

# R&S® SMZ FREQUENCY MULTIPLIER

## Specifications



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Data Sheet  
Version 05.01

**ROHDE & SCHWARZ**

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# Definitions

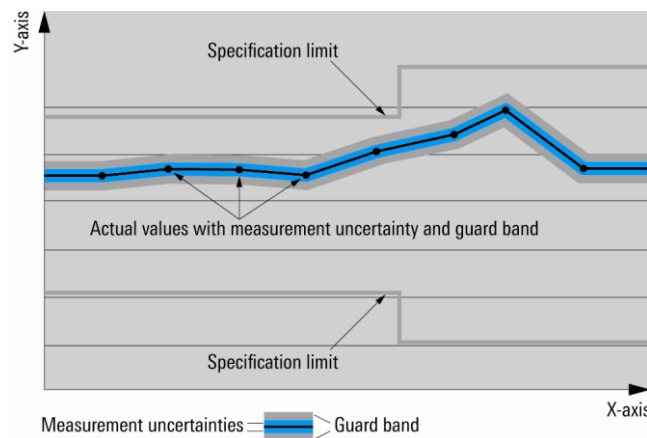
## General

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.



## 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/3GPP2 standard, chip rates are specified in Mcps (million chips per second), whereas bit rates and symbol rates are specified in Gbps (billion bits per second), Mbps (million bits per second), kbps (thousand bits per second), Msps (million symbols per second) or ksp/s (thousand symbols per second), and sample rates are specified in Msample/s (million samples per second). Gbps, Mcps, Mbps, Msps, kbps, ksp/s and Msample/s are not SI units.

# Specifications

## RF performance

### Frequency

Input range	R&S®SMZ75	8.3 GHz to 12.5 GHz
	R&S®SMZ90	10 GHz to 15 GHz
	R&S®SMZ110	12.5 GHz to 18.4 GHz
	R&S®SMZ170	9.1 GHz to 14.2 GHz
Output range	R&S®SMZ75	50 GHz to 75 GHz
	R&S®SMZ90	60 GHz to 90 GHz
	R&S®SMZ110	75 GHz to 110 GHz
	R&S®SMZ170	110 GHz to 170 GHz

### Level

Input	R&S®SMZ75, R&S®SMZ90, R&S®SMZ110, R&S®SMZ170	
	input level for specified output level	+6.7 dBm to +7.3 dBm
	level range for operation	+6 dBm to +10 dBm
	input impedance VSWR in 50 Ω system	< 2
	input connector	K female (50 Ω)
	input damage level	> +16 dBm
Output	output level at specified input level	
	R&S®SMZ75	+5 dBm (typ.)
	R&S®SMZ90	+11 dBm (typ.)
	R&S®SMZ110	+12 dBm (typ.)
	R&S®SMZ170	+8 dBm (typ.)
	with R&S®SMZ-B75M option mechanically controlled attenuator	
	maximum output level at specified input level	+4 dBm (typ.)
	minimum output level at specified input level	< -25 dBm
	with R&S®SMZ-B90M option mechanically controlled attenuator	
	maximum output level at specified input level	+10 dBm (typ.)
	minimum output level at specified input level	< -25 dBm
	with R&S®SMZ-B110M option mechanically controlled attenuator	
	maximum output level at specified input level	+11 dBm (typ.)
	minimum output level at specified input level	< -25 dBm
	level uncertainty	
	> 0 dBm	< 1.0 dB
	0 dBm to > -10 dBm	< 1.5 dB
	-10 dBm to -25 dBm	< 2.0 dB
	with R&S®SMZ-B75E option electronically controlled attenuator	
	maximum output level at specified input level	+1 dBm (typ.)
	minimum output level at specified input level	< -15 dBm
	with R&S®SMZ-B90E option electronically controlled attenuator	
	maximum output level at specified input level	+9 dBm (typ.)
	minimum output level at specified input level	< -7 dBm
	with R&S®SMZ-B110E option electronically controlled attenuator	
	maximum output level at specified input level	+8 dBm (typ.)
	minimum output level at specified input level	< -8 dBm
resolution	0.01 dB	

	level uncertainty	
	> 0 dBm	< 1.0 dB
	0 dBm to > -5 dBm	< 1.5 dB
	-5 dBm to -15 dBm	< 2.0 dB
	output impedance VSWR	< 1.7

### Spectral purity

Harmonics	R&S®SMZ75	< -20 dBc (meas.)
	R&S®SMZ90	< -20 dBc (meas.)
	R&S®SMZ110	< -20 dBc (meas.)
	R&S®SMZ170	< -20 dBc (meas.)
Subharmonics (in-band)	R&S®SMZ75	
	50 GHz to 55 GHz	< -10 dBc (typ.)
	> 55 GHz to 70 GHz	< -20 dBc (typ.)
	> 70 GHz to 75 GHz	< -10 dBc (typ.)
	R&S®SMZ90	
	60 GHz to 70 GHz	< -10 dBc (typ.)
	> 70 GHz to 90 GHz	< -20 dBc (typ.)
	R&S®SMZ110	< -20 dBc (typ.)
	R&S®SMZ170	
	110 GHz to 120 GHz	< -10 dBc (typ.)
	> 120 GHz to 145 GHz	< -20 dBc (typ.)
	> 145 GHz to 170 GHz	< -15 dBc (typ.)
In-band spurious	R&S®SMZ75	< -20 dBc (typ.)
	R&S®SMZ90	< -20 dBc (typ.)
	R&S®SMZ110	< -20 dBc (typ.)
	R&S®SMZ170	< -20 dBc (typ.)

## Connectors

### Front panel connector

Test port adapter with Rohde & Schwarz precision flange UG387/U-M & IEEE1785.2 flange compatible	RF output port	
	R&S®SMZ75	waveguide WR15
	R&S®SMZ90	waveguide WR12
	R&S®SMZ110	waveguide WM2540 (WR10)
	R&S®SMZ170	waveguide WM1651 (WR6.5)

### Rear panel connectors

RF input connector	RF IN	K female (50 Ω)
Power connector	connector type	DIN 45323
	voltage	+9 V ± 540 mV
	current	
	R&S®SMZ75, R&S®SMZ90, R&S®SMZ110	< 1 A
	R&S®SMZ170	< 2 A

## General data

<b>DC power adapter</b>		
Order No.	to be delivered with R&S®SMZ75, R&S®SMZ90, R&S®SMZ110	1307.8929.00
	to be delivered with R&S®SMZ170	3589.6959.00
AC input voltage range		100 V to 240 V ± 10 %
AC supply frequency		50 Hz to 60 Hz – 6 %/+ 5 %
Max. input current	R&S®SMZ75, R&S®SMZ90, R&S®SMZ110	0.045 A
	R&S®SMZ170	0.09 A
Power consumption, fully equipped, 230 V AC	R&S®SMZ75, R&S®SMZ90, R&S®SMZ110	10 W (meas.)
	R&S®SMZ170	20 W (meas.)
<b>EMC</b>		
Electromagnetic compatibility		in line with EN 55011 class A, EN 61326-1
Immunity to interfering field strength		up to 10 V/m
<b>Mechanical resistance</b>		
Vibration	sinusoidal	5 Hz to 150 Hz, max. 2 g at 55 Hz, max. 0.5 g at 55 Hz to 150 Hz, in line with EN 60068-2-6
	random	10 Hz to 300 Hz, acceleration 1.2 g RMS, in line with EN 60068-2-64
Shock		40 g shock spectrum, in line with MIL-STD-810E, method No. 516.4, procedure I
<b>Environmental conditions</b>		
Temperature range	operating temperature range	+18 °C to +30 °C
	permissible temperature range	+5 °C to +40 °C
	storage	–40 °C to +71 °C
Climatic resistance	test: +40 °C/80 % rel. humidity	in line with EN 60068-2-30
<b>Dimensions and weight</b>		
Dimensions	W x H x D (with feet height adjusted to 12 mm)	114 mm x 78 mm x 278 mm (4.49 in x 3.07 in x 10.94 in)
Weight	when fully equipped (including DC power adapter)	1.4 kg (3.09 lb)
<b>Calibration interval</b>		
Recommended calibration interval	operation 40 h/week in the full range of the specified environmental conditions	3 years

## Ordering information

Designation	Type	Order No.
<b>Base unit</b>		
Frequency multiplier, 50 GHz to 75 GHz	R&S®SMZ75	1417.4004K02
Frequency multiplier, 60 GHz to 90 GHz	R&S®SMZ90	1417.4504K02
Frequency multiplier, 75 GHz to 110 GHz	R&S®SMZ110	1417.5000K02
Frequency multiplier, 110 GHz to 170 GHz	R&S®SMZ170	1417.5500K02
Including waveguide-to-waveguide adapter, DC power adapter, USB cable, hex ball driver 3/32, operating manual, CD-ROM with operating manual		
<b>Hardware options</b>		
Mechanically controlled attenuator for the R&S®SMZ75	R&S®SMZ-B75M <sup>1</sup>	1417.6007.02
Electronically controlled attenuator for the R&S®SMZ75	R&S®SMZ-B75E <sup>1</sup>	1417.6107.02
Mechanically controlled attenuator for the R&S®SMZ90	R&S®SMZ-B90M <sup>1</sup>	1417.6507.02
Electronically controlled attenuator for the R&S®SMZ90	R&S®SMZ-B90E <sup>1</sup>	1417.6607.02
Mechanically controlled attenuator for the R&S®SMZ110	R&S®SMZ-B110M <sup>1</sup>	1417.7003.02
Electronically controlled attenuator for the R&S®SMZ110	R&S®SMZ-B110E <sup>1</sup>	1417.7103.02
<b>Software option</b>		
Software license for external PC software	R&S®SMZ-K1	1417.8400.02
<b>Recommended extras</b>		
Hardcopy manual (English)		1417.4027.32
Coaxial cable with SMA connectors 50 Ω (length 0.5 m)		3586.9963.00
Coaxial cable with SMA connectors 50 Ω (length 1.0 m)		3586.9970.00
Waveguide-to-waveguide adapter WR6.5, HP/A compatible (as test port saver)		1314.5815.00
Waveguide-to-waveguide adapter WR10, HP/A compatible (as test port saver)		1307.7074.00
Waveguide-to-waveguide adapter WR12, HP/A compatible (as test port saver)		1314.5796.00
Waveguide-to-waveguide adapter WR15, HP/A compatible (as test port saver)		1314.5780.00
USB cable, USB/-A to USB/-B (length 2.0 m)		1507.0567.00
Hex ball driver 3/32		1307.8670.00

<b>Service options</b>		
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 <sup>2</sup>. 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 <sup>2</sup> and calibration at the recommended intervals as well as any calibration carried out during repairs or option upgrades.

<sup>1</sup> Factory-installed option (only a mechanically or electronically controlled attenuator can be fitted; no attenuator option is available for the R&S®SMZ170).

<sup>2</sup> Excluding defects caused by incorrect operation or handling and force majeure. Wear-and-tear parts are not included.