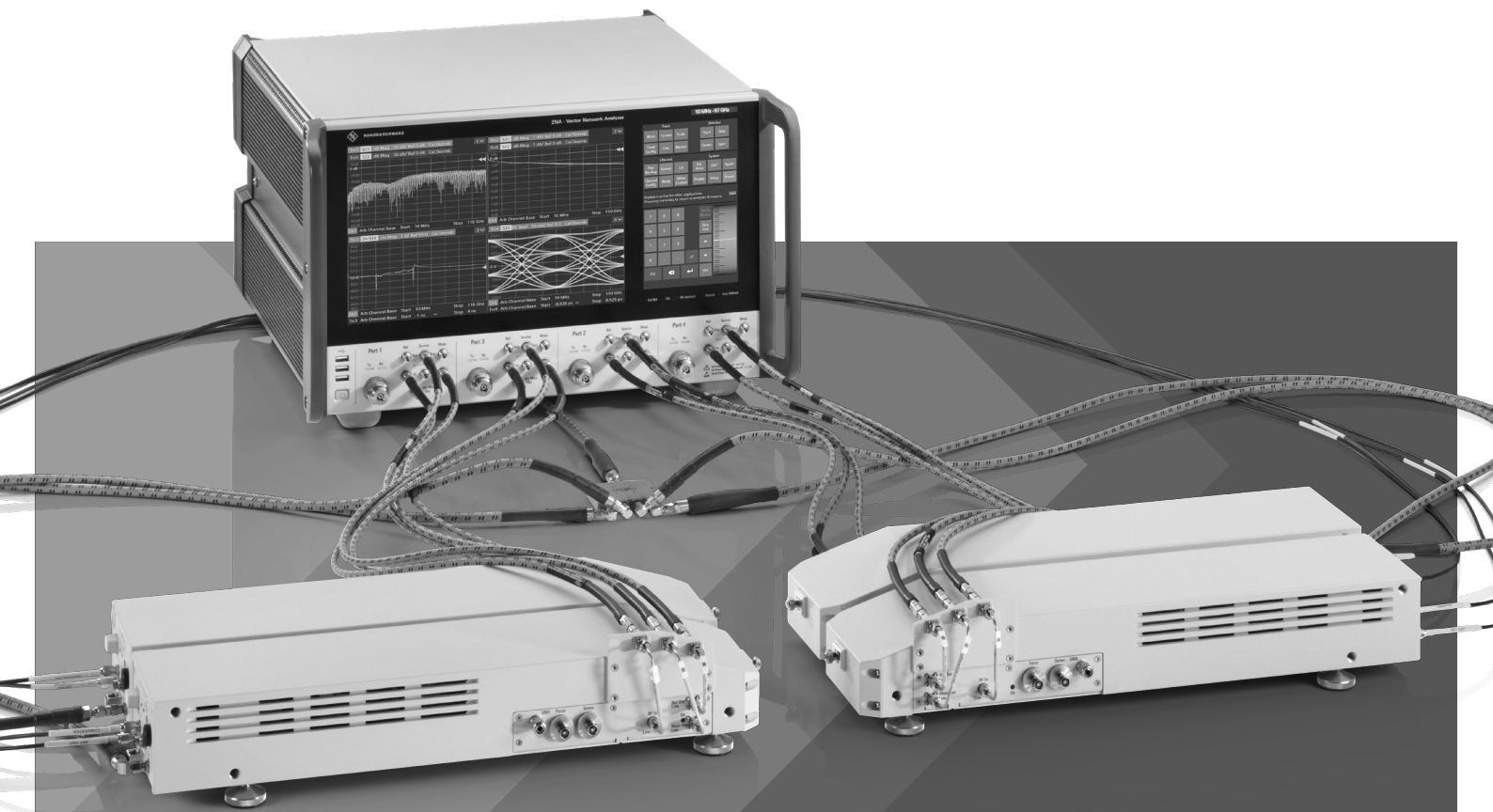


R&S® ZNA67EXT VECTOR NETWORK ANALYZER SYSTEM

Specifications



Specifications
Version 04.00

ROHDE & SCHWARZ

Make ideas real



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Definitions

General

Product data applies under the following conditions:

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

Specifications with limits

Represent warranted product performance by means of a range of values for the specified parameter. These specifications are marked with limiting symbols such as $<$, \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 vector network analyzer and up to four external test sets.

Each of the external test sets consists either of an R&S®ZVA-Z110 frequency converter and an R&S®ZVA-ZD110 diplexer or of an R&S®ZVA-Z110D unit.

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/.12/.13/.15/.16	2
	models .04/.07/.14/.17	4
Frequency range		10 MHz to 110 GHz

Static frequency accuracy	The static frequency accuracy is determined with the formula <i>(time since last adjustment in years × aging per year) + temperature drift + achievable initial calibration accuracy</i> 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 ^{1,2}	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	

¹ All receiver step attenuators in 0 dB position.

² Dynamic range reduced up to 18 dB below 68 GHz if one of the following options is present in the R&S®ZNA base unit:

R&S®ZNA-B161, R&S®ZNA-B163, R&S®ZNA-B212, R&S®ZNA-B213, R&S®ZNA-B302, R&S®ZNA-B312, R&S®ZNA-B501 or R&S®ZNA-B511.

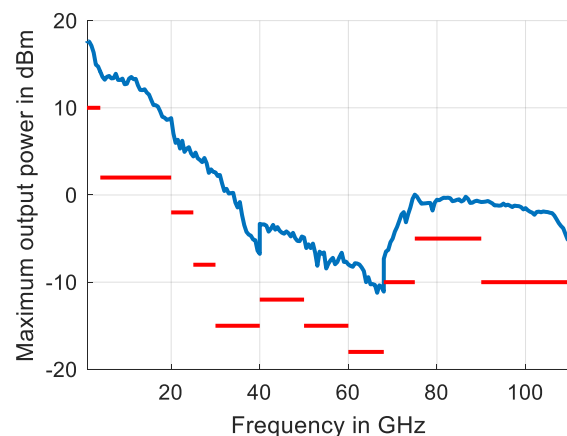
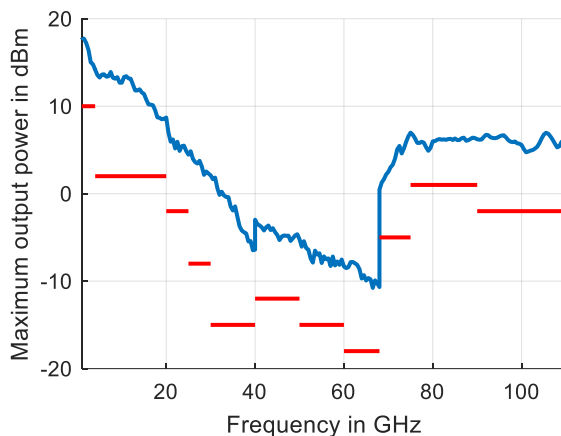
Effective system data

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 ³	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
	models .12/.13/.14	> –18 dBm
	models .15/.16/.17	> –5 dBm
	75 GHz to 90 GHz	
	models .02/.03/.04	> –10 dBm
	models .05/.06/.07	> +1 dBm
	models .12/.13/.14	> –5 dBm
models .15/.16/.17	> +1 dBm	
90 GHz to 110 GHz		
models .02/.03/.04	> –17 dBm	
models .05/.06/.07	> –2 dBm	
models .12/.13/.14	> –10 dBm	
models .15/.16/.17	> –2 dBm	
Minimum output power with source leveling data		< –35 dBm (typ.)



Exemplary measured maximum test port output power for the R&S®ZNA67EXT with R&S®ZVA-Z110D high power (left) and R&S®ZVA-Z110D standard power (right)

³ Maximum test port output power is reduced up to 10 dB below 68 GHz if one of the following options is present in the R&S®ZNA base unit: R&S®ZNA-B161, R&S®ZNA-B163, R&S®ZNA-B212 or R&S®ZNA-B213.

Power accuracy, ALC: on ⁴	models .02/.03/.04/.12/.13/.14: –20 dBm source power, models .05/.06/.07/.15/.16/.17: –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
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Connectors

Only additional connectors at R&S®ZVA-ZD110 or R&S®ZVA-Z110D are shown.

For interfaces of the R&S®ZNA67, see R&S®ZNA specifications document (PD 5215.4652.22).

Force on R&S®ZVA-ZD110 or R&S®ZVA-Z110D		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
Sense on R&S®ZVA-ZD110 or R&S®ZVA-Z110D		DC bias sense output for 1.0 mm port
Connector type		subminiature triaxial connector, female, signal applied to inner connector

⁴ With R&S®SMARTerCal (OSM or UOSM calibration).

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 or R&S®ZVA-Z110D)	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 or R&S®ZVA-Z110D)	10 W, 7 W (typ.)
Dimensions (W x H x D)	R&S®ZNA67	EIA RU1: 6 ⁵ , 461.4 mm x 284.6 mm x 462.1 mm (18.2 in x 11.2 in x 18.2 in)
	each external test set consisting of R&S®ZVA-Z110 and R&S®ZVA-ZD110	525 mm x 110 mm x 114 mm (20.7 in x 4.3 in x 4.5 in)
	each external test set consisting of R&S®ZVA-Z110D	463 mm x 66 mm x 100 mm (18.2 in x 2.6 in x 3.9 in)

⁵ Electronics Industry Association rack units. 1 RU = 1.75 in.

Weight	R&S®ZNA67	29 kg (63.9 lb)
	each external test set consisting of R&S®ZVA-Z110 and R&S®ZVA-ZD110	4.2 kg (9.3 lb)
	each external test set consisting of R&S®ZVA-Z110D	3.5 kg (7.7 lb)
Shipping weight	R&S®ZNA67	35 kg (77.2 lb)
	each external test set consisting of R&S®ZVA-Z110 and R&S®ZVA-ZD110	6.2 kg (13.6 lb)
	each external test set consisting of R&S®ZVA-Z110D	5.5 kg (12.1 lb)

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
Vector network analyzer system, 110 GHz, 2 test ports, complete system based on R&S®ZNA67, 2-port model, R&S®ZVA-110D, standard power	R&S®ZNA67EXT	1352.1888K12
Vector network analyzer system, 110 GHz, 2 test ports, complete system based on R&S®ZNA67, 4-port model, R&S®ZVA-110D, standard power	R&S®ZNA67EXT	1352.1888K13
Vector network analyzer system, 110 GHz, 4 test ports, complete system based on R&S®ZNA67, 4-port model, R&S®ZVA-110D, standard power	R&S®ZNA67EXT	1352.1888K14
Vector network analyzer system, 110 GHz, 2 test ports, complete system based on R&S®ZNA67, 2-port model, R&S®ZVA-110D, high power	R&S®ZNA67EXT	1352.1888K15
Vector network analyzer system, 110 GHz, 2 test ports, complete system based on R&S®ZNA67, 4-port model, R&S®ZVA-110D, high power	R&S®ZNA67EXT	1352.1888K16
Vector network analyzer system, 110 GHz, 4 test ports, complete system based on R&S®ZNA67, 4-port model, R&S®ZVA-110D, high power	R&S®ZNA67EXT	1352.1888K17

Options

Designation	Type	Requires	Service center upgrade ⁶	On-site upgrade ⁷	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

⁶ 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.

⁷ Option may be installed by the user on site.

Designation	Type	Requires	Service center upgrade ⁶	On-site upgrade ⁷	Order No.
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
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 ⁸	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

Designation	Type	Order No.
Recommended calibration and verification extras		
Calibration kits for manual calibration – high-end		
Calibration kit, 1.0 mm, 0 Hz to 110 GHz	R&S®ZN-Z210	1354.3407.02
Power sensor ⁹		
Thermal power sensor, DC to 110 GHz, 1.0 mm	R&S®NRP110T	1424.6215.02
Test cable		
Test cable, 0 Hz to 110 GHz, 1.0 mm (f) to 1.0 mm (m), length: 0.16 m	R&S®ZV-Z198	1306.4565.06

⁸ R&S®ZNAxx-B41/-B42/-B43/-B44, and/or R&S®ZNA-B91 (control of external pulse modulator). R&S®ZNA-B7 is recommended.

⁹ See further power meters in the R&S®NRP specifications document (PD 3607.0852.22).

Warranty and service

Warranty		
Base unit		1 year
All other items		1 year
Service options		
	Service plans	On demand
Calibration	up to five years ¹⁰	pay per calibration
Warranty and repair	up to five years ¹⁰	standard price repair
Contact your Rohde & Schwarz sales office for further details.		

¹⁰ For extended periods, contact your Rohde & Schwarz sales office.

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- ▶ Energy efficiency and low emissions
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