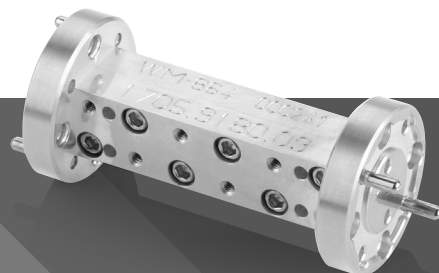
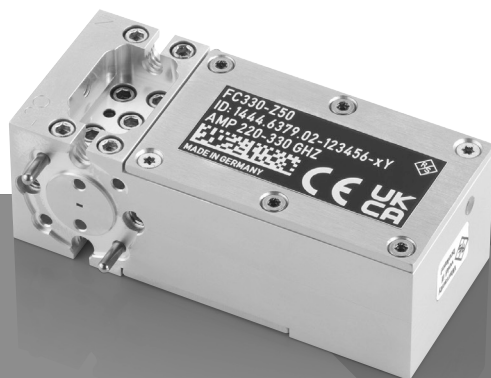
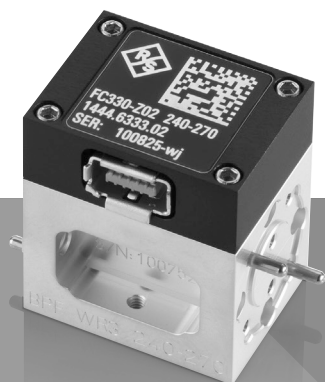


# R&S® FC330-Zxx ACCESSORIES

## Specifications



Specifications  
Version 02.00

**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 30 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

## Bandpass filters

The bandpass filters are available for the frequency bands:

- 220 GHz to 250 GHz (R&S®FC330-Z01)
- 240 GHz to 270 GHz (R&S®FC330-Z02)
- 260 GHz to 290 GHz (R&S®FC330-Z03)
- 280 GHz to 310 GHz (R&S®FC330-Z04)
- 300 GHz to 330 GHz (R&S®FC330-Z05)

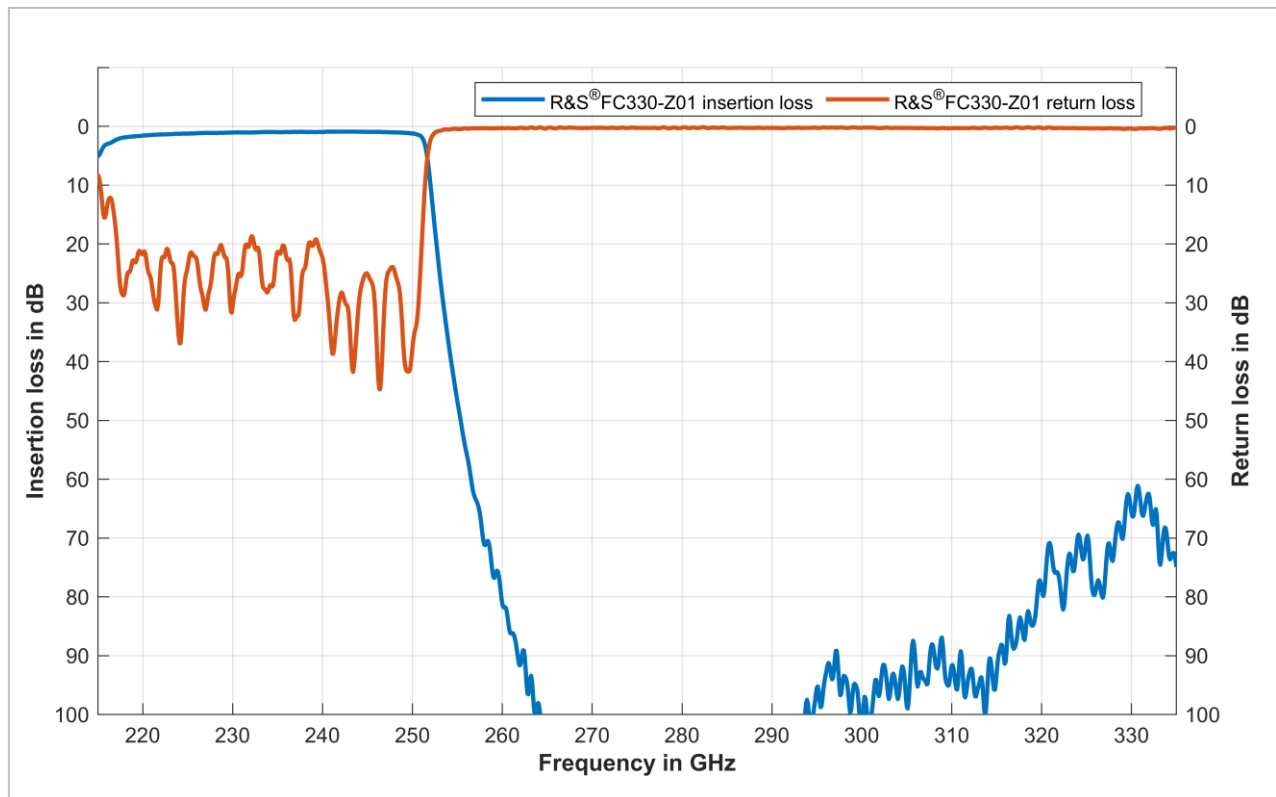
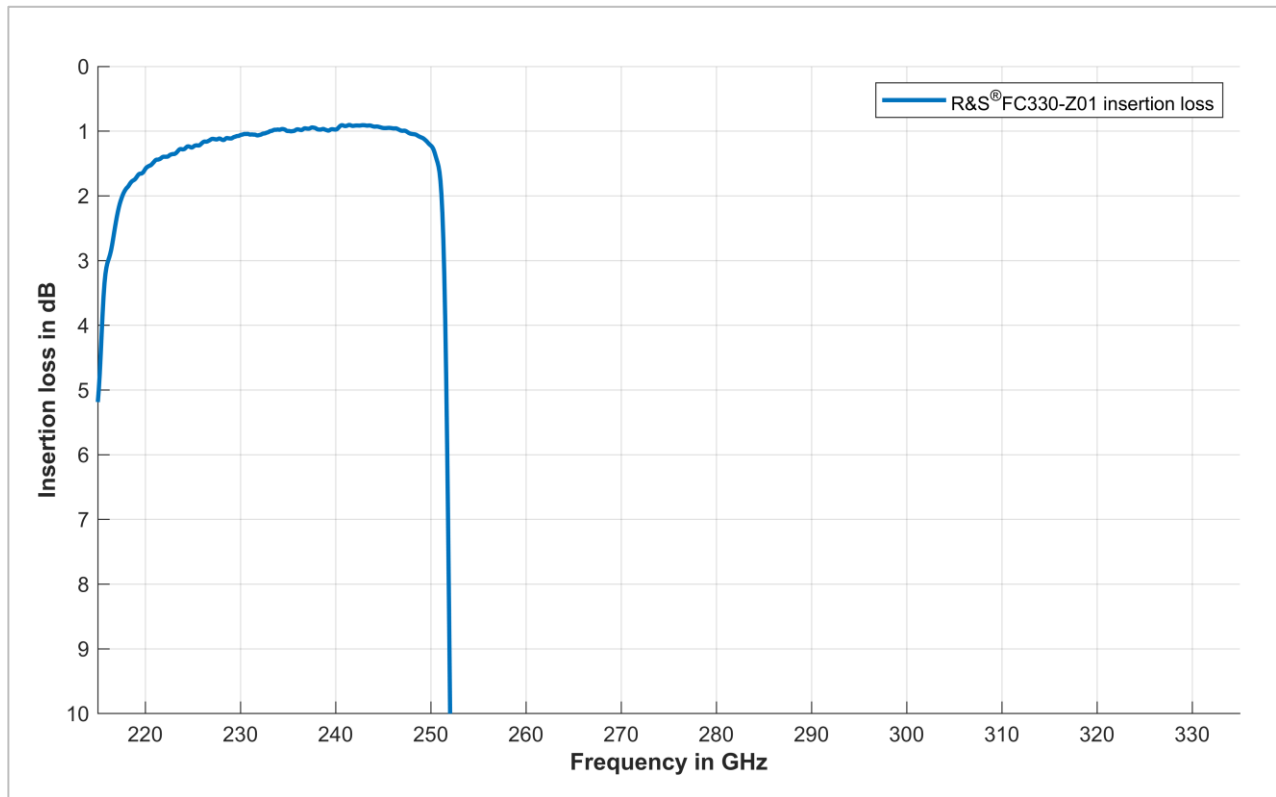
The filter includes an internal memory that contains identification information and calibration data. Currently the memory of the filters is not utilized when used in conjunction with an R&S®FC330 frequency converter.

## Electrical specifications

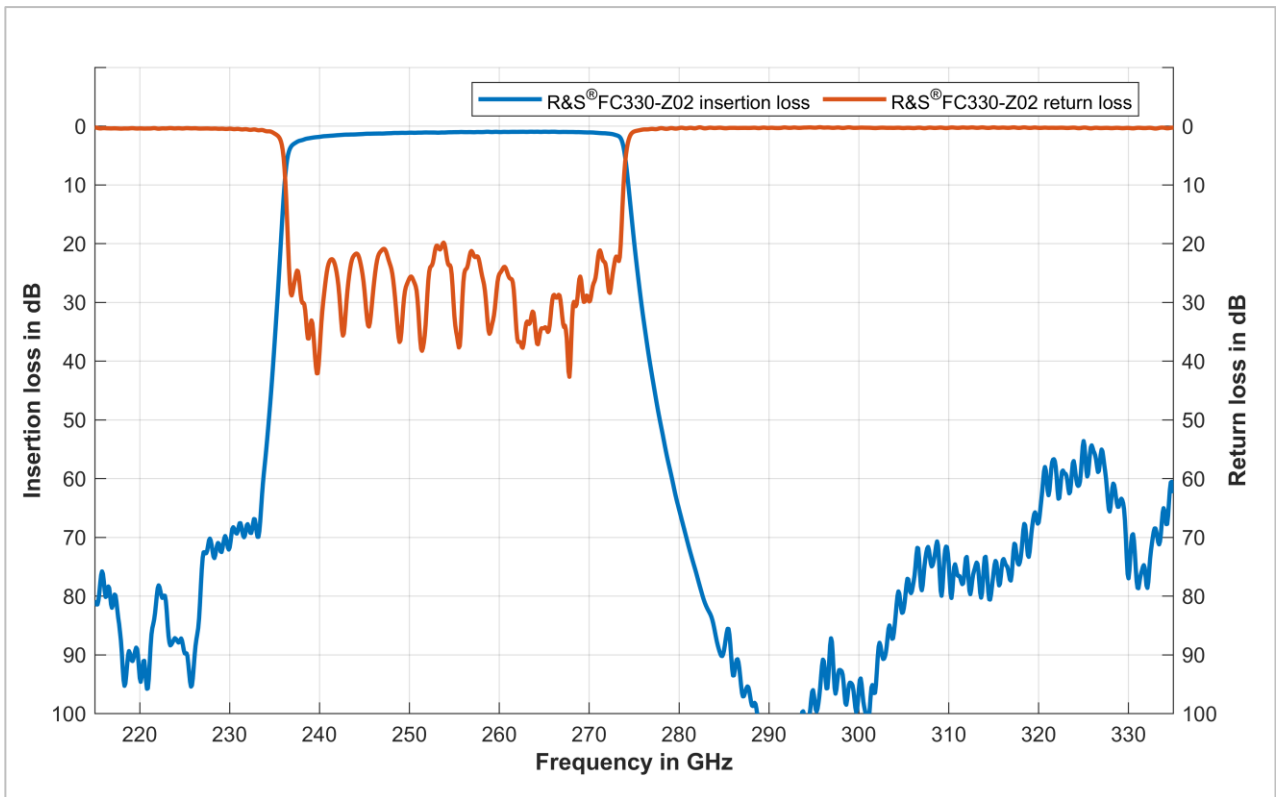
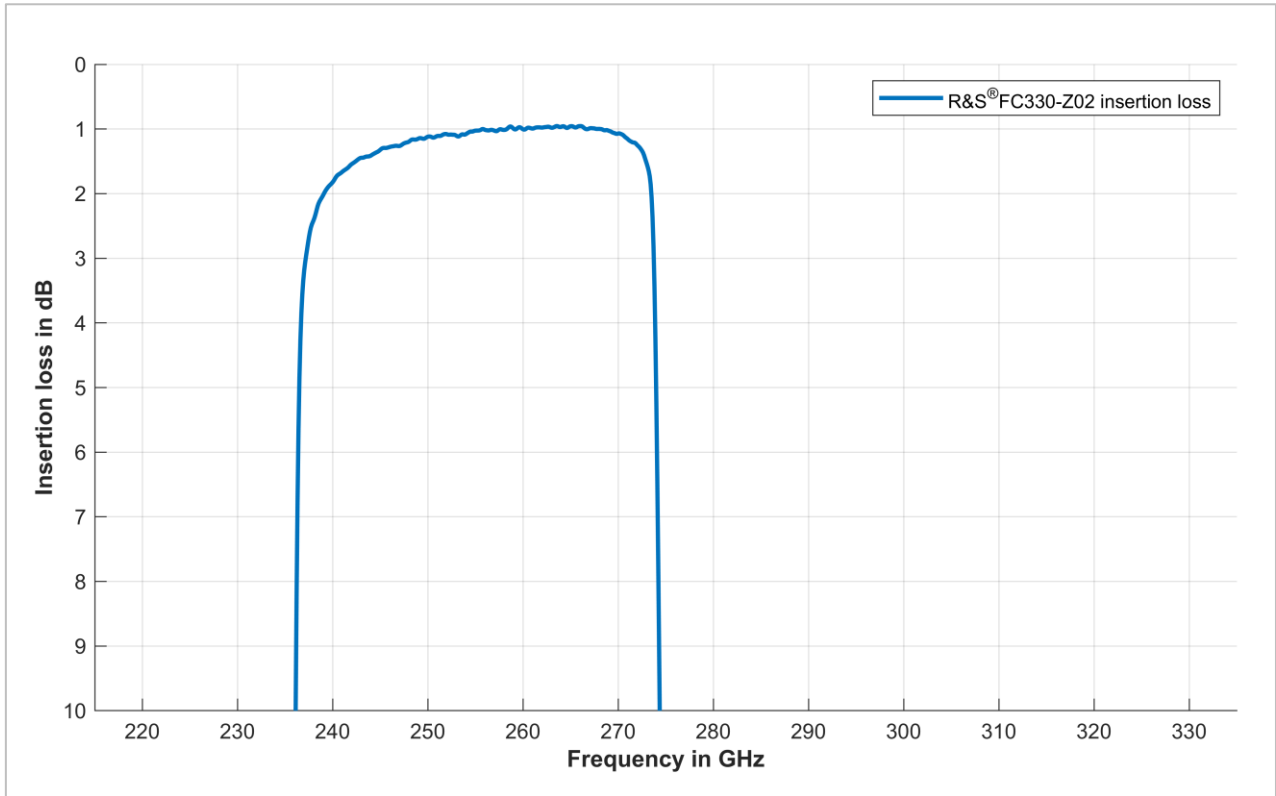
Frequency range		
R&S®FC330-Z01		220 GHz to 250 GHz
R&S®FC330-Z02		240 GHz to 270 GHz
R&S®FC330-Z03		260 GHz to 290 GHz
R&S®FC330-Z04		280 GHz to 310 GHz
R&S®FC330-Z05		300 GHz to 330 GHz
Insertion loss		
R&S®FC330-Z01	220 GHz ≤ f ≤ 250 GHz	< 1.9 dB, < 1.5 dB (meas.)
R&S®FC330-Z02	240 GHz ≤ f ≤ 270 GHz	< 2.0 dB, < 1.9dB (meas.)
R&S®FC330-Z03	260 GHz ≤ f ≤ 290 GHz	< 2.1 dB, < 2.0 dB (meas.)
R&S®FC330-Z04	280 GHz ≤ f ≤ 310 GHz	< 2.2 dB, < 1.8 dB (meas.)
R&S®FC330-Z05	300 GHz ≤ f ≤ 330 GHz	< 2.3 dB, < 1.8 dB (meas.)
Return loss		
R&S®FC330-Z01	220 GHz ≤ f ≤ 250 GHz	< 15 dB, < 16 dB (meas.)
R&S®FC330-Z02	240 GHz ≤ f ≤ 270 GHz	< 17 dB, < 18 dB (meas.)
R&S®FC330-Z03	260 GHz ≤ f ≤ 290 GHz	< 17 dB, < 18 dB (meas.)
R&S®FC330-Z04	280 GHz ≤ f ≤ 310 GHz	< 16 dB, < 17dB (meas.)
R&S®FC330-Z05	300 GHz ≤ f ≤ 330 GHz	< 16 dB, < 17dB (meas.)
Stopband attenuation		
R&S®FC330-Z01	261 GHz ≤ f ≤ 282 GHz, 282 GHz ≤ f ≤ 330 GHz	> 50 dB, > 70 dB (meas.), > 40 dB, > 55 dB (meas.)
R&S®FC330-Z02	220 GHz ≤ f ≤ 229 GHz, 281 GHz ≤ f ≤ 302 GHz; 302 GHz ≤ f ≤ 330 GHz	> 50 dB, > 62 dB (meas.), > 50 dB, > 70 dB (meas.), > 40 dB, > 45 dB (meas.)
R&S®FC330-Z03	220 GHz ≤ f < 228 GHz, 228 GHz ≤ f ≤ 249 GHz, 301 GHz ≤ f ≤ 322 GHz, 322 GHz < f ≤ 330 GHz	> 40 dB, > 64 dB (meas.), > 50 dB, > 70 dB (meas.), > 50 dB, > 51 dB (meas.), > 40 dB, > 47 dB (meas.)
R&S®FC330-Z04	220 GHz ≤ f < 248 GHz, 248 GHz ≤ f ≤ 269 GHz, 321 GHz ≤ f ≤ 330 GHz	> 40 dB, > 64 dB (meas.), > 50 dB, > 70 dB (meas.), > 50 dB, > 54 dB (meas.)
R&S®FC330-Z05	220 GHz ≤ f < 268 GHz, 268 GHz ≤ f ≤ 289 GHz	> 40 dB, > 70 dB (meas.), > 50 dB, > 70 dB (meas.)

## Measured insertion loss and return loss over frequency

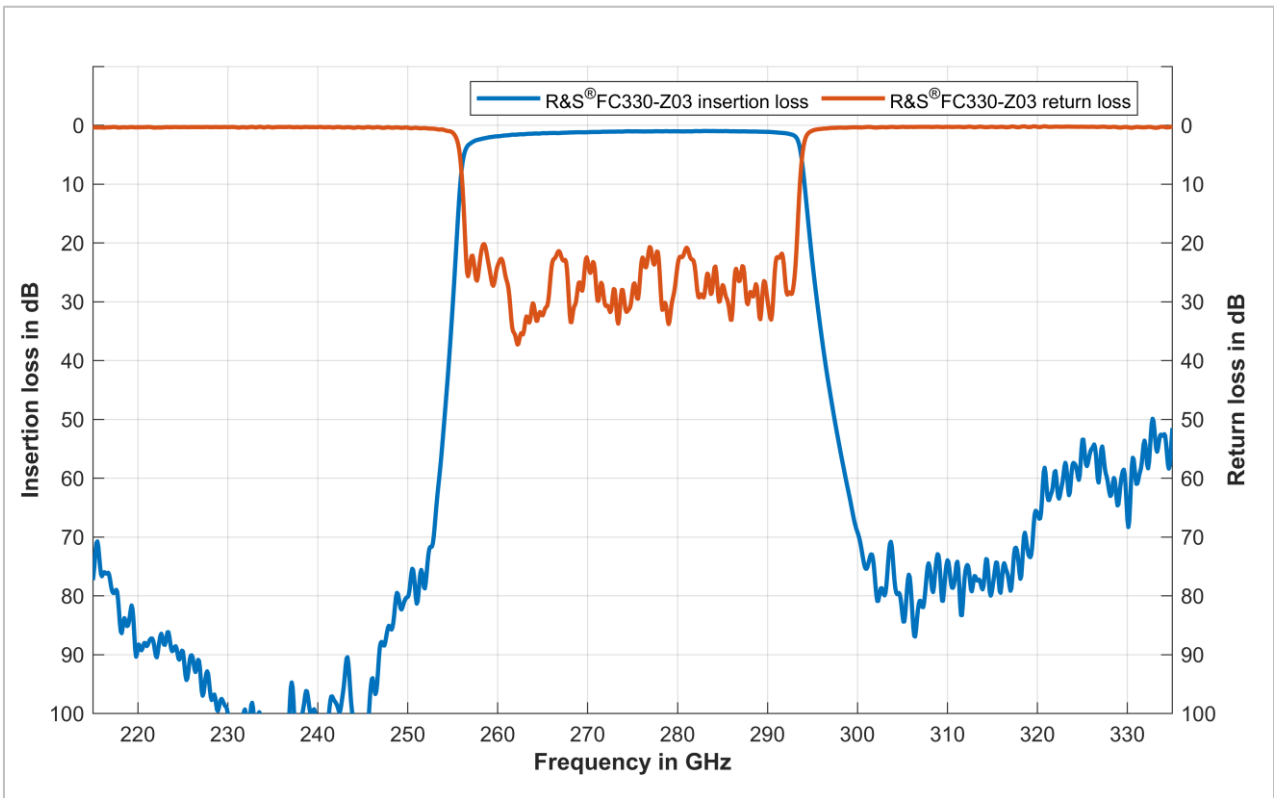
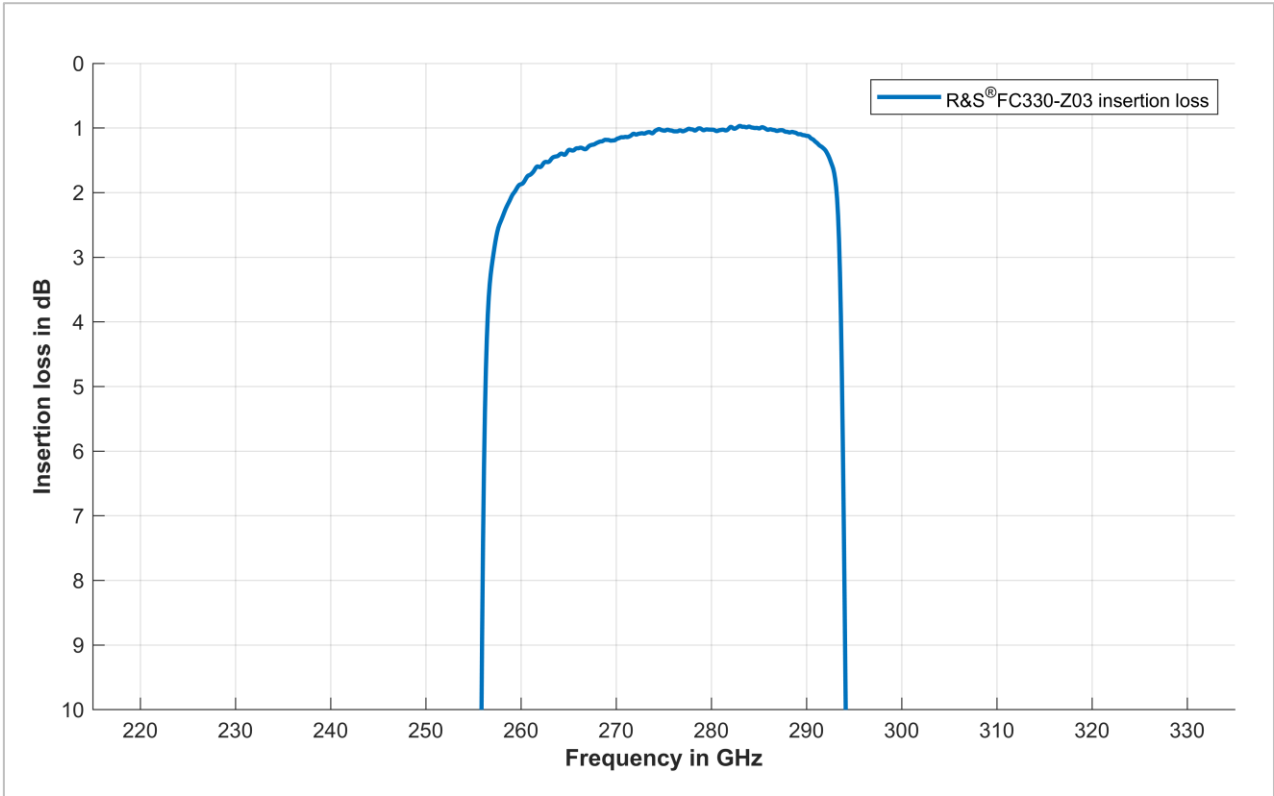
R&amp;S®FC330-Z01



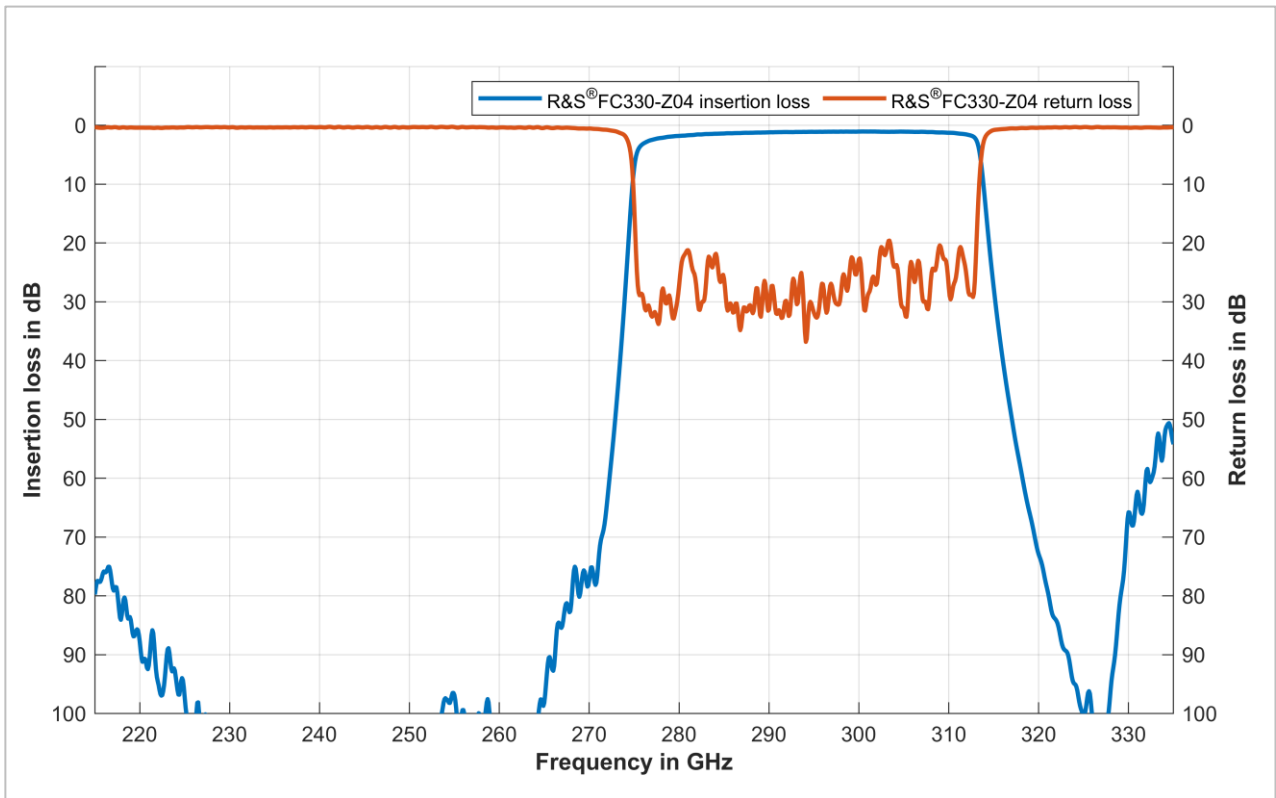
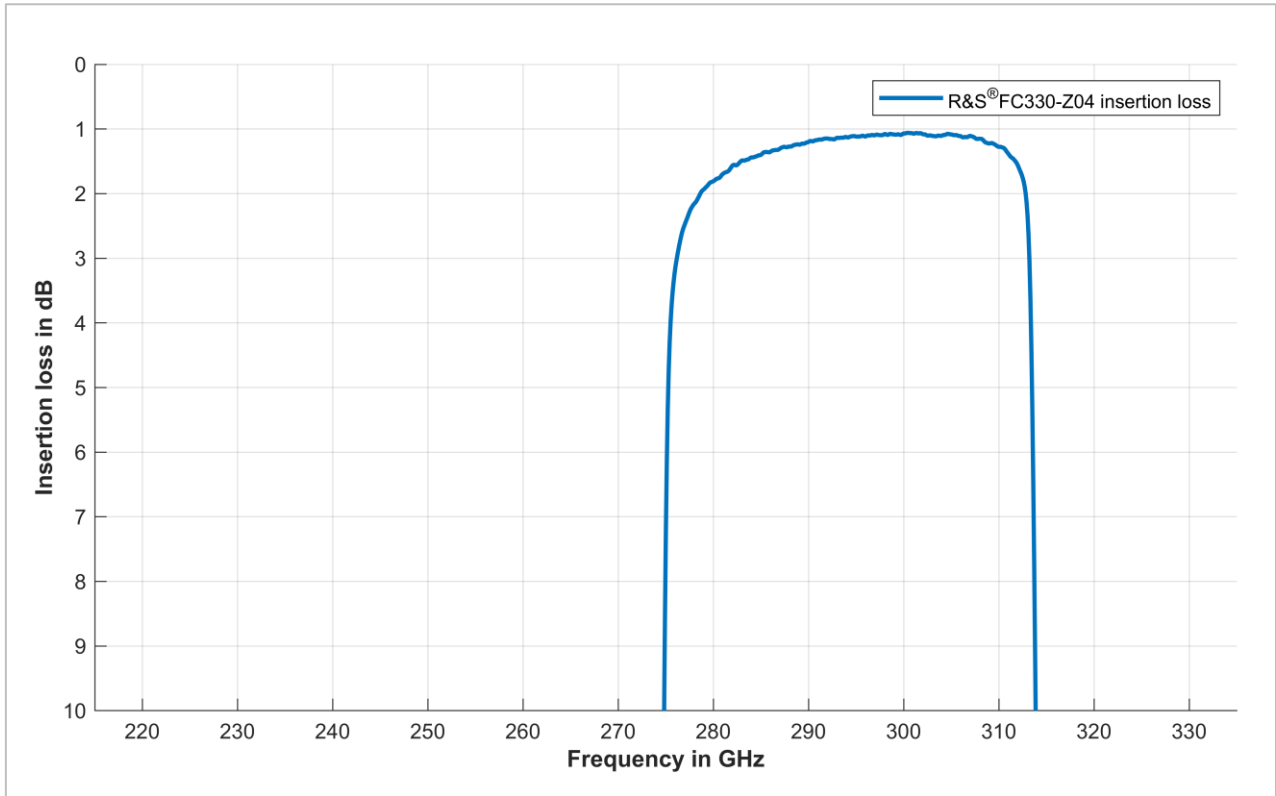
R&S®FC330-Z02



R&S®FC330-Z03

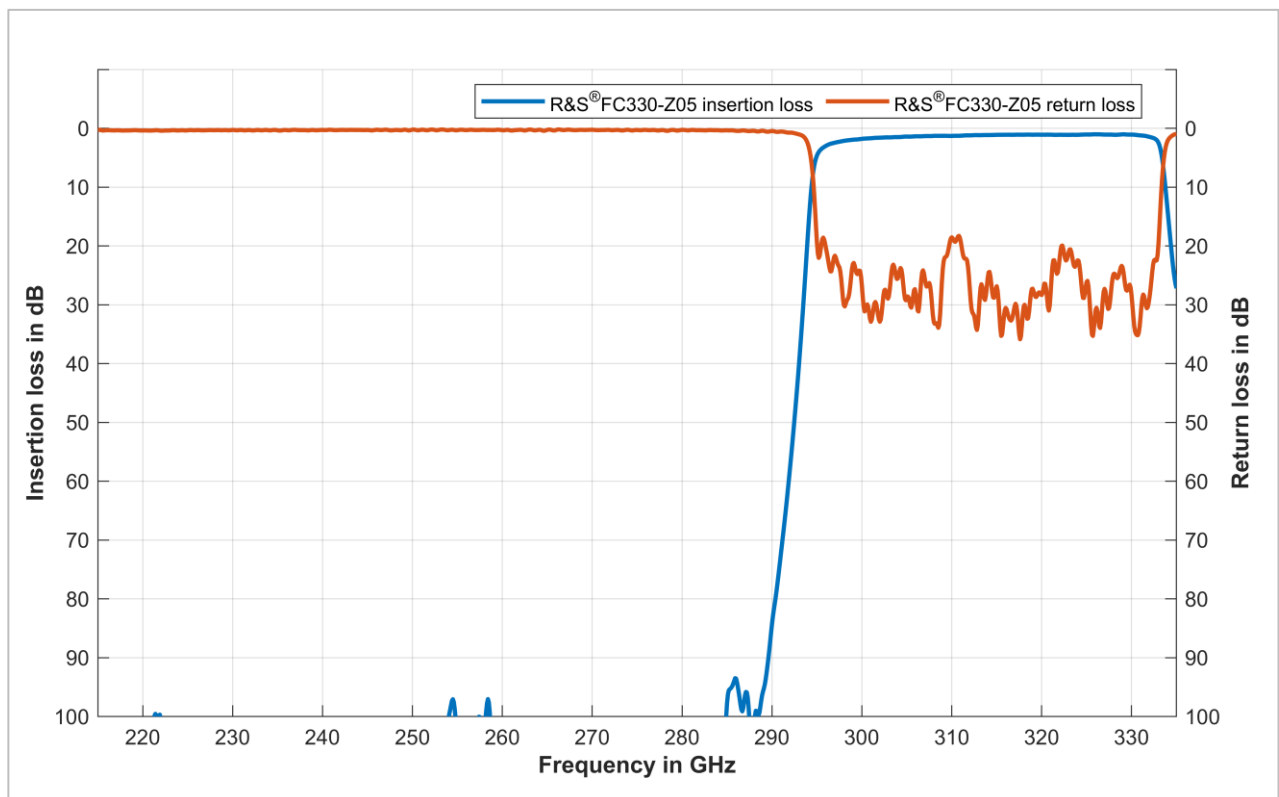
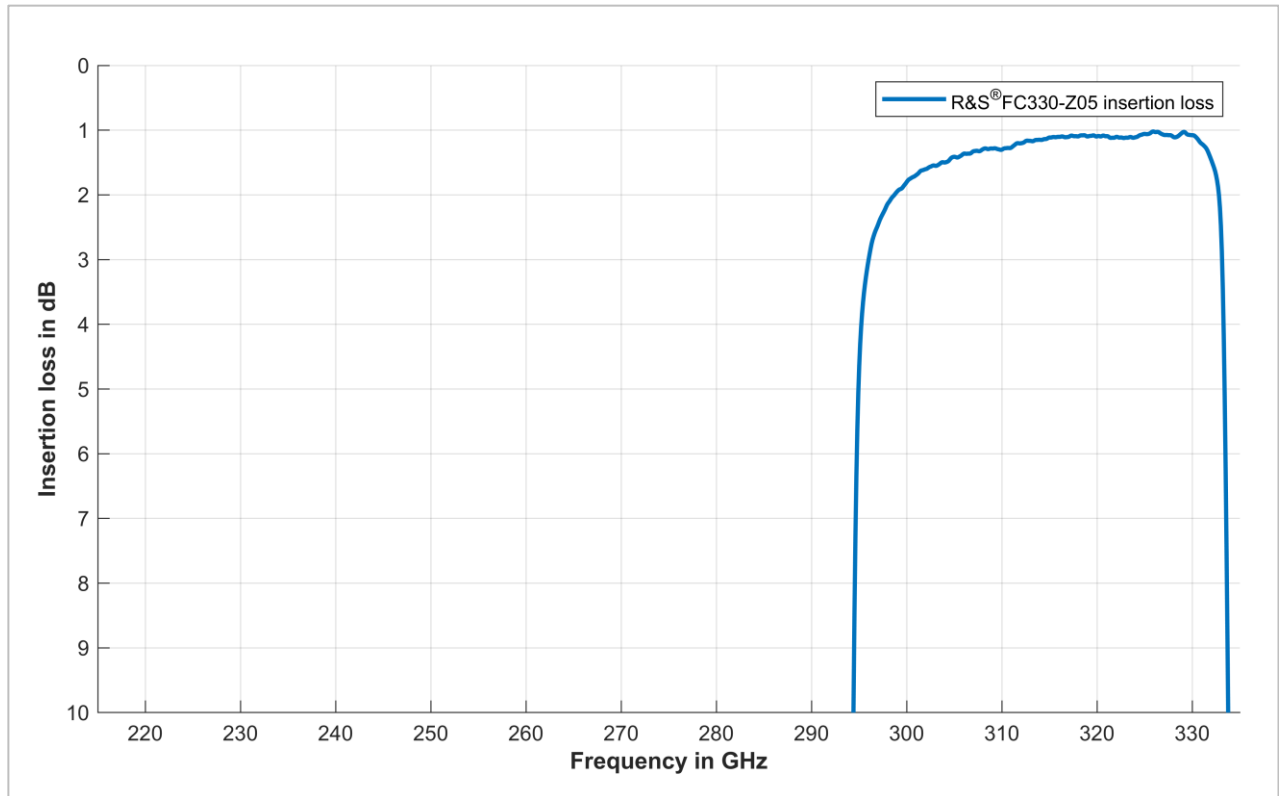


R&S®FC330-Z04

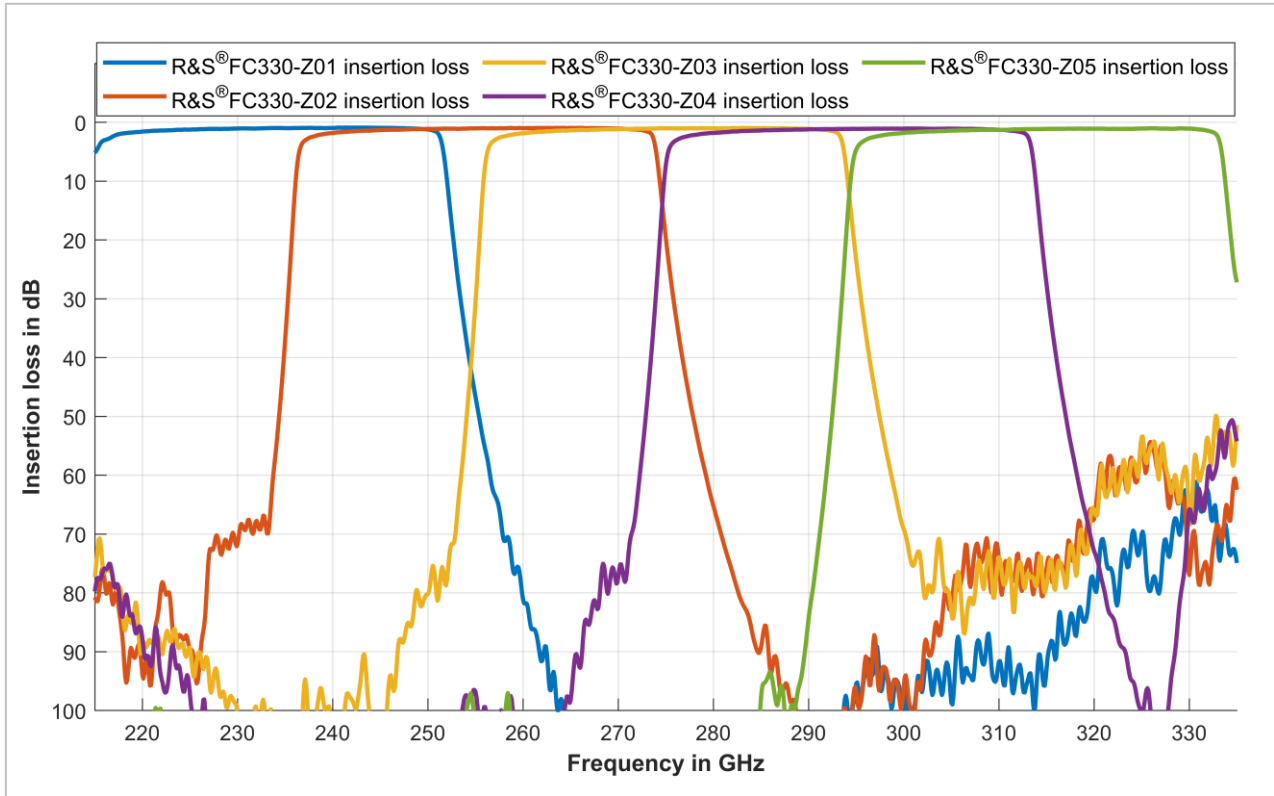




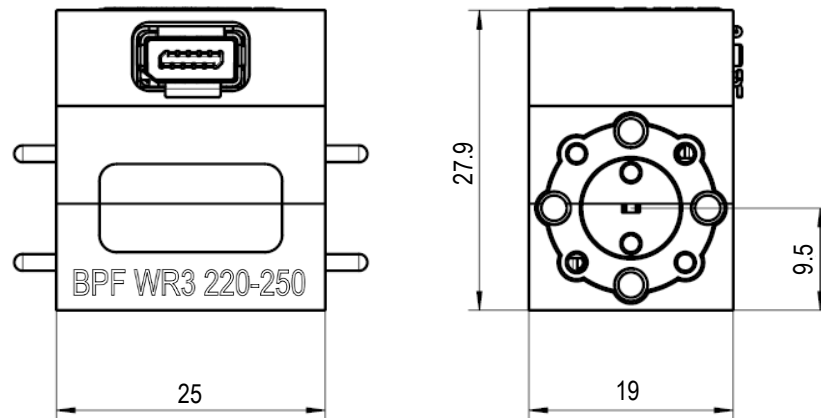
## R&amp;S®FC330-Z05



R&S®FC330-Z01, R&S®FC330-Z02, R&S®FC330-Z03, R&S®FC330-Z04 and R&S®FC330-Z05



## Outline drawing of R&amp;S®FC330-Z01



## Inputs and outputs

RF input and output H band accessories		
Connector		WM864 / WR3.4
Flange		UG387/U-M

Digital interface accessories		
Connector		ix Industrial, type B

**General data**

<b>Temperature</b>		
Temperature range	operating	+5 °C to +40 °C
	storage	−40 °C to +70 °C
Climatic loading		+40 °C at 80 % relative humidity, in line with EN 60068-2-30, without condensation

<b>Altitude</b>		
Maximum operating altitude	above sea level	4600 m (approx. 15100 ft)

<b>Mechanical resistance</b>		
Vibration	sinusoidal	5 Hz to 55 Hz, displacement: 0.3 mm, constant amplitude (1.8 g at 55 Hz), in line with EN 60068-2-6
		55 Hz to 150 Hz, acceleration: 0.5 g constant, in line with EN 60068-2-6
	random	8 Hz to 500 Hz, acceleration 1.2 g (RMS), in line with EN 60068-2-64
Shock		40 g shock spectrum, in line with MIL-STD-810G, method 516.6, procedure I

<b>EMC</b>		<ul style="list-style-type: none"> <li>• IEC/EN 61326-1 <sup>1, 2</sup></li> <li>• IEC/EN 61326-2-1</li> <li>• CISPR 11/EN 55011 <sup>1</sup></li> <li>• IEC/EN 61000-3-2</li> <li>• IEC/EN 61000-3-3</li> </ul>
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<b>Recommended calibration interval</b>		3 years
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<b>Surface</b>		plated gold
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<b>Dimensions and weight</b>		
Dimensions (nom.)	W x H x D (overall)	19 mm x 28 mm x 25 mm (0.75 in x 1.10 in x 0.98 in)
Net weight (nom.)		53 g (0.12 lb)

<sup>1</sup> Emission limits for class A equipment applied.

<sup>2</sup> Immunity test requirement for industrial environment (EN 61326 table 2).

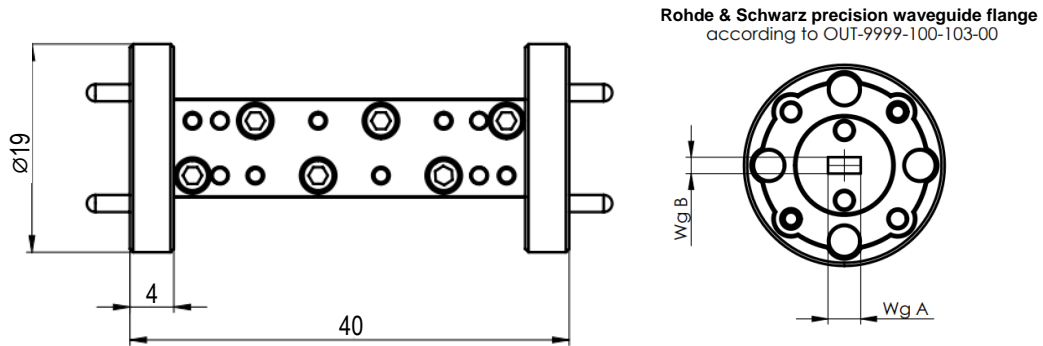
## R&S®FC330-Z20 WR3.4 waveguide-to-waveguide adapter

The waveguide adapter is available for the full frequency band from 220 GHz to 330 GHz with mechanical length of 40 mm.

### Electrical specifications

Frequency range		220 GHz to 330 GHz
Insertion loss	$220 \text{ GHz} \leq f \leq 330 \text{ GHz}$	< 1 dB (meas.)
Return loss	$220 \text{ GHz} \leq f \leq 330 \text{ GHz}$	> 25 dB (meas.)

### Outline drawing



**Inputs and outputs**

<b>RF input and output D band accessories</b>		
Connector		WM864 / WR3.4
Flange		UG387/U-M

**General data**

<b>Temperature</b>		
Temperature range	operating	+5 °C to +40 °C
	storage	−40 °C to +70 °C
Climatic loading		+40 °C at 80 % relative humidity, in line with EN 60068-2-30, without condensation

<b>Altitude</b>		
Maximum operating altitude	above sea level	4600 m (approx. 15100 ft)

<b>Mechanical resistance</b>		
Vibration	sinusoidal	5 Hz to 55 Hz, displacement: 0.3 mm, constant amplitude (1.8 g at 55 Hz), in line with EN 60068-2-6
		55 Hz to 150 Hz, acceleration: 0.5 g constant, in line with EN 60068-2-6
	random	8 Hz to 500 Hz, acceleration 1.2 g (RMS), in line with EN 60068-2-64
Shock		40 g shock spectrum, in line with MIL-STD-810G, method 516.6, procedure I

<b>Surface</b>		plated gold
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<b>Dimensions and weight</b>		
Dimensions (nom.)	W x H x D (overall)	19 mm x 19 mm x 40 mm (0.75 in x 0.75 in x 1.57 in)
Net weight (nom.)		40 g (0.09 lb)

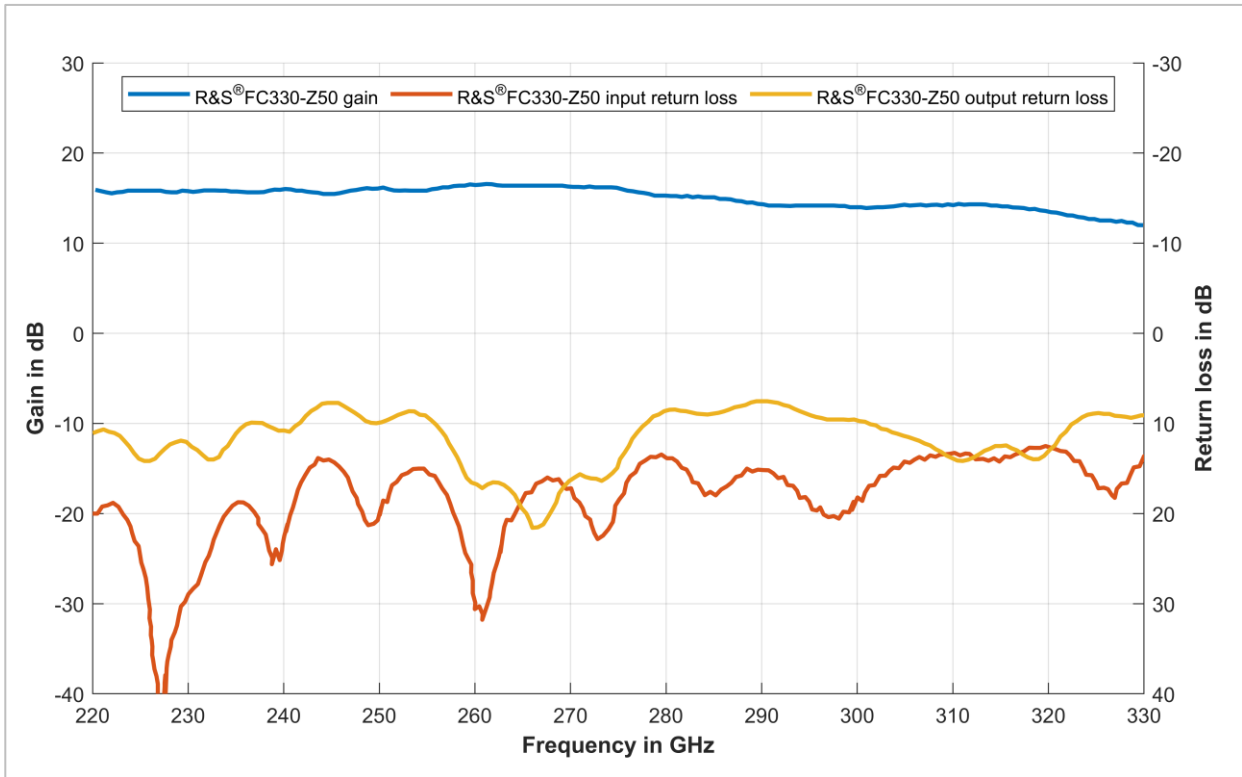
## R&S®FC330-Z50 external amplifier, 220 GHz to 330 GHz

The R&S®FC330-Z50 external amplifier operates within the frequency range from 220 GHz to 330 GHz. All testing was performed under +25 °C ambient temperature.

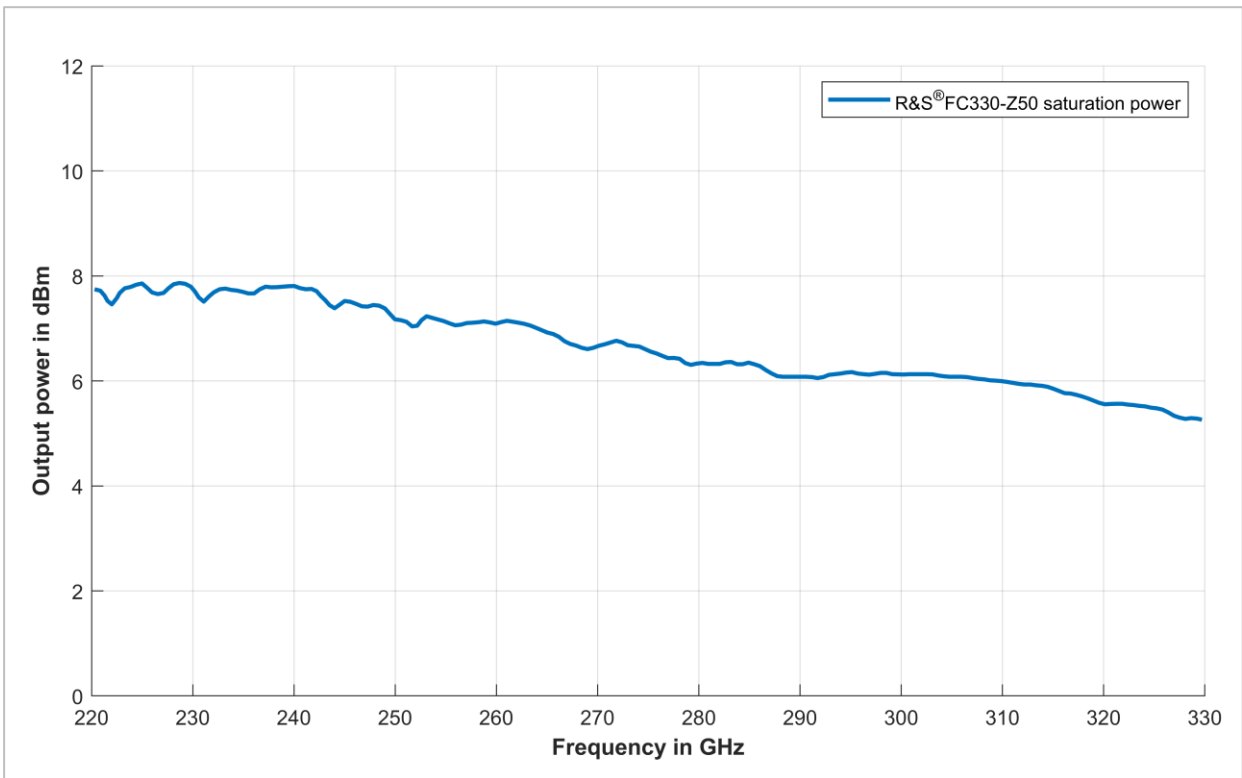
### Electrical specifications

Frequency range		220 GHz to 330 GHz
Gain	220 GHz ≤ f ≤ 280 GHz	> 14.0 dB (meas.)
	280 GHz ≤ f ≤ 310 GHz	> 13.5 dB (meas.)
	310 GHz ≤ f ≤ 330 GHz	> 11.5 dB (meas.)
Input return loss	220 GHz ≤ f ≤ 240 GHz	< -13.0 dB (meas.)
	240 GHz ≤ f ≤ 310 GHz	< -10.5 dB (meas.)
	310 GHz ≤ f ≤ 330 GHz	< -9.5 dB (meas.)
Output return loss	220 GHz ≤ f ≤ 240 GHz	< -8.0 dB (meas.)
	240 GHz ≤ f ≤ 310 GHz	< -6.0 dB (meas.)
	310 GHz ≤ f ≤ 330 GHz	< -8.5 dB (meas.)
Reverse isolation	220 GHz ≤ f ≤ 330 GHz	< -40 dB (meas.)
Saturation power	220 GHz ≤ f ≤ 260 GHz	> +7.0 dBm (meas.)
	260 GHz ≤ f ≤ 300 GHz	> +6.0 dBm (meas.)
	300 GHz ≤ f ≤ 330 GHz	> +5.0 dBm (meas.)
Maximum input power	220 GHz ≤ f ≤ 330 GHz	< +3 dBm

### Measured gain and return loss over frequency

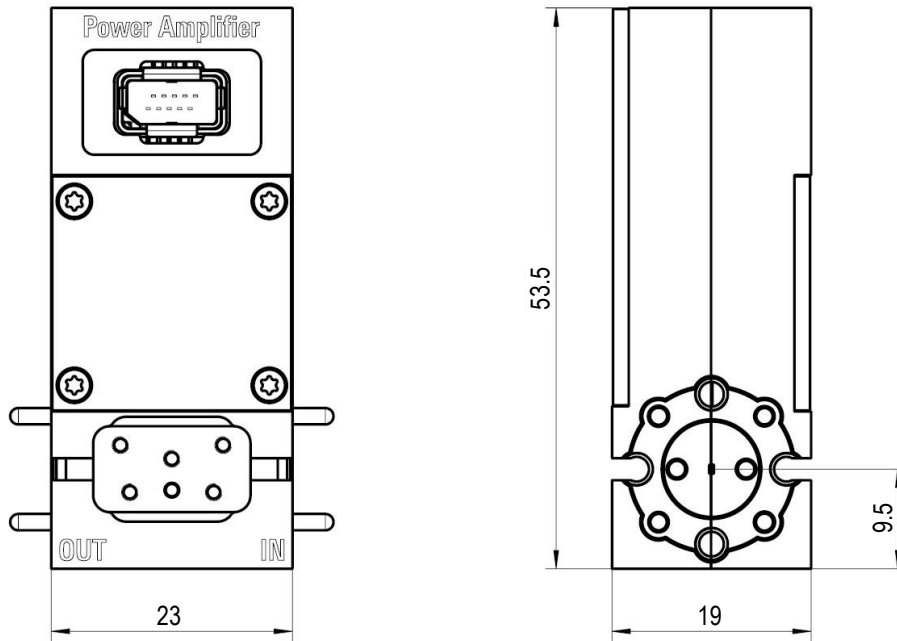


### Measured saturation power over frequency





## Outline drawing



## Inputs and outputs

Input and output D band accessories		
Connector		WM864 / WR3.4
Flange		UG387/U-M
Bias		ix Industrial, type B

**General data**

<b>Temperature</b>		
Temperature range	operating	+10 °C to +40 °C
	maximum case temperature	+50 °C

<b>Mechanical resistance</b>		
Vibration	sinusoidal	5 Hz to 55 Hz, displacement: 0.3 mm, constant amplitude (1.8 g at 55 Hz), in line with EN 60068-2-6
		55 Hz to 150 Hz, acceleration: 0.5 g constant, in line with EN 60068-2-6
	random	8 Hz to 500 Hz, acceleration 1.2 g (RMS), in line with EN 60068-2-64
Shock		40 g shock spectrum, in line with MIL-STD-810G, method 516.6, procedure I

<b>EMC</b>		
		IEC/EN 61326-1 <sup>3, 4</sup> IEC/EN 61326-2-1 CISPR 11/EN 55011

<b>Recommended calibration interval</b>		
		2 years

<b>Surface</b>		
		plated gold

<b>Dimensions and weight</b>		
Dimensions (nom.)	W x H x D (overall)	53.5 mm x 23 mm x 19 mm (2 in x 1.48 in x 0.75 in)
Net weight (nom.)		118 g (0.26 lb)

<sup>3</sup> Emission limits for class A equipment applied.

<sup>4</sup> Immunity test requirement for industrial environment (EN 61326 table 2).

## Ordering information

Designation	Type	Order No.
Waveguide filter, 220 GHz to 250 GHz	R&S®FC330-Z01	1444.6327.02
Waveguide filter, 240 GHz to 270 GHz	R&S®FC330-Z02	1444.6333.02
Waveguide filter, 260 GHz to 290 GHz	R&S®FC330-Z03	1444.6340.02
Waveguide filter, 280 GHz to 310 GHz	R&S®FC330-Z04	1444.6356.02
Waveguide filter, 300 GHz to 330 GHz	R&S®FC330-Z05	1444.6362.02
WR3.4 waveguide-to-waveguide adapter	R&S®FC330-Z20	1444.6385.02
External amplifier, 220 GHz to 330 GHz (for R&S®FC330ST and R&S®FC330SR frequency converters)	R&S®FC330-Z50	1444.6379.02

## Recommended extras

Designation	Type	Order No.
Torque wrench, for waveguide flanges, 0.58 Nm	R&S®ZCTW	1175.2014.02
Angled wrench, 3/32"	R&S®ZCAW	1175.1960.00

## Service options

Warranty		
Base unit		1 year
All other items		1 year
Service options		
	Service plans	On demand
Calibration	up to five years <sup>5</sup>	pay per calibration
Warranty and repair	up to five years <sup>6</sup>	standard price repair
Contact your Rohde & Schwarz sales office for further details.		

<sup>5</sup> For extended periods, contact your Rohde & Schwarz sales office.

<sup>6</sup> For options installed, the remaining base unit warranty applies if longer than 1 year. Exception: all batteries have a 1 year warranty.

## Service at Rohde & Schwarz You're in great hands

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

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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

**ISO 9001**

Certified Environmental Management

**ISO 14001**

## Rohde & Schwarz training

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[www.rohde-schwarz.com/support](http://www.rohde-schwarz.com/support)

