.9° | 0 dB to –3 dB | 0.015 |
| | –3 dB | 0.13 dB | 0.8° | –3 dB to –6 dB | 0.010 |
| | –6 dB | 0.14 dB | 0.9° | –6 dB to –15 dB | 0.008 |
| | –15 dB | 0.31 dB | 2.1° | –15 dB to –25 dB | 0.007 |
| | –25 dB | 0.93 dB | 6.5° | –25 dB to –35 dB | 0.006 |
| | –35 dB | 2.64 dB | 20.0° | –35 dB | 0.006 |
| > 20 GHz to 40 GHz | 0 dB | 0.16 dB | 1.2° | 0 dB to –3 dB | 0.019 |
| | –3 dB | 0.16 dB | 1.2° | –3 dB to –6 dB | 0.013 |
| | –6 dB | 0.17 dB | 1.3° | –6 dB to –15 dB | 0.010 |
| | –15 dB | 0.39 dB | 2.6° | –15 dB to –25 dB | 0.008 |
| | –25 dB | 1.15 dB | 8.1° | –25 dB to –35 dB | 0.008 |
| | –35 dB | 3.21 dB | 26.0° | –35 dB | 0.008 |
| > 40 GHz to 50 GHz | 0 dB | 0.20 dB | 1.6° | 0 dB to –3 dB | 0.024 |
| | –3 dB | 0.20 dB | 1.6° | –3 dB to –6 dB | 0.016 |
| | –6 dB | 0.22 dB | 1.7° | –6 dB to –15 dB | 0.013 |
| | –15 dB | 0.49 dB | 3.3° | –15 dB to –25 dB | 0.010 |
| | –25 dB | 1.43 dB | 10.0° | –25 dB to –35 dB | 0.010 |
| | –35 dB | 3.88 dB | 32.0° | –35 dB | 0.010 |
| > 50 GHz to 67 GHz | 0 dB | 0.26 dB | 1.8° | 0 dB to –3 dB | 0.031 |
| | –3 dB | 0.26 dB | 1.8° | –3 dB to –6 dB | 0.022 |
| | –6 dB | 0.30 dB | 2.0° | –6 dB to –15 dB | 0.018 |
| | –15 dB | 0.68 dB | 4.7° | –15 dB to –25 dB | 0.015 |
| | –25 dB | 1.95 dB | 14.0° | –25 dB to –35 dB | 0.014 |
| | –35 dB | 5.08 dB | 46.0° | –35 dB | 0.014 |

# Reflection measurement accuracy of the R&S®ZNA26 and R&S®ZNA43

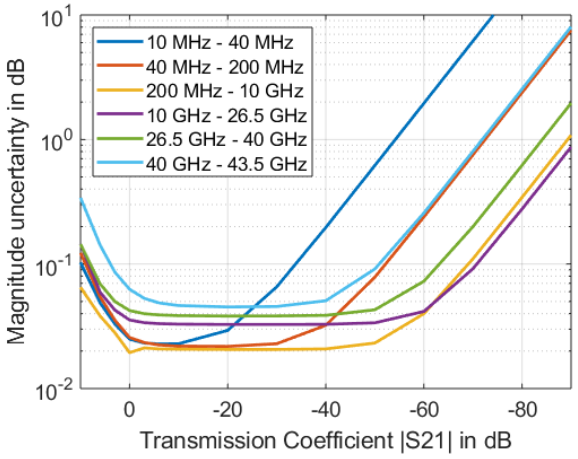
The diagrams below show the typical uncertainty of the reflection magnitude and reflection phase measurements for the R&S®ZNA26 in the frequency range from 10 MHz to 26.5 GHz and for the R&S®ZNA43 in the frequency range from 10 MHz to 43.5 GHz. Analysis conditions: $S_{12} = S_{21} = 0$, calibration power: 0 dBm, measurement power: 0 dBm. Drift effects were not considered.

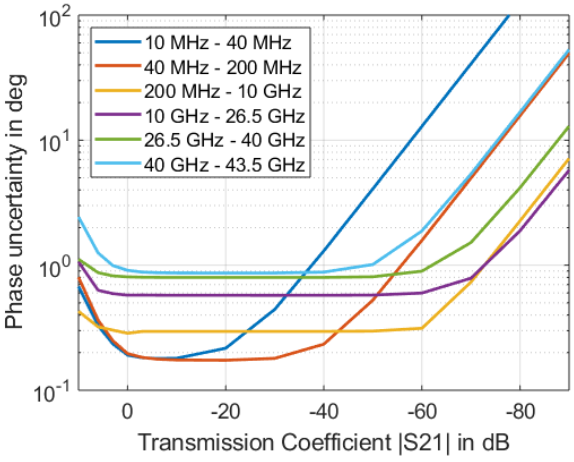



# Transmission measurement accuracy of the R&S®ZNA26 and R&S®ZNA43

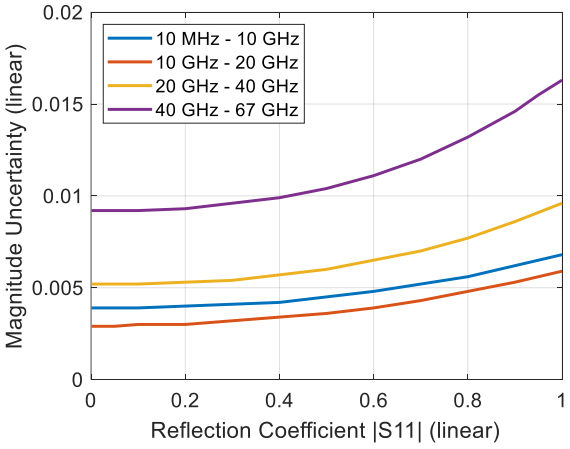
The diagrams below show the typical uncertainty of the transmission magnitude and transmission phase measurements for the R&S®ZNA26 in the frequency range from 10 MHz to 26.5 GHz and for the R&S®ZNA43 in the frequency range from 10 MHz to 43.5 GHz. Analysis conditions: $S_{11} = S_{22} = 0$, calibration power: 0 dBm, measurement power: 0 dBm, high-quality cable. Drift effects were not considered.

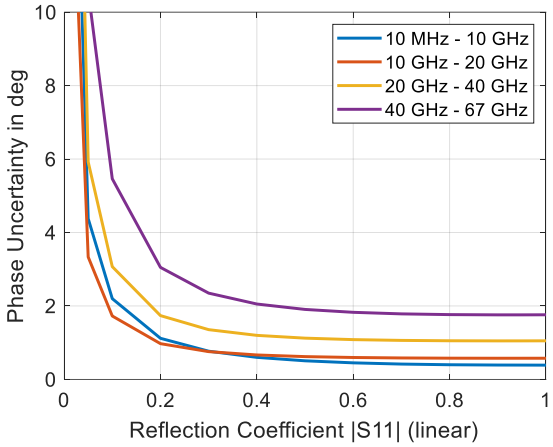


# Reflection measurement accuracy of the R&S®ZNA50 and R&S®ZNA67

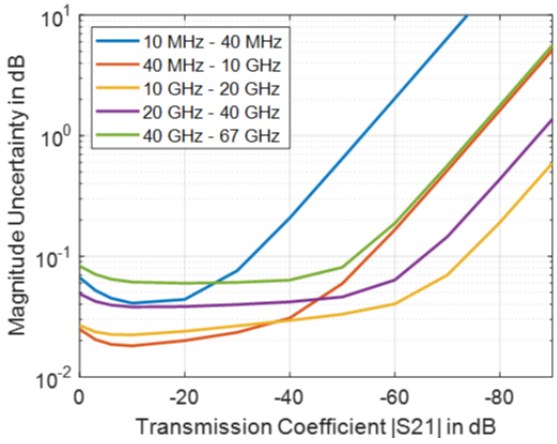
The diagrams below show the typical uncertainty of the reflection magnitude and reflection phase measurements for the R&S®ZNA50 in the frequency range from 10 MHz to 50 GHz and for the R&S®ZNA67 in the frequency range from 10 MHz to 67 GHz.
Analysis conditions: $S_{12} = S_{21} = 0$, calibration power: 0 dBm, measurement power: 0 dBm. Drift effects were not considered.

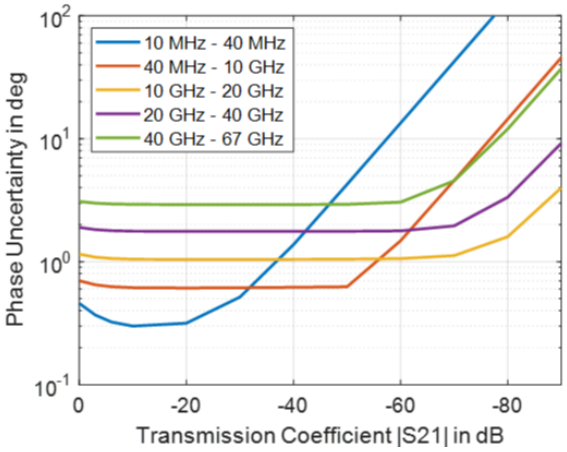



# Transmission measurement accuracy of the R&S®ZNA50 and R&S®ZNA67

The diagrams below show the typical uncertainty of the transmission magnitude and transmission phase measurements for the R&S®ZNA50 in the frequency range from 10 MHz to 50 GHz and for the R&S®ZNA67 in the frequency range from 10 MHz to 67 GHz.
Analysis conditions: $S_{11} = S_{22} = 0$, calibration power: 0 dBm, measurement power: 0 dBm, high-quality cable. Drift effects were not considered.



# Effective system data

The data below 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 of the calibration). The data is based on a measurement bandwidth of 10 Hz and a nominal source power of 0 dBm.

| R&S®ZNA26, calibrated with R&S®ZN-Z235 calibration kit | 10 MHz to 10 GHz | | 10 GHz to 20 GHz | | 20 GHz to 26.5 GHz | |
|---|---|---|---|---|---|---|
| | spec. | typ. | spec. | typ. | spec. | typ. |
| Directivity in dB | 46 | 49 | 44 | 47 | 42 | 45 |
| Source match in dB | 43 | 46 | 40 | 43 | 40 | 43 |
| Load match in dB | 45 | 48 | 43 | 46 | 41 | 44 |
| Reflection tracking in dB | 0.03 | 0.02 | 0.04 | 0.03 | 0.04 | 0.03 |
| Transmission tracking in dB | 0.02 | 0.01 | 0.03 | 0.02 | 0.03 | 0.02 |

| R&S®ZNA43, 2.92 mm interface calibrated with R&S®ZN-Z229 calibration kit | 10 MHz to 10 GHz | | 10 GHz to 26.5 GHz | | 26.5 GHz to 40 GHz | | 40 GHz to 43.5 GHz |
|---|---|---|---|---|---|---|---|
| | spec. | typ. | spec. | typ. | spec. | typ. | meas. |
| Directivity in dB | 45 | 48 | 42 | 45 | 38 | 41 | 38 |
| Source match in dB | 41 | 44 | 40 | 43 | 36 | 39 | 36 |
| Load match in dB | 44 | 47 | 41 | 44 | 37 | 40 | 37 |
| Reflection tracking in dB | 0.03 | 0.02 | 0.04 | 0.03 | 0.04 | 0.03 | 0.06 |
| Transmission tracking in dB | 0.02 | 0.01 | 0.03 | 0.02 | 0.04 | 0.03 | 0.05 |

| R&S®ZNA43, 2.4 mm interface calibrated with R&S®ZN-Z224 calibration kit | 10 MHz to 10 GHz | | 10 GHz to 20 GHz | | 20 GHz to 40 GHz | | 40 GHz to 43.5 GHz | |
|---|---|---|---|---|---|---|---|---|
| | spec. | typ. | spec. | typ. | spec. | typ. | spec. | typ. |
| Directivity in dB | 46 | 49 | 44 | 47 | 42 | 45 | 40 | 43 |
| Source match in dB | 43 | 46 | 40 | 43 | 38 | 41 | 36 | 39 |
| Load match in dB | 45 | 48 | 43 | 46 | 41 | 44 | 39 | 42 |
| Reflection tracking in dB | 0.03 | 0.02 | 0.04 | 0.03 | 0.04 | 0.03 | 0.06 | 0.05 |
| Transmission tracking in dB | 0.02 | 0.01 | 0.03 | 0.02 | 0.04 | 0.03 | 0.05 | 0.04 |

| R&S®ZNA50, calibrated with R&S®ZN-Z224 calibration kit | 10 MHz to 10 GHz | | 10 GHz to 20 GHz | | 20 GHz to 40 GHz | | 40 GHz to 50 GHz | |
|---|---|---|---|---|---|---|---|---|
| | spec. | typ. | spec. | typ. | spec. | typ. | spec. | typ. |
| Directivity in dB | 46 | 49 | 44 | 47 | 42 | 45 | 40 | 43 |
| Source match in dB | 43 | 46 | 40 | 43 | 38 | 41 | 36 | 39 |
| Load match in dB | 45 | 48 | 43 | 46 | 41 | 44 | 39 | 42 |
| Reflection tracking in dB | 0.03 | 0.02 | 0.04 | 0.03 | 0.04 | 0.03 | 0.06 | 0.05 |
| Transmission tracking in dB | 0.02 | 0.01 | 0.03 | 0.02 | 0.04 | 0.03 | 0.06 | 0.05 |

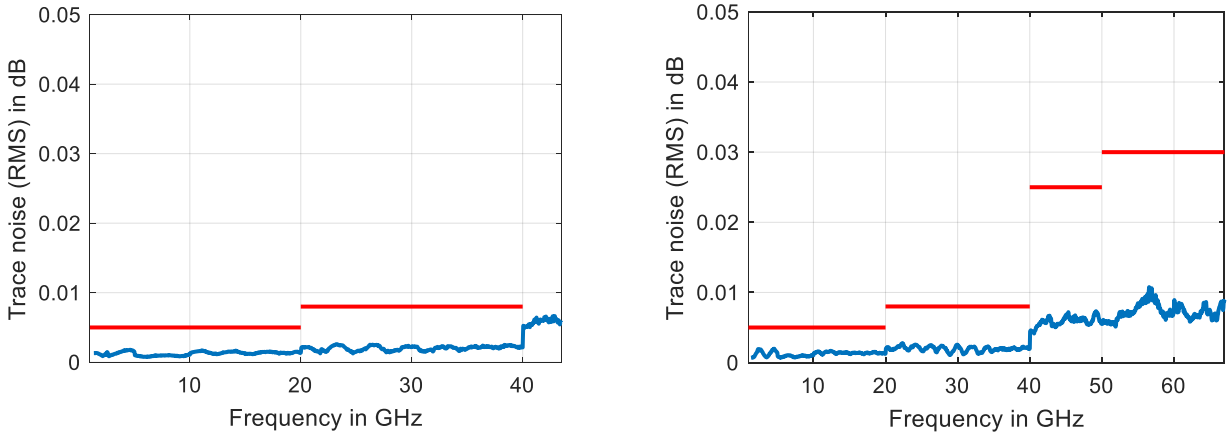
| **R&S®ZNA67, calibrated with R&S®ZN-Z218 calibration kit** | **10 MHz to 10 GHz** | | **10 GHz to 20 GHz** | | **20 GHz to 40 GHz** | | **40 GHz to 50 GHz** | | **50 GHz to 67 GHz** | |
|---|---|---|---|---|---|---|---|---|---|---|
| | **spec.** | **typ.** | **spec.** | **typ.** | **spec.** | **typ.** | **spec.** | **typ.** | **spec.** | **typ.** |
| Directivity in dB | 46 | 49 | 44 | 47 | 42 | 45 | 40 | 43 | 37 | 40 |
| Source match in dB | 43 | 46 | 40 | 43 | 38 | 41 | 36 | 39 | 34 | 37 |
| Load match in dB | 45 | 48 | 43 | 46 | 41 | 44 | 39 | 42 | 36 | 39 |
| Reflection tracking in dB | 0.03 | 0.02 | 0.04 | 0.03 | 0.04 | 0.03 | 0.06 | 0.05 | 0.07 | 0.06 |
| Transmission tracking in dB | 0.02 | 0.01 | 0.03 | 0.02 | 0.04 | 0.03 | 0.06 | 0.05 | 0.06 | 0.05 |

# Uncorrected system data

The data below 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.

| | | spec. | typ. | meas. |
|---|---|---|---|---|
| Directivity in dB | R&S®ZNA26, R&S®ZNA43, R&S®ZNA50 and R&S®ZNA67 | | | |
| | 10 MHz to 20 MHz | > 8 dB | 12 dB | |
| | 20 MHz to 20 GHz | > 10 dB | 18 dB | |
| | 20 GHz to 35 GHz | > 8 dB | 15 dB | |
| | 35 GHz to 40 GHz | > 6 dB | 10 dB | |
| | R&S®ZNA43, 2.4 mm interface | | | |
| | 40 GHz to 43.5 GHz | > 6 dB | 10 dB | |
| | R&S®ZNA43, 2.92 mm interface | | | |
| | 40 GHz to 43.5 GHz | | | 10 dB |
| | R&S®ZNA50 and R&S®ZNA67 | | | |
| | 40 GHz to 67 GHz | > 6 dB | 10 dB | |
| Source match in dB | R&S®ZNA26, R&S®ZNA43, R&S®ZNA50 and R&S®ZNA67 | | | |
| | 10 MHz to 20 GHz | > 10 dB | 18 dB | |
| | 20 GHz to 35 GHz | > 8 dB | 15 dB | |
| | 35 GHz to 40 GHz | > 6 dB | 10 dB | |
| | R&S®ZNA43, 2.4 mm interface | | | |
| | 40 GHz to 43.5 GHz | > 6 dB | 10 dB | |
| | R&S®ZNA43, 2.92 mm interface | | | |
| | 40 GHz to 43.5 GHz | | | 10 dB |
| | R&S®ZNA50 and R&S®ZNA67 | | | |
| | 40 GHz to 67 GHz | > 6 dB | 10 dB | |
| Reflection tracking in dB | R&S®ZNA26, R&S®ZNA43, R&S®ZNA50 and R&S®ZNA67 | | | |
| | 10 MHz to 10 GHz | < 1.5 dB | 0.5 dB | |
| | 10 GHz to 26.5 GHz | < 2 dB | 0.5 dB | |
| | 26.5 GHz to 40 GHz | < 2.5 dB | 0.5 dB | |
| | R&S®ZNA43, 2.4 mm interface | | | |
| | 40 GHz to 43.5 GHz | < 3 dB | 1 dB | |
| | R&S®ZNA43, 2.92 mm interface | | | |
| | 40 GHz to 43.5 GHz | | | 1 dB |
| | R&S®ZNA50 and R&S®ZNA67 | | | |
| | 40 GHz to 50 GHz | < 3 dB | 1 dB | |
| | R&S®ZNA67 | | | |
| | 50 GHz to 67 GHz | < 3.5 dB | 1 dB | |
| Transmission tracking in dB | R&S®ZNA26, R&S®ZNA43, R&S®ZNA50 and R&S®ZNA67 | | | |
| | 10 MHz to 10 GHz | < 1.5 dB | 0.5 dB | |
| | 10 GHz to 26.5 GHz | < 2 dB | 0.5 dB | |
| | 26.5 GHz to 40 GHz | < 2.5 dB | 0.5 dB | |
| | R&S®ZNA43, 2.4 mm interface | | | |
| | 40 GHz to 43.5 GHz | < 3 dB | 1 dB | |
| | R&S®ZNA43, 2.92 mm interface | | | |
| | 40 GHz to 43.5 GHz | | | 1 dB |
| | R&S®ZNA50 and R&S®ZNA67 | | | |
| | 40 GHz to 50 GHz | < 3 dB | 1 dB | |
| | R&S®ZNA67 | | | |
| | 50 GHz to 67 GHz | < 3.5 dB | 1 dB | |
| Load match in dB | R&S®ZNA26, R&S®ZNA43, R&S®ZNA50 and R&S®ZNA67 | | | |
| | 10 MHz to 20 GHz | > 10 dB | 18 dB | |
| | R&S®ZNA26, R&S®ZNA43 and R&S®ZNA67 | | | |
| | 20 GHz to 40 GHz | > 8 dB | 15 dB | |
| | R&S®ZNA50 | | | |
| | 20 GHz to 40 GHz | > 6 dB | 13 dB | |
| | R&S®ZNA43, 2.4 mm interface | | | |
| | 40 GHz to 43.5 GHz | > 6 dB | 10 dB | |
| | R&S®ZNA43, 2.92 mm interface | | | |
| | 40 GHz to 43.5 GHz | | | 10 dB |
| | R&S®ZNA50 and R&S®ZNA67 | | | |
| | 40 GHz to 67 GHz | > 6 dB | 10 dB | |

| Trace stability | | 1 kHz IF bandwidth | 100 kHz IF bandwidth | | |
|---|---|---|---|---|---|
| | | meas. | spec. | typ. | meas. |
| Trace noise magnitude (RMS) at 0 dBm source power, 0 dB reflection | R&S®ZNA26, R&S®ZNA43, R&S®ZNA50 and R&S®ZNA67 | | | | |
| | 10 MHz to 20 MHz | 0.010 dB | < 0.500 dB | 0.100 dB | |
| | 20 MHz to 50 MHz | 0.005 dB | < 0.200 dB | 0.050 dB | |
| | 50 MHz to 150 MHz | 0.001 dB | < 0.050 dB | 0.010 dB | |
| | 150 MHz to 500 MHz | 0.001 dB | < 0.020 dB | 0.002 dB | |
| | 500 MHz to 20 GHz | 0.001 dB | < 0.005 dB | 0.002 dB | |
| | 20 GHz to 40 GHz | 0.001 dB | < 0.008 dB | 0.003 dB | |
| | R&S®ZNA43, 2.4 mm interface | | | | |
| | 40 GHz to 43.5 GHz | 0.001 dB | < 0.030 dB | 0.007 dB | |
| | R&S®ZNA43, 2.92 mm interface | | | | |
| | 40 GHz to 43.5 GHz | 0.001 dB | | | 0.007 dB |
| | R&S®ZNA50 and R&S®ZNA67 | | | | |
| | 40 GHz to 50 GHz | | < 0.025 dB | 0.007 dB | |
| | R&S®ZNA67 | | | | |
| | 50 GHz to 67 GHz | | < 0.030 dB | 0.010 dB | |
| Trace noise phase (RMS) at 0 dBm source power, 0 dB reflection | R&S®ZNA26, R&S®ZNA43, R&S®ZNA50 and R&S®ZNA67 | | | | |
| | 10 MHz to 20 MHz | 0.05° | < 3.00° | 0.5° | |
| | 20 MHz to 50 MHz | 0.020° | < 1.00° | 0.20° | |
| | 50 MHz to 150 MHz | 0.005° | < 0.30° | 0.05° | |
| | 150 MHz to 500 MHz | 0.002° | < 0.10° | 0.02° | |
| | 500 MHz to 20 GHz | 0.001° | < 0.04° | 0.01° | |
| | 20 GHz to 40 GHz | 0.002° | < 0.06° | 0.02° | |
| | R&S®ZNA43, 2.4 mm interface | | | | |
| | 40 GHz to 43.5 GHz | 0.006° | < 0.20° | 0.06° | |
| | R&S®ZNA43, 2.92 mm interface | | | | |
| | 40 GHz to 43.5 GHz | | | | 0.06° |
| | R&S®ZNA50 and R&S®ZNA67 | | | | |
| | 40 GHz to 50 GHz | 0.006° | < 0.20° | 0.06° | |
| | R&S®ZNA67 | | | | |
| | 50 GHz to 67 GHz | 0.006° | < 0.25° | 0.12° | |
| Temperature dependence at 0 dB transmission or reflection | 10 MHz to 5 GHz | | | 0.01 dB/K, 0.1°/K | |
| | 5 GHz to 40 GHz | | | 0.02 dB/K, 0.4°/K | |
| | 40 GHz to 67 GHz | | | 0.04 dB/K, 0.8°/K | |




*Typical trace noise magnitude in dB (RMS) versus frequency for R&S®ZNA43 (left) and R&S®ZNA67 (right)* [11]

[11] At 0 dBm source power, 0 dB reflection and 100 kHz bandwidth.

# Test port output

The data below is valid from +18 °C to +28 °C.

| | | spec. | typ. | meas. |
|---|---|---|---|---|
| Power range without optional source step attenuator (for data with additional source step attenuator(s) refer to Options) | R&S®ZNA26 | | | |
| | 10 MHz to 4 GHz | –80 dBm to +17 dBm | up to +20 dBm | |
| | 4 GHz to 20 GHz | –80 dBm to +13 dBm | up to +18 dBm | |
| | 20 GHz to 25 GHz | –80 dBm to +11 dBm | up to +15 dBm | |
| | 25 GHz to 26.5 GHz | –80 dBm to +8 dBm | up to +11 dBm | |
| | R&S®ZNA43 | | | |
| | 10 MHz to 4 GHz | –80 dBm to +17 dBm | up to +20 dBm | |
| | 4 GHz to 20 GHz | –80 dBm to +13 dBm | up to +16 dBm | |
| | 20 GHz to 25 GHz | –80 dBm to +12 dBm | up to +15 dBm | |
| | 25 GHz to 30 GHz | –80 dBm to +9 dBm | up to +12 dBm | |
| | 30 GHz to 40 GHz | –80 dBm to +6 dBm | up to +9 dBm | |
| | R&S®ZNA43, 2.4 mm interface | | | |
| | 40 GHz to 43.5 GHz | –60 dBm to +4 dBm | up to +8 dBm | |
| | R&S®ZNA43, 2.92 mm interface | | | |
| | 40 GHz to 43.5 GHz | | | +8 dBm |
| | R&S®ZNA50 | | | |
| | 10 MHz to 4 GHz | –80 dBm to +16 dBm | up to +20 dBm | |
| | 4 GHz to 20 GHz | –80 dBm to +13 dBm | up to +18 dBm | |
| | 20 GHz to 25 GHz | –80 dBm to +12 dBm | up to +15 dBm | |
| | 25 GHz to 30 GHz | –80 dBm to +9 dBm | up to +12 dBm | |
| | 30 GHz to 40 GHz | –80 dBm to +6 dBm | up to +9 dBm | |
| | 40 GHz to 45 GHz | –60 dBm to +4 dBm | –80 dBm to +7 dBm | |
| | 45 GHz to 50 GHz | –60 dBm to +3 dBm | –80 dBm to +6 dBm | |
| | R&S®ZNA67 | | | |
| | 10 MHz to 4 GHz | –80 dBm to +16 dBm | up to +20 dBm | |
| | 4 GHz to 20 GHz | –80 dBm to +13 dBm | up to +18 dBm | |
| | 20 GHz to 25 GHz | –80 dBm to +11 dBm | up to +14 dBm | |
| | 25 GHz to 30 GHz | –80 dBm to +7 dBm | up to +10 dBm | |
| | 30 GHz to 40 GHz | –80 dBm to +4 dBm | up to +7 dBm | |
| | 40 GHz to 67 GHz | –60 dBm to +5 dBm | –80 dBm to +8 dBm | |
| Minimum power level using optional source step attenuator (see Options) | | –120 dBm | | |
| Power accuracy, source power –10 dBm | R&S®ZNA26 and R&S®ZNA43 | | | |
| | 10 MHz to 26.5 GHz | < 2.0 dB | | |
| | R&S®ZNA43 | | | |
| | 26.5 GHz to 40 GHz | < 3.0 dB | | |
| | R&S®ZNA43, 2.4 mm interface | | | |
| | 40 GHz to 43.5 GHz | < 3.0 dB | | |
| | R&S®ZNA43, 2.92 mm interface | | | |
| | 40 GHz to 43.5 GHz | | | 3.0 dB |
| | R&S®ZNA50 and R&S®ZNA67 | | | |
| | 10 MHz to 26.5 GHz | < 2.0 dB | | |
| | 26.5 GHz to 50 GHz | < 3.0 dB | | |
| | 50 GHz to 67 GHz | < 4.0 dB | | |

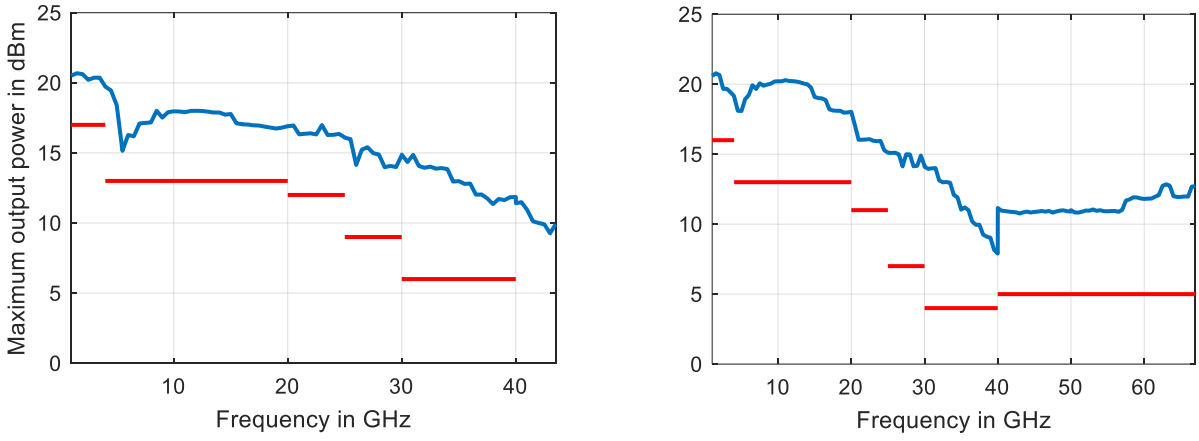
| | | spec. | typ. | meas. |
|---|---|---|---|---|
| Power linearity referenced to –10 dBm, no power calibration | source power –40 dBm to +10 dBm [12], R&S®ZNA26, R&S®ZNA43, R&S®ZNA5042 and R&S®ZNA67 | | | |
| | 10 MHz to 20 GHz | < 1.5 dB | 0.2 dB | |
| | 20 GHz to 40 GHz | < 2 dB | 0.2 dB | |
| | R&S®ZNA43, 2.4 mm interface | | | |
| | 40 GHz to 43.5 GHz | < 2 dB | 0.2 dB | |
| | R&S®ZNA43, 2.92 mm interface | | | |
| | 40 GHz to 43.5 GHz | | | 0.2 dB |
| | R&S®ZNA50 and R&S®ZNA67 | | | |
| | 40 GHz to 67 GHz | < 2 dB | 0.2 dB | |
| | source power < –40 dBm, R&S®ZNA26, R&S®ZNA43, R&S®ZNA50, and R&S®ZNA67 | | | |
| | 10 MHz to 20 GHz | < 2 dB | 0.2 dB | |
| | 20 GHz to 40 GHz | < 3 dB | 0.2 dB | |
| | R&S®ZNA43, 2.4 mm interface | | | |
| | 40 GHz to 43.5 GHz | < 3 dB | 0.2 dB | |
| | R&S®ZNA43, 2.92 mm interface | | | |
| | 40 GHz to 43.5 GHz | | | 0.2 dB |
| | R&S®ZNA50 and R&S®ZNA67 | | | |
| | 40 GHz to 67 GHz | < 3 dB | 0.2 dB | |
| Power resolution | | 0.01 dB | | |
| Power accuracy, –10 dBm source power, ALC ON | R&S®ZNA26, R&S®ZNA43, R&S®ZNA50 and R&S®ZNA67 | | | |
| | 10 MHz to 100 MHz | | 2.0 dB | |
| | 100 MHz to 26.5 GHz | | 1.0 dB | |
| | R&S®ZNA43, R&S®ZNA50 and R&S®ZNA67 | | | |
| | 26.5 GHz to 30 GHz | | 1.0 dB | |
| | 30 GHz to 40 GHz | | 1.5 dB | |
| | 40 GHz to 43.5 GHz | | 2.0 dB | |
| | R&S®ZNA50 and R&S®ZNA67 | | | |
| | 43.5 GHz to 50 GHz | | 2.0 dB | |
| | R&S®ZNA67 | | | |
| | 50 GHz to 67 GHz | | 2.5 dB | |
| Power linearity, referenced to –10 dBm, ALC ON | source power –40 dBm to +10 dBm [12], R&S®ZNA26, R&S®ZNA43, R&S®ZNA50 and R&S®ZNA67 | | | |
| | 10 MHz to 100 MHz | | 1.5 dB | |
| | 100 MHz to 67 GHz | | 0.5 dB | |
| | source power < –40 dBm, R&S®ZNA26, R&S®ZNA43, R&S®ZNA50 and R&S®ZNA67 | | | |
| | 10 MHz to 100 MHz | | 2.0 dB | |
| | 100 MHz to 67 GHz | | 1.0 dB | |

| | | spec. | typ. | nom. |
|---|---|---|---|---|
| Second harmonics at –10 dBm | R&S®ZNA26 and R&S®ZNA43 | | | |
| | 10 MHz to 20 MHz | < –23 dBc | –30 dBc | |
| | 20 MHz to 16 GHz | < –25 dBc | –40 dBc | |
| | R&S®ZNA50 and R&S®ZNA67 | | | |
| | 10 MHz to 20 MHz | < –23 dBc | –30 dBc | |
| | 20 MHz to 33 GHz | < –25 dBc | –40 dBc | |
| Third harmonics at –10 dBm | R&S®ZNA26 and R&S®ZNA43 | | | |
| | 10 MHz to 20 MHz | < –23 dBc | –30 dBc | |
| | 20 MHz to 50 MHz | < –25 dBc | –50 dBc | |
| | 50 MHz to 13 GHz | < –40 dBc | –60 dBc | |
| | R&S®ZNA50 and R&S®ZNA67 | | | |
| | 10 MHz to 20 MHz | < –23 dBc | –30 dBc | |
| | 20 MHz to 50 MHz | < –25 dBc | –50 dBc | |
| | 50 MHz to 22 GHz | < –40 dBc | –60 dBc | |
| Nonharmonic spurious (nom.), low phase noise mode | | | | –70 dBc |

[12] Maximum power level is limited to +10 dBm or the maximum specified output power, whichever is smaller.

| | Offset | 100 Hz | 1 kHz | 10 kHz | 100 kHz | 200 kHz | 1 MHz | 5 MHz |
|---|---|---|---|---|---|---|---|---|
| Phase noise (meas.) in dBc (1 Hz), low phase noise mode using the internal reference | R&S®ZNA26, R&S®ZNA43, R&S®ZNA50 and R&S®ZNA67 | | | | | | | |
| | 10 MHz to 100 MHz | –108 | –132 | –137 | –139 | –141 | –141 | –142 |
| | 100 MHz to 1.25 GHz | –85 | –117 | –125 | –122 | –125 | –135 | –142 |
| | 1.25 GHz to 2.5 GHz | –80 | –111 | –119 | –116 | –119 | –130 | –143 |
| | 2.5 GHz to 5 GHz | –74 | –105 | –113 | –111 | –113 | –124 | –139 |
| | 5 GHz to 10 GHz | –68 | –99 | –107 | –104 | –107 | –118 | –133 |
| | 10 GHz to 20 GHz | –62 | –94 | –100 | –98 | –101 | –112 | –127 |
| | 20 GHz to 26.5 GHz | –59 | –91 | –98 | –95 | –100 | –103 | –117 |
| | R&S®ZNA43, R&S®ZNA50 and R&S®ZNA67 | | | | | | | |
| | 26.5 GHz to 40 GHz | –56 | –87 | –95 | –90 | –95 | –105 | –120 |
| | 40 GHz to 43.5 GHz | –54 | –86 | –93 | –91 | –95 | –98 | –110 |
| | R&S®ZNA50 and R&S®ZNA67 | | | | | | | |
| | 43.5 GHz to 50 GHz | –53 | –85 | –91 | –90 | –94 | –97 | –111 |

| | Offset | 100 Hz | 1 kHz | 10 kHz | 100 kHz | 200 kHz | 1 MHz | 5 MHz |
|---|---|---|---|---|---|---|---|---|
| Phase noise (meas.) in dBc (1 Hz), low phase noise mode using an external 1 GHz frequency reference with the external frequency reference input | R&S®ZNA26, R&S®ZNA43, R&S®ZNA50 and R&S®ZNA67 | | | | | | | |
| | 10 MHz to 100 MHz | –123 | –133 | –138 | –141 | –141 | –142 | –142 |
| | 100 MHz to 1.25 GHz | –114 | –129 | –132 | –127 | –121 | –135 | –143 |
| | 1.25 GHz to 2.5 GHz | –109 | –123 | –126 | –121 | –115 | –127 | –141 |
| | 2.5 GHz to 5 GHz | –103 | –117 | –120 | –116 | –109 | –121 | –136 |
| | 5 GHz to 10 GHz | –96 | –110 | –114 | –109 | –103 | –117 | –129 |
| | 10 GHz to 20 GHz | –90 | –100 | –104 | –103 | –97 | –111 | –123 |
| | 20 GHz to 26.5 GHz | –90 | –98 | –98 | –102 | –96 | –103 | –117 |
| | R&S®ZNA43, R&S®ZNA50 and R&S®ZNA67 | | | | | | | |
| | 26.5 GHz to 40 GHz | –84 | –93 | –95 | –98 | –91 | –105 | –118 |
| | 40 GHz to 43.5 GHz | –84 | –93 | –95 | –97 | –91 | –98 | –110 |
| | R&S®ZNA50 and R&S®ZNA67 | | | | | | | |
| | 43.5 GHz to 50 GHz | –81 | –93 | –95 | –96 | –90 | –97 | –110 |




*Typical maximum output power in dBm versus frequency for R&S®ZNA43 (left) and R&S®ZNA67 (right)* [13]

[13] With R&S®ZNAxx-B16 option.

# Test port input

| | | spec. | typ. | meas. |
|---|---|---|---|---|
| Match without system error correction, equivalent to raw test port match | R&S®ZNA26, R&S®ZNA43, R&S®ZNA50 and R&S®ZNA67 | | | |
| | 10 MHz to 20 GHz | > 10 dB | 18 dB | |
| | R&S®ZNA26, R&S®ZNA43 and R&S®ZNA67 | | | |
| | 20 GHz to 40 GHz | > 8 dB | 15 dB | |
| | R&S®ZNA50 | | | |
| | 20 GHz to 40 GHz | > 6 dB | 13 dB | |
| | R&S®ZNA43, 2.4 mm interface | | | |
| | 40 GHz to 43.5 GHz | > 6 dB | 10 dB | |
| | R&S®ZNA43, 2.92 mm interface | | | |
| | 40 GHz to 43.5 GHz | | | 10 dB |
| | R&S®ZNA50 and R&S®ZNA67 | | | |
| | 40 GHz to 67 GHz | > 6 dB | 10 dB | |
| Power measurement accuracy at –10 dBm with power calibration using R&S®SMARTerCal (UOSM) | R&S®ZNA26, R&S®ZNA43, R&S®ZNA50 and R&S®ZNA67 | | | |
| | 10 MHz to 26.5 GHz | < 0.1 dB | | |
| | 26.5 GHz to 40 GHz | < 0.2 dB | | |
| | R&S®ZNA43, 2.4 mm interface | | | |
| | 40 GHz to 43.5 GHz | < 0.2 dB | | |
| | R&S®ZNA43, 2.92 mm interface | | | |
| | 40 GHz to 43.5 GHz | | 0.2 dB | |
| | R&S®ZNA50 and R&S®ZNA67 | | | |
| | 40 GHz to 60 GHz | < 0.2 dB | | |
| | 60 GHz to 67 GHz | < 0.3 dB | | |
| Power measurement accuracy at –10 dBm without power calibration from +18 °C to +28 °C | R&S®ZNA26 and R&S®ZNA43 | | | |
| | 10 MHz to 30 GHz | < 1.5 dB | | |
| | 30 GHz to 40 GHz | < 2.0 dB | | |
| | R&S®ZNA43, 2.4 mm interface | | | |
| | 40 GHz to 43.5 GHz | < 2.5 dB | | |
| | R&S®ZNA43, 2.92 mm interface | | | |
| | 40 GHz to 43.5 GHz | | | 2.5 dB |
| | R&S®ZNA50 and R&S®ZNA67 | | | |
| | 40 GHz to 60 GHz | < 2.5 dB | | |
| | 60 GHz to 67 GHz | < 3.0 dB | | |

| | | spec. | typ. | meas. |
|---|---|---|---|---|
| Compression at test port input, > 0 dBm input level, referenced to –10 dBm | R&S®ZNA26, R&S®ZNA43, R&S®ZNA50, and R&S®ZNA67 | | | |
| | 10 MHz to 25 GHz, +8 dBm to +10 dBm | < 0.20 dB | 0.10 dB | |
| | 10 MHz to 40 GHz, 0 dBm to +8 dBm | < 0.20 dB | 0.05 dB | |
| | R&S®ZNA43, 2.92 mm interface | | | |
| | 40 GHz to 43.5 GHz, 0 dBm to +8 dBm | | | 0.05 dB |
| | R&S®ZNA43, 2.4 mm interface | | | |
| | 40 GHz to 43.5 GHz, 0 dBm to +8 dBm | < 0.20 dB | 0.05 dB | |
| | R&S®ZNA50 and R&S®ZNA67 | | | |
| | 40 GHz to 67 GHz, 0 dBm to +8 dBm | < 0.20 dB | 0.05 dB | |
| Linearity at test port input, –50 dBm to 0 dBm input level, referenced to –10 dBm | R&S®ZNA26 and R&S®ZNA43, 2.92 mm interface | | | |
| | 10 MHz to 40 GHz | < 0.05 dB | 0.03 dB | |
| | 40 GHz to 43.5 GHz | | | 0.03 dB |
| | R&S®ZNA43, 2.4 mm interface | | | |
| | 10 MHz to 43.5 GHz | < 0.05 dB | 0.03 dB | |
| | R&S®ZNA50 | | | |
| | 10 MHz to 50 GHz | < 0.05 dB | 0.03 dB | |
| | R&S®ZNA67 | | | |
| | 10 MHz to 67 GHz | < 0.05 dB | 0.03 dB | |
| Damage level | | +27 dBm | | |
| Damage DC voltage | | 30 V | | |

| Standard configuration | | **Base unit** | | | **Base unit + R&S®ZNAxx-B16 + R&S®ZNAxx-B3n [14]** | | |
|---|---|---|---|---|---|---|---|
| | | **spec.** | **typ.** | **meas.** | **spec.** | **typ.** | **meas.** |
| Noise level [15] at 1 kHz measurement bandwidth, normalized to 1 Hz | R&S®ZNA26, R&S®ZNA43, R&S®ZNA50 and R&S®ZNA67 | | | | | | |
| | 10 MHz to 30 MHz | < –75 dBm | –100 dBm | | < –85 dBm | –110 dBm | |
| | 30 MHz to 100 MHz | < –92 dBm | –110 dBm | | < –102 dBm | –120 dBm | |
| | 100 MHz to 500 MHz | < –107 dBm | –125 dBm | | < –117 dBm | –130 dBm | |
| | 500 MHz to 30 GHz | < –120 dBm | –132 dBm | | < –130 dBm | –142 dBm | |
| | 30 GHz to 40 GHz | < –115 dBm | –130 dBm | | < –122 dBm | –139 dBm | |
| | R&S®ZNA43, 2.4 mm interface | | | | | | |
| | 40 GHz to 43.5 GHz | < –105 dBm | –120 dBm | | < –111 dBm | –126 dBm | |
| | R&S®ZNA43, 2.92 mm interface | | | | | | |
| | 40 GHz to 43.5 GHz | | | –120 dBm | | | –126 dBm |
| | R&S®ZNA50 and R&S®ZNA67 | | | | | | |
| | 40 GHz to 50 GHz | < –105 dBm | –120 dBm | | < –111 dBm | –126 dBm | |
| | 50 GHz to 67 GHz | < –104 dBm | –119 dBm | | < –110 dBm | –125 dBm | |

| Reversed coupler configuration [16] | | **Base unit + R&S®ZNAxx-B16** | | | **Base unit + R&S®ZNAxx-B16 + R&S®ZNAxx-B3n [14]** | | |
|---|---|---|---|---|---|---|---|
| | | **spec.** | **typ.** | **meas.** | **spec.** | **typ.** | **meas.** |
| Noise level [15] at 1 kHz measurement bandwidth, normalized to 1 Hz | R&S®ZNA26, R&S®ZNA43, R&S®ZNA50 and R&S®ZNA67 | | | | | | |
| | 10 MHz to 30 MHz | < –105 dBm | –122 dBm | | < –115 dBm | –132 dBm | |
| | 30 MHz to 100 MHz | < –117 dBm | –139 dBm | | < –127 dBm | –149 dBm | |
| | 100 MHz to 500 MHz | < –127 dBm | –141 dBm | | < –137 dBm | –151 dBm | |
| | 500 MHz to 30 GHz | < –127 dBm | –141 dBm | | < –137 dBm | –151 dBm | |
| | 30 GHz to 40 GHz | < –122 dBm | –137 dBm | | < –129 dBm | –145 dBm | |
| | R&S®ZNA43, 2.4 mm interface | | | | | | |
| | 40 GHz to 43.5 GHz | < –112 dBm | –132 dBm | | < –118 dBm | –138 dBm | |
| | R&S®ZNA43, 2.92 mm interface | | | | | | |
| | 40 GHz to 43.5 GHz | | | –132 dBm | | | –138 dBm |
| | R&S®ZNA50 and R&S®ZNA67 | | | | | | |
| | 40 GHz to 50 GHz | < –110 dBm | –120 dBm | | < –118 dBm | –130 dBm | |
| | 50 GHz to 67 GHz | < –108 dBm | –120 dBm | | < –116 dBm | –130 dBm | |

| Direct source and receiver access [17] | | **Base unit + R&S®ZNAxx-B16** | | |
|---|---|---|---|---|
| | | **spec.** | **typ.** | **meas.** |
| Noise level [15] at 1 kHz measurement bandwidth, normalized to 1 Hz | R&S®ZNA26, R&S®ZNA43, R&S®ZNA50 and R&S®ZNA67 | | | |
| | 10 MHz to 30 MHz | < –115 dBm | –132 dBm | |
| | 30 MHz to 100 MHz | < –127 dBm | –149 dBm | |
| | 100 MHz to 500 MHz | < –137 dBm | –151 dBm | |
| | 500 MHz to 30 GHz | < –137 dBm | –151 dBm | |
| | 30 GHz to 40 GHz | < –129 dBm | –145 dBm | |
| | R&S®ZNA43, 2.4 mm interface | | | |
| | 40 GHz to 43.5 GHz | < –118 dBm | –138 dBm | |
| | R&S®ZNA43, 2.92 mm interface | | | |
| | 40 GHz to 43.5 GHz | | | –138 dBm |
| | R&S®ZNA50 and R&S®ZNA67 | | | |
| | 40 GHz to 50 GHz | < –118 dBm | –128 dBm | |
| | 50 GHz to 67 GHz | < –116 dBm | –126 dBm | |

[14] Receiver step attenuator in 0 dB position.

[15] The noise level is defined as the RMS value of the specified noise floor. For different bandwidth add [10 × $\log_{10}$(bandwidth / 1Hz)] to the given noise level.

[16] With the R&S®ZNAxx-B16 option installed, the jumpers of the direct source and receiver access connectors Source and Meas are swapped to horizontal position to enable the reverse coupler operation.

[17] Using the direct source and receiver access connectors Meas In and Ref In (jumpers removed) and no receiver attenuator installed or in 0 dB position.

# Display

| | | |
|---|---|---|
| Main screen | | touchscreen, 30.7 cm (12.1") diagonal, WXGA, 18-bit color LCD |
| Main screen resolution | | 1280 × 800 pixel, 125 dpi |
| Pixel failure rate | | ≤ $1 \times 10^{-5}$ |
| Auxiliary screen | | touchscreen, 17.8 cm (7") diagonal, WVGA, 18-bit color LCD |
| Auxiliary screen resolution | | 480 × 800 pixel, 125 dpi |
| Pixel failure rate | | ≤ $1.5 \times 10^{-5}$ |

# Internal PC

| | | |
|---|---|---|
| **Removable PC** [18] | | IPC 11/4 |
| CPU | | Intel® Core™ i7, x64 |
| Clock rate | | 2.3 GHz |
| RAM | | 16 Gbyte DDR3 |
| Operating system | | Windows 10 IoT Enterprise 2021 LTSC |
| Solid-state drive | | ≥ 256 Gbyte |

# Front panel connectors

| | | |
|---|---|---|
| USB | 2.0 device connector (type A) | 3 |

# Rear panel connectors

| | | |
|---|---|---|
| GPIB interface | remote control interface, in line with IEEE 488, IEC 60625; 24-pin | |
| External handler I/O | connector for R&S®ZNBT-Z14 handler I/O option (external) for R&S®ZNA | |
| LAN | local area network connector, 8-pin, RJ-45, 1 Gbit/s | |
| USB | 2.0 device connector (type A) | 4 |
| USB device | 2.0 secondary connector (type B) | 1 |
| External monitor | DVI-D digital-only connector | 1 |
| | DisplayPort | 1 |

| | | |
|---|---|---|
| **REF IN** | input for external reference frequency signal | |
| Connector type | | |
| BNC, female | input frequency range | 1 MHz to 50 MHz |
| | step size | 1 Hz |
| | input impedance | 100 Ω |
| SMA, female | input frequency range | 100 MHz or 1 GHz |
| | step size | fixed frequency |
| | input impedance | 50 Ω |
| Maximum permissible deviation | | 1 kHz |
| Input power | | –10 dBm to +15 dBm |

| | | |
|---|---|---|
| **REF OUT** | output for external reference frequency signal | |
| Connector type | | |
| BNC, female | output impedance | 50 Ω |
| | output frequency | 10 MHz |
| | output frequency accuracy | 1 Hz |
| | output power | +9 dBm ± 4 dB |

[18] Internal PC is subject to change without notice.

| | | |
|---|---|---|
| **USER CONTROL** | diverse control and trigger signals, 25-pin D-Sub, 3.3 V TTL,<br>for controlling external generators, for limit checks, sweep signals, etc. | |
| CHANNEL BIT 0 to CHANNEL BIT 3 | pin 8 to pin 11 (outputs) | channel-specific, user-configurable bits |
| CHANNEL BIT 4 to CHANNEL BIT 7 | pin 16 to pin 19 (outputs) | channel-specific, user-configurable bits |
| DRIVE PORT 1 to DRIVE PORT 4 | pin 16 to pin 19 (outputs) | indicates drive ports (can alternatively be used for channel bits 4 to 7) |
| PASS 1 and PASS 2 | pin 13 and pin 14 (outputs) | pass/fail results of limit checks |
| BUSY | pin 4 (output) | measurements running |
| READY FOR TRIGGER | pin 6 (output) | ready for trigger |
| EXT GEN TRIGGER | pin 21 (output) | control signal for external generator |
| EXT GEN BLANK | pin 22 (input) | handshake signal from external generator |
| EXTERNAL TRIGGER | pin 2 (input) | first trigger input for analyzer, 5 V tolerant |
| EXTERNAL TRIGGER 2 | pin 25 (input) | second trigger input for analyzer,<br>5 V tolerant |

| | | |
|---|---|---|
| **Trigger In A** | 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 | | 5 kΩ (nom.) |

# Options

## R&S®ZNA-B7 memory extension for data streaming

| | | |
|---|---|---|
| Timing resolution | ≥ 20 MHz resolution bandwidth | 8 ns |
| | ≥ 10 MHz resolution bandwidth | 16 ns |
| Number of wave quantities capturable | ≥ 20 MHz resolution bandwidth | 4 |
| | ≥ 10 MHz resolution bandwidth | 8 |

## R&S®ZNA-B8 mmWave converter LO

The data is valid in the temperature range from +18 °C to +28 °C.

| | | |
|---|---|---|
| Connector type | | 2.92 mm, female |
| Power range | 30 MHz to 26.5 GHz | |
| | spec. | –10 dBm to +20 dBm |
| | typ. | +25 dBm |
| Power accuracy,<br>–10 dBm source power | 30 MHz to 26.5 GHz | |
| | spec. | < 2.0 dB |
| Power linearity referenced to 0 dBm, no power calibration | 30 MHz to 26.5 GHz, –10 dBm to +20 dBm | |
| | spec. | < 2 dB |
| | typ. | 0.2 dB |
| Power resolution | spec. | 0.01 dB |
| Second harmonics at 0 dBm | 1 GHz to 20 GHz | |
| | spec. | < –15 dBc |
| | typ. | –20 dBc |
| Third harmonics at 0 dBm | 1 GHz to 13 GHz | |
| | spec. | < –25 dBc |
| | typ. | –30 dBc |

# R&S®ZNA-B15 RFFE GPIO interface

The R&S®ZNA-B15 RFFE GPIO interfaces (models .02 and .03) provide two independent MIPI RFFE busses and ten individually configurable output lanes with different power handling capabilities.

| | | |
|---|---|---|
| Connector type | | 25-pin D-Sub, female |
| Ground | analog and digital | pins 1, 3, 5, 11 and 22 |

| Output voltage | Output pin | Voltage range | Voltage step size | Maximum current |
|---|---|---|---|---|
| RFFE port 1, VIO | pin 2 | 0 V to +2 V | 1 mV | 20 mA |
| RFFE port 1, DATA | pin 15 | 0 V to +2 V | 1 mV | 20 mA |
| RFFE port 1, CLK | pin 14 | configurable clock rate: 31.25 kHz to 26 MHz | | |
| | | 0 V to +2 V | 1 mV | 20 mA |
| RFFE port 2, VIO | pin 4 | 0 V to +2 V | 1 mV | 20 mA |
| RFFE port 2, DATA | pin 17 | 0 V to +2 V | 1 mV | 20 mA |
| RFFE port 2, CLK | pin 16 | configurable clock rate: 31.25 kHz to 26 MHz | | |
| | | 0 V to +2 V | 1 mV | 20 mA |
| GPIO 1 to GPIO 8 | pin 6 to pin 9,<br>pin 18 to pin 21 | –5 V to +10 V,<br>typ. –6 V to +12 V | 5 mV | 20 mA |
| GPIO 9 and 10 | pin 10 and 23 | –5 V to +10 V,<br>typ. –6 V to +12 V | 5 mV | 100 mA |

The R&S®ZNA-B15 RFFE GPIO interface (model .03) provides voltage and current measurement with switchable source resistance. 32 internal ADC channels measure voltage and current at each RFFE and GPIO pin simultaneously.

| Voltage measurement | Input pin | Voltage range | Resolution | Accuracy [19] |
|---|---|---|---|---|
| RFFE port 1 and 2, VIO, DATA, CLK | pin 2 and 4,<br>pin 14 to pin 17 | 0 V to +3 V | 100 µV | 2 % ± 20 mV |
| GPIO 1 to GPIO 10 | pin 6 to pin 9,<br>pin 18 to pin 21,<br>pin 10, pin 23 | –5 V to +10 V | 100 µV | 2 % ± 50 mV |

| Current measurement | Input pin | Source shunt resistor | Current range | Resolution | Accuracy [19] | Repeatability |
|---|---|---|---|---|---|---|
| | | current values are valid for GPIO voltages from –5 V to +8 V | | | | |
| RFFE port 1 and 2, VIO, DATA, CLK, GPIO 1 to GPIO 8 | pin 6 to pin 9,<br>pin 18 to pin 21 | 10 Ω | –20 mA to +20 mA | 10 µA | 2 % ± 200 µA | < 100 µA |
| | | 100 Ω | –2 mA to +2 mA | 1 µA | 2 % ± 20 µA | < 10 µA |
| | | 1 kΩ | –200 µA to +200 µA | 100 nA | 3 % ± 3 µA | < 1 µA |
| | | 10 kΩ | –20 µA to +20 µA | 10 nA | 5 % ± 500 nA | < 100 nA |
| | | 100 kΩ | –2 µA to +2 µA | 1 nA | 5 % ± 50 nA | < 10 nA |
| GPIO 9 and 10 | pin 10 and 23 | | –100 mA to +100 mA | 10 µA | 3 % ± 3 mA | < 100 µA |

[19] x % ± y is to be understood as x % of reading ± y.

## R&S®ZNA-B26 direct IF access

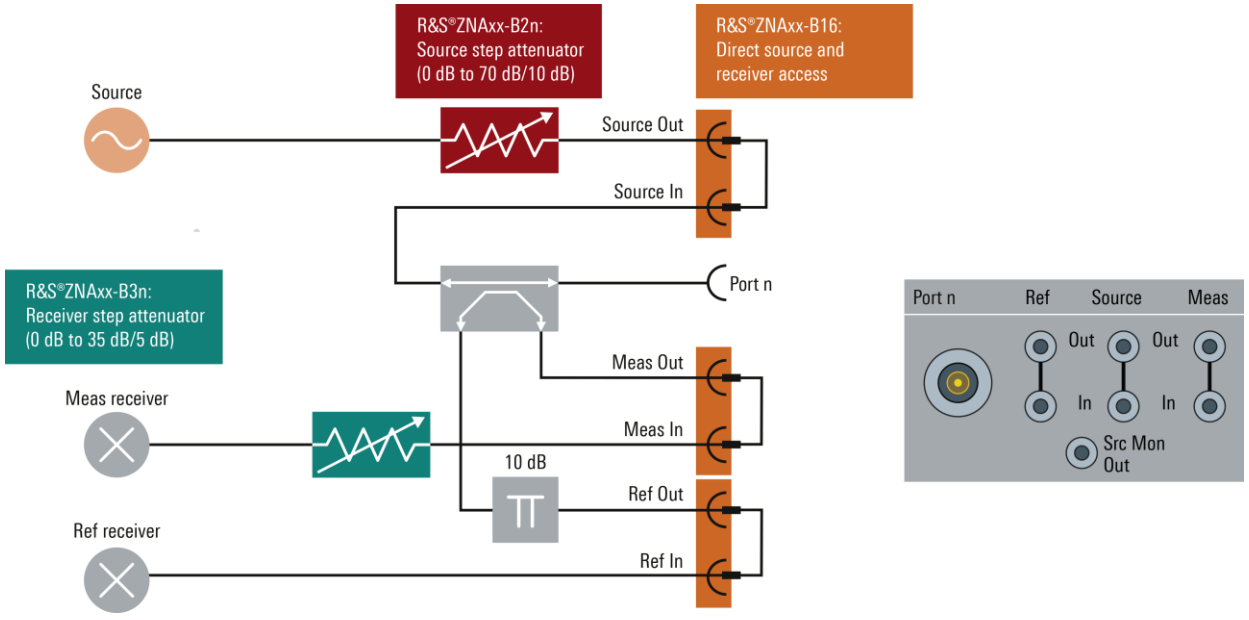
| | | |
|---|---|---|
| Connector type | | SMA, female |
| Impedance | | 50 Ω (nom.) |
| Frequency range | input (ADC clock 125 MHz) | 100 kHz to 1 GHz (nom.) |
| | output, RF ≤ 5 GHz | 100 kHz to 60 MHz (nom.) |
| | output, RF > 5 GHz | 100 kHz to 2 GHz (nom.) |
| Damage level | | +20 dBm, 10 V DC |
| Interfaces | | |
| IF Reference 1 | | input/output |
| IF Meas 1 | | input/output |
| IF Reference 2 | | input/output |
| IF Meas 2 | | input/output |
| IF Reference 3 | 4-port model | input/output |
| IF Meas 3 | 4-port model | input/output |
| IF Reference 4 | 4-port model | input/output |
| IF Meas 4 | 4-port model | input/output |
| Input 0.1 dB compression | 30 MHz, IF gain: 0 dB | –4 dBm (meas.) |

## R&S®ZNA-B91 trigger and control I/O board

| | | |
|---|---|---|
| Connector type | | BNC, female |
| Interfaces | | |
| Trigger In B | input | 3 V, 5 V tolerant,<br>impedance: 10 kΩ (nom.) |
| Trigger In C | | |
| Trigger In D | | |
| Trigger Out A | output | logic high: typ. 5 V,<br>impedance: 50 Ω (nom.) |
| Trigger Out B | | |
| Trigger Out C | | |
| Trigger Out D | | |
| PuMo In/Out A | input/output | input: 3 V, 5 V tolerant,<br>impedance: 10 kΩ (nom.) |
| PuMo In/Out B | | |
| PuMo In/Out C | | output, logic high: typ. 5 V,<br>impedance: 50 Ω (nom.) |
| PuMo In/Out D | | |
| Ready for Trigger | output | logic high: typ. 5 V,<br>impedance: 50 Ω (nom.) |
| Busy | output | logic high: typ. 5 V,<br>impedance: 50 Ω (nom.) |
| RF Off Control | input | pull up resistor: 4.7 kΩ on 3.3 V |

# R&S®ZNA26-B16, R&S®ZNA43-B16, R&S®ZNA50-B16 and R&S®ZNA67-B16 direct source and receiver access

| | | |
|---|---|---|
| Connector type | R&S®ZNA26-B16, R&S®ZNA43-B16 | 2.92 mm, female |
| | R&S®ZNA50-B16, R&S®ZNA67-B16 | 1.85 mm, female |
| Frequency range | R&S®ZNA26-B16 | |
| | spec. | 10 MHz to 26.5 GHz |
| | nom. | 100 kHz to 26.5 GHz |
| | R&S®ZNA43-B16, test port 2.4 mm interface | |
| | spec. | 10 MHz to 40 GHz |
| | meas. | 40 GHz to 43.5 GHz |
| | nom. | 100 kHz to 43.5 GHz |
| | R&S®ZNA43-B16, test port 2.92 mm interface | |
| | spec. | 10 MHz to 40 GHz |
| | meas. | 40 GHz to 43.5 GHz |
| | nom. | 100 kHz to 43.5 GHz |
| | R&S®ZNA50-B16 | |
| | spec. | 10 MHz to 50 GHz |
| | nom. | 100 kHz to 50 GHz |
| | R&S®ZNA67-B16 | |
| | spec. | 10 MHz to 67 GHz |
| | nom. | 100 kHz to 67 GHz |
| Damage level | Source In | +30 dBm, 30 V DC |
| | other inputs | +20 dBm, 0 V DC |
| Dynamic range is reduced by | 10 MHz to 1 GHz | 0 dB |
| | 1 GHz to 40 GHz | 2 dB |
| | 40 GHz to 50 GHz | 3 dB |
| | 50 GHz to 60 GHz | 4 dB |
| | 60 GHz to 67 GHz | 5 dB |
| Input 0.1 dB compression, receiver step attenuator: 0 dB | ≤ 10 GHz | –8 dBm (meas.) |
| | > 10 GHz | –6 dBm (meas.) |




*Test set configuration for R&S®ZNAxx-B16 direct source and receiver access*

## R&S®ZNA26-B21/-B22/-B23/-B24, R&S®ZNA43-B21/-B22/-B23/-B24, R&S®ZNA50-B21/-B22/-B23/-B24 and R&S®ZNA67-B21/-B22/-B23/-B24 source step attenuators

| | | |
|---|---|---|
| Frequency range | R&S®ZNA26-B21/-B22/-B23/-B24 | 10 MHz to 26.5 GHz |
| | R&S®ZNA43-B21/-B22/-B23/-B24 | 10 MHz to 43.5 GHz |
| | R&S®ZNA50-B21/-B22/-B23/-B24 | 10 MHz to 50 GHz |
| | R&S®ZNA67-B21/-B22/-B23/-B24 | 10 MHz to 67 GHz |
| Attenuation (nom.) | R&S®ZNA26-B21/-B22/-B23/-B24, R&S®ZNA43-B21/-B22/-B23/-B24 | 0 dB to 70 dB, in 10 dB steps |
| | R&S®ZNA50-B21/-B22/-B23/-B24 (order no. 1332.5118.2x), R&S®ZNA67-B21/-B22/-B23/-B24 (order no. 1332.5194.2x) | 0 dB to 50 dB, in 10 dB steps |
| | R&S®ZNA50-B21/-B22/-B23/-B24 (order no. 1332.5007.2x), R&S®ZNA67-B21/-B22/-B23/-B24 (order no. 1332.5013.2x) | 0 dB to 70 dB, in 10 dB steps |
| Minimum output power is reduced to | | –120 dBm |
| Maximum output power and dynamic range are reduced by | R&S®ZNA26-B21/-B22/-B23/-B24, R&S®ZNA43-B21/-B22/-B23/-B24 | |
| | 10 MHz to 16 GHz | 1 dB |
| | 16 GHz to 30 GHz | 2 dB |
| | 30 GHz to 40 GHz | 3 dB |
| | 40 GHz to 43.5 GHz | 4 dB |
| | R&S®ZNA50-B21/-B22/-B23/-B24, R&S®ZNA67-B21/-B22/-B23/-B24 | |
| | 10 MHz to 4 GHz | 1 dB |
| | 4 GHz to 16 GHz | 2 dB |
| | 16 GHz to 30 GHz | 3 dB |
| | 30 GHz to 40 GHz | 4 dB |
| | 40 GHz to 67 GHz | 5 dB |

## R&S®ZNA26-B31/-B32/-B33/-B34, R&S®ZNA43-B31/-B32/-B33/-B34, R&S®ZNA50-B31/-B32/-B33/-B34 and R&S®ZNA67-B31/-B32/-B33/-B34 receiver step attenuators

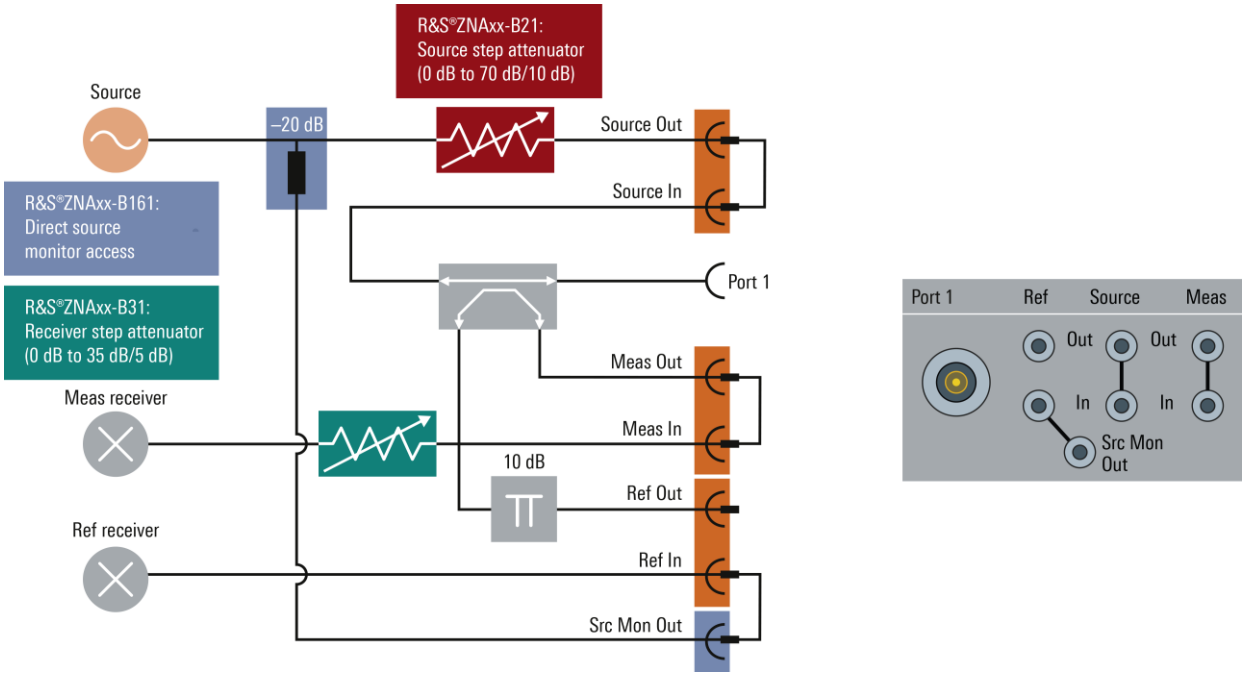
| | | |
|---|---|---|
| Frequency range | R&S®ZNA26-B31/-B32/-B33/-B34 | 10 MHz to 26.5 GHz |
| | R&S®ZNA43-B31/-B32/-B33/-B34 | 10 MHz to 43.5 GHz |
| | R&S®ZNA50-B31/-B32/-B33/-B34 | 10 MHz to 50 GHz |
| | R&S®ZNA67-B31/-B32/-B33/-B34 | 10 MHz to 67 GHz |
| Attenuation | 10 dB preset setting | 0 dB to 35 dB, in 5 dB steps |
| Step attenuator accuracy; attenuation > 0 dB, referenced to attenuation = 10 dB | 10 MHz to 20 GHz | ≤ 1 dB |
| | 20 GHz to 40 GHz | ≤ 1.5 dB |
| | 40 GHz to 50 GHz | ≤ 2 dB |
| | 50 GHz to 60 GHz | ≤ 2.5 dB |
| | 60 GHz to 67 GHz | ≤ 3 dB |
| Dynamic range is increased by | 10 MHz to 500 MHz | 0 dB |
| | 500 MHz to 1 GHz | 5 dB |
| | 1 GHz to 30 GHz | 8 dB |
| | 30 GHz to 40 GHz | 7 dB |
| | 40 GHz to 67 GHz | 6 dB |
| Noise floor is reduced by | 10 MHz to 30 GHz | 10 dB |
| | 30 GHz to 40 GHz | 7 dB |
| | 40 GHz to 67 GHz | 6 dB |

## R&S®ZNA26-B41/-B42/-B43/-B44, R&S®ZNA43-B41/-B42/-B43/-B44, R&S®ZNA50-B41/-B42/-B43/-B44 and R&S®ZNA67-B41/-B42/-B43/-B44 internal pulse modulators

| | | |
|---|---|---|
| Frequency range | R&S®ZNA26-B41/-B42/-B43/-B44 | 10 MHz to 26.5 GHz |
| | R&S®ZNA43-B41/-B42/-B43/-B44 | 10 MHz to 43.5 GHz |
| | R&S®ZNA50-B41/-B42/-B43/-B44 | 10 MHz to 50 GHz |
| | R&S®ZNA67-B41/-B42/-B43/-B44 | 10 MHz to 67 GHz |
| Pulse generator | pulse period | 200 ns to 30 s, in 8 ns steps (nom.) |
| | pulse width | 8 ns to 15 s, in 4 ns steps (nom.) |
| Pulse modulator | minimum pulse width | 40 ns (nom.) |
| On/off ratio | 10 MHz to 18 GHz | 80 dB (nom.) |
| | 18 GHz to 67 GHz | 100 dB (nom.) |
| Rise/fall time | | 20 ns (nom.) |
| Dynamic range | | no impact |

## R&S®ZNA26-B161, R&S®ZNA43-B161, R&S®ZNA50-B161, R&S®ZNA67-B161 source monitor access port 1 and R&S®ZNA26-B163, R&S®ZNA43-B163, R&S®ZNA50-B163, R&S®ZNA67-B163 source monitor access port 1 and port 3

| | | |
|---|---|---|
| Connector type | R&S®ZNA26-B161/-B163, R&S®ZNA43-B161/-B163 | 2.92 mm, female |
| | R&S®ZNA50-B161/-B163, R&S®ZNA67-B161/-B163 | 1.85 mm, female |
| Frequency range | R&S®ZNA26-B161/-B163 | 10 MHz to 26.5 GHz |
| | R&S®ZNA43-B161/-B163 | 10 MHz to 43.5 GHz |
| | R&S®ZNA50-B161/-B163 | 10 MHz to 50 GHz |
| | R&S®ZNA67-B161/-B163 | 10 MHz to 67 GHz |
| Nominal reference path attenuation | | 20 dB (nom.) |
| Maximum output power and dynamic range are reduced by | 10 MHz to 30 GHz | 2 dB |
| | 30 GHz to 40 GHz | 3 dB |
| | 40 GHz to 50 GHz | 4 dB |
| | 50 GHz to 67 GHz | 5 dB |

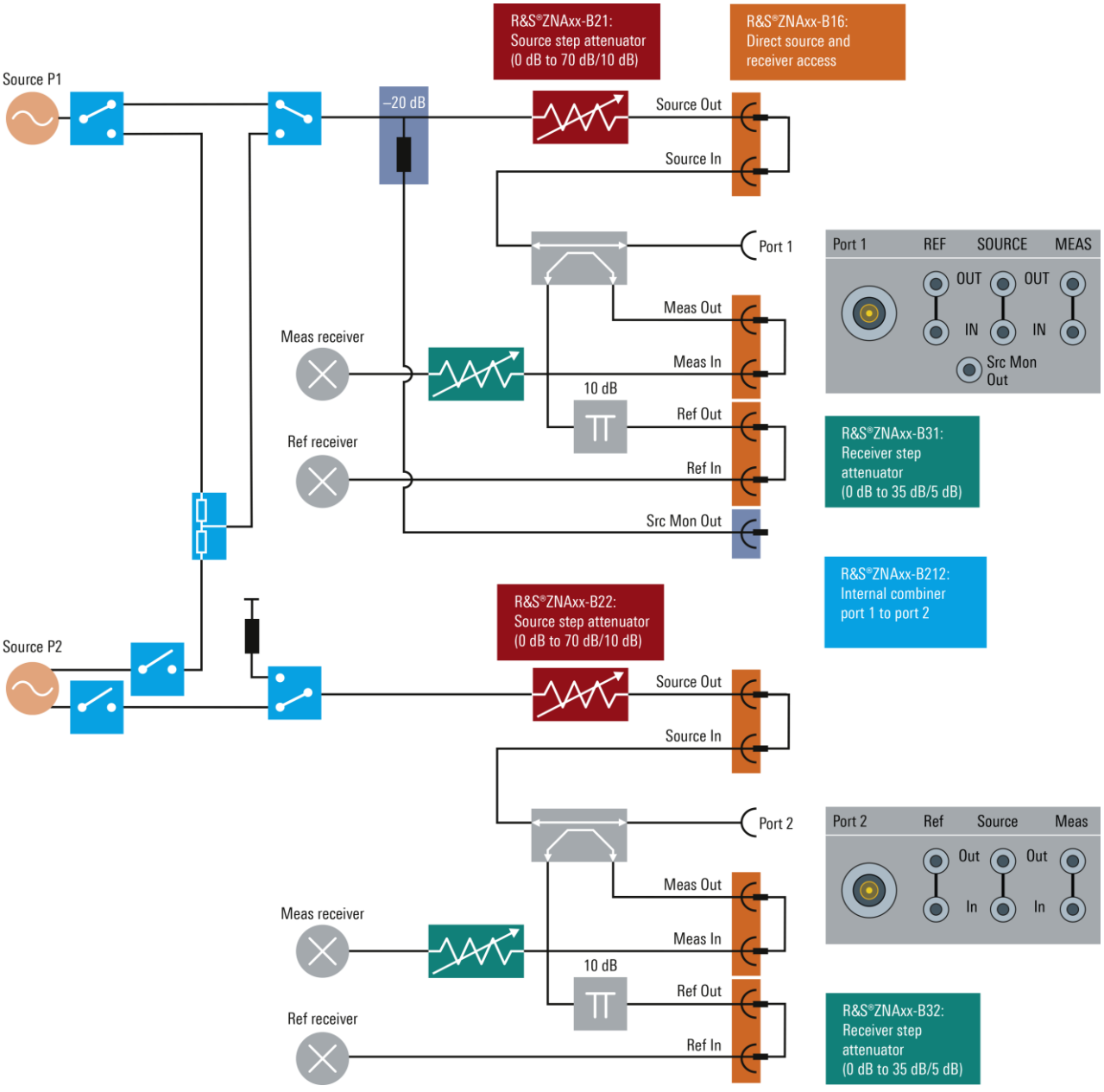



*Test set configuration for R&S®ZNAxx-B161 source monitor access port 1*

## R&S®ZNA26-B212, R&S®ZNA43-B212, R&S®ZNA50-B212, R&S®ZNA67-B212 internal combiner, port 1 and port 2

| | | |
|---|---|---|
| Frequency range | R&S®ZNA26-B212 | 10 MHz to 26.5 GHz |
| | R&S®ZNA43-B212 | 10 MHz to 43.5 GHz |
| | R&S®ZNA50-B212 | 10 MHz to 50 GHz |
| | R&S®ZNA67-B212 | 10 MHz to 67 GHz |
| Maximum output power and dynamic range are reduced by | 10 MHz to 30 GHz | 1 dB |
| | 30 GHz to 40 GHz | 2 dB |
| | 40 GHz to 50 GHz | 3 dB |
| | 50 GHz to 67 GHz | 4 dB |
| Maximum output power and dynamic range in combined state for ports 1 and 2 are reduced by | 10 MHz to 30 MHz | 10 dB |
| | 30 MHz to 100 MHz | 7 dB |
| | 100 MHz to 1 GHz | 6 dB |
| | 1 GHz to 16 GHz | 7 dB |
| | 16 GHz to 30 GHz | 8 dB |
| | 30 GHz to 50 GHz | 9 dB |
| | 50 GHz to 67 GHz | 10 dB |
| Power range | | no impact |
| Power accuracy | | no impact |

Measurements in reverse direction (load match) are possible with enabled internal combiner for two tone signals.

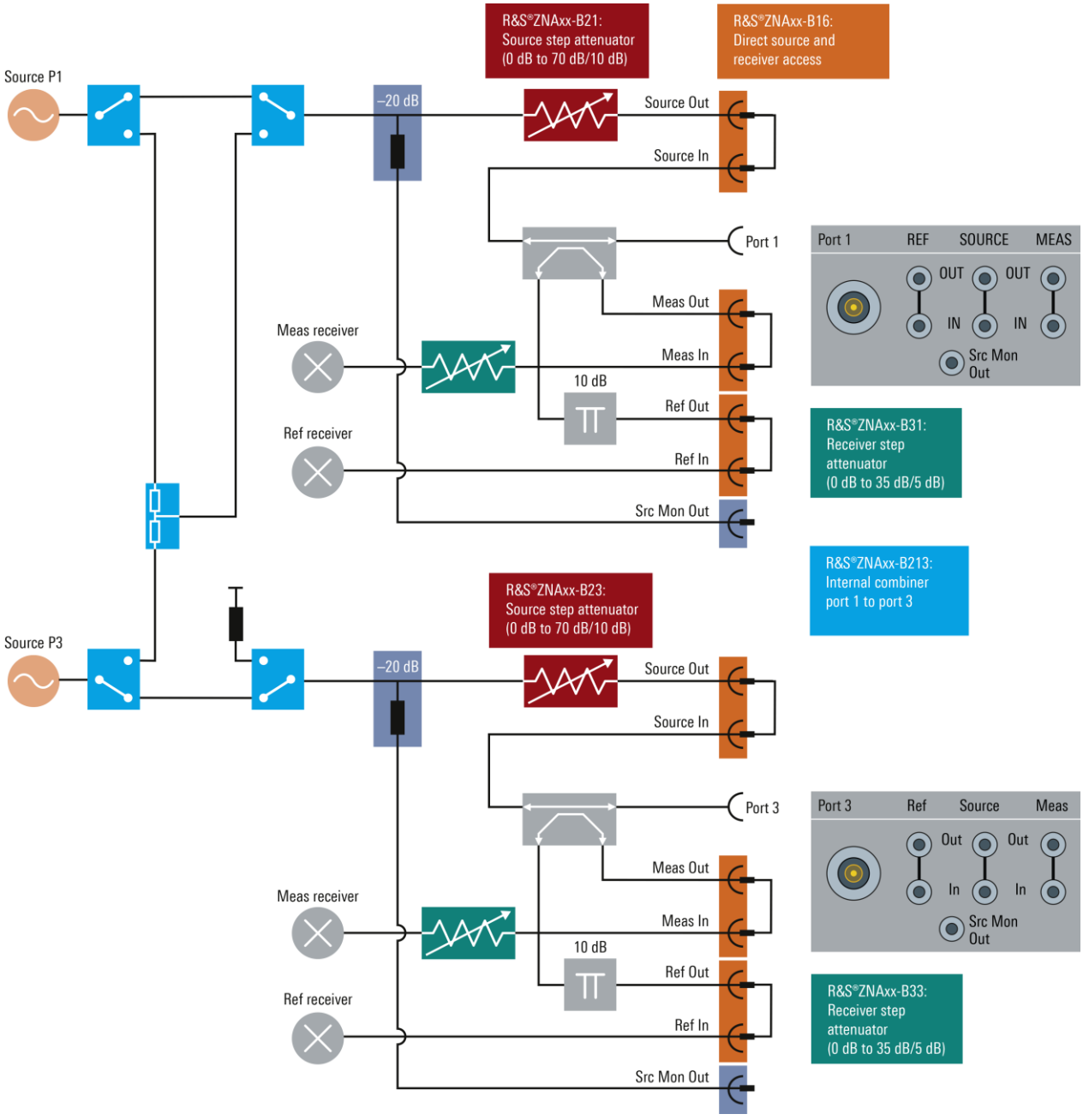



*Test set configuration for R&S®ZNAxx-B212 internal combiner, port 1 and port 2*

## R&S®ZNA26-B213, R&S®ZNA43-B213, R&S®ZNA50-B213, R&S®ZNA67-B213 internal combiner, port 1 and port 3

| | | |
|---|---|---|
| Frequency range | R&S®ZNA26-B213 | 10 MHz to 26.5 GHz |
| | R&S®ZNA43-B213 | 10 MHz to 43.5 GHz |
| | R&S®ZNA50-B213 | 10 MHz to 50 GHz |
| | R&S®ZNA67-B213 | 10 MHz to 67 GHz |
| Maximum output power and dynamic range are reduced by | 10 MHz to 30 GHz | 1 dB |
| | 30 GHz to 40 GHz | 2 dB |
| | 40 GHz to 50 GHz | 3 dB |
| | 50 GHz to 67 GHz | 4 dB |
| Maximum output power and dynamic range in combined state for ports 1 and 3 are reduced by | 10 MHz to 30 MHz | 10 dB |
| | 30 MHz to 100 MHz | 7 dB |
| | 100 MHz to 1 GHz | 6 dB |
| | 1 GHz to 16 GHz | 7 dB |
| | 16 GHz to 30 GHz | 8 dB |
| | 30 GHz to 50 GHz | 9 dB |
| | 50 GHz to 67 GHz | 10 dB |
| Power range | | no impact |
| Power accuracy | | no impact |

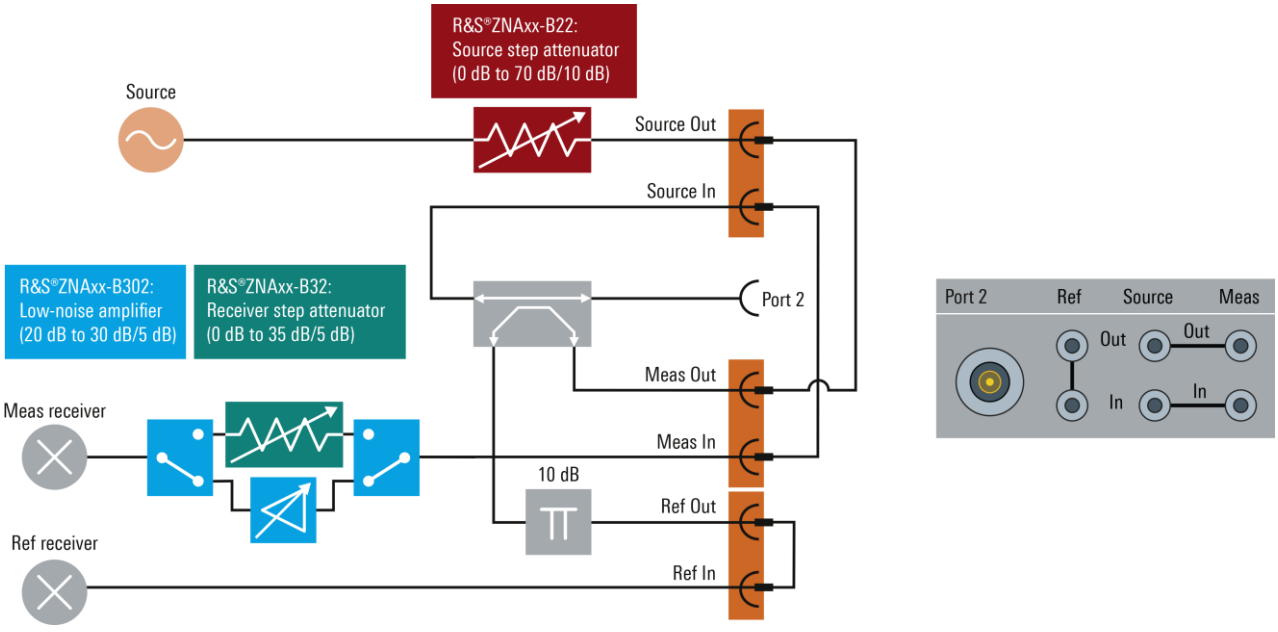
Measurements in reverse direction (load match) are possible with enabled internal combiner for two tone signals.




*Test set configuration for R&S®ZNAxx-B213 internal combiner, port 1 and port 3*

# R&S®ZNA26-B302, R&S®ZNA43-B302, R&S®ZNA50-B302, R&S®ZNA67-B302, R&S®ZNA50-B312, R&S®ZNA67-B312 low-noise amplifier, port 2

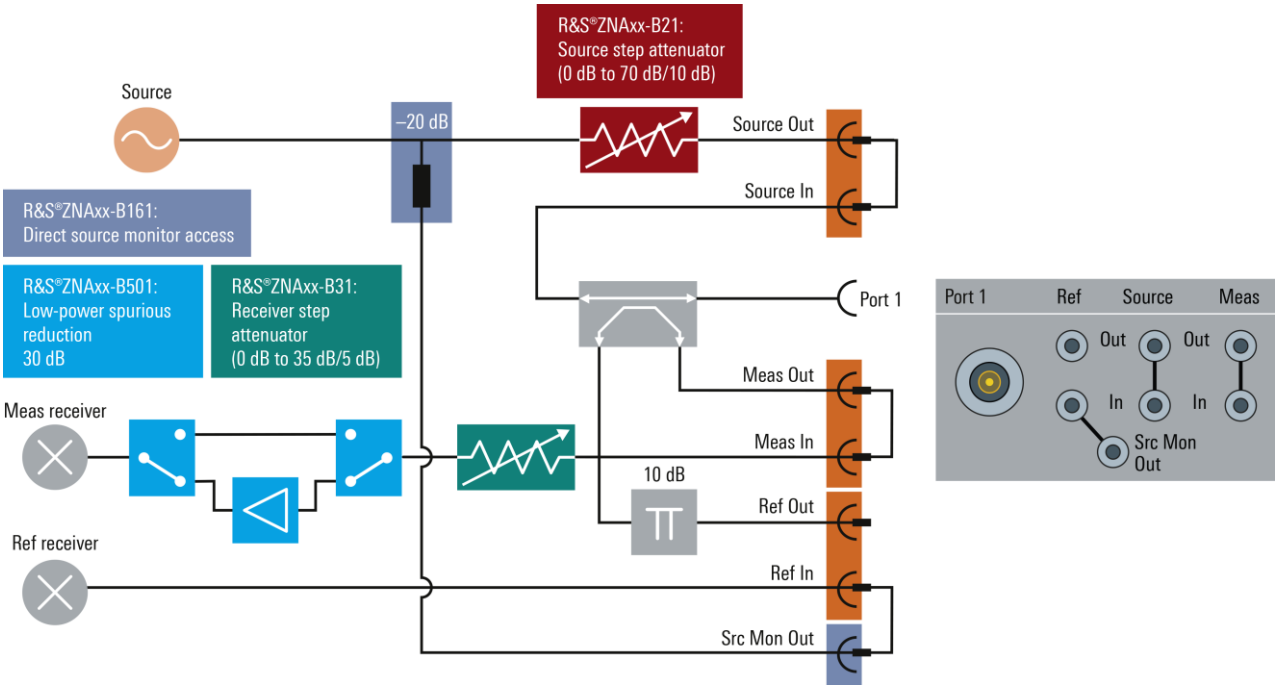
| | | |
|---|---|---|
| Frequency range | R&S®ZNA26-B302 | 10 MHz to 26.5 GHz |
| | R&S®ZNA43-B302 | 10 MHz to 43.5 GHz |
| | R&S®ZNA50-B302 | 10 MHz to 50 GHz |
| | R&S®ZNA67-B302 | 10 MHz to 67 GHz |
| Input noise and dynamic range are reduced by | 10 MHz to 40 GHz | 3 dB |
| | 40 GHz to 67 GHz | 4 dB |
| Power measurement accuracy at –20 dBm without power calibration from +18 °C to +28 °C | 10 MHz to 30 GHz | < 2 dB |
| | 30 GHz to 40 GHz | < 2.5 dB |
| | 30 GHz to 40 GHz | < 3.5 dB |
| | 40 GHz to 67 GHz | < 4 dB |
| Noise level at 1 kHz measurement bandwidth, normalized to 1 Hz, low-noise amplifier: 25 dB gain, normal port configuration | R&S®ZNA26-B302 | |
| | 10 MHz to 30 MHz | < –90 dBm |
| | 30 MHz to 100 MHz | < –112 dBm |
| | 100 MHz to 500 MHz | < –124 dBm |
| | 500 MHz to 26.5 GHz | < –140 dBm |
| | R&S®ZNA43-B302 | |
| | 10 MHz to 30 MHz | < –90 dBm |
| | 30 MHz to 100 MHz | < –107 dBm |
| | 100 MHz to 500 MHz | < –122 dBm |
| | 500 MHz to 30 GHz | < –135 dBm |
| | 30 GHz to 40 GHz | < –135 dBm |
| | R&S®ZNA50-B302, R&S®ZNA67-B302 | |
| | 10 MHz to 30 MHz | < –90 dBm |
| | 30 MHz to 100 MHz | < –107 dBm |
| | 100 MHz to 500 MHz | < –122 dBm |
| | 500 MHz to 30 GHz | < –135 dBm |
| | 30 GHz to 40 GHz | < –135 dBm |
| | 40 GHz to 67 GHz | < –121 dBm |
| Noise level at 1 kHz measurement bandwidth, normalized to 1 Hz, low-noise amplifier: 30 dB gain, reversed coupler configuration | R&S®ZNA26-B302 | |
| | 10 MHz to 30 MHz | –148 dBm (meas.) |
| | 30 MHz to 100 MHz | –158 dBm (meas.) |
| | 100 MHz to 500 MHz | –162 dBm (meas.) |
| | 500 MHz to 26.5 GHz | –156 dBm (meas.) |
| | R&S®ZNA43-B302 | |
| | 10 MHz to 30 MHz | –144 dBm (meas.) |
| | 30 MHz to 100 MHz | –153 dBm (meas.) |
| | 100 MHz to 500 MHz | –157 dBm (meas.) |
| | 500 MHz to 30 GHz | –158 dBm (meas.) |
| | 30 GHz to 40 GHz | –157 dBm (meas.) |
| | R&S®ZNA50-B302, R&S®ZNA67-B302 | |
| | 10 MHz to 30 MHz | –148 dBm (meas.) |
| | 30 MHz to 100 MHz | –154 dBm (meas.) |
| | 100 MHz to 500 MHz | –157 dBm (meas.) |
| | 500 MHz to 30 GHz | –157 dBm (meas.) |
| | 30 GHz to 40 GHz | –157 dBm (meas.) |
| | 40 GHz to 50 GHz | –155 dBm (meas.) |
| | 50 GHz to 67 GHz | –150 dBm (meas.) |
| Damage level at test port | | 0 dBm |
| Test port input 0.1 dB compression, low-noise amplifier: 30 dB gain, reversed coupler configuration | referenced to –60 dBm | –40 dBm (meas.) |
| Receiver noise figure, low-noise amplifier: 30 dB gain, reversed coupler configuration | 100 MHz to 40 GHz | 17 dB (meas.) |
| | 40 GHz to 67 GHz | 24 dB (meas.) |




*Test set configuration for R&S®ZNAxx-B302 low-noise amplifier port 2, with reversed coupler configuration*

# R&S®ZNA26-B501, R&S®ZNA43-B501, R&S®ZNA50-B501, R&S®ZNA67-B501, R&S®ZNA50-B511, R&S®ZNA67-B511 low power spurious reduction, port 1

| | | |
|---|---|---|
| Frequency range | R&S®ZNA26-B501 | 10 MHz to 26.5 GHz |
| | R&S®ZNA43-B501 | 10 MHz to 43.5 GHz |
| | R&S®ZNA50-B501 | 10 MHz to 50 GHz |
| | R&S®ZNA67-B501 | 10 MHz to 67 GHz |
| Input noise and dynamic range are reduced by | 10 MHz to 40 GHz | 3 dB |
| | 40 GHz to 67 GHz | 4 dB |
| Power measurement accuracy at –10 dBm without power calibration from +18 °C to +28 °C | 10 MHz to 30 GHz | < 2 dB |
| | 30 GHz to 40 GHz | < 2.5 dB |
| | 40 GHz to 50 GHz | < 3.5 dB |
| | 50 GHz to 67 GHz | < 4 dB |
| Noise level at 1 kHz measurement bandwidth, normalized to 1 Hz, 0 dB receiver step attenuation, normal port configuration | R&S®ZNA26-B501 | |
| | 10 MHz to 30 MHz | < –90 dBm |
| | 30 MHz to 100 MHz | < –112 dBm |
| | 100 MHz to 500 MHz | < –127 dBm |
| | 500 MHz to 26.5 GHz | < –140 dBm |
| | R&S®ZNA43-B501, R&S®ZNA50-B501, R&S®ZNA67-B501 | |
| | 10 MHz to 30 MHz | < –90 dBm |
| | 30 MHz to 100 MHz | < –107 dBm |
| | 100 MHz to 500 MHz | < –121 dBm |
| | 500 MHz to 30 GHz | < –135 dBm |
| | 30 GHz to 40 GHz | < –130 dBm |
| | 40 GHz to 50 GHz | < –125 dBm |
| | 50 GHz to 67 GHz | < –120 dBm |
| Noise level at 1 kHz measurement bandwidth, normalized to 1 Hz, low-noise amplifier: 30 dB gain, reversed coupler configuration | R&S®ZNA26-B501 | |
| | 10 MHz to 30 MHz | –144 dBm (meas.) |
| | 30 MHz to 100 MHz | –153 dBm (meas.) |
| | 100 MHz to 500 MHz | –157 dBm (meas.) |
| | 500 MHz to 26.5 GHz | –156 dBm (meas.) |
| | R&S®ZNA43-B501 | |
| | 10 MHz to 30 MHz | –144 dBm (meas.) |
| | 30 MHz to 100 MHz | –153 dBm (meas.) |
| | 100 MHz to 500 MHz | –157 dBm (meas.) |
| | 500 MHz to 30 GHz | –156 dBm (meas.) |
| | 30 GHz to 40 GHz | –155 dBm (meas.) |
| | R&S®ZNA50-B501, R&S®ZNA67-B501 | |
| | 10 MHz to 30 MHz | –144 dBm (meas.) |
| | 30 MHz to 100 MHz | –153 dBm (meas.) |
| | 100 MHz to 500 MHz | –157 dBm (meas.) |
| | 500 MHz to 30 GHz | –156 dBm (meas.) |
| | 30 GHz to 40 GHz | –155 dBm (meas.) |
| | 40 GHz to 50 GHz | –151 dBm (meas.) |
| | 50 GHz to 67 GHz | –145 dBm (meas.) |
| Measured low power spurious level, with R&S®ZNAxx-B161/-B163, source step attenuation: 40 dB or higher, at test port | 10 MHz to 22 GHz | –110 dBm (meas.) |
| | 22 GHz to 67 GHz | –100 dBm (meas.) |




*Test set configuration for R&S®ZNAxx-B501 low power spurious reduction port 1*

## R&S®ZNA-K1 spectrum analyzer mode (based on fast Fourier transform)

| | | |
|---|---|---|
| Impedance | | 50 Ω |
| Test port connector | R&S®ZNA26 | 3.5 mm, male, ruggedized |
| | R&S®ZNA43, 2.92 mm interface | 2.92 mm, male, ruggedized |
| | R&S®ZNA43, 2.4 mm interface | 2.4 mm, male, ruggedized |
| | R&S®ZNA50 | 2.4 mm, male, ruggedized |
| | R&S®ZNA67 | 1.85 mm, male, ruggedized |
| Frequency range | R&S®ZNA26 | 10 MHz to 26.5 GHz |
| | R&S®ZNA43 | 10 MHz to 43.5 GHz |
| | R&S®ZNA50 | 10 MHz to 50 GHz |
| | R&S®ZNA67 | 10 MHz to 67 GHz |
| Test port | | selectable |
| DC block | | standard |
| Number of points | | 2 to 100001 |
| Resolution bandwidth (–3 dB) | 1/1.5/2/3/5/7 steps | 1 Hz to 1.5 MHz |
| R&S®ZNA-K1 cannot be combined with R&S®ZNA50-B312, R&S®ZNA67-B312, R&S®ZNA50-B511 and R&S®ZNA67-B511 | | |

| Standard configuration | | **Base unit** | **Base unit + R&S®ZNAxx-B16 + R&S®ZNAxx-B3n** |
|---|---|---|---|
| | | **nom.** | **nom.** |
| Noise level [20] | R&S®ZNA26, R&S®ZNA43, R&S®ZNA50 and R&S®ZNA67 | | |
| at 1 kHz measurement bandwidth using RMS detector, normalized to 1 Hz, 10 dB IF gain | 10 MHz to 30 MHz | –100 dBm | –110 dBm |
| | 30 MHz to 100 MHz | –110 dBm | –120 dBm |
| | 100 MHz to 500 MHz | –125 dBm | –130 dBm |
| | 500 MHz to 30 GHz | –132 dBm | –142 dBm |
| | 30 GHz to 40 GHz | –130 dBm | –139 dBm |
| | 40 GHz to 50 GHz | –118 dBm | –124 dBm |
| | 50 GHz to 67 GHz | –115 dBm | –121 dBm |

## R&S®ZNA-K5 vector corrected converter measurements

| | |
|---|---|
| Recommended setup and options | 4-port R&S®ZNA,<br>+ R&S®ZNA-K4<br>+ R&S®ZNA-B5<br>+ R&S®ZNA-B8 mmWave converter LO<br>+ R&S®ZN-ZM292 calibration mixer<br>+ calibration accessories |

## R&S®ZNA-K6 phase-coherent source control

| | | |
|---|---|---|
| Frequency range | R&S®ZNA26 | 10 MHz to 26.5 GHz |
| | R&S®ZNA43 | 10 MHz to 43.5 GHz |
| | R&S®ZNA50 | 10 MHz to 50 GHz |
| | R&S®ZNA67 | 10 MHz to 67 GHz |
| Phase accuracy | 10 MHz to 10 GHz | 0.1° (nom.) |
| | 10 GHz to 30 GHz | 0.2° (nom.) |
| | 30 GHz to 43.5 GHz | 0.3° (nom.) |

## R&S®ZNA-K7 measurements on pulsed signals

Video series about “Making pulsed measurements with a vector network analyzer”:

- https://www.rohde-schwarz.com/zna-k7-video1
- https://www.rohde-schwarz.com/zna-k7-video2
- https://www.rohde-schwarz.com/zna-k7-video3
- https://www.rohde-schwarz.com/zna-k7-video4

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

## R&S®ZNA-K8 mmWave converter support

| | |
|---|---|
| Recommended setup and options | two mmWave converters with 2-port R&S®ZNA or<br>four mmWave converters with 4-port R&S®ZNA<br>+ R&S®ZNA-K8<br>+ R&S®ZNA-B8<br>+ R&S®ZNA-B26<br>+ R&S®ZCAKN (contains splitter and adapters)<br>+ accessories (test cables etc.) |
| Alternative setup and options | two mmWave converters with 4-port R&S®ZNA<br>+ R&S®ZNA-K8<br>+ R&S®ZNAxx-B16<br>+ R&S®ZCAKN (contains splitter and adapters)<br>+ accessories (test cables etc.) |

## R&S®ZNA-K9 group delay measurements

| | |
|---|---|
| Recommended setup and options | 4-port R&S®ZNA<br>+ R&S®ZNAxx-B213<br>+ R&S®ZNA-B5<br>+ R&S®ZNA-K4<br>+ R&S®ZNA-K9,<br>2-port R&S®ZNA<br>+ R&S®ZNAxx-B212<br>+ R&S®ZNAxx-B52<br>+ R&S®ZNA-K4<br>+ R&S®ZNA-K9 |
| Alternative setup and options | 4-port R&S®ZNA<br>+ R&S®ZNA-K4<br>+ R&S®ZNA-K9<br>+ R&S®ZNAxx-Z9 |

## R&S®ZNA-K30 noise figure measurement

| | |
|---|---|
| Recommended setup and options,<br>see additional application note 1SL378 | use port 1 as driving and port 2 as receiving port<br>+ R&S®ZNAxx-B16<br>+ R&S®ZNAxx-B21<br>+ R&S®ZNAxx-B32<br>+ R&S®ZNAxx-B161<br>+ R&S®ZNAxx-B302<br>+ diode power sensor (e.g + R&S®NRP40S), see Ordering information<br>+ accessories (test cables, fixed attenuators: 3 dB/6 dB/10 dB, etc.), see Ordering information |

## R&S®ZNA-K980 health and utilization monitoring service (HUMS) [21, 22]

| | | |
|---|---|---|
| Interfaces | protocols and interfaces supported for data readout and display | • SNMP (v1, v2c, v3)<br>• REST (JSON)<br>• SCPI<br>• device web |
| Services | information provided | • device information (model, serial number, BIOS, date, time, system, HUMS and software information)<br>• user-defined information tags (e.g. for asset management)<br>• equipment information (hardware, options, software, licenses)<br>• system operating status<br>• instrument security information<br>• service related information (due dates etc.)<br>• mass storage related information<br>• instrument utilization data<br>• device history (event log) |

[21] For details see application note under: www.rohde-schwarz.com/appnote/GFM336

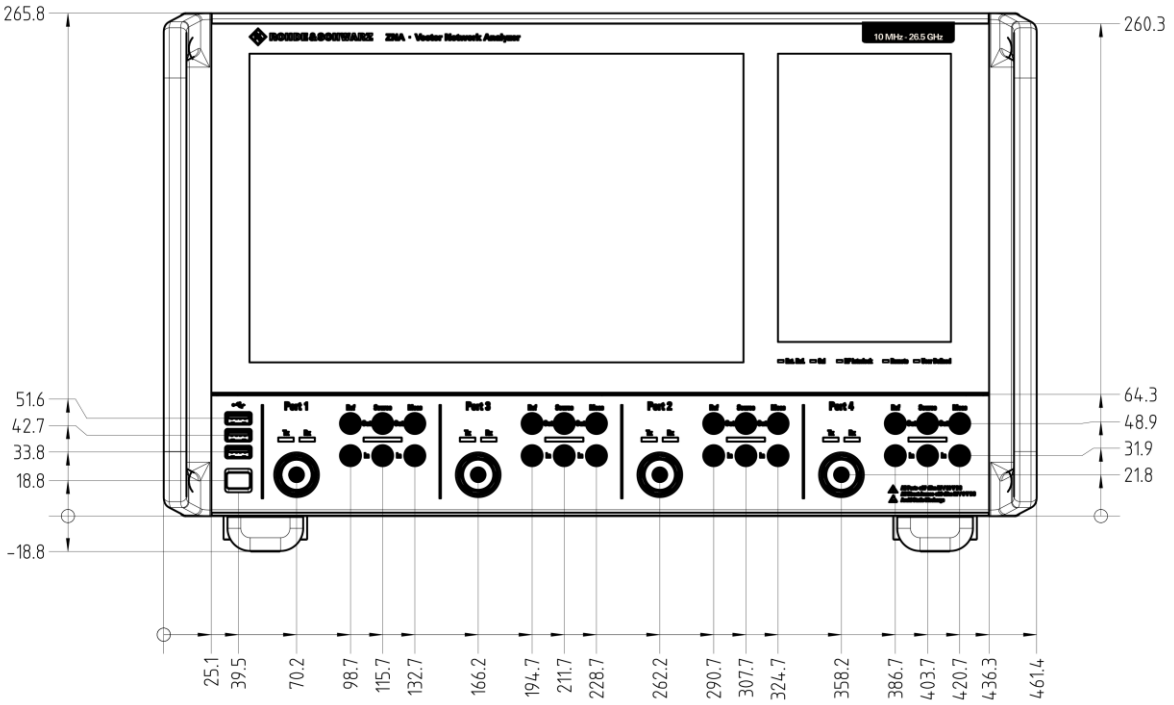
[22] For use with common available asset management tools.

# General data

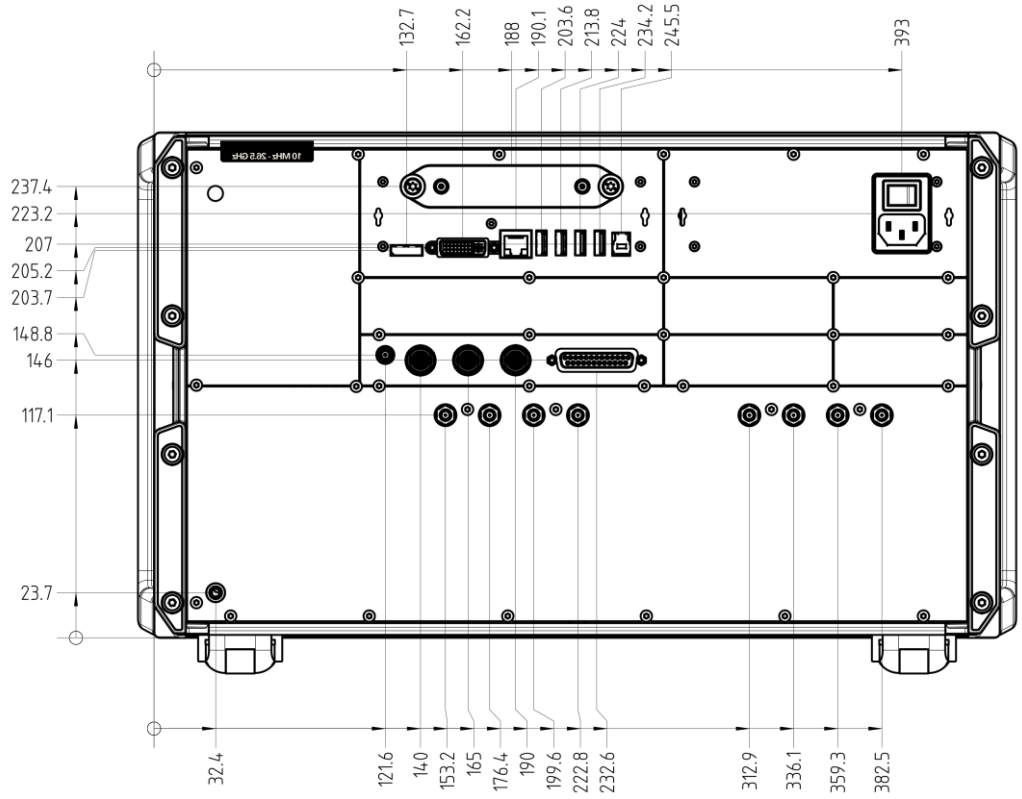
| | | |
|---|---|---|
| Temperature loading | | in line with IEC 60068-2-1 and IEC 60068-2-2 |
| | operating temperature range | +5 °C to +40 °C |
| | storage temperature range | –20 °C to +60 °C |
| Damp heat | | +40 °C at 85 % rel. humidity, in line with IEC 60068-2-30 |
| Maximum operating altitude | above sea level | 4600 m (approx. 15100 ft) |
| Mechanical resistance | vibration, sinusoidal | 5 Hz to 55 Hz, 0.15 mm constant amplitude, 55 Hz to 150 Hz, 0.5 g constant, in line with IEC 60068-2-6 |
| | vibration, random | 10 Hz to 300 Hz, acceleration 1.2 g (RMS), in line with IEC 60068-2-64 |
| | shock | 40 g shock spectrum, in line with MIL-STD-810E, method no. 516.4, procedure I |
| Calibration interval | | 1 year |
| EMC | RF emission | in line with CISPR 11/EN 55011 group 1 class A (for a shielded test setup); instrument complies with the emission requirements stipulated by EN 55011 and EN 61326-1 class A; This means that the instrument is suitable for use in industrial environments. |
| | immunity | in line with EMC Directive 2014/30/EU, including: IEC/EN 61326-1 (immunity test requirements for industrial environments, EN 61326 table 2), IEC/EN 61326-2-1, IEC/EN 61000-3-2, IEC/EN 61000-3-3 |
| Safety | | in line with IEC 61010-1, EN 61010-1 and UL 61010-1, CSA C22.2 61010-1 |
| Power supply | | 100 V to 240 V at 50 Hz to 60 Hz and 400 Hz, max. 7.3 A to 4.6 A (respectively) |
| Power consumption | 2-port models | ≤ 450 W (specification), 300 W (typ.) |
| | 4-port models | ≤ 550 W (specification), 350 W (typ.) |
| Conformity marking | | VDE, $_{C}$CSA$_{US}$, CE, KCC conformity mark |
| Dimensions | W × H × D | EIA RU1: 6 [23], 461.4 mm × 284.6 mm × 462.1 mm (18.2 in × 11.2 in × 18.2 in) |
| Weight | 2-port models | 24 kg (52.9 lb) |
| | 4-port models | 29 kg (63.9 lb) |
| Shipping weight | 2-port models | 30 kg (66.2 lb) |
| | 4-port models | 35 kg (77.2 lb) |

[23] Electronics Industry Association rack units. 1 RU = 1.75 in.

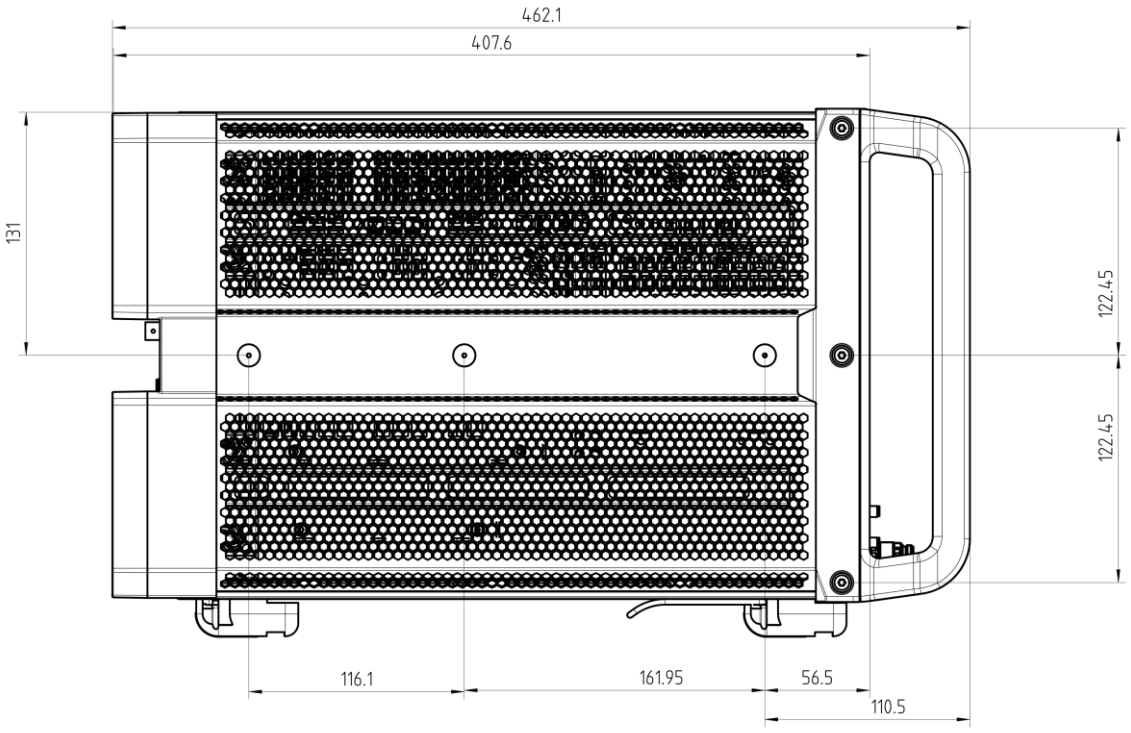
# Dimensions (in mm)




*Front view of the R&S®ZNA*




*Rear view of the R&S®ZNA*




*Side view of the R&S®ZNA*

# Ordering information

| Designation | Type | Requires | Service center upgrade [24] | On-site upgrade [25] | Order No. |
|---|---|---|---|---|---|
| **Base unit** | | | | | |
| Vector network analyzer, 2 ports, 26.5 GHz, 3.5 mm connectors | R&S®ZNA26 | | | | 1332.4500.22 |
| Vector network analyzer, 4 ports, 26.5 GHz, 3.5 mm connectors | R&S®ZNA26 | | | | 1332.4500.24 |
| Vector network analyzer, 2 ports, 43.5 GHz, 2.92 mm connectors | R&S®ZNA43 | | | | 1332.4500.42 |
| Vector network analyzer, 4 ports, 43.5 GHz, 2.92 mm connectors | R&S®ZNA43 | | | | 1332.4500.44 |
| Vector network analyzer, 2 ports, 43.5 GHz, 2.4 mm connectors | R&S®ZNA43 | | | | 1332.4500.43 |
| Vector network analyzer, 4 ports, 43.5 GHz, 2.4 mm connectors | R&S®ZNA43 | | | | 1332.4500.45 |
| Vector network analyzer, 2 ports, 50 GHz, 2.4 mm connectors | R&S®ZNA50 | | | | 1332.4500.52 |
| Vector network analyzer, 4 ports, 50 GHz, 2.4 mm connectors | R&S®ZNA50 | | | | 1332.4500.54 |
| Vector network analyzer, 2 ports, 67 GHz, 1.85 mm connectors | R&S®ZNA67 | | | | 1332.4500.62 |
| Vector network analyzer, 4 ports, 67 GHz, 1.85 mm connectors | R&S®ZNA67 | | | | 1332.4500.64 |
| **Options** | | | | | |
| Direct source and receiver access | | | | | |
| Direct source and receiver access, for R&S®ZNA26 | R&S®ZNA26-B16 | 2-port model | yes (U) | | 1332.4581.22 |
| | R&S®ZNA26-B16 | 4-port model | yes (U) | | 1332.4581.24 |
| Direct source and receiver access, for R&S®ZNA43 | R&S®ZNA43-B16 | 2-port model | yes (U) | | 1332.4581.42 |
| | R&S®ZNA43-B16 | 4-port model | yes (U) | | 1332.4581.44 |
| Direct source and receiver access, for R&S®ZNA50 | R&S®ZNA50-B16 | 2-port model | yes (U) | | 1332.4581.52 |
| | R&S®ZNA50-B16 | 4-port model | yes (U) | | 1332.4581.54 |
| Direct source and receiver access, for R&S®ZNA67 | R&S®ZNA67-B16 | 2-port model | yes (U) | | 1332.4581.62 |
| | R&S®ZNA67-B16 | 4-port model | yes (U) | | 1332.4581.64 |
| Source step attenuators | | | | | |
| For R&S®ZNA26 | | | | | |
| Source step attenuator, port 1 | R&S®ZNA26-B21 | | yes (U) | | 1332.4630.21 |
| Source step attenuator, port 2 | R&S®ZNA26-B22 | | yes (U) | | 1332.4630.22 |
| Source step attenuator, port 3 | R&S®ZNA26-B23 | | yes (U) | | 1332.4630.23 |
| Source step attenuator, port 4 | R&S®ZNA26-B24 | | yes (U) | | 1332.4630.24 |
| For R&S®ZNA43 | | | | | |
| Source step attenuator, port 1 | R&S®ZNA43-B21 | | yes (U) | | 1332.4646.21 |
| Source step attenuator, port 2 | R&S®ZNA43-B22 | | yes (U) | | 1332.4646.22 |
| Source step attenuator, port 3 | R&S®ZNA43-B23 | | yes (U) | | 1332.4646.23 |
| Source step attenuator, port 4 | R&S®ZNA43-B24 | | yes (U) | | 1332.4646.24 |
| For R&S®ZNA50 | | | | | |
| Source step attenuator, port 1 | R&S®ZNA50-B21 | | yes (U) | | 1332.5007.21 |
| Source step attenuator, port 2 | R&S®ZNA50-B22 | | yes (U) | | 1332.5007.22 |
| Source step attenuator, port 3 | R&S®ZNA50-B23 | | yes (U) | | 1332.5007.23 |
| Source step attenuator, port 4 | R&S®ZNA50-B24 | | yes (U) | | 1332.5007.24 |
| For R&S®ZNA67 | | | | | |
| Source step attenuator, port 1 | R&S®ZNA67-B21 | | yes (U) | | 1332.5013.21 |
| Source step attenuator, port 2 | R&S®ZNA67-B22 | | yes (U) | | 1332.5013.22 |
| Source step attenuator, port 3 | R&S®ZNA67-B23 | | yes (U) | | 1332.5013.23 |
| Source step attenuator, port 4 | R&S®ZNA67-B24 | | yes (U) | | 1332.5013.24 |

[24] Option may also be ordered at a later date; upgrade by Rohde & Schwarz service center. For upgrades, order the designated U option instead of the B option.

[25] Option may be installed by the user on site.

| Designation | Type | Requires | Service center upgrade [24] | On-site upgrade [25] | Order No. |
|---|---|---|---|---|---|
| Receiver step attenuators | | | | | |
| For R&S®ZNA26 | | | | | |
| Receiver step attenuator, port 1 | R&S®ZNA26-B31 | | yes (U) | | 1332.4700.31 |
| Receiver step attenuator, port 2 | R&S®ZNA26-B32 | | yes (U) | | 1332.4700.32 |
| Receiver step attenuator, port 3 | R&S®ZNA26-B33 | | yes (U) | | 1332.4700.33 |
| Receiver step attenuator, port 4 | R&S®ZNA26-B34 | | yes (U) | | 1332.4700.34 |
| For R&S®ZNA43 | | | | | |
| Receiver step attenuator, port 1 | R&S®ZNA43-B31 | | yes (U) | | 1332.4717.31 |
| Receiver step attenuator, port 2 | R&S®ZNA43-B32 | | yes (U) | | 1332.4717.32 |
| Receiver step attenuator, port 3 | R&S®ZNA43-B33 | | yes (U) | | 1332.4717.33 |
| Receiver step attenuator, port 4 | R&S®ZNA43-B34 | | yes (U) | | 1332.4717.34 |
| For R&S®ZNA50 | | | | | |
| Receiver step attenuator, port 1 | R&S®ZNA50-B31 | | yes (U) | | 1332.5020.31 |
| Receiver step attenuator, port 2 | R&S®ZNA50-B32 | | yes (U) | | 1332.5020.32 |
| Receiver step attenuator, port 3 | R&S®ZNA50-B33 | | yes (U) | | 1332.5020.33 |
| Receiver step attenuator, port 4 | R&S®ZNA50-B34 | | yes (U) | | 1332.5020.34 |
| For R&S®ZNA67 | | | | | |
| Receiver step attenuator, port 1 | R&S®ZNA67-B31 | | yes (U) | | 1332.5036.31 |
| Receiver step attenuator, port 2 | R&S®ZNA67-B32 | | yes (U) | | 1332.5036.32 |
| Receiver step attenuator, port 3 | R&S®ZNA67-B33 | | yes (U) | | 1332.5036.33 |
| Receiver step attenuator, port 4 | R&S®ZNA67-B34 | | yes (U) | | 1332.5036.34 |
| Internal pulse modulators | | | | | |
| For R&S®ZNA26 | | | | | |
| Internal pulse modulator, port 1 | R&S®ZNA26-B41 | | yes | yes | 1332.4775.41 |
| Internal pulse modulator, port 2 | R&S®ZNA26-B42 | | yes | yes | 1332.4775.42 |
| Internal pulse modulator, port 3 | R&S®ZNA26-B43 | | yes | yes | 1332.4775.43 |
| Internal pulse modulator, port 4 | R&S®ZNA26-B44 | | yes | yes | 1332.4775.44 |
| For R&S®ZNA43 | | | | | |
| Internal pulse modulator, port 1 | R&S®ZNA43-B41 | | yes | yes | 1332.4781.41 |
| Internal pulse modulator, port 2 | R&S®ZNA43-B42 | | yes | yes | 1332.4781.42 |
| Internal pulse modulator, port 3 | R&S®ZNA43-B43 | | yes | yes | 1332.4781.43 |
| Internal pulse modulator, port 4 | R&S®ZNA43-B44 | | yes | yes | 1332.4781.44 |
| For R&S®ZNA50 | | | | | |
| Internal pulse modulator, port 1 | R&S®ZNA50-B41 | | yes | yes | 1332.5088.41 |
| Internal pulse modulator, port 2 | R&S®ZNA50-B42 | | yes | yes | 1332.5088.42 |
| Internal pulse modulator, port 3 | R&S®ZNA50-B43 | | yes | yes | 1332.5088.43 |
| Internal pulse modulator, port 4 | R&S®ZNA50-B44 | | yes | yes | 1332.5088.44 |
| For R&S®ZNA67 | | | | | |
| Internal pulse modulator, port 1 | R&S®ZNA67-B41 | | yes | yes | 1332.5094.41 |
| Internal pulse modulator, port 2 | R&S®ZNA67-B42 | | yes | yes | 1332.5094.42 |
| Internal pulse modulator, port 3 | R&S®ZNA67-B43 | | yes | yes | 1332.5094.43 |
| Internal pulse modulator, port 4 | R&S®ZNA67-B44 | | yes | yes | 1332.5094.44 |
| 3rd and 4th internal sources | | | | | |
| 3rd and 4th internal source, for R&S®ZNA26 | R&S®ZNA26-B3 | 4-port model | yes | | 1332.4523.02 |
| 3rd and 4th internal source, for R&S®ZNA43 | R&S®ZNA43-B3 | 4-port model | yes | | 1332.4617.02 |
| 3rd and 4th internal source, for R&S®ZNA50 | R&S®ZNA50-B3 | 4-port model | yes | | 1332.4981.02 |
| 3rd and 4th internal source, for R&S®ZNA67 | R&S®ZNA67-B3 | 4-port model | yes | | 1332.4998.02 |
| Source monitor access | | | | | |
| Source monitor access port 1, for R&S®ZNA26 | R&S®ZNA26-B161 | R&S®ZNA26-B21 | only 2-port model (U) | | 1332.4823.51 |
| Source monitor access port 1 and port 3, for R&S®ZNA26 | R&S®ZNA26-B163 | 4-port model, R&S®ZNA26-B21 and R&S®ZNA26-B23 | yes (U) | | 1332.4823.53 |
| Source monitor access port 1, for R&S®ZNA43 | R&S®ZNA43-B161 | R&S®ZNA43-B21 | only 2-port model (U) | | 1332.4830.51 |
| Source monitor access port 1 and port 3, for R&S®ZNA43 | R&S®ZNA43-B163 | 4-port model, R&S®ZNA43-B21 and R&S®ZNA43-B23 | yes (U) | | 1332.4830.53 |

| Designation | Type | Requires | Service center upgrade [24] | On-site upgrade [25] | Order No. |
|---|---|---|---|---|---|
| Source monitor access port 1, for R&S®ZNA50 | R&S®ZNA50-B161 | R&S®ZNA50-B21 | only 2-port model (U) | | 1332.5107.51 |
| Source monitor access port 1 and port 3, for R&S®ZNA50 | R&S®ZNA50-B163 | 4-port model, R&S®ZNA50-B21 and R&S®ZNA50-B23 | yes (U) | | 1332.5107.53 |
| Source monitor access port 1, for R&S®ZNA67 | R&S®ZNA67-B161 | R&S®ZNA67-B21 | only 2-port model (U) | | 1332.5113.51 |
| Source monitor access port 1 and port 3, for R&S®ZNA67 | R&S®ZNA67-B163 | 4-port model, R&S®ZNA67-B21 and R&S®ZNA67-B23 | yes (U) | | 1332.5113.53 |
| Low-noise amplifiers | | | | | |
| Low-noise amplifier port 2, for R&S®ZNA26 | R&S®ZNA26-B302 | R&S®ZNA26-B16 and R&S®ZNA26-B32 | yes | | 1332.4752.12 |
| Low-noise amplifier port 2, for R&S®ZNA43 | R&S®ZNA43-B302 | R&S®ZNA43-B16 and R&S®ZNA43-B32 | yes | | 1332.4769.22 |
| Low-noise amplifier port 2, for R&S®ZNA50 | R&S®ZNA50-B302 | R&S®ZNA50-B16 and R&S®ZNA50-B32 | yes | | 1332.4798.12 |
| Low-noise amplifier port 2, for R&S®ZNA67 | R&S®ZNA67-B302 | R&S®ZNA67-B16 and R&S®ZNA67-B32 | yes | | 1332.4817.12 |
| Low-noise amplifier port 2, for R&S®ZNA50 (no export restriction) | R&S®ZNA50-B312 | R&S®ZNA50-B16 and R&S®ZNA50-B32 | yes | | 1332.5659.02 |
| Low-noise amplifier port 2, for R&S®ZNA67 (no export restriction) | R&S®ZNA67-B312 | R&S®ZNA67-B16 and R&S®ZNA67-B32 | yes | | 1332.5665.02 |
| Low-power spurious reduction | | | | | |
| Low-power spurious reduction port 1, for R&S®ZNA26 | R&S®ZNA26-B501 | R&S®ZNA26-B16, R&S®ZNA26-B31 and R&S®ZNA26-B16x | yes | | 1332.5220.11 |
| Low-power spurious reduction port 1, for R&S®ZNA43 | R&S®ZNA43-B501 | R&S®ZNA43-B16, R&S®ZNA43-B31 and R&S®ZNA43-B16x | yes | | 1332.5236.11 |
| Low-power spurious reduction port 1, for R&S®ZNA50 | R&S®ZNA50-B501 | R&S®ZNA50-B16, R&S®ZNA50-B31 and R&S®ZNA50-B16x | yes | | 1332.5242.11 |
| Low-power spurious reduction port 1, for R&S®ZNA67 | R&S®ZNA67-B501 | R&S®ZNA67-B16, R&S®ZNA67-B31 and R&S®ZNA67-B16x | yes | | 1332.5259.11 |
| Low-power spurious reduction port 1, for R&S®ZNA50 (no export restriction) | R&S®ZNA50-B511 | R&S®ZNA50-B16, R&S®ZNA50-B31 and R&S®ZNA50-B16x | yes | | 1332.5671.02 |
| Low-power spurious reduction port 1, for R&S®ZNA67 (no export restriction) | R&S®ZNA67-B511 | R&S®ZNA67-B16, R&S®ZNA67-B31 and R&S®ZNA67-B16x | yes | | 1332.5688.02 |
| Internal combiner | | | | | |
| Internal combiner port 1 and port 2, for R&S®ZNA26 | R&S®ZNA26-B212 | 2-port model, R&S®ZNA26-B52, R&S®ZNA26-B21 and R&S®ZNA26-B22 | yes | | 1332.5265.02 |
| Internal combiner port 1 and port 2, for R&S®ZNA43 | R&S®ZNA43-B212 | 2-port model, R&S®ZNA43-B52, R&S®ZNA43-B21 and R&S®ZNA43-B22 | yes | | 1332.5271.02 |
| Internal combiner port 1 and port 2, for R&S®ZNA50 | R&S®ZNA50-B212 | 2-port model, R&S®ZNA50-B52, R&S®ZNA50-B21 and R&S®ZNA50-B22 | yes | | 1332.5288.02 |
| Internal combiner port 1 and port 2, for R&S®ZNA67 | R&S®ZNA67-B212 | 2-port model, R&S®ZNA67-B52, R&S®ZNA67-B21 and R&S®ZNA67-B22 | yes | | 1332.5294.02 |

| Designation | Type | Requires | Service center upgrade [24] | On-site upgrade [25] | Order No. |
|---|---|---|---|---|---|
| Internal combiner port 1 and port 3, for R&S®ZNA26 | R&S®ZNA26-B213 | 4-port model, R&S®ZNA26-B21 and R&S®ZNA26-B23 | yes | | 1332.4846.13 |
| Internal combiner port 1 and port 3, for R&S®ZNA43 | R&S®ZNA43-B213 | 4-port model, R&S®ZNA43-B21 and R&S®ZNA43-B23 | yes | | 1332.4869.13 |
| Internal combiner port 1 and port 3, for R&S®ZNA50 | R&S®ZNA50-B213 | 4-port model, R&S®ZNA50-B21 and R&S®ZNA50-B23 | yes | | 1332.5042.13 |
| Internal combiner port 1 and port 3, for R&S®ZNA67 | R&S®ZNA67-B213 | 4-port model, R&S®ZNA67-B21 and R&S®ZNA67-B23 | yes | | 1332.5065.13 |
| Precision frequency reference (OCXO) | R&S®ZNA-B4 | | yes | | 1332.4530.02 |
| 2nd internal LO source | R&S®ZNA-B5 | 4-port model | yes | yes | 1332.4675.02 |
| 2nd internal source and LO | | | | | |
| 2nd internal source and LO, for R&S®ZNA26 | R&S®ZNA26-B52 | 2-port model | yes | | 1332.6503.02 |
| 2nd internal source and LO, for R&S®ZNA43 | R&S®ZNA43-B52 | 2-port model | yes | | 1332.6510.02 |
| 2nd internal source and LO, for R&S®ZNA50 | R&S®ZNA50-B52 | 2-port model | yes | | 1332.6526.02 |
| 2nd internal source and LO, for R&S®ZNA67 | R&S®ZNA67-B52 | 2-port model | yes | | 1332.6532.02 |
| Data streaming memory | R&S®ZNA-B7 | | yes | | 1332.4546.02 |
| mmWave converter LO | R&S®ZNA-B8 | 2-port model: R&S®ZNA-B26; 4-port model: R&S®ZNA-B26 or R&S®ZNA-B5 | yes | | 1332.4652.02 |
| RFFE GPIO interface | R&S®ZNA-B15 | | yes | | 1332.4575.02 |
| RFFE GPIO interface, including voltage/current measurement | R&S®ZNA-B15 | | yes | | 1332.4575.03 |
| Additional removable hard disk | R&S®ZNA-B19 | Windows 10 IoT Enterprise LTSB 2016 (1607) | | | 1332.4600.02 |
| Additional removable hard disk | R&S®ZNA-B19 | Windows 10 IoT Enterprise LTSC 2021 (21H2) | | | 1332.4600.03 |
| Direct IF access | R&S®ZNA-B26 | | yes | yes | 1332.4598.02 |
| Trigger and control I/O board | R&S®ZNA-B91 | | yes | | 1332.4800.02 |
| Spectrum analyzer mode | R&S®ZNA-K1 | | yes | yes | 1332.5320.02 |
| Time domain analysis (TDR) | R&S®ZNA-K2 | | yes | yes | 1332.5336.02 |
| Extended time domain analysis (including eye diagram) | R&S®ZNA-K20 | R&S®ZNA-K2 | yes | yes | 1332.4746.02 |
| Scalar mixer measurements, arbitrary frequency-converting measurements | R&S®ZNA-K4 | | yes | yes | 1332.5342.02 |
| Vector mixer measurements | R&S®ZNA-K5 | see Options section for recommended setup | yes | yes | 1332.5359.02 |
| Phase coherent source control | R&S®ZNA-K6 | | yes | yes | 1332.5413.02 |
| True differential mode | R&S®ZNA-K61 | R&S®ZNA-K6 | yes | yes | 1332.5442.02 |
| Measurements on pulsed signals | R&S®ZNA-K7 | R&S®ZNA-K17 together with pulse modulator [26] | yes | yes | 1332.5371.02 |
| Increased IF bandwidth 30 MHz | R&S®ZNA-K17 | | yes | yes | 1332.5459.02 |
| mmWave converter support | R&S®ZNA-K8 | see Options section for recommended setup | yes | yes | 1332.5388.02 |
| Group delay measurements on frequency converters without LO access | R&S®ZNA-K9 | see Options section for recommended setup | yes | yes | 1332.5394.02 |

[26] R&S®ZNAxx-B41/-B42/-B43/-B44 and/or R&S®ZNA-B91 (control of external pulse modulator). R&S®ZNA-B7 is recommended.

| Designation | Type | Requires | Service center upgrade [24] | On-site upgrade [25] | Order No. |
|---|---|---|---|---|---|
| 1 mHz frequency resolution | R&S®ZNA-K19 | | yes | yes | 1332.5513.02 |
| Continuous data recording | R&S®ZNA-K28 | | yes | yes | 1332.5613.02 |
| Noise figure measurement | R&S®ZNA-K30 | see Options section for recommended setup | yes | yes | 1332.5465.02 |
| Uncertainty analysis | R&S®ZNA-K50 | | yes | yes | 1332.5542.02 |
| Uncertainty analysis, pre-installed | R&S®ZNA-K50P | | | | 1332.5594.02 |
| Security write protection | R&S®ZNA-K51 | | | | 1332.5559.02 |
| Easy deembedding | R&S®ZNA-K210 | | yes | yes | 1339.3897.02 |
| In-situ deembedding | R&S®ZNA-K220 | | yes | | 1339.3900.02 |
| Smart fixture deembedding | R&S®ZNA-K230 | | yes | | 1339.3916.02 |
| Delta-L PCB characterization | R&S®ZNA-K231 | | yes | | 1339.3922.02 |
| Health and utilization monitoring service | R&S®ZNA-K980 | | yes | yes | 1332.5607.02 |

| Designation | Type | Order No. |
|---|---|---|
| **Recommended calibration and verification accessories** | | |
| Calibration kits for manual calibration – high-end | | |
| Calibration kit, 0 Hz to 26.5 GHz, 3.5 mm | R&S®ZN-Z235 | 1336.8500.02 |
| Calibration kit, 0 Hz to 43.5 GHz, 2.92 mm | R&S®ZN-Z229 | 1336.7004.02 |
| Calibration kit, 0 Hz to 50.0 GHz, 2.4 mm | R&S®ZN-Z224 | 1339.5002.02 |
| Calibration kit, 0 Hz to 67.0 GHz, 1.85 mm | R&S®ZN-Z218 | 1337.3502.02 |
| Calibration kit, 0 Hz to 110 GHz, 1.0 mm | R&S®ZV-Z210 | 5011.6588.02 |
| Calibration units for automatic calibration – high-end | | |
| Calibration unit, 9 kHz to 26.5 GHz, 2 ports, 3.5 mm (f) | R&S®ZN-Z50 | 1335.6904.32 |
| Calibration unit, 100 kHz to 26.5 GHz, 4 ports, 3.5 mm (f) | R&S®ZN-Z52 | 1335.7046.30 |
| Calibration unit, 100 kHz to 26.5 GHz, 2 ports, 3.5 mm (f) | R&S®ZN-Z53 | 1335.7046.32 |
| Calibration unit, 9 kHz to 40 GHz, 2 ports, 2.92 mm (f), characterized to 43.5 GHz | R&S®ZN-Z54 | 1335.7117.92 |
| Calibration unit, 9 kHz to 50 GHz, 2 ports, 2.4 mm (f) | R&S®ZN-Z55 | 1335.7181.42 |
| Calibration unit, 10 MHz to 67 GHz, 2 ports, 1.85 mm (f) | R&S®ZN-Z156 | 1332.7239.03 |
| Inline calibration units for automatic calibration | | |
| CAN bus controller for inline calibration units | R&S®ZN-Z30 | 1328.7609.02 |
| Inline calibration unit, 10 MHz to 40 GHz, characterized to 43.5 GHz | R&S®ZN-Z33 | 1328.7644.02 |
| Inline calibration unit, 10 MHz to 40 GHz, for TVAC, characterized to 43.5 GHz | R&S®ZN-Z33 | 1328.7644.03 |
| Thermal insulator 2.92 mm | R&S®ZN-Z391 | 1350.8504.02 |
| Verification kits | | |
| Verification kit, 45 MHz to 26.5 GHz, 3.5 mm | R&S®ZV-Z435 | 1319.1060.02 |
| Verification kit, 45 MHz to 40.0 GHz, 2.92 mm | R&S®ZV-Z429 | 1319.1076.02 |
| Verification kit, 45 MHz to 50.0 GHz, 2.4 mm | R&S®ZV-Z424 | 1319.1082.02 |
| **Power sensors** [27] | | |
| Three-path diode power sensor, 10 MHz to 33 GHz, 3.5 mm | R&S®NRP33S | 1419.0064.02 |
| Three-path diode power sensor, 50 MHz to 40 GHz, 2.92 mm | R&S®NRP40S | 1419.0041.02 |
| Three-path diode power sensor, 50 MHz to 50 GHz, 2.4 mm | R&S®NRP50S | 1419.0087.02 |
| Three-path diode power sensor, 50 MHz to 67 GHz, 1.85 mm | R&S®NRP67S | 1424.6396.02 |
| **Switch matrix and accessories** | | |
| Switch matrix, 26.5 GHz, 2 VNA ports to 6 test ports | R&S®ZN-Z86 | 1351.2216.02 |
| Additional test ports 7 to 12, 2 VNA ports to 12 test ports | R&S®ZN-Z86-B22 | 1351.2900.22 |
| Additional test ports 13 to 18, 2 VNA ports to 18 test ports [28] | R&S®ZN-Z86-B32 | 1351.2900.32 |
| Additional test ports 19 to 24, 2 VNA ports to 24 test ports [29] | R&S®ZN-Z86-B42 | 1351.2900.42 |
| Additional test ports 7 to 12, 4 VNA ports to 12 test ports | R&S®ZN-Z86-B24 | 1351.2900.24 |
| Additional test ports 13 to 18, 4 VNA ports to 18 test ports [30] | R&S®ZN-Z86-B34 | 1351.2900.34 |
| Additional test ports 19 to 24, 4 VNA ports to 24 test ports [31] | R&S®ZN-Z86-B44 | 1351.2900.44 |
| Semi-rigid cable set for R&S®ZNA, 2.92 mm (f) to 2.92 mm (m), 2 or 4 R&S®ZNA ports to R&S®ZN-Z86, benchtop operation | R&S®ZN-ZA26 | 1328.8905.02 |
| Mechanical matrix extension for the R&S®ZN-Z86 | R&S®ZN-ZTBE | 1351.3906.02 |
| **Test cables** | | |
| Test cables, 0 Hz to 26.5 GHz, 3.5 mm (f) to 3.5 mm (m) | | |
| Length: 0.6 m | R&S®ZV-Z93 | 1301.7595.25 |
| Length: 1 m | R&S®ZV-Z93 | 1301.7595.38 |
| Test cables, 0 Hz to 26.5 GHz, 3.5 mm (f) to 3.5 mm (m) | | |
| Length: 0.6 m | R&S®ZV-Z193 | 1306.4520.24 |
| Length: 0.9 m | R&S®ZV-Z193 | 1306.4520.36 |
| Length: 1.5 m | R&S®ZV-Z193 | 1306.4520.60 |
| Test cables, 0 Hz to 40 GHz, 2.92 mm (f) to 2.92 mm (m) | | |
| Length: 0.6 m | R&S®ZV-Z95 | 1301.7608.25 |
| Length: 1 m | R&S®ZV-Z95 | 1301.7608.38 |
| Test cables, 0 Hz to 40 GHz, 2.92 mm (f) to 2.92 mm (m) | | |
| Length: 0.6 m | R&S®ZV-Z195 | 1306.4536.24 |
| Length: 0.9 m | R&S®ZV-Z195 | 1306.4536.36 |
| Test cable, 0 Hz to 50 GHz, 2.4 mm (f) to 2.4 mm (m) | | |
| Length: 0.6 m | R&S®ZV-Z97 | 1301.7637.25 |
| Test cables, 0 Hz to 67 GHz, 1.85 mm (f) to 1.85 mm (m) | | |
| Length: 0.6 m | R&S®ZV-Z196 | 1306.4559.24 |
| Length: 0.9 m | R&S®ZV-Z196 | 1306.4559.36 |

[27] See further power meters in the R&S®NRP specifications, 3607.0852.22.

[28] Requires R&S®ZN-Z86-B22.

[29] Requires R&S®ZN-Z86-B32.

[30] Requires R&S®ZN-Z86-B24.

[31] Requires R&S®ZN-Z86-B34.

| Designation | Type | Order No. |
|---|---|---|
| **Hardware add-ons** | | |
| Calibration mixer, 10 GHz to 40 GHz, 2.92 mm (f) | R&S®ZN-ZM292 | 1339.3800.02 |
| Preamplifier, 10 MHz to 43 GHz, $P_{out}$ = +20 dBm, 27 dB gain, 2.92 mm (f) to 2.92 mm (f) | R&S®ZN-ZSDM-PA | 1702.6073.02 |
| Preamplifier, 3 GHz to 67 GHz, $P_{out}$ = +17 dBm, 27 dB gain, 1.85 mm (f) to 1.85 mm (f) | R&S®ZN-ZSDM-PA | 1702.6073.03 |
| 2-way power divider, 40 GHz | R&S®ZN-Z1229 | 3691.8162.02 |
| 4-way power divider, 40 GHz | R&S®ZN-Z1230 | 3691.8179.02 |
| mmWave adaption kit, for R&S®ZNA26/43, two converters | R&S®ZCAKN | 1332.6178.43 |
| mmWave adaption kit, for R&S®ZNA26/43, four converters | R&S®ZCAKN | 1332.6178.44 |
| mmWave adaption kit, for R&S®ZNA50/67, two converters | R&S®ZCAKN | 1332.6178.67 |
| mmWave adaption kit, for R&S®ZNA50/67, four converters | R&S®ZCAKN | 1332.6178.68 |
| Torque wrench, for 3.5/2.92/2.4/1.85 mm connector, 8 mm width, 0.9 Nm torque | R&S®ZTW | 1328.8534.35 |
| Torque wrench, for R&S®ZNA test port connector, 19 mm width, 0.9 Nm torque | R&S®ZTW | 1328.8534.19 |
| 19" rack adapter | R&S®ZZA-KN6 | 1175.3056.00 |
| Cable set, for R&S®ZNA-K9 (3.5 mm for R&S®ZNA26) | R&S®ZNA26-Z9 | 1332.4730.26 |
| Cable set, for R&S®ZNA-K9 (2.92 mm for R&S®ZNA43) | R&S®ZNA43-Z9 | 1332.4730.43 |
| Cable set, for R&S®ZNA-K9 (2.4 mm for R&S®ZNA43) | R&S®ZNA43-Z9 | 1332.4730.44 |
| Cable set, for R&S®ZNA-K9 (1.85 mm for R&S®ZNA50) | R&S®ZNA50-Z9 | 1332.4730.50 |
| Cable set, for R&S®ZNA-K9 (1.85 mm for R&S®ZNA67) | R&S®ZNA67-Z9 | 1332.4730.67 |

| **Warranty** | | |
|---|---|---|
| Base unit | | 3 years |
| All other items [32] | | 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 and two years (WE1 and WE2)**
Repairs carried out during the contract term are free of charge [33]. 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 [33] 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 [33] and accredited calibration at the recommended intervals as well as any accredited calibration carried out during repairs or option upgrades.



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

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

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PD 5215.4652.22 | Version 20.00 | September 2023 (st)
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