ROHDE&SCHWARZ

Make ideas real

WHERE HISTORY MEETS TOMORROW

Vector Network Analyzer

APPLICATIONS

Antenna arrays
Measuring antenna arrays at high frequencies is often a challenge. The R&S®ZNBT is a high-performance VNA with up to 24 fully integrated test ports. The R&S®ZNBT supports frequencies up to 40 GHz, covering the most important 5G frequencies. The intuitive interface allows the user to set up measurements conveniently.

Measurements in the mmWave range
Extending the R&S®ZNA, the R&S®ZCxxx mmWave converter family covers frequencies up to 1.1 THz. Measurement tasks for mmWave applications are versatile, ranging from the characterization of high-blocking filters to material measurements. Their high dynamic range, high power output and support of third-party probers and software enable the user to perform on-wafer testing in demanding fields such as satellite communications and defense.

Signal integrity
Rohde&Schwarz offers a wide range of solutions for signal integrity measurements for different standards (USB-C, automotive Ethernet, BroadR-Reach, etc.). Time-domain analysis options for high-speed signal testing are available with the R&S®ZNB and R&S®ZNBT, both of which can be combined with the R&S®ZN-Z8x and R&S®OSP to support challenging multiport applications.

General purpose and field installation
Measurement equipment for general purposes and education has to be versatile. On-site applications, such as installing antenna systems in the field, require high flexibility. The Rohde&Schwarz economy and handheld VNAs are ideally suited to meet these requirements.

In a world where precision can define success, every measurement is a piece of a larger puzzle. Rohde&Schwarz brings simplicity to complexity.

The R&S®ZNA forms the powerful core in antenna test systems.

Frequency	5 kHz	9 kHz	30 kHz	100 kHz	300 kHz	1 MHz	10 MHz	3 GHz	4 GHz	4.5 GHz	6 GHz	8 GHz	8.5 GHz	13.5 GHz	14 GHz	18 GHz	20 GHz	24 GHz	26.5 GHz	40 GHz	43.5 GHz	50 GHz	67 GHz	110 GHz	500 GHz
Economy and handheld																									
R&S®ZNH4										B4															
R&S®ZNH8																									
R&S®ZNH18																									
R&S®ZNH26																									
R&S®ZNLE3					B100																				
R&S®ZNLE4					B100																				
R&S®ZNLE6					B100																				
R&S®ZNLE14					B100																				
R&S®ZNLE18					B100																				
R&S®ZNL3																									
R&S®ZNL4																									
R&S®ZNL6																									
R&S®ZNL14																									
R&S®ZNL20																									
R&S®ZND													K1												
Midrange																									
R&S®ZNBT8																									
R&S®ZNBT20																									
R&S®ZNBT26																									
R&S®ZNBT40																									
R&S®ZNB4																									
R&S®ZNB8																									
R&S®ZNB20																									
R&S®ZNB26																									
R&S®ZNB43																									
High end																									
R&S®ZNA26					B16																				
R&S®ZNA43					B16																				
R&S®ZNA50																									
R&S®ZNA67																									
R&S®ZNA67EXT																									

VECTOR NETWORK ANALYZER PORTFOLIO

More than 70 years of experience in the field of vector network analysis pay off: With the versatile product portfolio Rohde & Schwarz continuously sets new benchmarks for vector network analyzers. From basic S-parameter to fast multiport-measurements and complex high-end applications, Rohde & Schwarz offers a variety of solutions for a wide range of applications.

No matter if a vector network analyzer is needed in R&D, production or in the classroom: benefit from the high-quality instruments and excellent development expertise that Rohde & Schwarz offers.

Instrument		R&S®ZNH	R&S®ZNLE	R&S®ZNL	R&S®ZND	R&S®ZNB	R&S®ZNBT	R&S®ZNA
Main characteristics								
Frequency range	min.	30 kHz	100 kHz (with B100) 1 MHz	5 kHz	100 kHz	9 kHz (ZNB4/8) 100 kHz (ZNB20/26/43)	9 kHz (ZNBT8) 100 kHz (ZNBT20/26/40)	10 MHz
	max.	4/8/18/26.5 GHZ	3/4.5/6/14/18 GHz (overrange to 20 GHz)	3/4.5/6/14/20 GHz	4.5 GHz 8.5 GHz (with K1/K8)	4.5/8.5/20/26.5/43.5 GHz	8.5/20/26.5/40 GHz	26.5/43.5/50/67 GHz
Number of ports		2	2	2	2	2, 4	4 (ZNBT8 only) 8, 12, 16, 20, 24 available for all models	2, 4
Number of sources		1	1	1	1	1 (2 ports unit) 1 or 2 (4 ports unit)	1 or 2 (with more than 8 ports)	1 or 2 (2 ports unit) 2 or 4 (4 ports unit)
RF performance								
Dynamic range* (typ.)		Up to 100 dB	Up to 120 dB	Up to 130 dB	Up to 130 dB	Up to 140 dB Up to 150 dB (with B52/B54)	Up to 145 dB (ZNBT8-B5xx) Up to 140 dB (ZNBT8/20) Up to 130 dB (ZNBT26/40)	Up to 139 dB Up to 147 dB (with B3n)
Max. output power* (typ.)		Up to 0 dBm meas.	Up to +2 dBm	Up to +3 dBm	Up to +10 dBm (with B7)	Up to +15 dBm (ZNB4/8/20) Up to +12 dBm ((ZNB26/43)	Up to +15 dBm (ZNBT8/20) Up to +11 dBm (ZNBT26/40)	Up to +20 dBm
Power range * (spec.)	min.	–5 dBm norm.	–10 dBm	–10 dBm –40 dBm (with B22)	–20 dBm –45 dBm (with K7 & B7)	–55 dBm (ZNB4/8) –30 dBm (ZNB20/26/43) -85 dBm (ZNB4/8 w B2x) -60 dBm (ZNB20/26/43 w B2x)	–55 dBm (ZNBT8) –85 dBm (ZNBT8 w B2x) –30dBm (ZNBT20/26/40) –60 dBm (ZNBT20/26/40 w B2x)	–80 dBm
	max.	–25 dBm norm.	0 dBm	–3 dBm 0 dBm (with B22)	+3 dBm +10 dBm (with K7 & B7)	+10 dBm (ZNB4/8) +12 dBm (ZNB20) +8 dBm (ZNB26/43)	+13 dBm (ZNBT8) +12 dBm (ZNBT20) +8 dBm (ZNBT26/40)	+17 dBm (ZNA26/43) +16 dBm (ZNA50/67)
Measurement speed (Best speed at 201 points, correction off)		153 ms [IF BW: 100 kHz]	4.9 ms (ZNLE4/6) 11.8 ms (ZNLE14/18) [IF BW: 100 kHz]	4.9 ms (ZNL4/6) 11.8 ms (ZNL14/20) [IF BW: 100 kHz]	5 ms [IF BW: 300 kHz]	3 ms (ZNB4/8) 2.5 ms (ZNB20) 2.4 ms (ZNB26) 2.6 ms (ZNB43) [IF BW: 500 kHz]	2.5 ms (ZNBT8) 3.8 ms (ZNBT20) 4.7 ms (ZNBT26/40) [IF BW: 500 kHz]	5.1 ms [IF BW: 500 kHz]
Number of points		3 to 16,001	1 to 5,001	1 to 100,001	2 to 5,001	1 to 100,001	2 to 100,001	1 to 100,001
IFBW		10 Hz to 100 kHz	1 Hz to 500 kHz	1 Hz to 500 kHz	1 Hz to 300 kHz	1 Hz to 1 MHz 1 Hz to 10 MHz (with K17)	1 Hz to 1 MHz 1 Hz to 10 MHz (with K17)	1 Hz to 1.5 MHz 1 Hz to 30 MHz (with K17)
Display and OS								
Size and type		7" WVGA 800 × 480 pixel	10.1" WXGA 1280 x 800 pixel	10.1" WXGA 1280 x 800 pixel	12.1" WXGA 1280 x 800 pixel	12.1" WXGA 1280 x 800 pixel	N.A.	12.1" WXGA 1280 x 800 pixel
Operating system		Windows CE	Windows 10	Windows 10	Windows 10	Windows 10	Windows 10	Windows 10
General data								
Size (W x H x D)		202 × 294 × 76 mm	408 × 186 × 235 mm	408 × 186 × 235 mm	463 × 240 × 362 mm	463 × 240 × 362 mm	463 x 240 x 612 mm	462 285 x 462 mm
Weight		3.1 kg	6 kg	6 kg (without HW option) 7.3 kg (with battery)	14 kg	14 kg (2 ports model) 16 kg (4 ports model)	22 kg to 45 kg	24 kg (2-ports) 29 kg (4-ports)
Key features								
Measurement excellence that drives innovation			▶ Battery operation time of 4 hours ▶ High in precision ▶ Simple to operate, configure configure and add-value	▶ Easy to use ▶ Economical instrument with solid performance ▶ Ideal instrument for basic S-parameter measurements	▶ Optionally battery powered ▶ Modern instrument platform ▶ 3-in-1 instrument: vector network analysis, spectrum analysis, power meter measurements	▶ Flexible and future-proof option concept ▶ Clear menu structures and convenient user interface ▶ High output power option	▶ High output power option ▶ Convenient characterization of passive devices and standard measurements of active devices ▶ Multiport capability with switch matrices	▶ Parallel measurements up to 24 ports ▶ High output power ▶ True multiport vector network analyzer for high-speed measurements	▶ High stability, low trace noise, excellent raw data ▶ Up to: four internal sources, two internal LOs (phase-coherent), four internal pulse modulators ▶ mm-wave extensions up to 1.1 THz

MULTIPORT SOLUTION

Instrument	R&S®ZNBT	R&S®ZN-Z84	R&S®ZN-Z85	R&S®ZN-Z86	R&S®ZN-Z86X	R&S®OSP
Multiport type	True multiport VNA	Switch Matrix (Supported with ZND/ZNB/ZNBT/ZNA)	Switch Matrix (Supported with ZNB/ZNBT/ZNA)	Switch Matrix (Supported with ZNB/ZNBT/ZNA)	Switch Matrix (Supported with ZNB/ZNBT/ZNA)	Open switch & control platform (Supported with ZNB/ZNA)
Frequency range min.	9 kHz (ZNBT8) 100 kHz (ZNBT20/26/40)	10 MHz	10 MHz	100 MHz	100 MHz	DC
Frequency range max.	8.5 / 20 / 26.5 / 40 GHz	8.5 GHz	20 GHz	26.5 GHz	26.5 GHz	Up to 67 GHz
Test ports options	4 (ZNBT8 base) 8 (ZNBT20/26/40 base, ZNBT8 + B108) 12/16/20/24 (options)	6(base) / 12 / 18 / 24	6(base) / 12	6(base) / 12 / 18 / 24	12 / 24	Configurable
Max. number of ports	24	48	12	48	12/24	Configurable
Test port connector type	ZNBT8 - N (f) ZNBT20 - 3.5 mm (m) ZNBT26/40 - 2.92 mm (m)	SMA (f)	SMA (f)	2.92 mm (f)	2.92 mm (f)	Frequency dependent
Standard Software Tool		ZN-Z8X Toolbox	ZN-Z8X Toolbox	ZN-Z8X Toolbox	ZN-Z8X Toolbox	OSP Web GUI
Trigger function Software	Yes	No	No	Yes (with ZN-Z8X Toolbox)	Yes (with ZN-Z8X Toolbox)	Yes (with OSP-K100)
Trigger function Hardware	Yes (via BNC)	Yes (via direct control)	Yes (via direct control)	Yes (via BNC and direct control1)	Yes (via BNC and direct control1)	Yes (via BNC, prerequisite OSP-K100)
Touchscreen	No	No	No	No	No	OSP220 – No OSP230 – Yes OSP320 – Yes (option OSP-B300M)
Weight (depend on options installed)	22 kg to 45 kg	5 kg to 7 kg	5 kg to 6 kg	4 kg to 6 kg	5 kg to 7 kg	OSP220 - 6.85 kg OSP230 - 6.95 kg OSP320 – 7.95 kg (without module)
Dimension	463 × 240 x 612 mm 4HU 19"	445 × 88 × 300 mm 2HU 19"	445 × 88 × 300 mm 2HU 19	460 x 105 352 mm 2HU 19"	460 x 149 x 352 mm 3HU 19"	445 × 108 × 472 mm 2HU 19'' (OSP220/230) 445 x 152 x 472 mm 3HU 19'' (OSP320)
Rack mount kit option	ZZA-KN5	ZZA-KN2	ZZA-KN2	ZZA-KNP21	ZZA-KNP31	ZZA-KN21 (OSP220, OSP230) ZZA-KN31 (OSP320)

OPTIONS

In combination with the vector network analyzers, Rohde & Schwarz provides a versatile range of hardware and software options covering a wide range of applications.

Tailored to different requirements

With their wide range of options, Rohde & Schwarz vector network analyzers provide excellent solutions to many T&M challenges, such as characterizing complex test devices or maximizing test throughput. Various software and hardware options for advanced applications ease of operation, speed and efficiency. With the R&S®ZNrun automated test software, Rohde & Schwarz offers a versatile control application for automated measurements.

Options supporting basic measurements

Instrument	Extended power range	Step attenuators	Distance-to-fault	Time domain measurements	Differential measurements	Multiport support
R&S®ZNH		Built-in Rx step attenuator	Standard	K68	K47 - Mixed mode	
R&S®ZNLE			K3	K2		
R&S®ZNL	B22	B31 (Rx, port 1) B32 (Rx, port 2)	K3	K2		
R&S®ZND	K7 B7 High output power		K3	K2		▶ via R&S®ZNrun ▶ with R&S®ZN-Z84
R&S®ZNB	B22 (2-port) B24 (4-port)	B31 (Rx, port 1) B32 (Rx, port 2) B33 (Rx, port 3) B34 (Rx, port 4)	K3	K2 K20 Extended time domain analysis	Virtual differential	▶ via R&S®ZNrun ▶ with R&S®ZN-Z84 / Z85 / Z86 / Z86X / R&S®OSP
R&S®ZNBT	B2X	B36X (Rx)	K3	K2 K20 Extended time domain analysis	Virtual differential	▶ via R&S®ZNrun ▶ with R&S®ZN-Z84 / Z85 / Z86 / Z86X / R&S®OSP
R&S®ZNA	Standard	B2N (Source, port N) B3N (Rx, port N)		K2 K20 Extended time domain analysis	Virtual differential True differential	▶ via R&S®ZNrun ▶ with R&S®ZN-Z85 / Z86 / Z86X / R&S®OSP
R&S®ZNA67EXT	Standard Var .05/.06/.07 – High output power	B2N (Source, port N) B3N (Rx, port N)		K2 K20 Extended time domain analysis	Virtual differential True differential	via R&S®ZNrun

Options supporting advanced measurements

Instrument	Frequency conversion measurements	Intermodulation measurements	Vector corrected mixer measurements	Measurement of group delay on frequency converters without LO access	Noise figure measurements	Pulse measurements
R&S®ZNH	K69 (requires external power sensor)					K29 (with power sensor)
R&S®ZNL					FPL1-K30 (requires B1 and FPL1-B5)	
R&S®ZNB	K4	K14 (requires K4)				
R&S®ZNBT	K4	K14 (requires K4)				
R&S®ZNA	K4	K4	K5 (requires K4)	K9	K30	B4N (Pulse modulator, Port N)
R&S®ZNA67EXT	K4		K5 (requires K4)			B4N (Pulse modulator, Port N)

*A complete list of options is available for each instrument on its datasheet.

CONVERTER

		R&S®ZC75	R&S®ZC90	R&S®ZC90E	R&S®ZC110
Frequency range	min.	50 GHz	60 GHz	60 GHz	75 GHz
	max.	75 GHz	90 GHz	90 GHz	110 GHz
Test port (Waveguide designator)		WR15	WR12	WR12	WM-2540 (WR10)
Output power (typ.)		+12 dBm	+10 dBm	+6 dBm	+15 dBm
Dynamic range (typ.)		110 dB	120 dB	118 dB	120 dB

		R&S®ZC140	R&S®ZC170	R&S®ZC220	R&S®ZC260
Frequency range	min.	90 GHz	100 GHz	140 GHz	170 GHz
	max.	140 GHz	170 GHz	220 GHz	260 GHz
Test port (Waveguide designator)		WM-2032 (WR8)	WM-1651 (WR6.5)	WM-1295 (WR5.1)	WM-1092 (WR4.3)
Output power (typ.)		Up to +9 dBm	+9 dBm	+1 dBm	-2 dBm
Dynamic range (typ.)		120 dB	105 dB	115 dB	110 dB

		R&S®ZC330	R&S®ZC400	R&S®ZC500	R&S®ZC750	R&S®ZC1100
Frequency range	min.	220 GHz	260 GHz	330 GHz	500 GHz	750 GHz
	max.	330 GHz	400 GHz	500 GHz	750 GHz	1100 GHz
Test port (Waveguide designator)		WM-864 (WR3.4)	WM-710	WM-570	WM-380	WM-250
Output power (typ.)		-7 dBm	-12 dBm	-11 dBm	-18 dBm	Up to -25 dBm
Dynamic range (typ.9)		115 dB	95 dB	105 dB	90 dB	75 dB

CALIBRATION KITS AND UNITS

Manual calibration kits

Type	Frequency range	Description	Remarks
R&S®ZN-Z170	DC to 18 GHz	N (f) or N (m)	Economy
R&S®ZN-Z135	DC to 26.5 GHz	3.5mm (f) or 3.5mm (m)	Economy
R&S®ZN-Z129	DC to 40 GHz	2.92mm (f) or 2.92mm (m)	Economy
R&S®ZN-Z129E	DC to 43.5 GHz	2.92mm (f) or 2.92mm (m)	Economy
R&S®ZCAN	0 Hz to 3 GHz	N (f) and N (m), 50Ω or 75Ω	Economy
R&S®ZV-Z270	0 Hz to 18 GHz	N (f) and N (m)	Premium
R&S®ZN-Z235	0 Hz to 26.5 GHz	3.5mm (f) and 3.5mm (m)	Premium
R&S®ZV-Z235E	0 Hz to 33 GHz	3.5mm (f) and 3.5mm (m)	Premium
R&S®ZN-Z229	0 Hz to 43.5 GHz	2.92mm (f) and 2.92mm (m)	Premium
R&S®ZN-Z224	0 Hz to 50 GHz	2.4mm (f) and 2.4mm (m)	Premium
R&S®ZN-Z218	0 Hz to 67 GHz	1.85mm (f) and 1.85mm (m)	Premium

Automatic calibration units

Type	Frequency range	Description	Remarks
R&S®ZN-ZE104	5 kHz to 4.5 GHz	Two ports, N (m/f) or 3.5mm-compatible (m/f)	Economy
R&S®ZN-ZE109	5 kHz to 9 GHz	Two ports, N (m/f) or 3.5mm-compatible (m/f)	Economy
R&S®ZN-ZE118	5 kHz to 18 GHz	Two ports, N (m/f) or 3.5mm-compatible (m/f)	Economy
R&S®ZN-ZE126	5 kHz to 26.5 GHz	Two ports, 3.5mm-compatible (m/f)	Economy
R&S®ZN-Z152	100 kHz to 8.5 GHz	Six ports, SMA (f)	Premium Economy
R&S®ZN-Z153	100 kHz to 8.5 GHz	Four ports, SMA (f)	Premium Economy
R&S®ZN-Z154	100 kHz to 8.5 GHz	Six ports (up to twenty-four ports with options), SMA (f)	Premium Economy
R&S®ZN-Z156	5 GHz to 67 GHz / 10MHz to 67 GHz	Two ports, 1.85mm (f)	Premium
R&S®ZN-Z50	9 kHz to 9 GHz / 9 kHz to 26.5 GHz	Two ports, 3.5mm (f)	Premium
R&S®ZN-Z51	100 kHz to 8.5 GHz	Two ports, N (f) or 3.5mm (f), Four ports, N (f)	Premium
R&S®ZN-Z52	100 kHz to 26.5 GHz	Four ports, 3.5mm (f)	Premium
R&S®ZN-Z53	100 kHz to 26.5 GHz	Two ports, N(f) or 3.5mm (f)	Premium
R&S®ZN-Z54	9 kHz to 40 GHz (characterized up to 43.5 GHz)	Two ports, 2.92mm (f)	Premium
R&S®ZN-Z55	9 kHz to 50 GHz	Two ports, 2.4mm (f)	Premium
R&S®ZV-Z53	300 kHz to 3 GHz	Two ports, 75 Ω, N (f)	Premium
R&S®ZV-Z58	300 kHz to 8 GHz	Eight ports, N (f) or 3.5mm (f)	Premium
R&S®ZV-Z59	10 MHz to 20 GHz	Six ports, 3.5mm (f)	Premium

Automatic inline calibration units

Type	Frequency range	Description
R&S®ZN-Z32	10 MHz to 8.5 GHz	One ports, SMA (m/f)
R&S®ZN-Z33	10 MHz to 40 GHz	One ports, 2.92mm (m/f)

Waveguide calibration kits

Type	Frequency range	Description
R&S®ZV-WR02	325 GHz to 500 GHz	WR02, without sliding match
R&S®ZV-WR03	220 GHz to 325 GHz	WR03, with or without sliding match
R&S®ZV-WR05	140 GHz to 220 GHz	WR05, with or without sliding match
R&S®ZV-WR06	110 GHz to 170 GHz	WR06, with or without sliding match
R&S®ZV-WR08	90 GHz to 140 GHz	WR08, without sliding match
R&S®ZV-WR10	75 GHz to 110 GHz	WR10, with or without sliding match
R&S®ZV-WR12	60 GHz to 90 GHz	WR12, with or without sliding match
R&S®ZV-WR15	50 GHz to 75 GHz	WR15, with or without sliding match
R&S®ZCWM-1092	170 GHz to 260 GHz	WM-1092, without sliding match
R&S®ZCWM-710	260 GHz to 400 GHz	WM-710, without sliding match
R&S®ZCWM-570	330 GHz to 500 GHz	WM-570, without sliding match
R&S®ZCWM-380	500 GHz to 750 GHz	WM-380, without sliding match
R&S®ZCWM-250	750 GHz to 1100 GHz	WM-250, without sliding match

R&S®ZN-Z154

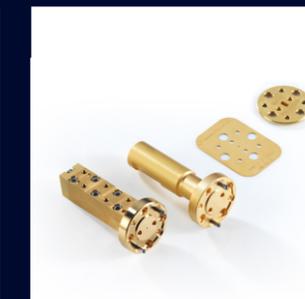R&S®ZN-Z2xx

R&S®ZN-Z129

R&S®ZN-Z170

R&S®ZN-ZExxx

R&S®ZN-Z153

R&S®ZN-Z32

R&S®ZV-WR

R&S®ZCWM

Rohde & Schwarz Measurement excellence that drives innovation

Service at Rohde & Schwarz
You're in great hands

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

Rohde & Schwarz

The Rohde & Schwarz technology group is among the trailblazers when it comes to paving the way for a safer and connected world with its leading solutions in test & measurement, technology systems, and networks & cybersecurity. Founded 90 years ago, the group is a reliable partner for industry and government customers around the globe. The independent company is headquartered in Munich, Germany and has an extensive sales and service network with locations in more than 70 countries.

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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	Certified Environmental Management
ISO 9001	ISO 14001

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