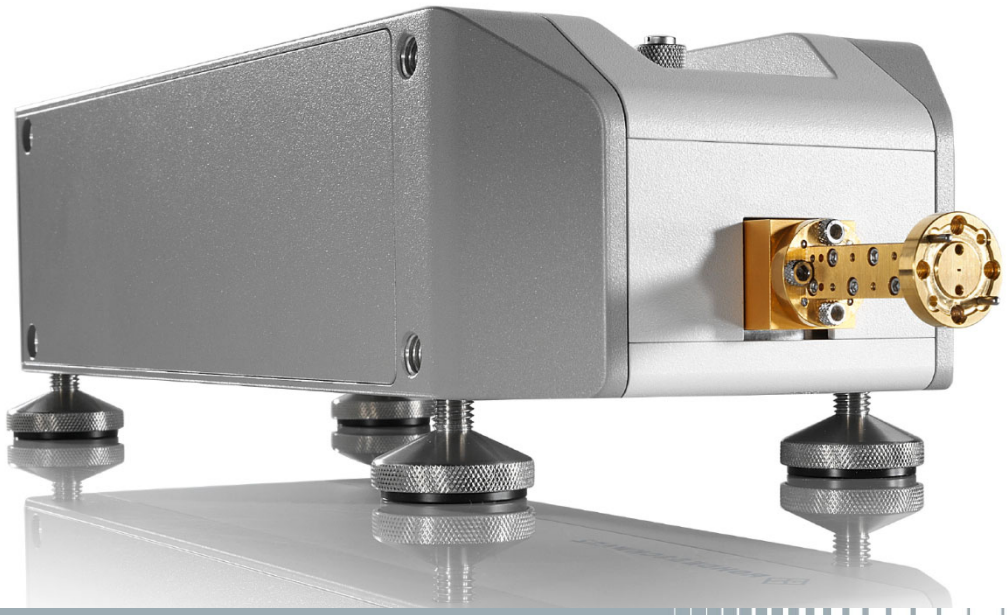
Version 01.30, Oktober 2019

RPG ZRXxxx
Millimeter-Wave Receiver
Specifications



ROHDE&SCHWARZ

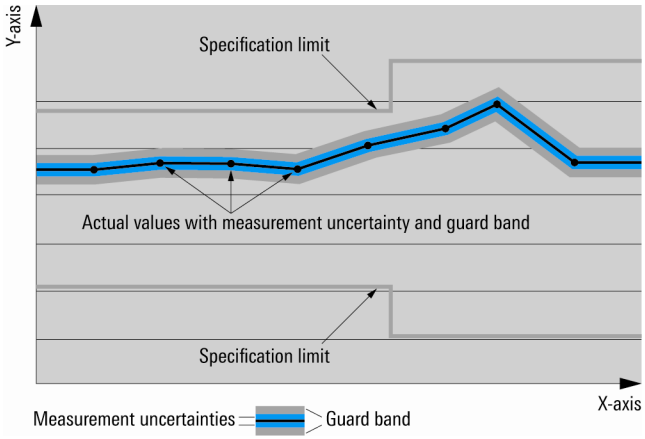
Data Sheet | Version 01.30

Definitions

General
Product data applies under the following conditions:

- Three hours storage at ambient temperature followed by 30 minutes warm-up operation
- Specified environmental conditions met
- Recommended calibration interval adhered to
- All internal automatic adjustments performed, if applicable

Specifications with limits
Represent warranted product performance by means of a range of values for the specified parameter. These specifications are marked with limiting symbols such as <, ≤, >, ≥, ±, 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 Radiometer Physics 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 indicated as follows: “parameter: value”.

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

General information

The RPG ZRXxxx millimeter-wave receivers are optional for the following four-port vector network analyzers: R&S®ZVA24, R&S®ZVA40, R&S®ZVA50 or R&S®ZVA67, and R&S®ZVT20 with at least four ports. The receivers facilitate measurements in the millimeter-wave frequency range.

The RPG ZRXxxx millimeter-wave receivers are available for the frequency bands from:

- 60 GHz to 90 GHz (RPG ZRX90)
- 75 GHz to 110 GHz (RPG ZRX110)
- 90 GHz to 140 GHz (RPG ZRX140)
- 110 GHz to 170 GHz (RPG ZRX170)
- 140 GHz to 220 GHz (RPG ZRX220)
- 170 GHz to 260 GHz (RPG ZRX260)
- 220 GHz to 330 GHz (RPG ZRX330)
- 260 GHz to 400 GHz (RPG ZRX400)
- 330 GHz to 500 GHz (RPG ZRX500)
- 500 GHz to 750 GHz (RPG ZRX750)
- 750 GHz to 1100 GHz (RPG ZRX1100)

The four-port network analyzer must be equipped with the R&S®ZVAxx-B16 and R&S®ZVA-K8 options.

The RPG ZRXxxx millimeter-wave receivers come with the following accessories:

- Hex ball driver
- Two coaxial cables with SMA connectors for the reference and measurement output signals
- Waveguide-to-waveguide adapter (test port adapter, factory mounted)
- Fixed Attenuator with adjusted Attenuation[1]
- DC cable and USB cable
- Waveguide flange screws and dowel pins
- Documentation

The RPG ZRXxxx millimeter-wave receivers must be operated with the R&S®ZCPS power supply module (available as an option; one module supplies two converters).

[1] Except ZRX750 and ZRX1100

Specifications

Test port

Frequency range	RPG ZRX90	60 GHz to 90 GHz
	RPG ZRX110	75 GHz to 110 GHz
	RPG ZRX140	90 GHz to 140 GHz
	RPG ZRX170	110 GHz to 170 GHz
	RPG ZRX220	140 GHz to 220 GHz
	RPG ZRX260	170 GHz to 260 GHz
	RPG ZRX330	220 GHz to 330 GHz
	RPG ZRX400	260 GHz to 400 GHz
	RPG ZRX500	330 GHz to 500 GHz
	RPG ZRX750	500 GHz to 750 GHz
	RPG ZRX1100	750 GHz to 1100 GHz
Waveguide designator	RPG ZRX90	WR-12
	RPG ZRX110	WM-2546 (WR10)
	RPG ZRX140	WM-2032 (WR 8)
	RPG ZRX170	WM-1651 (WR 6.5)
	RPG ZRX220	WM-1295 (WR 5.1)
	RPG ZRX260	WM-1092 (WR 4.3)
	RPG ZRX330	WM-864 (WR 3.4)
	RPG ZRX400	WM-710
	RPG ZRX500	WM-570
	RPG ZRX750	WM-380
	RPG ZRX1100	WM-250
Connector type (anti cocking flange)	RPG ZRX90	R&S precision waveguide flange (compatible with UG-387/U-M and IEEE1785.2)
	RPG ZRX110	
	RPG ZRX140	
	RPG ZRX170	
	RPG ZRX220	
	RPG ZRX260	
	RPG ZRX330	
	RPG ZRX400	
	RPG ZRX500	
	RPG ZRX750	
	RPG ZRX1100	
Damage level	RPG ZRX90	10 dBm
	RPG ZRX110	
	RPG ZRX140	
	RPG ZRX170	
	RPG ZRX220	
	RPG ZRX260	
	RPG ZRX330	0 dBm
	RPG ZRX400	
	RPG ZRX500	
	RPG ZRX750	
	RPG ZRX1100	
Compression Level (P1dB)	RPG ZRX90	- 5 dBm
	RPG ZRX110	
	RPG ZRX140	
	RPG ZRX170	
	RPG ZRX220	
	RPG ZRX260	
	RPG ZRX330	
	RPG ZRX400	
	RPG ZRX500	
	RPG ZRX750	
	RPG ZRX1100	
Attenuation of Fixed Attenuator	RPG ZRX90	Typ. 30 dB
	RPG ZRX110	Typ. 34 dB
	RPG ZRX140	Typ. 30 dB
	RPG ZRX170	Typ. 30 dB
	RPG ZRX220	Typ. 20 dB
	RPG ZRX260	Typ. 20 dB
	RPG ZRX330	Typ. 13 dB
	RPG ZRX400	Typ. 15 dB

	RPG ZRX500	Typ. 10 dB
	RPG ZRX750	Typ. 10 dB
	RPG ZRX1100	Typ. 10 dB

Local oscillator input (LO IN)

Connector type	2.92 mm, female		
Frequency range and multiplication factor	RPG ZRX90	15.000 GHz to 22.500 GHz	× 4
	RPG ZRX110	9.375 GHz to 13.750 GHz	× 8
	RPG ZRX140	11.250 GHz to 17.500 GHz	× 8
	RPG ZRX170	11.000 GHz to 17.000 GHz	× 10
	RPG ZRX220	11.667 GHz to 18.333 GHz	× 12
	RPG ZRX260	14.166 GHz to 21.666 GHz	× 12
	RPG ZRX330	9.166 GHz to 13.750 GHz	× 24
	RPG ZRX400	13.000 GHz to 20.000 GHz	× 20
	RPG ZRX500	13.750 GHz to 20.833 GHz	× 24
	RPG ZRX750	13.888 GHz to 20.833 GHz	× 36
	RPG ZRX1100	15.625 GHz to 22.916 GHz	× 48
Input power range	Typ. + 7 dBm		

Measurement output (MEAS OUT)

Connector type	SMA, female
Frequency range	5 MHz to 2900 MHz

USB connector (USB •⇾)

Connector type	universal serial bus (USB), type B

Power supply input (POWER SUPPLY)

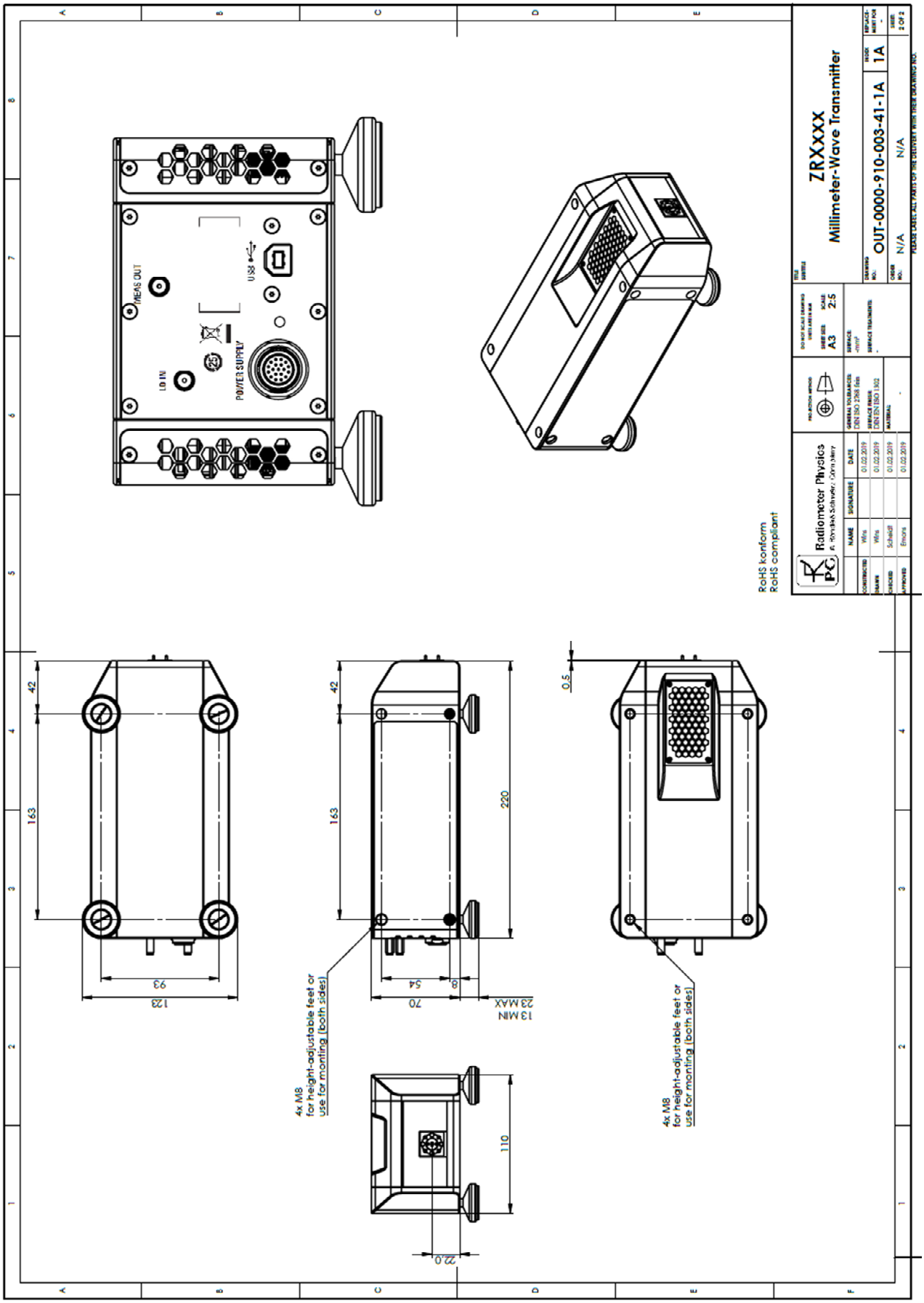
Connector type	RPG ZRX90	ODU MINI-SNAP® 19-pin miniature circular connector with push-pull locking
	RPG ZRX110	
	RPG ZRX140	
	RPG ZRX170	
	RPG ZRX220	
	RPG ZRX260	
	RPG ZRX330	
	RPG ZRX400	
	RPG ZRX500	
	RPG ZRX750	
	RPG ZRX1100	
Power consumption	RPG ZRX90	6 W
	RPG ZRX110	6 W
	RPG ZRX140	6 W
	RPG ZRX170	6 W
	RPG ZRX220	6 W
	RPG ZRX260	6 W
	RPG ZRX330	10 W
	RPG ZRX400	8 W
	RPG ZRX500	16 W
	RPG ZRX750	10 W
	RPG ZRX1100	10 W

System characteristics

IF Gain	RPG ZRX90	13 dB
	RPG ZRX110	13 dB
	RPG ZRX140	13 dB
	RPG ZRX170	28 dB
	RPG ZRX220	13 dB
	RPG ZRX260	13 dB
	RPG ZRX330	18 dB
	RPG ZRX400	33 dB
	RPG ZRX500	26 dB
	RPG ZRX750	28 dB
	RPG ZRX1100	60 dB
Conversion loss	RPG ZRX90	Typ. 12 dB
	RPG ZRX110	Typ. 10 dB
	RPG ZRX140	Typ. 12 dB
	RPG ZRX170	Typ. 22 dB
	RPG ZRX220	Typ. 11 dB
	RPG ZRX260	Typ. 12 dB
	RPG ZRX330	Typ. 15 dB
	RPG ZRX400	Typ. 30 dB
	RPG ZRX500	Typ. 22 dB
	RPG ZRX750	Typ. 35 dB
	RPG ZRX1100	Typ. 55 dB
VSWR	RPG ZRX90	Typ. 1.4 : 1
	RPG ZRX110	Typ. 1.4 : 1
	RPG ZRX140	Typ. 1.4 : 1
	RPG ZRX170	Typ. 1.4 : 1
	RPG ZRX220	Typ. 1.4 : 1
	RPG ZRX260	Typ. 3.5 : 1
	RPG ZRX330	Typ. 3.5 : 1
	RPG ZRX400	Typ. 3.5 : 1
	RPG ZRX500	Typ. 3.5 : 1
	RPG ZRX750	Typ. 3.5 : 1
	RPG ZRX1100	Typ. 3.5 : 1
Dynamic range (with Attenuation)	RPG ZRX75	> 95 dB, typ. 110 dB
	RPG ZRX90	> 110 dB, typ. 120 dB
	RPG ZRX110	> 110 dB, typ. 120 dB
	RPG ZRX140	> 105 dB, typ. 115 dB
	RPG ZRX170	> 90 dB, typ. 105 dB
	RPG ZRX220	> 100 dB, typ. 120 dB
	RPG ZRX260	> 100 dB, typ. 110 dB
	RPG ZRX330	> 100 dB, typ. 115 dB
	RPG ZRX400	> 70 dB, typ. 95 dB
	RPG ZRX500	> 85 dB, typ. 105 dB
	RPG ZRX750	> 80 dB, typ. 95 dB
	RPG ZRX1100	> 60 dB, typ. 75 dB
Dynamic range (without Attenuation)	RPG ZRX90	> 140 dB, typ. 150 dB
	RPG ZRX110	> 140 dB, typ. 150 dB
	RPG ZRX140	> 135 dB, typ. 145 dB
	RPG ZRX170	> 120 dB, typ. 135 dB
	RPG ZRX220	> 120 dB, typ. 140 dB
	RPG ZRX260	> 120 dB, typ. 130 dB
	RPG ZRX330	> 113 dB, typ. 128 dB
	RPG ZRX400	> 85 dB, typ. 120 dB
	RPG ZRX500	> 95 dB, typ. 115 dB
	RPG ZRX750	> 90 dB, typ. 105 dB
	RPG ZRX1100	> 70 dB, typ. 85 dB
Measured @ 10 Hz Bandwidth with ZC Converter		

General data

Temperature loading	operating temperature range	+18 °C to +28 °C
	permissible temperature range	+5 °C to +40 °C
	storage temperature range	–40 °C to +70 °C
		in line with IEC 60068-2-1 and IEC 60068-2-2
Damp heat		+40 °C at 80 % rel. humidity, in line with IEC 60068-2-30
Mechanical resistance	vibration, sinusoidal	5 Hz to 150 Hz, in line with IEC 60068-2-6
	vibration, random	10 Hz to 300 Hz, in line with IEC 60068-2-64
	shock	40 g shock spectrum, in line with MIL-STD-810, method 516, procedure I
Operation	permissible altitude	3000 m above sea level
Dimensions (W × H × D)	without protruding coupler and test port adapter, with feet height adjusted to 12.1 mm (0.5 in)	123 mm × 88.38 mm × 322.5 mm (4.84 in × 3.48 in × 12.70 in)
Dimensions (W × H × D)	without protruding coupler and test port adapter, with feet height adjusted to 12.1 mm (0.5 in)	123 mm × 88.38 mm × 262.5 mm (4.84 in × 3.48 in × 10.33 in)
Number of feet	alternatively	3 or 4
Feet height	user-adjustable	12.1 mm to 29.1 mm (0.5 in to 1.1 in)
Weight		3 kg (7 lb)
Shipping weight		5 kg (11 lb)


ZRXxxx
Millimeter-Wave Transmitter
OUT-0000-910-003-41-1A
1A
N/A
Radiometer Physics
RoHS konform
RoHS compliant
MEAS OUT
USB
LO IN
POWER SUPPLY
42
163
93
123
220
54
70
13 MIN
23 MAX
110
22.0
0.5
4x M8
for height-adjustable feet or
use for monting (both sides)

Ordering information

Designation	Type	Order No.
Receiver WR-12	RPG ZRX90	3658.5368.02 (21000026)
Receiver WM-2546	RPG ZRX110	3637.1511.02 (21000028)
Receiver WM-2032	RPG ZRX140	3637.1528.02 (21000034)
Receiver WM-1651	RPG ZRX170	3622.0737.02 (21000033)
Receiver WM1295	RPG ZRX220	3622.0743.02 (21000032)
Receiver WM-1092	RPG ZRX260	3622.0750.02 (21000031)
Receiver WM-864	RPG ZRX330	3622.0766.02 (21000030)
Receiver WM-710	RPG ZRX400	3658.5374.02 (21000050)
Receiver WM-570	RPG ZRX500	3622.0772.02 (21000029)
Receiver WM-380	RPG ZRX750	3658.5745.02 (21000040)
Receiver WM-250	RPG ZRX1100	3658.5868.02 (21000094)
Converter Set Transport Case	R&S®ZCSTC	1323.7730.00
Converter Power Supply (supplies two converters)	R&S®ZCPS	1325.6101.02
Long Cable for ZCPS (Length: 160 cm, 40 cm longer than the standard DC connection cable delivered with each converter)	R&S®ZCPSC	1323.7952.00
Test Cable, 3.5 mm (f) to 3.5 mm (m), length: 910 mm (two cables per converter required) Or Test Cable, 2.92 mm (f) to 2.92 mm (m), length: 910 mm (two cables per converter required)	R&S®ZV-Z193 R&S®ZV-Z195	1306.4520.36 1306.4536.36
Waveguide Calibration Kit WR-12 compatible with Receiver ZRX90	RPG WR12	1307.7700.10 (without sliding match) 1307.7700.11 (with sliding match)
Waveguide Calibration Kit WM-2546 compatible with Receiver ZRX110	RPG ZCWM-2546	
Waveguide Calibration Kit WM-2032 compatible with Receiver ZRX140	RPG ZCWM-2032	
Waveguide Calibration Kit WM-1651 compatible with Receiver ZRX170	RPG ZCWM-1651	
Waveguide Calibration Kit WM-1295 compatible with Receiver ZRX220	RPG ZCWM-1295	
Waveguide Calibration Kit WM-1092 compatible with Receiver ZRX260	RPG ZCWM-1092	3628.5699.02 (without sliding match)
Waveguide Calibration Kit WM-864 compatible with Receiver ZRX330	RPG ZCWM-864	
Waveguide Calibration Kit WM-710 compatible with Receiver ZRX400	RPG ZCWM-710	
Waveguide Calibration Kit WM-570 compatible with Receiver ZRX500	RPG ZCWM-570	1322.3099.10 (without sliding match)
Waveguide Calibration Kit WM-380 compatible with Receiver ZRX750	RPG ZCWM-380	1322.3101.02 (without sliding match)
Waveguide Calibration Kit WM-250 compatible with Receiver ZRX1100	RPG ZCWM-250	1322.3118.02 (without sliding match)
Converter Control Software	R&S®ZVA-K8	1307.7022.02
Adapter Kit, including a power divider and two right angle SMA (m/m) adapters (required if R&S®ZVA24 var. 28 or R&S®ZVA40 var. 48 (VNAs with four sources) is used)	R&S®ZCAK	1323.7746.24
Adapter Kit, including four 1.85 mm (f) to 2.92 mm (m) adapters and four 1.85 mm (m) to 2.92 mm (f) adapters (required if R&S®ZVA50 is used)	R&S®ZCAK	1323.7746.50
Adapter Kit, including a power divider, two right angle SMA (m/m) adapters, three 1.85 mm (f) to 2.92 mm (m) adapters and four 1.85 mm (m) to 2.92 mm (f) adapters (required if R&S®ZVA67 is used)	R&S®ZCAK	1323.7746.67
Torque Wrench, for waveguide flange screws	R&S®ZV-Z1000	1314.5467.02
Angled Wrench, for waveguide flange screws	R&S®ZCAW	1175.1960.00
Angled Torque Wrench, for waveguide flange screws	R&S®ZCTW	1175.2014.02

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, three years	R&S®WE3	
Extended Warranty, four years	R&S®WE4	
Extended Warranty with Calibration Coverage, one year	R&S®CW1	
Extended Warranty with Calibration Coverage, two years	R&S®CW2	
Extended Warranty with Calibration Coverage, three years	R&S®CW3	
Extended Warranty with Calibration Coverage, four years	R&S®CW4	

Extended warranty with a term of one to four years (WE1 to WE4)
Repairs carried out during the contract term are free of charge [2]. Necessary calibration and adjustments carried out during repairs are also covered.
Extended warranty with calibration (CW1 to CW4)
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 [2] and calibration at the recommended intervals as well as any calibration carried out during repairs or option upgrades.

For product brochure, see PD 3607.1471.12 and www.rohde-schwarz.com

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