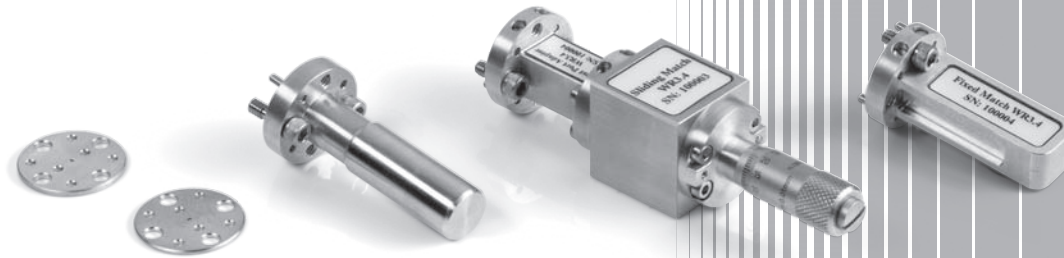


# R&S® ZV-WRxx Waveguide Calibration Kits Specifications



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# Definitions

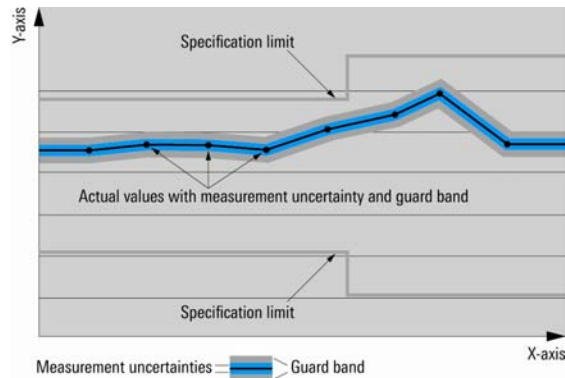
## General

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  $<$ ,  $\leq$ ,  $>$ ,  $\geq$ ,  $\pm$ , 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.



**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.

Typical data as well as nominal and measured values are not warranted by Rohde & Schwarz.

# Specifications

Specifications apply under the following conditions: 60 minutes warm-up time at ambient temperature, specified environmental conditions met, calibration cycle adhered to.

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.

## Measurement range

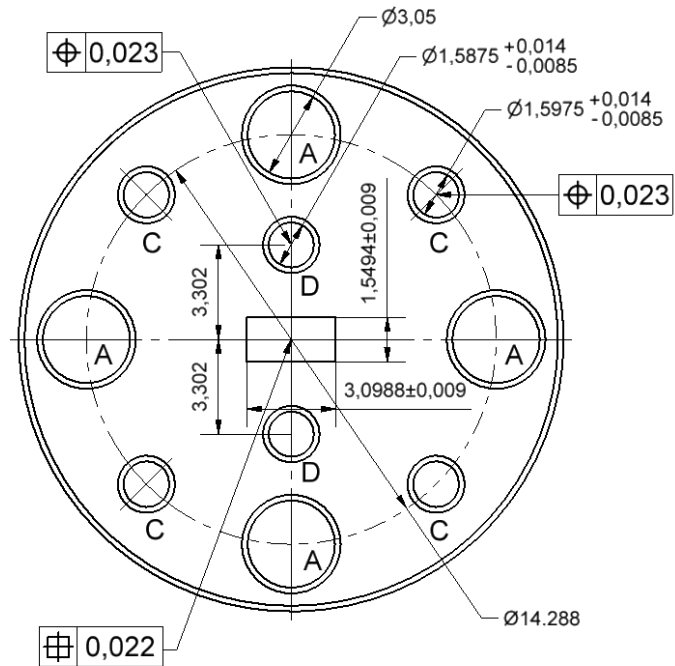
Frequency range	R&S® ZV-WR15	50 GHz to 75 GHz
	R&S® ZV-WR12	60 GHz to 90 GHz
	R&S® ZV-WR10	75 GHz to 110 GHz
	R&S® ZV-WR08	90 GHz to 140 GHz
	R&S® ZV-WR06	110 GHz to 170 GHz
	R&S® ZV-WR05	140 GHz to 220 GHz
	R&S® ZV-WR03	220 GHz to 325 GHz
	R&S® ZV-WR02	325 GHz to 500 GHz
Waveguide designator Electronic Industries Alliance (EIA)	R&S® ZV-WR15	WR15
	R&S® ZV-WR12	WR12
	R&S® ZV-WR10	WR10
	R&S® ZV-WR08	WR08
	R&S® ZV-WR06	WR06/WR6.5
	R&S® ZV-WR05	WR05/WR5.1
	R&S® ZV-WR03	WR03/WR3.4
	R&S® ZV-WR02	WR02/WR2.2
Connector type	anti-cocking flange	precision waveguide flange compatible with UG387/U-M
Damage level		+13 dBm

## Standards

Two different models for each calibration kit are available. One contains the calibration standards short, shim(s), and a fixed match; the other additionally includes a sliding match.

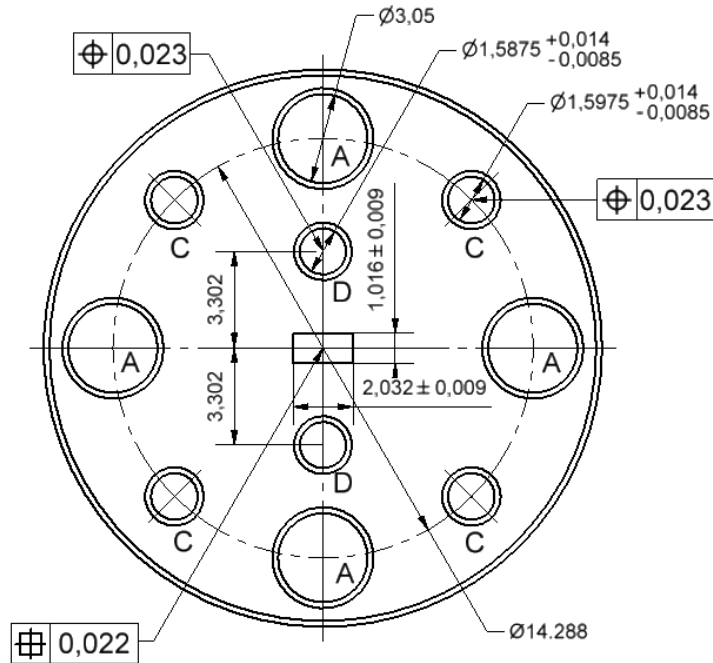
Length of short		0 mm
Length of shim	R&S <sup>®</sup> ZV-WR15	1.611 mm ± 5 µm
	R&S <sup>®</sup> ZV-WR12	1.338 mm ± 5 µm
	R&S <sup>®</sup> ZV-WR10	1.085 mm ± 5 µm
	R&S <sup>®</sup> ZV-WR08	0.873 mm ± 5 µm
	R&S <sup>®</sup> ZV-WR06	0.717 mm ± 5 µm
	R&S <sup>®</sup> ZV-WR05	1.000 mm ± 5 µm
	R&S <sup>®</sup> ZV-WR03	1.000 mm ± 5 µm
	R&S <sup>®</sup> ZV-WR02	0.650 mm ± 5 µm
Length of shim #2	R&S <sup>®</sup> ZV-WR05	1.558 mm ± 5 µm
	R&S <sup>®</sup> ZV-WR03	1.371 mm ± 5 µm
	R&S <sup>®</sup> ZV-WR02	0.889 mm ± 5 µm
Return loss of fixed match	R&S <sup>®</sup> ZV-WR15	> 30 dB, typ. > 35 dB
	R&S <sup>®</sup> ZV-WR12	typ. > 35 dB
	R&S <sup>®</sup> ZV-WR10	> 30 dB, typ. > 35 dB
	R&S <sup>®</sup> ZV-WR08	typ. > 30 dB
	R&S <sup>®</sup> ZV-WR06	typ. > 30 dB
	R&S <sup>®</sup> ZV-WR05	typ. > 30 dB
	R&S <sup>®</sup> ZV-WR03	typ. > 27 dB
	R&S <sup>®</sup> ZV-WR02	typ. > 23 dB

Return loss of sliding match	R&S <sup>®</sup> ZV-WR15	> 30 dB, typ. > 35 dB
	R&S <sup>®</sup> ZV-WR12	typ. > 35 dB
	R&S <sup>®</sup> ZV-WR10	> 30 dB, typ. > 35 dB
	R&S <sup>®</sup> ZV-WR08	typ. > 30 dB
	R&S <sup>®</sup> ZV-WR06	typ. > 30 dB
	R&S <sup>®</sup> ZV-WR05	typ. > 30 dB
	R&S <sup>®</sup> ZV-WR03	typ. > 27 dB
	R&S <sup>®</sup> ZV-WR02	N/A

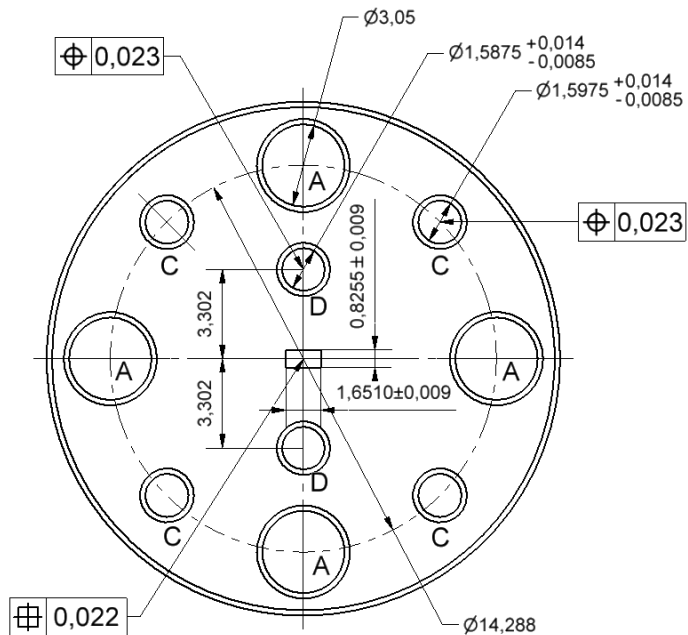


Drawing of shim of the R&S<sup>®</sup> ZV-WR12 with mechanical tolerances.

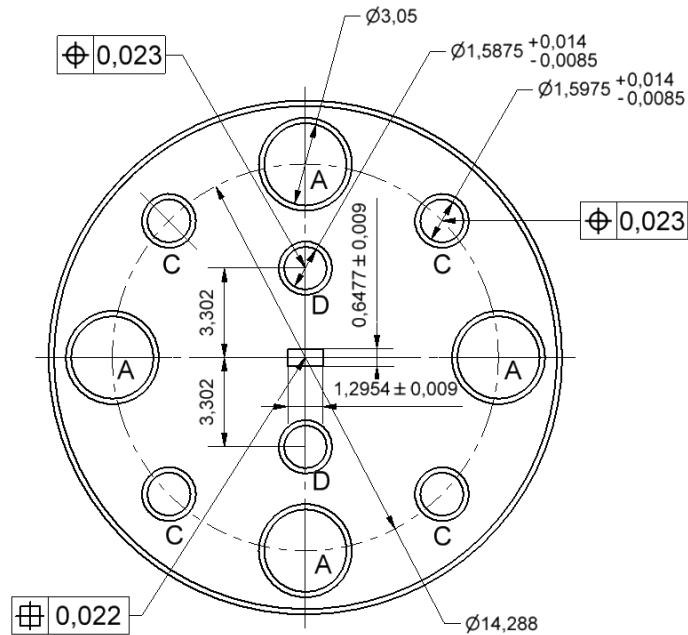




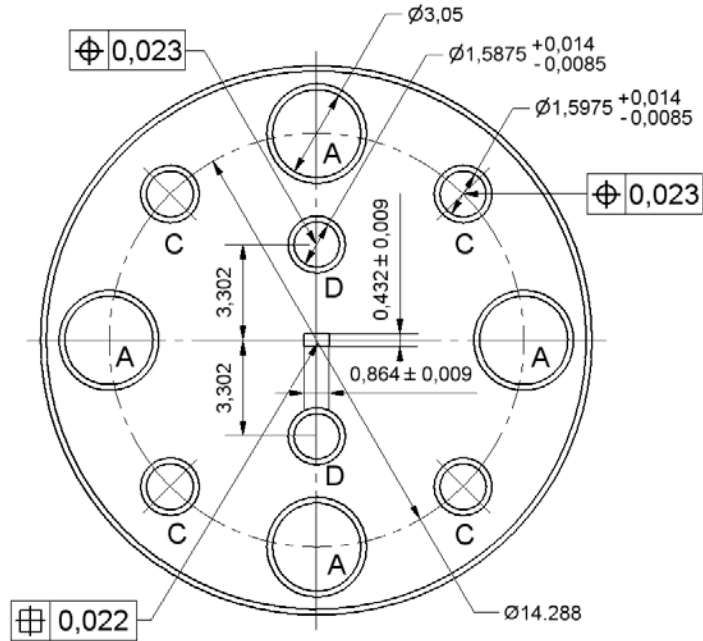
Drawing of shim of the R&S®ZV-WR08 with mechanical tolerances.



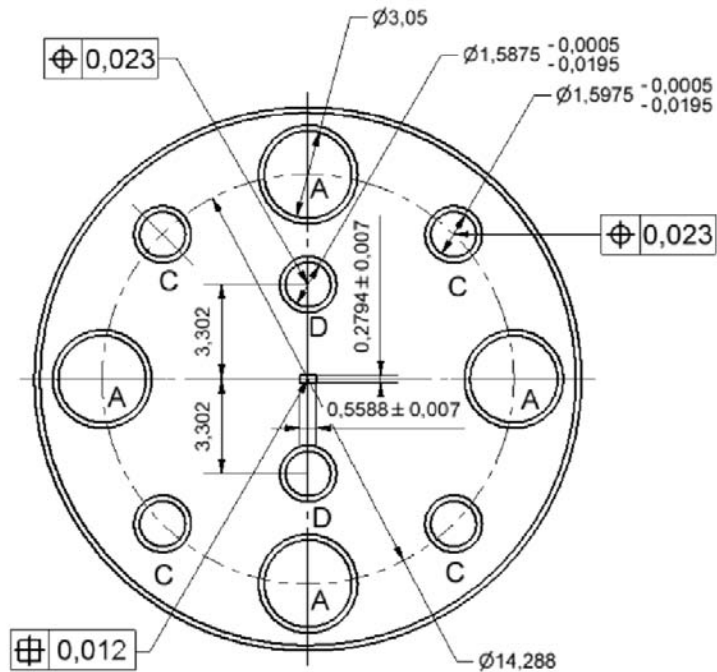
Drawing of shim of the R&S<sup>®</sup> ZV-WR06 with mechanical tolerances.



Drawing of shim of the R&S<sup>®</sup> ZV-WR05 with mechanical tolerances.



*Drawing of shim of the R&S<sup>®</sup>ZV-WR03 with mechanical tolerances.*



Drawing of shim of the R&S®ZV-WR02 with mechanical tolerances.

## Effective system data

This data is valid for the measurement system between +18 °C and +28 °C, at a measurement bandwidth of 10 Hz, a nominal power of +2 dBm at the calibration ports, and after performing a TOSM calibration at the test ports of the R&S®ZVA-Zxx converters.

Directivity calibrated with fixed match	R&S®ZV-WR15	> 30 dB, typ. > 35 dB
	R&S®ZV-WR12	typ. > 35 dB
	R&S®ZV-WR10	> 30 dB, typ. > 35 dB
	R&S®ZV-WR08	typ. > 30 dB
	R&S®ZV-WR06	typ. > 30 dB
	R&S®ZV-WR05	typ. > 30 dB
	R&S®ZV-WR03	typ. > 30 dB
	R&S®ZV-WR02	typ. > 30 dB
Directivity calibrated with sliding match	R&S®ZV-WR15	> 40 dB, typ. > 42 dB
	R&S®ZV-WR12	typ. > 42 dB
	R&S®ZV-WR10	> 40 dB, typ. > 42 dB
	R&S®ZV-WR08	typ. > 35 dB
	R&S®ZV-WR06	typ. > 35 dB
	R&S®ZV-WR05	typ. > 35 dB
	R&S®ZV-WR03	typ. > 35 dB
	R&S®ZV-WR02	typ. > 30 dB
Source match	R&S®ZV-WR15	> 30 dB, typ. > 35 dB
	R&S®ZV-WR12	typ. > 35 dB
	R&S®ZV-WR10	> 30 dB, typ. > 35 dB
	R&S®ZV-WR08	typ. > 30 dB
	R&S®ZV-WR06	typ. > 30 dB
	R&S®ZV-WR05	typ. > 30 dB
	R&S®ZV-WR03	typ. > 30 dB
	R&S®ZV-WR02	typ. > 30 dB

Reflection tracking	R&S® ZV-WR15	< 0.2 dB, typ. < 0.1 dB
	R&S® ZV-WR12	typ. < 0.1 dB
	R&S® ZV-WR10	< 0.2 dB, typ. < 0.1 dB
	R&S® ZV-WR08	typ. < 0.3 dB
	R&S® ZV-WR06	typ. < 0.3 dB
	R&S® ZV-WR05	typ. < 0.4 dB
	R&S® ZV-WR03	typ. < 0.4 dB
	R&S® ZV-WR02	typ. < 0.5 dB
Load match calibrated with fixed match	R&S® ZV-WR15	> 30 dB, typ. > 34 dB
	R&S® ZV-WR12	typ. > 34 dB
	R&S® ZV-WR10	> 30 dB, typ. > 34 dB
	R&S® ZV-WR08	typ. > 30 dB
	R&S® ZV-WR06	typ. > 30 dB
	R&S® ZV-WR05	typ. > 30 dB
	R&S® ZV-WR03	typ. > 30 dB
	R&S® ZV-WR02	typ. > 30 dB
Load match calibrated with sliding match	R&S® ZV-WR15	> 35 dB, typ. > 40 dB
	R&S® ZV-WR12	typ. > 40 dB
	R&S® ZV-WR10	> 35 dB, typ. > 40 dB
	R&S® ZV-WR08	typ. > 32 dB
	R&S® ZV-WR06	typ. > 32 dB
	R&S® ZV-WR05	typ. > 32 dB
	R&S® ZV-WR03	typ. > 32 dB
	R&S® ZV-WR02	N/A

Transmission tracking	R&S® ZV-WR15	< 0.2 dB, typ. < 0.1 dB
	R&S® ZV-WR12	typ. < 0.1 dB
	R&S® ZV-WR10	< 0.2 dB, typ. < 0.1 dB
	R&S® ZV-WR08	typ. < 0.6 dB
	R&S® ZV-WR06	typ. < 0.6 dB
	R&S® ZV-WR05	typ. < 0.8 dB
	R&S® ZV-WR03	typ. < 0.8 dB
	R&S® ZV-WR02	typ. < 1.0 dB

## 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		+40 °C at 95 % rel. humidity
Calibration interval		1 year
Dimensions (W x H x D)	of case	256 mm x 55 mm x 215 mm (10.1 in x 2.2 in x 8.5 in)
Weight	including case	1 kg (2.2 lb)
	shipping weight	3 kg (6.6 lb)



## Ordering information

Designation	Type	Order No.
Waveguide Calibration Kit WR15, 50 GHz to 75 GHz (without sliding match)	R&S®ZV-WR15	1307.7500.30
Waveguide Calibration Kit WR15, 50 GHz to 75 GHz (with sliding match)	R&S®ZV-WR15	1307.7500.31
Waveguide Calibration Kit WR12, 60 GHz to 90 GHz (without sliding match)	R&S®ZV-WR12	1307.7700.10
Waveguide Calibration Kit WR12, 60 GHz to 90 GHz (with sliding match)	R&S®ZV-WR12	1307.7700.11
Waveguide Calibration Kit WR10, 75 GHz to 110 GHz (without sliding match)	R&S®ZV-WR10	1307.7100.10
Waveguide Calibration Kit WR10, 75 GHz to 110 GHz (with sliding match)	R&S®ZV-WR10	1307.7100.11
Waveguide Calibration Kit WR08, 90 GHz to 140 GHz (without sliding match)	R&S®ZV-WR08	1307.7900.10
Waveguide Calibration Kit WR08, 90 GHz to 140 GHz (with sliding match)	R&S®ZV-WR08	1307.7900.11
Waveguide Calibration Kit WR06, 110 GHz to 170 GHz (without sliding match)	R&S®ZV-WR06	1311.8807.10
Waveguide Calibration Kit WR06, 110 GHz to 170 GHz (with sliding match)	R&S®ZV-WR06	1311.8807.11
Waveguide Calibration Kit WR05, 140 GHz to 220 GHz (without sliding match)	R&S®ZV-WR05	1307.8106.10
Waveguide Calibration Kit WR05, 140 GHz to 220 GHz (with sliding match)	R&S®ZV-WR05	1307.8106.11

**Version 04.01, June 2010**

<b>Designation</b>	<b>Type</b>	<b>Order No.</b>
Waveguide Calibration Kit WR03, 220 GHz to 325 GHz (without sliding match)	R&S® ZV-WR03	1307.7300.30
Waveguide Calibration Kit WR03, 220 GHz to 325 GHz (with sliding match)	R&S® ZV-WR03	1307.7300.31
Waveguide Calibration Kit WR02, 325 GHz to 500 GHz (without sliding match)	R&S® ZV-WR02	1314.5550.10



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- | Customized and flexible
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- | Energy-efficient products
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- | ISO 14001-certified environmental management system

Certified Quality System  
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