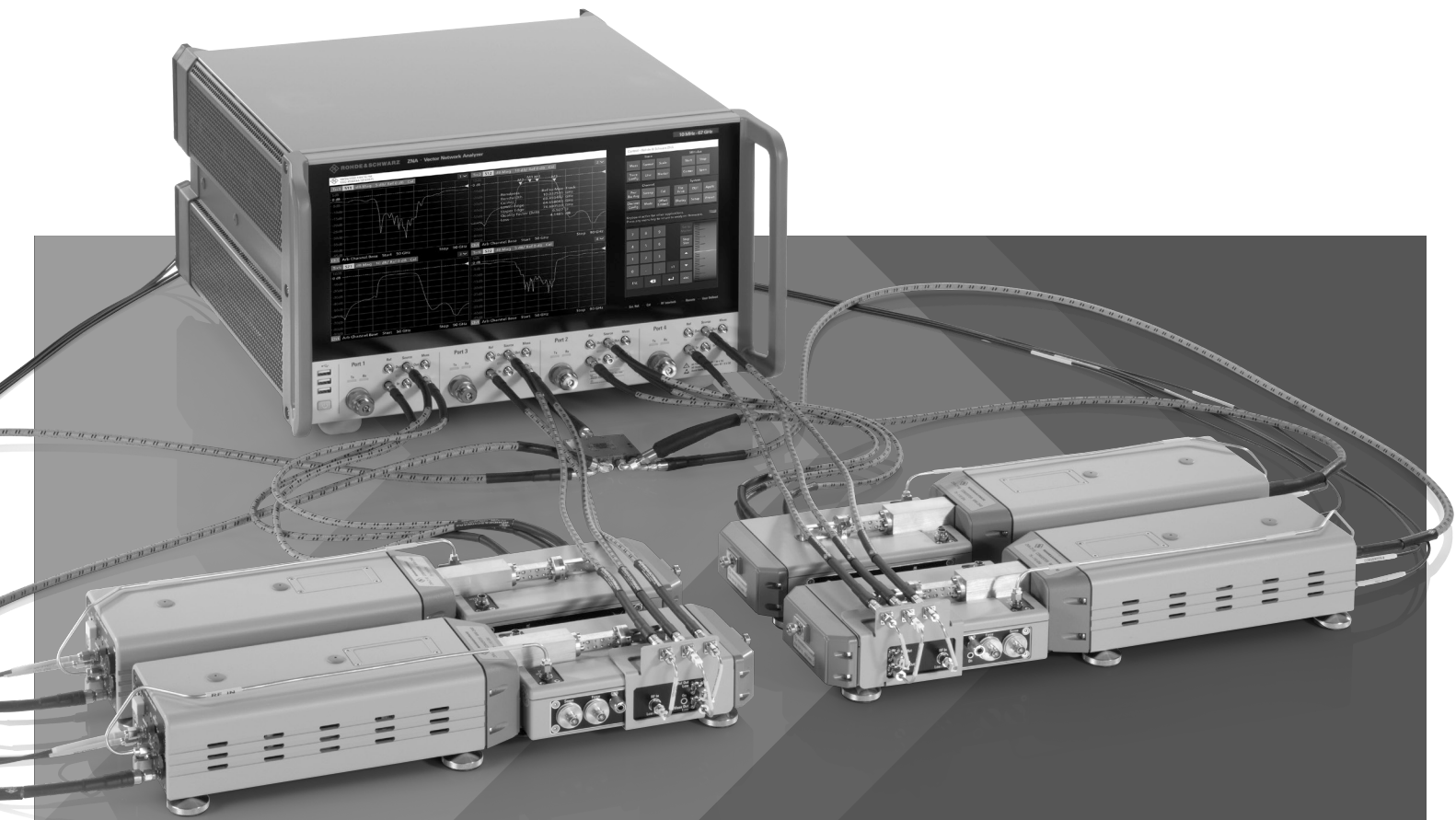


# R&S® ZNA67EXT VECTOR NETWORK ANALYZER SYSTEM

## Specifications



Data Sheet  
Version 02.01

**ROHDE & SCHWARZ**

Make ideas real



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# Definitions

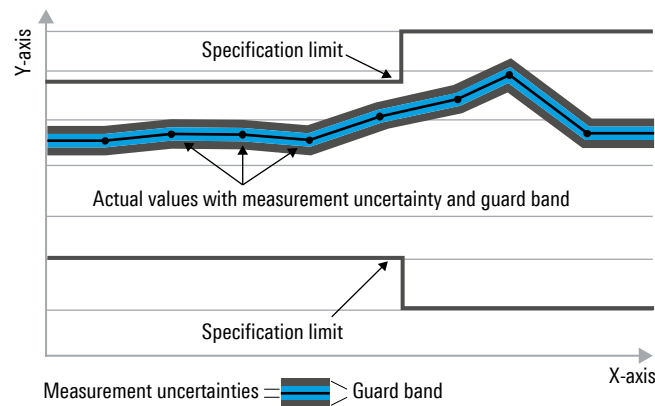
## General

Product data applies under the following conditions:

- Three hours storage at ambient temperature followed by 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  $<$ ,  $\leq$ ,  $>$ ,  $\geq$ ,  $\pm$ , or descriptions such as maximum, limit of, minimum. Compliance is ensured by testing or is derived from the design. Test limits are narrowed by guard bands to take into account measurement uncertainties, drift and aging, if applicable.



## Non-traceable specifications with limits (n. trc.)

Represent product performance that is specified and tested as described under “Specifications with limits” above. However, product performance in this case cannot be warranted due to the lack of measuring equipment traceable to national metrology standards. In this case, measurements are referenced to standards used in the Rohde & Schwarz laboratories.

## Specifications without limits

Represent warranted product performance for the specified parameter. These specifications are not specially marked and represent values with no or negligible deviations from the given value (e.g. dimensions or resolution of a setting parameter). Compliance is ensured by design.

## Typical data (typ.)

Characterizes product performance by means of representative information for the given parameter. When marked with  $<$ ,  $>$  or as a range, it represents the performance met by approximately 80 % of the instruments at production time. Otherwise, it represents the mean value.

## Nominal values (nom.)

Characterize product performance by means of a representative value for the given parameter (e.g. nominal impedance). In contrast to typical data, a statistical evaluation does not take place and the parameter is not tested during production.

## Measured values (meas.)

Characterize expected product performance by means of measurement results gained from individual samples.

## Uncertainties

Represent limits of measurement uncertainty for a given measurand. Uncertainty is defined with a coverage factor of 2 and has been calculated in line with the rules of the Guide to the Expression of Uncertainty in Measurement (GUM), taking into account environmental conditions, aging, wear and tear.

Device settings and GUI parameters are designated with the format “parameter: value”.

Non-traceable specifications with limits, typical data as well as nominal and measured values are not warranted by Rohde & Schwarz.

In line with the 3GPP standard, chip rates are specified in million chips per second (Mcps), whereas bit rates and symbol rates are specified in billion bit per second (Gbps), million bit per second (Mbps), thousand bit per second (kbps), million symbols per second (Msps) or thousand symbols per second (ksps), and sample rates are specified in million samples per second (Msample/s). Gbps, Mcps, Mbps, Msps, kbps, ksps and Msample/s are not SI units.

# Specifications

## Overview

The R&S®ZNA67EXT is a 1.0 mm vector network analyzer system, covering the frequency range from 10 MHz to 110 GHz.

The R&S®ZNA67EXT vector network analyzer system consists of one R&S®ZNA67 4-port vector network analyzer and up to four external test sets.

Each of the external test sets consists of an R&S®ZVA-Z110 frequency converter and an R&S®ZVA-ZD110 diplexer.

The following specifications apply for operation as a 1.0 mm vector network analyzer system. The specified data is only valid for a system configuration identical to the designation scheme at the rear panel of the R&S®ZNA67, with respect to the type and serial numbers as well as the correct position (i.e. port) of the system.

## Measurement range

|                      |                        |                   |
|----------------------|------------------------|-------------------|
| Impedance            |                        | 50 Ω              |
| Test port connector  |                        | 1.0 mm, male      |
| Number of test ports | models .02/.03/.05/.06 | 2                 |
|                      | models .04/.07         | 4                 |
| Frequency range      |                        | 10 MHz to 110 GHz |

|   |   |                        |
|---|---|------------------------|
| Static frequency accuracy               | The static frequency accuracy is determined with the formula<br><i>(time since last adjustment in years × aging per year) + temperature drift + achievable initial calibration accuracy</i><br>using the values specified below. Depending on whether or not R&S®ZNA-B4 precision frequency reference option is installed, the standard or the improved value has 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 | user-selectable     | 1 to 100001     |
| Measurement bandwidths       | 1/1.5/2/3/5/7 steps | 1 Hz to 1.5 MHz |

## Dynamic range

|                            |                    |          |
|----------------------------|--------------------|----------|
| Dynamic range <sup>1</sup> | 10 MHz to 30 MHz   | > 54 dB  |
|                            | 30 MHz to 100 MHz  | > 94 dB  |
|                            | 100 MHz to 500 MHz | > 94 dB  |
|                            | 500 MHz to 1 GHz   | > 120 dB |
|                            | 1 GHz to 16 GHz    | > 120 dB |
|                            | 16 GHz to 20 GHz   | > 120 dB |
|                            | 20 GHz to 30 GHz   | > 105 dB |
|                            | 30 GHz to 40 GHz   | > 85 dB  |
|                            | 40 GHz to 50 GHz   | > 80 dB  |
|                            | 50 GHz to 60 GHz   | > 80 dB  |
|                            | 60 GHz to 68 GHz   | > 75 dB  |
|                            | 68 GHz to 80 GHz   | > 75 dB  |
|                            | 80 GHz to 90 GHz   | > 90 dB  |
| 90 GHz to 110 GHz          | > 80 dB            |          |

<sup>1</sup> All receiver step attenuators in 0 dB position.

## 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 –15 dBm.

| R&S®ZNA67EXT, calibrated with R&S®ZV-Z210 calibration kit | 0 Hz to 0.7 GHz |      | 0.7 GHz to 24 GHz |      | 24 GHz to 65 GHz |      | 65 GHz to 75 GHz |      | 75 GHz to 110 GHz |      |
|---|-----------------|------|-------------------|------|------------------|------|------------------|------|-------------------|------|
|   | spec.           | typ. | spec.             | typ. | spec.            | typ. | spec.            | typ. | spec.             | typ. |
| Directivity in dB   | ≥ 27            | 30   | ≥ 32              | 35   | ≥ 30             | 33   | ≥ 27             | 30   | ≥ 26              | 29   |
| Source match in dB  | ≥ 27            | 30   | ≥ 32              | 35   | ≥ 28             | 31   | ≥ 25             | 28   | ≥ 24              | 27   |
| Load match in dB  | ≥ 27            | 30   | ≥ 32              | 35   | ≥ 28             | 31   | ≥ 25             | 28   | ≥ 24              | 27   |
| Reflection tracking in dB                                 | ≤ 0.2           | 0.1  | ≤ 0.2             | 0.1  | ≤ 0.3            | 0.2  | ≤ 0.3            | 0.2  | ≤ 0.3             | 0.2  |
| Transmission tracking in dB                               | ≤ 0.3           | 0.2  | ≤ 0.3             | 0.2  | ≤ 0.4            | 0.3  | ≤ 0.5            | 0.4  | ≤ 0.4             | 0.3  |

## Test port output

|  |   |                  |
|--|---|------------------|
| Maximum output power with source leveling data | 10 MHz to 4 GHz   | > +10 dBm        |
|  | 4 GHz to 20 GHz   | > +2 dBm         |
|  | 20 GHz to 25 GHz  | > –2 dBm         |
|  | 25 GHz to 30 GHz  | > –8 dBm         |
|  | 30 GHz to 40 GHz  | > –15 dBm        |
|  | 40 GHz to 50 GHz  | > –12 dBm        |
|  | 50 GHz to 60 GHz  | > –15 dBm        |
|  | 60 GHz to 68 GHz  | > –18 dBm        |
|  | 68 GHz to 75 GHz  |                  |
|  | models .02/.03/.04  | > –18 dBm        |
|  | models .05/.06/.07  | > –5 dBm         |
|  | 75 GHz to 90 GHz  |                  |
|  | models .02/.03/.04  | > –10 dBm        |
|  | models .05/.06/.07  | > +1 dBm         |
| 90 GHz to 110 GHz                              |   |                  |
| models .02/.03/.04                             | > –17 dBm   |                  |
| models .05/.06/.07                             | > –2 dBm  |                  |
| Minimum output power with source leveling data |   | < –35 dBm (typ.) |
| Power accuracy, ALC: on <sup>2</sup>           | models .02/.03/.04: –20 dBm source power,<br>models .05/.06/.07: –10 dBm source power |                  |
|  | 10 MHz to 30 GHz  | 1.5 dB           |
|  | 30 GHz to 40 GHz  | 2.0 dB           |
|  | 40 GHz to 60 GHz  | 2.5 dB           |
|  | 60 GHz to 68 GHz  | 3.0 dB           |
|  | 68 GHz to 110 GHz   | 6.0 dB           |

## Test port input

|              |  |         |
|--------------|--|---------|
| Damage level |  | +27 dBm |
|--------------|--|---------|

<sup>2</sup> With R&S®SMARTerCal (OSM or UOSM calibration).

## Connectors

Only additional connectors at R&S®ZVA-ZD110 are shown. For interfaces of the R&S®ZNA67, see R&S®ZNA data sheet (PD 5215.4652.22).

| <b>Force on R&amp;S®ZVA-ZD110</b> |  | fused DC bias input for 1.0 mm port  |
|-----------------------------------|--|--|
| Connector type                    |  | subminiature triaxial connector, female, signal applied to inner connector |
| Maximum nominal input voltage     |  | 28 V   |
| Maximum nominal input current     |  | 200 mA   |
| Damage voltage                    |  | 30 V   |
| Damage current                    |  | 500 mA   |

| <b>Sense on R&amp;S®ZVA-ZD110</b> |  | DC bias sense output for 1.0 mm port                                       |
|-----------------------------------|--|--|
| Connector type                    |  | subminiature triaxial connector, female, signal applied to inner connector |

## General data

|                            |   |   |
|----------------------------|---|---|
| Temperature loading        |   | in line with IEC 60068-2-1 and IEC 60068-2-2  |
|                            | operating temperature range   | +18 °C to +28 °C  |
|                            | permissible temperature range   | +5 °C to +40 °C   |
|                            | storage temperature range   | −40 °C to +70 °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 feet)   |
| 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   | 8 Hz to 500 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               | R&S®ZNA67   | 100 V to 240 V at 50 Hz to 60 Hz and 400 Hz, max. 7.3 A to 4.6 A (respectively)   |
|                            | each external test set (consisting of R&S®ZVA-Z110 and R&S®ZVA-ZD110) | power adapter, 100 V to 240 V (AC) with ±10 % tolerance, 50 Hz to 60 Hz with ±5 % tolerance, safety class II; output: 9 V, max. 1.1 A DC; output connector: DIN 45323   |
| Power consumption          | R&S®ZNA67   | ≤ 550 W (spec.), 350 W (typ.)   |
|                            | each external test set (consisting of R&S®ZVA-Z110 and R&S®ZVA-ZD110) | 10 W, 7 W (typ.)  |

|                        |   |  |
|------------------------|---|--|
| Dimensions (W x H x D) | R&S®ZNA67   | EIA RU1: 6 <sup>3</sup> ,<br>461.4 mm x 284.6 mm x 462.1 mm<br>(18.2 in x 11.2 in x 18.2 in) |
|                        | each external test set<br>(consisting of R&S®ZVA-Z110 and<br>R&S®ZVA-ZD110) | 525 mm x 110 mm x 114 mm<br>(20.7 in x 4.3 in x 4.5 in)                                      |
| Weight                 | R&S®ZNA67   | 29 kg (63.9 lb)  |
|                        | each external test set<br>(consisting of R&S®ZVA-Z110 and<br>R&S®ZVA-ZD110) | 4.2 kg (9.3 lb)  |
| Shipping weight        | R&S®ZNA67   | 35 kg (77.2 lb)  |
|                        | each external test set<br>(consisting of R&S®ZVA-Z110 and<br>R&S®ZVA-ZD110) | 6.2 kg (13.6 lb)   |

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<sup>3</sup> Electronics Industry Association rack units. 1 RU = 1.75 in.

# Ordering information

## Base units

| Designation   | Type         | Order No.    |
|---|--------------|--------------|
| Vector network analyzer system, 110 GHz, 2 test ports, complete system based on R&S®ZNA67, 2-port model, standard power | R&S®ZNA67EXT | 1352.1888K02 |
| Vector network analyzer system, 110 GHz, 2 test ports, complete system based on R&S®ZNA67, 4-port model, standard power | R&S®ZNA67EXT | 1352.1888K03 |
| Vector network analyzer system, 110 GHz, 4 test ports, complete system based on R&S®ZNA67, 4-port model, standard power | R&S®ZNA67EXT | 1352.1888K04 |
| Vector network analyzer system, 110 GHz, 2 test ports, complete system based on R&S®ZNA67, 2-port model, high power     | R&S®ZNA67EXT | 1352.1888K05 |
| Vector network analyzer system, 110 GHz, 2 test ports, complete system based on R&S®ZNA67, 4-port model, high power     | R&S®ZNA67EXT | 1352.1888K06 |
| Vector network analyzer system, 110 GHz, 4 test ports, complete system based on R&S®ZNA67, 4-port model, high power     | R&S®ZNA67EXT | 1352.1888K07 |

## Options

| Designation  | Type          | Requires     | Service center upgrade <sup>4</sup> | On-site upgrade <sup>5</sup> | Order No.    |
|--|---------------|--------------|-------------------------------------|------------------------------|--------------|
| Direct source and receiver access, for R&S®ZNA67 (mandatory)           | R&S®ZNA67-B16 | 2-port model |                                     |                              | 1332.4581.62 |
|  | R&S®ZNA67-B16 | 4-port model |                                     |                              | 1332.4581.64 |
| Source step attenuator, for R&S®ZNA67                                  |               |              |                                     |                              |              |
| Port 1   | R&S®ZNA67-B21 |              | yes (U)                             |                              | 1332.5013.21 |
| Port 2   | R&S®ZNA67-B22 |              | yes (U)                             |                              | 1332.5013.22 |
| Port 3   | R&S®ZNA67-B23 |              | yes (U)                             |                              | 1332.5013.23 |
| Port 4   | R&S®ZNA67-B24 |              | yes (U)                             |                              | 1332.5013.24 |
| Receiver step attenuator, for R&S®ZNA67 (mandatory)                    |               |              |                                     |                              |              |
| Port 1   | R&S®ZNA67-B31 |              |                                     |                              | 1332.5036.31 |
| Port 2   | R&S®ZNA67-B32 |              |                                     |                              | 1332.5036.32 |
| Port 3   | R&S®ZNA67-B33 |              |                                     |                              | 1332.5036.33 |
| Port 4   | R&S®ZNA67-B34 |              |                                     |                              | 1332.5036.34 |
| Internal pulse modulator, for R&S®ZNA67                                |               |              |                                     |                              |              |
| Port 1   | R&S®ZNA67-B41 |              | yes                                 | yes                          | 1332.5094.41 |
| Port 2   | R&S®ZNA67-B42 |              | yes                                 | yes                          | 1332.5094.42 |
| Port 3   | R&S®ZNA67-B43 |              | yes                                 | yes                          | 1332.5094.43 |
| Port 4   | R&S®ZNA67-B44 |              | yes                                 | yes                          | 1332.5094.44 |
| 3rd and 4th internal source, for R&S®ZNA67                             | R&S®ZNA67-B3  | 4-port model | yes                                 |                              | 1332.4998.02 |
| 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, 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 (mandatory)  | R&S®ZNA-B8    |              |                                     |                              | 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   |              |                                     |                              | 1332.4600.02 |
| Direct IF access (mandatory)   | R&S®ZNA-B26   |              |                                     |                              | 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    |              | yes                                 | yes                          | 1332.5359.02 |

<sup>4</sup> 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.

<sup>5</sup> Option may be installed by the user on site.



| Designation  | Type           | Requires   | Service center upgrade <sup>4</sup> | On-site upgrade <sup>5</sup> | Order No.    |
|--|----------------|--|-------------------------------------|------------------------------|--------------|
| Phase coherent source control                                      | R&S®ZNA-K6     |  | yes                                 | yes                          | 1332.5413.02 |
| True differential mode   | R&S®ZNA-K61    |  | yes                                 | yes                          | 1332.5442.02 |
| Measurements on pulsed signals                                     | R&S®ZNA-K7     | R&S®ZNA-K17 together with pulse modulator <sup>6</sup> | yes                                 | yes                          | 1332.5371.02 |
| Increased IF bandwidth 30 MHz                                      | R&S®ZNA-K17    |  | yes                                 | yes                          | 1332.5459.02 |
| mmWave converter support (mandatory)                               | R&S®ZNA-K8     |  |                                     |                              | 1332.5388.02 |
| Group delay measurements on frequency converters without LO access | R&S®ZNA-K9     |  | yes                                 | yes                          | 1332.5394.02 |
| 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 |
| Uncertainty analysis   | R&S®ZNA-K50    |  | yes                                 | yes                          | 1332.5542.02 |
| Uncertainty analysis, preinstalled                                 | R&S®ZNA-K50P   |  |                                     |                              | 1332.5594.02 |
| Security write protection  | R&S®ZNA-K51    |  |                                     |                              | 1332.5559.02 |
| Continuous sweep 110 GHz (mandatory)                               | R&S®ZNA67-K110 |  |                                     |                              | 1332.5642.02 |
| 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 |

## Warranty

| Warranty  |         |   |
|---|---------|---|
| Base unit   |         | 3 years   |
| All other items <sup>7</sup>                                      |         | 1 year  |
| Service options   |         |   |
| Extended warranty, one year                                       | R&S®WE1 | Please contact your local Rohde & Schwarz sales office. |
| Extended warranty, two years                                      | R&S®WE2 |   |
| Extended warranty with calibration coverage, one year             | R&S®CW1 |   |
| Extended warranty with calibration coverage, two years            | R&S®CW2 |   |
| Extended warranty with accredited calibration coverage, one year  | R&S®AW1 |   |
| Extended warranty with accredited calibration coverage, two years | R&S®AW2 |   |

### Extended warranty with a term of one and two years (WE1 and WE2)

Repairs carried out during the contract term are free of charge <sup>8</sup>. 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 <sup>8</sup> 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 <sup>8</sup> and accredited calibration at the recommended intervals as well as any accredited calibration carried out during repairs or option upgrades.

<sup>6</sup> R&S®ZNAxx-B41/-B42/-B43/-B44, and/or R&S®ZNA-B91 (control of external pulse modulator). R&S®ZNA-B7 is recommended.

<sup>7</sup> For options that are installed, the remaining base unit warranty applies if longer than 1 year. Exception: all batteries have a 1 year warranty.

<sup>8</sup> Excluding defects caused by incorrect operation or handling and force majeure. Wear-and-tear parts are not included.





## Service at Rohde & Schwarz You're in great hands

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- ▶ Customized and flexible
- ▶ Uncompromising quality
- ▶ Long-term dependability

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## Sustainable product design

- ▶ Environmental compatibility and eco-footprint
- ▶ Energy efficiency and low emissions
- ▶ Longevity and optimized total cost of ownership

Certified Quality Management

**ISO 9001**

Certified Environmental Management

**ISO 14001**

## Rohde & Schwarz training

[www.training.rohde-schwarz.com](http://www.training.rohde-schwarz.com)

## Rohde & Schwarz customer support

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