

# R&S® ZV-Z9x and R&S® ZV-Z19x Test Port Cables Specifications



**ROHDE & SCHWARZ**

## CONTENTS

General information .....	3
Cable handling.....	3
Mechanical data .....	4
Electrical data .....	6
General data.....	12
Ordering information.....	14

Specifications apply under the following conditions: 60 minutes warm-up time at ambient temperature, specified environmental conditions met, calibration cycle adhered to, and all internal automatic adjustments performed. "Typical values" are designated with the abbreviation "typ." These values are verified during the final test but are not assured by Rohde & Schwarz. "Nominal values" are design parameters that are not assured by Rohde & Schwarz. These values are verified during product development but are not specifically tested during production.

Rohde & Schwarz equipment is designed for reliable operation up to an altitude of 3000 m above sea level, and for transport up to an altitude of 4500 m above sea level.

## General information

The R&S®ZV-Z9x test port cables are especially suited for precision measurements where high phase stability and high mechanical flexibility are required. The semi-rigid R&S®ZV-Z19x test port cables are mostly used for general-purpose applications.

The R&S®ZV-Z9x test port cables are ideal for high-precision measurements in labs and production. Their rugged design offers superior magnitude and phase stability, allowing stable and accurate measurements with high repeatability. The R&S®ZV-Z9x test port cables are especially suitable for connecting a device under test (DUT) to a test port of a vector network analyzer (VNA), e.g. the R&S®ZVA8, R&S®ZVA24, R&S®ZVA40, R&S®ZVA50, R&S®ZVA67, R&S®ZVB4, R&S®ZVB8, R&S®ZVB14, R&S®ZVB20, R&S®ZVT8, or R&S®ZVT20.

No test port cables are necessary for measuring a one-port DUT, which can be connected to the analyzer's test port directly or by using a suitable adapter. Use a single test port cable when measuring one-port DUTs or two-port DUTs where one port is connected to the VNA test port directly or via a suitable adapter. Use two or more test port cables if a two-port or multiport DUT is to be connected to the VNA test ports via cables. Depending on the frequency range and the appropriate type of VNA test port connector, different cables are required. The test port cables are flexible. They are available in different lengths.

The R&S®ZV-Z91, R&S®ZV-Z92, R&S®ZV-Z191, and R&S®ZV-Z192 test port cables are designed for use with the R&S®ZVA8, R&S®ZVB4, R&S®ZVB8, and R&S®ZVT8 vector network analyzers. They include a type N male connector for connection to the type N female test ports of the VNA. For connecting the DUT, the R&S®ZV-Z91 and the R&S®ZV-Z191 include a type N male connector, while the R&S®ZV-Z92 and R&S®ZV-Z192 include a 3.5 mm male connector.

The R&S®ZV-Z93 and the R&S®ZV-Z193 test port cables are designed for use with the R&S®ZVA24, R&S®ZVB14, R&S®ZVB20, and R&S®ZVT20 vector network analyzers. They include a 3.5 mm female connector for connection to the 3.5 mm male test ports of the VNA. Alternatively a cable with a 3.5 mm male connector is also available. The cables include a 3.5 mm male connector for DUT connection.

The R&S®ZV-Z194 test port cable is designed for use with 75 Ω test sets and comes with a 75 Ω type N male connector for connecting the 75 Ω type N female test ports of the VNA. The cable includes a 75 Ω type N male connector for DUT connection.

The R&S®ZV-Z95 and the R&S®ZV-Z195 test port cables are designed for use with the R&S®ZVA40 vector network analyzer and come with a 2.92 mm female connector for connecting the 2.92 mm male test ports of the VNA. The cables include a 2.92 mm male connector for DUT connection.

The R&S®ZV-Z97 and the R&S®ZV-Z197 test port cables are designed for use with the R&S®ZVA50 vector network analyzer and come with a 2.4 mm female connector for connecting the 2.4 mm male test ports of the VNA. The cables include a 2.4 mm male connector for DUT connection.

The R&S®ZV-Z96 and the R&S®ZV-Z196 test port cables are designed for use with the R&S®ZVA67 vector network analyzer and come with a 1.85 mm female connector for connecting the 1.85 mm male test ports of the VNA. Alternatively a cable with a 1.85 mm male connector is also available. The cable include a 1.85 mm male connector for DUT connection.

The R&S®ZV-Z198 test port cable is designed for use with the R&S®ZVA110 vector network analyzer and comes with a 1.00 mm female connector for connecting the 1.00 mm male test ports of the VNA. The cable includes a 1.85 mm male connector for DUT connection. This cable is only available in a length of 160 mm (6 in).

## Cable handling

Handle cables carefully and inspect all connectors before making a connection. Cables that are not used are to be stored with a view to maximum protection.

Observe the minimum bend radius specified for the cable. Failure to do so may destroy the cable. Cable phase and loss slightly change whenever the cable is bent.

Cables used to perform precise measurements may have to be fit into fixtures to prevent movement after calibration. Otherwise, accurate measurements will not be possible after calibration. If you use a precision calibration kit, make especially sure to move the cable as little as possible.

## Mechanical data

<b>Cable connector to VNA</b>	R&S® ZV-Z91	precision type N male
	R&S® ZV-Z92	precision type N male
	R&S® ZV-Z93	ruggedized 3.5 mm female
	R&S® ZV-Z95	ruggedized 2.92 mm female
	R&S® ZV-Z96	ruggedized 1.85 mm female
	R&S® ZV-Z97	ruggedized 2.4 mm female
	R&S® ZV-Z191	precision type N male
	R&S® ZV-Z192	precision type N male
	R&S® ZV-Z193	3.5 mm female or male
	R&S® ZV-Z194	type N (75 Ω) male
	R&S® ZV-Z195	2.92 mm female
	R&S® ZV-Z196	1.85 mm female or male
	R&S® ZV-Z197	2.4 mm female
	R&S® ZV-Z198	1.00 mm female

<b>Cable connector to DUT</b>	R&S® ZV-Z91	precision type N male
	R&S® ZV-Z92	ruggedized 3.5 mm male
	R&S® ZV-Z93	ruggedized 3.5 mm male
	R&S® ZV-Z95	ruggedized 2.92 mm male
	R&S® ZV-Z96	ruggedized 1.85 mm male
	R&S® ZV-Z97	ruggedized 2.4 mm male
	R&S® ZV-Z191	precision type N male
	R&S® ZV-Z192	3.5 mm male
	R&S® ZV-Z193	3.5 mm male
	R&S® ZV-Z194	type N (75 Ω) male
	R&S® ZV-Z195	2.92 mm male
	R&S® ZV-Z196	1.85 mm male
	R&S® ZV-Z197	2.4 mm male
	R&S® ZV-Z198	1.00 mm male

<b>Cable length</b>	R&S® ZV-Z91 model .25	635 mm (25 in)
	R&S® ZV-Z91 model .38	965 mm (38 in)
	R&S® ZV-Z92 model .25	635 mm (25 in)
	R&S® ZV-Z92 model .38	965 mm (38 in)
	R&S® ZV-Z93 model .25	635 mm (25 in)
	R&S® ZV-Z93 model .38	965 mm (38 in)
	R&S® ZV-Z95 model .25	635 mm (25 in)
	R&S® ZV-Z95 model .38	965 mm (38 in)
	R&S® ZV-Z96 model .25	635 mm (25 in)
	R&S® ZV-Z97 model .25	635 mm (25 in)
	R&S® ZV-Z191 model .24	610 mm (24 in)
	R&S® ZV-Z191 model .36	914 mm (36 in)
	R&S® ZV-Z192 model .24	610 mm (24 in)
	R&S® ZV-Z192 model .36	914 mm (36 in)
	R&S® ZV-Z193 model .24	610 mm (24 in)
	R&S® ZV-Z193 model .36	914 mm (36 in)
	R&S® ZV-Z193 model .60	1524 mm (60 in)
	R&S® ZV-Z193 model .61	1524 mm (60 in)
	R&S® ZV-Z194 model .24	610 mm (24 in)
	R&S® ZV-Z194 model .36	914 mm (36 in)
	R&S® ZV-Z195 model .24	610 mm (24 in)
	R&S® ZV-Z195 model .36	914 mm (36 in)
	R&S® ZV-Z196 model .24	610 mm (24 in)
	R&S® ZV-Z196 model .25	610 mm (24 in)
	R&S® ZV-Z196 model .36	914 mm (36 in)
	R&S® ZV-Z196 model .37	914 mm (36 in)
	R&S® ZV-Z197 model .24	610 mm (24 in)
	R&S® ZV-Z197 model .36	914 mm (36 in)
	R&S® ZV-Z198 model .06	160 mm (6 in)

<b>Outer diameter of cable</b>	R&S® ZV-Z9x	15.2 mm (0.6 in)
	R&S® ZV-Z191	6.1 mm (0.24 in)
	R&S® ZV-Z192	6.1 mm (0.24 in)
	R&S® ZV-Z193	6.1 mm (0.24 in)
	R&S® ZV-Z194	N/A
	R&S® ZV-Z195	6.1 mm (0.24 in)
	R&S® ZV-Z196	5.8 mm (0.23 in)
	R&S® ZV-Z197	6.1 mm (0.24 in)
	R&S® ZV-Z198	4.2 mm (0.167 in)

<b>Minimum bend radius</b>	R&S® ZV-Z9x	57 mm (2.25 in)
	R&S® ZV-Z191	26 mm (1 in)
	R&S® ZV-Z192	26 mm (1 in)
	R&S® ZV-Z193	26 mm (1 in)
	R&S® ZV-Z194	N/A
	R&S® ZV-Z195	26 mm (1 in)
	R&S® ZV-Z196	26 mm (1 in)
	R&S® ZV-Z197	26 mm (1 in)
	R&S® ZV-Z198	N/A

<b>Crush resistance</b>	R&S® ZV-Z9x	14 kg/mm (800 lb/in)
	R&S® ZV-Z191	4 kg/mm (250 lb/in)
	R&S® ZV-Z192	4 kg/mm (250 lb/in)
	R&S® ZV-Z193	4 kg/mm (250 lb/in)
	R&S® ZV-Z194	N/A
	R&S® ZV-Z195	4 kg/mm (250 lb/in)
	R&S® ZV-Z196	4 kg/mm (250 lb/in)
	R&S® ZV-Z197	4 kg/mm (250 lb/in)
	R&S® ZV-Z198	N/A

<b>Coupling torque</b>	R&S® ZV-Z9x	N/A
	R&S® ZV-Z191	1.5 Nm ± 0.2 Nm
	R&S® ZV-Z192	1.5 Nm ± 0.2 Nm
	R&S® ZV-Z193	0.9 Nm ± 0.1 Nm
	R&S® ZV-Z194	1.5 Nm ± 0.2 Nm
	R&S® ZV-Z195	0.9 Nm ± 0.1 Nm
	R&S® ZV-Z196	0.9 Nm ± 0.1 Nm
	R&S® ZV-Z197	0.9 Nm ± 0.1 Nm
	R&S® ZV-Z198	0.45 Nm ± 0.05 Nm

## Electrical data

Impedance	50 $\Omega$
-----------	-------------

Frequency range	R&S® ZV-Z91	0 Hz to 18 GHz
	R&S® ZV-Z92	0 Hz to 18 GHz
	R&S® ZV-Z93	0 Hz to 26.5 GHz
	R&S® ZV-Z95	0 Hz to 40 GHz
	R&S® ZV-Z96	0 Hz to 67 GHz
	R&S® ZV-Z97	0 Hz to 50 GHz
	R&S® ZV-Z191	0 Hz to 18 GHz
	R&S® ZV-Z192	0 Hz to 18 GHz
	R&S® ZV-Z193	0 Hz to 26.5 GHz
	R&S® ZV-Z194	0 Hz to 3 GHz
	R&S® ZV-Z195	0 Hz to 40 GHz
	R&S® ZV-Z196	0 Hz to 67 GHz
	R&S® ZV-Z197	0 Hz to 50 GHz
	R&S® ZV-Z198	0 Hz to 110 GHz

<b>Reflection and transmission</b>		
Match (at maximum frequency)	R&S® ZV-Z91 model .25	> 17.94 dB (VSWR < 1.29), typ. 24.94 dB
	R&S® ZV-Z91 model .38	> 17.94 dB (VSWR < 1.29), typ. 24.94 dB
	R&S® ZV-Z92 model .25	> 17.94 dB (VSWR < 1.29), typ. 24.29 dB
	R&S® ZV-Z92 model .38	> 17.94 dB (VSWR < 1.29), typ. 24.29 dB
	R&S® ZV-Z93 model .25	> 17.94 dB (VSWR < 1.29), typ. 27.32 dB
	R&S® ZV-Z93 model .38	> 17.94 dB (VSWR < 1.29), typ. 27.32 dB
	R&S® ZV-Z95 model .25	> 15.93 dB (VSWR < 1.38), typ. 25.96 dB
	R&S® ZV-Z95 model .38	> 15.93 dB (VSWR < 1.38), typ. 25.96 dB
	R&S® ZV-Z96 model .25	> 13.98 dB (VSWR < 1.50), typ. 21.27 dB
	R&S® ZV-Z97 model .25	> 15.04 dB (VSWR < 1.43), typ. 18.30 dB
	R&S® ZV-Z191 model .24	> 16.53 dB (VSWR < 1.35), typ. 21.27 dB
	R&S® ZV-Z191 model .36	> 16.53 dB (VSWR < 1.35), typ. 21.27 dB
	R&S® ZV-Z192 model .24	> 16.53 dB (VSWR < 1.35), typ. 21.27 dB
	R&S® ZV-Z192 model .36	> 16.53 dB (VSWR < 1.35), typ. 21.27 dB
	R&S® ZV-Z193 model .24	> 14.73 dB (VSWR < 1.45), typ. 22.00 dB
	R&S® ZV-Z193 model .36	> 14.73 dB (VSWR < 1.45), typ. 22.00 dB
	R&S® ZV-Z193 model .60	N/A
	R&S® ZV-Z193 model .61	N/A
	R&S® ZV-Z194 model .24	> 26.44 dB (VSWR < 1.1)
	R&S® ZV-Z194 model .36	> 26.44 dB (VSWR < 1.1)
	R&S® ZV-Z195 model .24	> 16.53 dB (VSWR < 1.35), typ. 21.50 dB
	R&S® ZV-Z195 model .36	> 16.53 dB (VSWR < 1.35), typ. 21.50 dB
	R&S® ZV-Z196 model .24	> 13.98 dB (VSWR < 1.50), typ. 21.27 dB
	R&S® ZV-Z196 model .25	> 13.98 dB (VSWR < 1.50), typ. 21.27 dB
	R&S® ZV-Z196 model .36	N/A
	R&S® ZV-Z196 model .37	N/A
	R&S® ZV-Z197 model .24	> 15.04 dB (VSWR < 1.43)
	R&S® ZV-Z197 model .36	> 15.04 dB (VSWR < 1.43)
	R&S® ZV-Z198 model .06	> 13.97 dB (VSWR < 1.5)

Transmission loss (at maximum frequency)	R&S® ZV-Z91 model .25	< 1.24 dB, typ. 1.00 dB
	R&S® ZV-Z91 model .38	< 1.72 dB, typ. 1.42 dB
	R&S® ZV-Z92 model .25	< 1.24 dB, typ. 1.00 dB
	R&S® ZV-Z92 model .38	< 1.72 dB, typ. 1.42 dB
	R&S® ZV-Z93 model .25	< 1.56 dB, typ. 1.26 dB
	R&S® ZV-Z93 model .38	< 2.17 dB, typ. 1.80 dB
	R&S® ZV-Z95 model .25	< 3.46 dB, typ. 2.64 dB
	R&S® ZV-Z95 model .38	< 4.82 dB, typ. 3.85 dB
	R&S® ZV-Z96 model .25	< 5.83 dB, typ. 5.07 dB
	R&S® ZV-Z97 model .25	< 3.61 dB, typ. 2.64 dB
	R&S® ZV-Z191 model .24	< 1.20 dB, typ. 0.96 dB
	R&S® ZV-Z191 model .36	< 1.65 dB, typ. 1.36 dB
	R&S® ZV-Z192 model .24	< 1.20 dB, typ. 0.96 dB
	R&S® ZV-Z192 model .36	< 1.65 dB, typ. 1.36 dB
	R&S® ZV-Z193 model .24	< 1.51 dB, typ. 1.22 dB
	R&S® ZV-Z193 model .36	< 2.08 dB, typ. 1.71 dB
	R&S® ZV-Z193 model .60	N/A
	R&S® ZV-Z193 model .61	N/A
	R&S® ZV-Z194 model .24	< 0.44 dB, typ. 0.36 dB
	R&S® ZV-Z194 model .36	< 0.44 dB, typ. 0.36 dB
	R&S® ZV-Z195 model .24	< 3.06 dB, typ. 2.25 dB
	R&S® ZV-Z195 model .36	< 4.32 dB, typ. 3.37 dB
	R&S® ZV-Z196 model .24	< 4.80 dB, typ. 4.39 dB
	R&S® ZV-Z196 model .25	< 4.80 dB, typ. 4.39 dB
	R&S® ZV-Z196 model .36	N/A
	R&S® ZV-Z196 model .37	N/A
	R&S® ZV-Z197 model .24	< 3.50 dB, typ. 2.52 dB
	R&S® ZV-Z197 model .36	< 4.92 dB, typ. 3.78 dB
	R&S® ZV-Z198 model .06	< 2.74 dB, typ. 2.14 dB

Transmission loss (versus frequency)	R&S® ZV-Z91 model .25	$< (0.1000 + 0.1915 \cdot \sqrt{f} + 0.0179 \cdot f)$ dB typ. $(0.0255 + 0.1747 \cdot \sqrt{f} + 0.0127 \cdot f)$ dB where f is the frequency in GHz
	R&S® ZV-Z91 model .38	$< (0.1000 + 0.2911 \cdot \sqrt{f} + 0.0215 \cdot f)$ dB typ. $(0.0284 + 0.2616 \cdot \sqrt{f} + 0.0159 \cdot f)$ dB where f is the frequency in GHz
	R&S® ZV-Z92 model .25	$< (0.1000 + 0.1915 \cdot \sqrt{f} + 0.0179 \cdot f)$ dB typ. $(0.0255 + 0.1747 \cdot \sqrt{f} + 0.0127 \cdot f)$ dB where f is the frequency in GHz
	R&S® ZV-Z92 model .38	$< (0.1000 + 0.2911 \cdot \sqrt{f} + 0.0215 \cdot f)$ dB typ. $(0.0284 + 0.2616 \cdot \sqrt{f} + 0.0159 \cdot f)$ dB where f is the frequency in GHz
	R&S® ZV-Z93 model .25	$< (0.1000 + 0.1915 \cdot \sqrt{f} + 0.0179 \cdot f)$ dB typ. $(0.0255 + 0.1748 \cdot \sqrt{f} + 0.0127 \cdot f)$ dB where f is the frequency in GHz
	R&S® ZV-Z93 model .38	$< (0.1000 + 0.2911 \cdot \sqrt{f} + 0.0215 \cdot f)$ dB typ. $(0.0284 + 0.2616 \cdot \sqrt{f} + 0.0159 \cdot f)$ dB where f is the frequency in GHz
	R&S® ZV-Z95 model .25	$< (0.1109 + 0.4813 \cdot \sqrt{f} + 0.0075 \cdot f)$ dB typ. $(0.0309 + 0.4470 \cdot \sqrt{f} - 0.0055 \cdot f)$ dB where f is the frequency in GHz
	R&S® ZV-Z95 model .38	$< (0.1109 + 0.6780 \cdot \sqrt{f} + 0.0105 \cdot f)$ dB typ. $(0.0309 + 0.6257 \cdot \sqrt{f} - 0.0035 \cdot f)$ dB where f is the frequency in GHz
	R&S® ZV-Z96 model .25	$< (0.1333 + 0.8230 \cdot \sqrt{f} - 0.01629 \cdot f)$ dB typ. $(0.0548 + 0.8043 \cdot \sqrt{f} - 0.0234 \cdot f)$ dB where f is the frequency in GHz
	R&S® ZV-Z97 model .25	$< (0.1 + 0.3781 \cdot \sqrt{f} + 0.0168 \cdot f)$ dB typ. $(0.02 + 0.3438 \cdot \sqrt{f} - 0.0038 \cdot f)$ dB where f is the frequency in GHz
	R&S® ZV-Z191 model .24	$< (0.1000 + 0.1838 \cdot \sqrt{f} + 0.0177 \cdot f)$ dB typ. $(0.0253 + 0.1681 \cdot \sqrt{f} + 0.0125 \cdot f)$ dB where f is the frequency in GHz
	R&S® ZV-Z191 model .36	$< (0.1000 + 0.2758 \cdot \sqrt{f} + 0.0210 \cdot f)$ dB typ. $(0.0280 + 0.2482 \cdot \sqrt{f} + 0.0154 \cdot f)$ dB where f is the frequency in GHz
	R&S® ZV-Z192 model .24	$< (0.1000 + 0.1838 \cdot \sqrt{f} + 0.0177 \cdot f)$ dB typ. $(0.0253 + 0.1681 \cdot \sqrt{f} + 0.0125 \cdot f)$ dB where f is the frequency in GHz
	R&S® ZV-Z192 model .36	$< (0.1000 + 0.2758 \cdot \sqrt{f} + 0.0210 \cdot f)$ dB typ. $(0.0280 + 0.2482 \cdot \sqrt{f} + 0.0154 \cdot f)$ dB where f is the frequency in GHz
	R&S® ZV-Z193 model .24	$< (0.1000 + 0.1838 \cdot \sqrt{f} + 0.0177 \cdot f)$ dB typ. $(0.0253 + 0.1681 \cdot \sqrt{f} + 0.0125 \cdot f)$ dB where f is the frequency in GHz
	R&S® ZV-Z193 model .36	$< (0.1000 + 0.2758 \cdot \sqrt{f} + 0.0210 \cdot f)$ dB typ. $(0.0280 + 0.2482 \cdot \sqrt{f} + 0.0154 \cdot f)$ dB where f is the frequency in GHz
	R&S® ZV-Z193 model .60	N/A
	R&S® ZV-Z193 model .61	N/A
	R&S® ZV-Z194 model .24	N/A
	R&S® ZV-Z194 model .36	N/A
	R&S® ZV-Z195 model .24	$< (0.1000 + 0.3630 \cdot \sqrt{f} + 0.0166 \cdot f)$ dB typ. $(0.0200 + 0.3300 \cdot \sqrt{f} + 0.0037 \cdot f)$ dB where f is the frequency in GHz
	R&S® ZV-Z195 model .36	$< (0.1000 + 0.5445 \cdot \sqrt{f} + 0.0193 \cdot f)$ dB typ. $(0.0200 + 0.4950 \cdot \sqrt{f} + 0.0055 \cdot f)$ dB where f is the frequency in GHz
	R&S® ZV-Z196 model .24	N/A
	R&S® ZV-Z196 model .25	N/A
	R&S® ZV-Z196 model .36	N/A
	R&S® ZV-Z196 model .37	N/A
R&S® ZV-Z197 model .24	N/A	
R&S® ZV-Z197 model .36	N/A	
R&S® ZV-Z198 model .06	N/A	



<b>Delay time</b>	R&S® ZV-Z91 model .25	2.5 ns
	R&S® ZV-Z91 model .38	3.8 ns
	R&S® ZV-Z92 model .25	2.5 ns
	R&S® ZV-Z92 model .38	3.8 ns
	R&S® ZV-Z93 model .25	2.5 ns
	R&S® ZV-Z93 model .38	3.8 ns
	R&S® ZV-Z95 model .25	2.5 ns
	R&S® ZV-Z95 model .38	3.8 ns
	R&S® ZV-Z96 model .25	2.5 ns
	R&S® ZV-Z97 model .25	2.5 ns

<b>Stability</b> <sup>1</sup>		
Magnitude stability	R&S® ZV-Z91 model .25	< 0.08 dB
	R&S® ZV-Z91 model .38	< 0.15 dB
	R&S® ZV-Z92 model .25	< 0.08 dB
	R&S® ZV-Z92 model .38	< 0.15 dB
	R&S® ZV-Z93 model .25	< 0.08 dB
	R&S® ZV-Z93 model .38	< 0.15 dB
	R&S® ZV-Z95 model .25	< 0.08 dB
	R&S® ZV-Z95 model .38	< 0.15 dB
	R&S® ZV-Z96 model .25	< 0.10 dB
	R&S® ZV-Z97 model .25	< 0.08 dB
	R&S® ZV-Z191 model .24	< 0.08 dB
	R&S® ZV-Z191 model .36	< 0.15 dB
	R&S® ZV-Z192 model .24	< 0.08 dB
	R&S® ZV-Z192 model .36	< 0.15 dB
	R&S® ZV-Z193 model .24	< 0.08 dB
	R&S® ZV-Z193 model .36	< 0.15 dB
	R&S® ZV-Z193 model .60	N/A
	R&S® ZV-Z193 model .61	N/A
	R&S® ZV-Z194 model .24	N/A
	R&S® ZV-Z194 model .36	N/A
	R&S® ZV-Z195 model .24	< 0.08 dB
	R&S® ZV-Z195 model .36	< 0.15 dB
	R&S® ZV-Z196 model .24	< 0.10 dB, typ. 0.05 dB
	R&S® ZV-Z196 model .25	< 0.10 dB, typ. 0.05 dB
	R&S® ZV-Z196 model .36	N/A
	R&S® ZV-Z196 model .37	N/A
	R&S® ZV-Z197 model .24	< 0.08 dB, typ. 0.05 dB
	R&S® ZV-Z197 model .36	< 0.15 dB, typ. 0.05 dB
	R&S® ZV-Z198 model .06	N/A

<sup>1</sup> Stability is measured by means of a standard test procedure using a mandrel with a diameter of 114.3 mm (4.5 in).

Phase stability (at maximum frequency)	R&S® ZV-Z91 model .25	< 2.8°
	R&S® ZV-Z91 model .38	< 5.2°
	R&S® ZV-Z92 model .25	< 2.8°
	R&S® ZV-Z92 model .38	< 5.2°
	R&S® ZV-Z93 model .25	< 3.9°
	R&S® ZV-Z93 model .38	< 7.4°
	R&S® ZV-Z95 model .25	< 3.7°
	R&S® ZV-Z95 model .38	< 7.3°
	R&S® ZV-Z96 model .25	N/A
	R&S® ZV-Z97 model .25	< 8.0°
	R&S® ZV-Z191 model .24	< 4.7°
	R&S® ZV-Z191 model .36	< 4.7°
	R&S® ZV-Z192 model .24	< 4.7°
	R&S® ZV-Z192 model .36	< 4.7°
	R&S® ZV-Z193 model .24	< 6.6°
	R&S® ZV-Z193 model .36	< 6.6°
	R&S® ZV-Z193 model .60	N/A
	R&S® ZV-Z193 model .61	N/A
	R&S® ZV-Z194 model .24	N/A
	R&S® ZV-Z194 model .36	N/A
	R&S® ZV-Z195 model .24	< 9.6°
	R&S® ZV-Z195 model .36	< 9.6°
	R&S® ZV-Z196 model .24	< 14.6°, typ. 8.0°
	R&S® ZV-Z196 model .25	< 14.6°, typ. 8.0°
	R&S® ZV-Z196 model .36	N/A
	R&S® ZV-Z196 model .37	N/A
	R&S® ZV-Z197 model .24	< 11.8°, typ. 6.0°
	R&S® ZV-Z197 model .36	< 11.8°, typ. 6.0°
	R&S® ZV-Z198 model .06	N/A

Phase stability (versus frequency)	R&S® ZV-Z91 model .25	$< 0.5^\circ + 0.13^\circ \cdot f$ where f is the frequency in GHz
	R&S® ZV-Z91 model .38	$< 0.5^\circ + 0.26^\circ \cdot f$ where f is the frequency in GHz
	R&S® ZV-Z92 model .25	$< 0.5^\circ + 0.13^\circ \cdot f$ where f is the frequency in GHz
	R&S® ZV-Z92 model .38	$< 0.5^\circ + 0.26^\circ \cdot f$ where f is the frequency in GHz
	R&S® ZV-Z93 model .25	$< 0.5^\circ + 0.13^\circ \cdot f$ where f is the frequency in GHz
	R&S® ZV-Z93 model .38	$< 0.5^\circ + 0.26^\circ \cdot f$ where f is the frequency in GHz
	R&S® ZV-Z95 model .25	$< 0.5^\circ + 0.08^\circ \cdot f$ where f is the frequency in GHz
	R&S® ZV-Z95 model .38	$< 0.5^\circ + 0.17^\circ \cdot f$ where f is the frequency in GHz
	R&S® ZV-Z96 model .25	$< 0.5^\circ + 0.12^\circ \cdot f$ where f is the frequency in GHz
	R&S® ZV-Z97 model .25	$< 0.5^\circ + 0.15^\circ \cdot f$ where f is the frequency in GHz
	R&S® ZV-Z191 model .24	$< 0.64^\circ + 0.2234^\circ \cdot f$ where f is the frequency in GHz
	R&S® ZV-Z191 model .36	$< 0.64^\circ + 0.2234^\circ \cdot f$ where f is the frequency in GHz
	R&S® ZV-Z192 model .24	$< 0.64^\circ + 0.2234^\circ \cdot f$ where f is the frequency in GHz
	R&S® ZV-Z192 model .36	$< 0.64^\circ + 0.2234^\circ \cdot f$ where f is the frequency in GHz
	R&S® ZV-Z193 model .24	$< 0.64^\circ + 0.2234^\circ \cdot f$ where f is the frequency in GHz
	R&S® ZV-Z193 model .36	$< 0.64^\circ + 0.2234^\circ \cdot f$ where f is the frequency in GHz
	R&S® ZV-Z193 model .60	N/A
	R&S® ZV-Z193 model .61	N/A
	R&S® ZV-Z194 model .24	N/A
	R&S® ZV-Z194 model .36	N/A
	R&S® ZV-Z195 model .24	$< 0.64^\circ + 0.2234^\circ \cdot f$ where f is the frequency in GHz
	R&S® ZV-Z195 model .36	$< 0.64^\circ + 0.2234^\circ \cdot f$ where f is the frequency in GHz
	R&S® ZV-Z196 model .24	N/A
	R&S® ZV-Z196 model .25	N/A
	R&S® ZV-Z196 model .36	N/A
	R&S® ZV-Z196 model .37	N/A
R&S® ZV-Z197 model .24	N/A	
R&S® ZV-Z197 model .36	N/A	
R&S® ZV-Z198 model .06	N/A	

## General data

Temperature loading	operating temperature range	+18 °C to +28 °C
	permissible temperature range	0 °C to +50 °C
	storage temperature range	-40 °C to +70 °C
Damp heat		in line with IEC 60068-2-1 and IEC 60068-2-2
		+40 °C at 95 % 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 IEC 60068-2-27, MIL-STD-810
Length	R&S® ZV-Z91 model .25	635 mm (25 in)
	R&S® ZV-Z91 model .38	965 mm (38 in)
	R&S® ZV-Z92 model .25	635 mm (25 in)
	R&S® ZV-Z92 model .38	965 mm (38 in)
	R&S® ZV-Z93 model .25	635 mm (25 in)
	R&S® ZV-Z93 model .38	965 mm (38 in)
	R&S® ZV-Z95 model .25	635 mm (25 in)
	R&S® ZV-Z95 model .38	965 mm (38 in)
	R&S® ZV-Z96 model .25	635 mm (25 in)
	R&S® ZV-Z97 model .25	635 mm (25 in)
	R&S® ZV-Z191 model .24	610 mm (24 in)
	R&S® ZV-Z191 model .36	914 mm (36 in)
	R&S® ZV-Z192 model .24	610 mm (24 in)
	R&S® ZV-Z192 model .36	914 mm (36 in)
	R&S® ZV-Z193 model .24	610 mm (24 in)
	R&S® ZV-Z193 model .36	914 mm (36 in)
	R&S® ZV-Z193 model .60	1524 mm (60 in)
	R&S® ZV-Z193 model .61	1524 mm (60 in)
	R&S® ZV-Z194 model .24	610 mm (24 in)
	R&S® ZV-Z194 model .36	914 mm (36 in)
	R&S® ZV-Z195 model .24	610 mm (24 in)
	R&S® ZV-Z195 model .36	914 mm (36 in)
	R&S® ZV-Z196 model .24	610 mm (24 in)
	R&S® ZV-Z196 model .25	610 mm (24 in)
	R&S® ZV-Z196 model .36	914 mm (36 in)
	R&S® ZV-Z196 model .37	914 mm (36 in)
	R&S® ZV-Z197 model .24	610 mm (24 in)
	R&S® ZV-Z197 model .36	914 mm (36 in)
	R&S® ZV-Z198 model .06	160 mm (6 in)

Weight	R&S® ZV-Z91 model .25	175 g (6 oz)
	R&S® ZV-Z91 model .38	266 g (9 oz)
	R&S® ZV-Z92 model .25	175 g (6 oz)
	R&S® ZV-Z92 model .38	266 g (9 oz)
	R&S® ZV-Z93 model .25	175 g (6 oz)
	R&S® ZV-Z93 model .38	266 g (9 oz)
	R&S® ZV-Z95 model .25	175 g (6 oz)
	R&S® ZV-Z95 model .38	266 g (9 oz)
	R&S® ZV-Z96 model .25	175 g (6 oz)
	R&S® ZV-Z97 model .25	175 g (6 oz)
	R&S® ZV-Z191 model .24	175 g (6 oz)
	R&S® ZV-Z191 model .36	266 g (9 oz)
	R&S® ZV-Z192 model .24	175 g (6 oz)
	R&S® ZV-Z192 model .36	266 g (9 oz)
	R&S® ZV-Z193 model .24	175 g (6 oz)
	R&S® ZV-Z193 model .36	266 g (9 oz)
	R&S® ZV-Z193 model .60	N/A
	R&S® ZV-Z193 model .61	N/A
	R&S® ZV-Z194 model .24	N/A
	R&S® ZV-Z194 model .36	N/A
	R&S® ZV-Z195 model .24	175 g (6 oz)
	R&S® ZV-Z195 model .36	266 g (9 oz)
	R&S® ZV-Z196 model .24	175 g (6 oz)
	R&S® ZV-Z196 model .25	175 g (6 oz)
	R&S® ZV-Z196 model .36	266 g (9 oz)
	R&S® ZV-Z196 model .37	266 g (9 oz)
	R&S® ZV-Z197 model .24	N/A
	R&S® ZV-Z197 model .36	N/A
	R&S® ZV-Z198 model .06	N/A

Shipping weight	R&S® ZV-Z91 model .25	0.5 kg (1 lb)
	R&S® ZV-Z91 model .38	0.5 kg (1 lb)
	R&S® ZV-Z92 model .25	0.5 kg (1 lb)
	R&S® ZV-Z92 model .38	0.5 kg (1 lb)
	R&S® ZV-Z93 model .25	0.5 kg (1 lb)
	R&S® ZV-Z93 model .38	0.5 kg (1 lb)
	R&S® ZV-Z95 model .25	0.5 kg (1 lb)
	R&S® ZV-Z95 model .38	0.5 kg (1 lb)
	R&S® ZV-Z96 model .25	0.5 kg (1 lb)
	R&S® ZV-Z97 model .25	0.5 kg (1 lb)
	R&S® ZV-Z191 model .24	0.5 kg (1 lb)
	R&S® ZV-Z191 model .36	0.5 kg (1 lb)
	R&S® ZV-Z192 model .24	0.5 kg (1 lb)
	R&S® ZV-Z192 model .36	0.5 kg (1 lb)
	R&S® ZV-Z193 model .24	0.5 kg (1 lb)
	R&S® ZV-Z193 model .36	0.5 kg (1 lb)
	R&S® ZV-Z193 model .60	N/A
	R&S® ZV-Z193 model .61	N/A
	R&S® ZV-Z194 model .24	N/A
	R&S® ZV-Z194 model .36	N/A
	R&S® ZV-Z195 model .24	0.5 kg (1 lb)
	R&S® ZV-Z195 model .36	0.5 kg (1 lb)
	R&S® ZV-Z196 model .24	0.5 kg (1 lb)
	R&S® ZV-Z196 model .25	0.5 kg (1 lb)
	R&S® ZV-Z196 model .36	0.5 kg (1 lb)
	R&S® ZV-Z196 model .37	0.5 kg (1 lb)
	R&S® ZV-Z197 model .24	N/A
	R&S® ZV-Z197 model .36	N/A
	R&S® ZV-Z198 model .06	N/A

## Ordering information

Designation	Type	Order No.
<b>Test Port Cables for the R&amp;S® ZVA8, R&amp;S® ZVB4, R&amp;S® ZVB8, and R&amp;S® ZVT8 Vector Network Analyzers</b>	<b>frequency range 0 Hz to 18 GHz</b>	
Test Port Cable type N male to type N male, length 635 mm (25 in)	R&S® ZV-Z91	1301.7572.25
Test Port Cable type N male to type N male, length 965 mm (38 in)	R&S® ZV-Z91	1301.7572.38
Test Port Cable type N male to 3.5 mm male, length 635 mm (25 in)	R&S® ZV-Z92	1301.7589.25
Test Port Cable type N male to 3.5 mm male, length 965 mm (38 in)	R&S® ZV-Z92	1301.7589.38
Test Port Cable type N male to type N male, length 610 mm (24 in)	R&S® ZV-Z191	1301.4507.24
Test Port Cable type N male to type N male, length 914 mm (36 in)	R&S® ZV-Z191	1301.4507.36
Test Port Cable type N male to 3.5 mm male, length 610 mm (24 in)	R&S® ZV-Z192	1301.4513.24
Test Port Cable type N male to 3.5 mm male, length 914 mm (36 in)	R&S® ZV-Z192	1301.4513.36
<b>Test Port Cables for the R&amp;S® ZVA8, R&amp;S® ZVB4, R&amp;S® ZVB8, and R&amp;S® ZVT8 Vector Network Analyzers</b>	<b>frequency range 0 Hz to 3 GHz</b>	
Test Port Cable type N 75 Ω male to type N 75 Ω male, length 610 mm (24 in)	R&S® ZV-Z194	1306.4542.24
Test Port Cable type N 75 Ω male to type N 75 Ω male, length 914 mm (36 in)	R&S® ZV-Z194	1306.4542.36
<b>Test Port Cables for the R&amp;S® ZVA24, R&amp;S® ZVB20, and R&amp;S® ZVT20 Vector Network Analyzers</b>	<b>frequency range 0 Hz to 26.5 GHz</b>	
Test Port Cable 3.5 mm female to 3.5 mm male, length 635 mm (25 in)	R&S® ZV-Z93	1301.7595.25
Test Port Cable 3.5 mm female to 3.5 mm male, length 965 mm (38 in)	R&S® ZV-Z93	1301.7595.38
Test Port Cable 3.5 mm female to 3.5 mm male, length 610 mm (24 in)	R&S® ZV-Z193	1306.4520.24
Test Port Cable 3.5 mm female to 3.5 mm male, length 914 mm (36 in)	R&S® ZV-Z193	1306.4520.36
Test Port Cable 3.5 mm female to 3.5 mm male, length 1524 mm (60 in)	R&S® ZV-Z193	1306.4520.60
Test Port Cable 3.5 mm male to 3.5 mm male, length 1524 mm (60 in)	R&S® ZV-Z193	1306.4520.61
<b>Test Port Cables for the R&amp;S® ZVA40 Vector Network Analyzer</b>	<b>frequency range 0 Hz to 40 GHz</b>	
Test Port Cable 2.92 mm female to 2.92 mm male, length 635 mm (25 in)	R&S® ZV-Z95	1301.7608.25
Test Port Cable 2.92 mm female to 2.92 mm male, length 965 mm (38 in)	R&S® ZV-Z95	1301.7608.38
Test Port Cable 2.92 mm female to 2.92 mm male, length 610 mm (24 in)	R&S® ZV-Z195	1306.4536.24
Test Port Cable 2.92 mm female to 2.92 mm male, length 914 mm (36 in)	R&S® ZV-Z195	1306.4536.36
<b>Test Port Cables for the R&amp;S® ZVA50 Vector Network Analyzer</b>	<b>frequency range 0 Hz to 50 GHz</b>	
Test Port Cable 2.4 mm female to 2.4 mm male, length 635 mm (25 in)	R&S® ZV-Z97	1301.7637.25
Test Port Cable 2.4 mm female to 2.4 mm male, length 610 mm (24 in)	R&S® ZV-Z197	1306.4571.24
Test Port Cable 2.4 mm female to 2.4 mm male, length 914 mm (36 in)	R&S® ZV-Z197	1306.4571.36

<b>Designation</b>	<b>Type</b>	<b>Order No.</b>
<b>Test Port Cables for the R&amp;S® ZVA67 Vector Network Analyzer</b>	<b>frequency range 0 Hz to 67 GHz</b>	
Test Port Cable 1.85 mm female to 1.85 mm male, length 635 mm (25 in)	R&S® ZV-Z96	1301.7614.25
Test Port Cable 1.85 mm female to 1.85 mm male, length 610 mm (24 in)	R&S® ZV-Z196	1306.4559.24
Test Port Cable 1.85 mm male to 1.85 mm male, length 610 mm (24 in)	R&S® ZV-Z196	1306.4559.25
Test Port Cable 1.85 mm female to 1.85 mm male, length 914 mm (36 in)	R&S® ZV-Z196	1306.4559.36
Test Port Cable 1.85 mm male to 1.85 mm male, length 914 mm (36 in)	R&S® ZV-Z196	1306.4559.37
<b>Test Port Cables for the R&amp;S® ZVA110 Vector Network Analyzer</b>	<b>frequency range 0 Hz to 110 GHz</b>	
Test Port Cable 1.00 mm female to 1.00 mm male, length 160 mm (6 in)	R&S® ZV-Z198	1306.4565.06