

# R&S® ZVB

## Vector Network Generator

### Specifications



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# Definitions

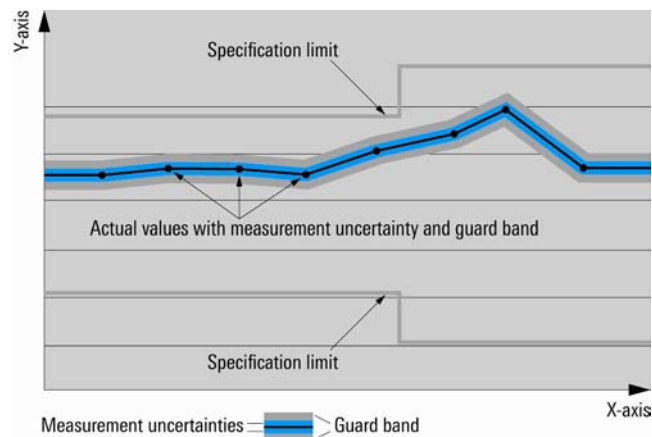
## General

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

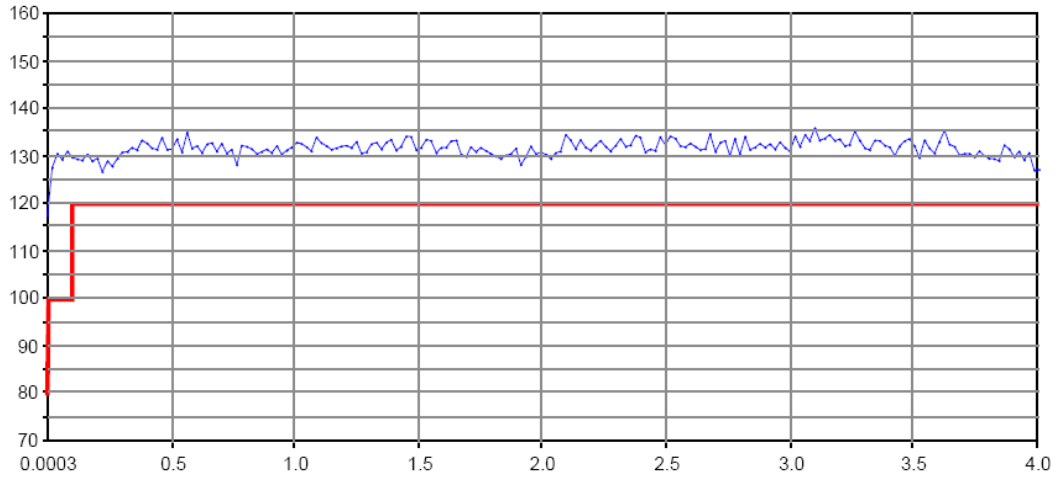
Represent limits of measurement uncertainty for a given measurand. Uncertainty is defined with a coverage factor of 2 and has been calculated in line with the rules of the Guide to the Expression of Uncertainty in Measurement (GUM), taking into account environmental conditions, aging, wear and tear.

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

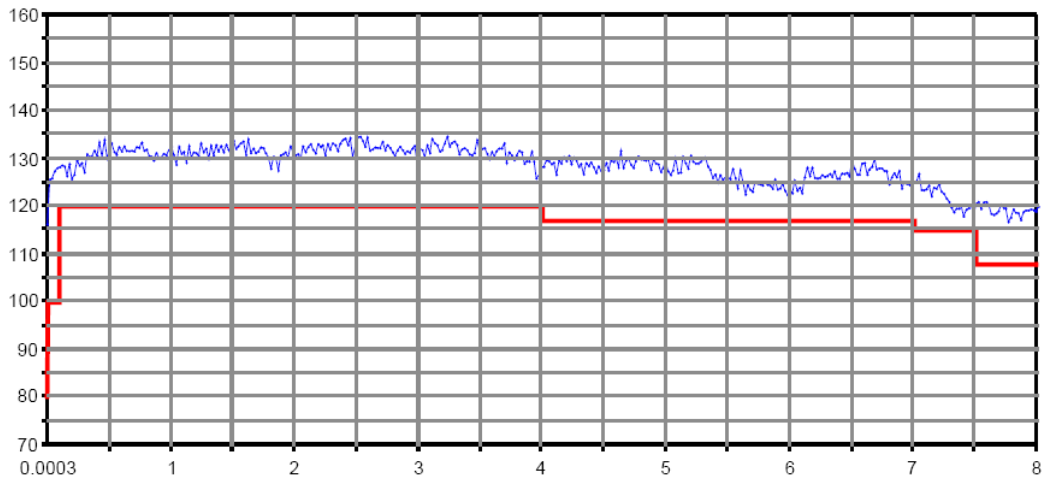
# Specifications

## Measurement range

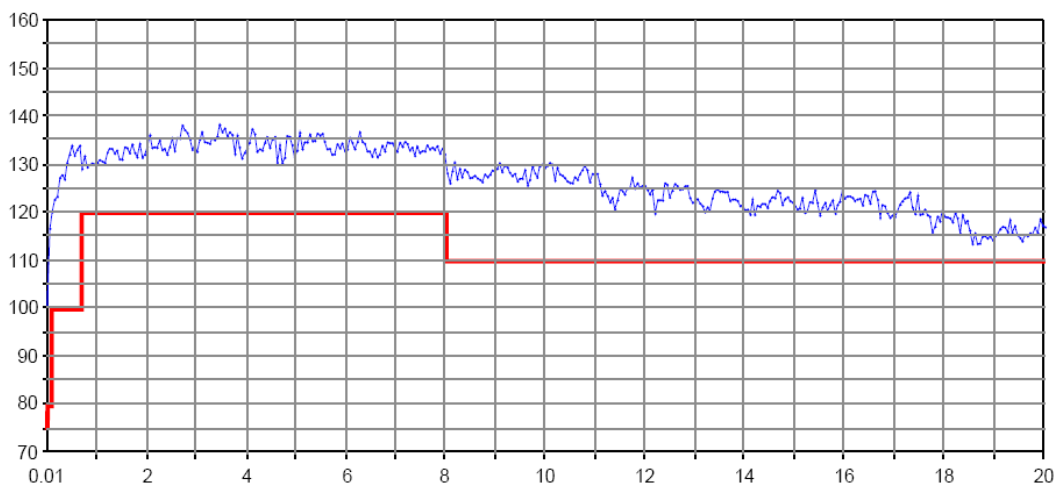
Impedance		50 $\Omega$
Test port connector	R&S <sup>®</sup> ZVB4 and R&S <sup>®</sup> ZVB8	type N, female
	R&S <sup>®</sup> ZVB14 and R&S <sup>®</sup> ZVB20	3.5 mm, male
Number of test ports		2 or 4
Frequency range	R&S <sup>®</sup> ZVB4	300 kHz to 4 GHz
	R&S <sup>®</sup> ZVB8	300 kHz to 8 GHz
	R&S <sup>®</sup> ZVB14	10 MHz to 14 GHz
	R&S <sup>®</sup> ZVB20	10 MHz to 20 GHz
Static frequency accuracy	without optional oven quartz	$8 \times 10^{-6}$
	with optional oven quartz	$1 \times 10^{-7}$
Frequency resolution		1 Hz
Number of measurement points	per trace	2 to 60001
Measurement bandwidths	1/2/5 steps	1 Hz to 500 kHz
Dynamic range of the R&S <sup>®</sup> ZVB4 two-port model and the R&S <sup>®</sup> ZVB8 two-port model (without optional step attenuators)	from PORT 1 to PORT 2	
	300 kHz to 5 MHz	> 80 dB, typ. 100 dB
	5 MHz to 100 MHz	> 100 dB, typ. 120 dB
	100 MHz to 4 GHz	> 120 dB, typ. 130 dB
	4 GHz to 7 GHz (R&S <sup>®</sup> ZVB8 only)	> 117 dB, typ. 127 dB
	7 GHz to 7.5 GHz (R&S <sup>®</sup> ZVB8 only)	> 115 dB, typ. 120 dB
Dynamic range of the R&S <sup>®</sup> ZVB4 four-port model and the R&S <sup>®</sup> ZVB8 four-port model (without optional step attenuators)	from PORT 1 to PORT 2 and from PORT 3 to PORT 4 (for four-port models only)	
	300 kHz to 5 MHz	> 80 dB, typ. 100 dB
	5 MHz to 100 MHz	> 100 dB, typ. 120 dB
	100 MHz to 500 MHz	> 120 dB, typ. 130 dB
	500 MHz to 4 GHz	> 123 dB, typ. 130 dB
	4 GHz to 7 GHz (R&S <sup>®</sup> ZVB8 only)	> 120 dB, typ. 130 dB
	7 GHz to 7.5 GHz (R&S <sup>®</sup> ZVB8 only)	> 115 dB, typ. 125 dB
Dynamic range of the R&S <sup>®</sup> ZVB14	from PORT 1 to PORT 2 and from PORT 3 to PORT 4 (for four-port model only)	
	10 MHz to 100 MHz	> 80 dB, typ. 110 dB
	100 MHz to 700 MHz	> 100 dB, typ. 130 dB
	700 MHz to 8 GHz	> 120 dB, typ. 133 dB
	8 GHz to 14 GHz	> 110 dB, typ. 122 dB
Dynamic range of the R&S <sup>®</sup> ZVB20	from PORT 1 to PORT 2 and from PORT 3 to PORT 4 (for four-port model only)	
	10 MHz to 100 MHz	> 80 dB, typ. 110 dB
	100 MHz to 700 MHz	> 100 dB, typ. 130 dB
	700 MHz to 8 GHz	> 120 dB, typ. 133 dB
Dynamic range of the R&S <sup>®</sup> ZVB20	from PORT 1 to PORT 2 and from PORT 3 to PORT 4 (for four-port model only)	
	10 MHz to 100 MHz	> 80 dB, typ. 110 dB
	100 MHz to 700 MHz	> 100 dB, typ. 130 dB
	700 MHz to 8 GHz	> 120 dB, typ. 133 dB
Dynamic range of the R&S <sup>®</sup> ZVB20	from PORT 1 to PORT 2 and from PORT 3 to PORT 4 (for four-port model only)	
	10 MHz to 100 MHz	> 80 dB, typ. 110 dB
	100 MHz to 700 MHz	> 100 dB, typ. 130 dB
	700 MHz to 8 GHz	> 120 dB, typ. 133 dB
The dynamic range is defined as the difference between the actually available maximum source power and the RMS value of the data trace of the transmission magnitude, which is produced by noise and crosstalk with the test ports short-circuited. The specification applies at 10 Hz measurement bandwidth and without system error correction. The dynamic range can be increased by using a measurement bandwidth of 1 Hz.		



Dynamic range in dB versus frequency in GHz of the R&S<sup>®</sup>ZVB4.



Dynamic range in dB versus frequency in GHz of the R&S<sup>®</sup>ZVB8.



Dynamic range in dB versus frequency in GHz of the R&S<sup>®</sup>ZVB14 (up to 14 GHz) and the R&S<sup>®</sup>ZVB20.

## Measurement speed

Measurement time	for 201 measurement points, with span 100 MHz, 500 kHz measurement bandwidth, ALC and display switched OFF	
	with center frequency 1.1 GHz	< 6 ms
	with center frequency 5.1 GHz	< 4.5 ms
Measurement time per point	500 kHz measurement bandwidth, CW mode	< 4.5 $\mu$ s
Data transfer time	for 201 measurement points	
	via IEC/IEEE bus	< 2.9 ms
	via VX11 over 100 Mbit/s LAN	< 1.3 ms
	via RSIB over 100 Mbit/s LAN	< 0.7 ms
Time for measurement and data transfer	for 201 measurement points, with start frequency 1 GHz, stop frequency 1.1 GHz, 500 kHz measurement bandwidth, and display switched OFF (No additional time for data transfer is needed, as this occurs simultaneously during the measurement.)	< 6 ms
Switching time between channels	with not more than 2001 points	< 1 ms
Switching time between two preloaded instrument settings	with not more than 2001 points	< 10 ms

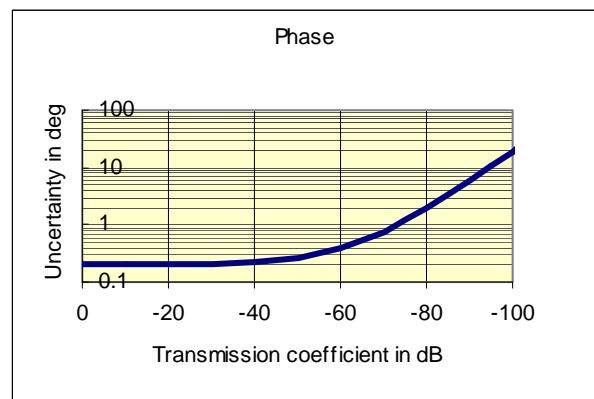
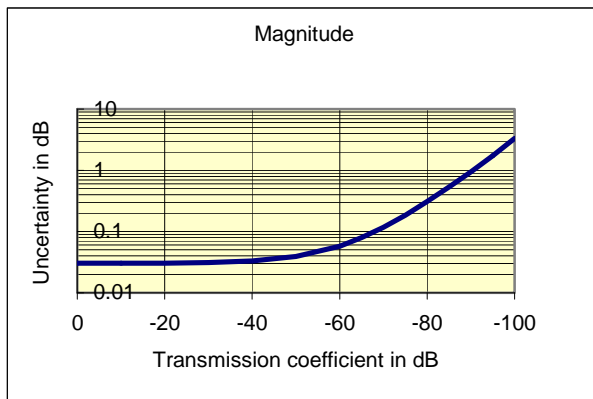
### Typical sweep times versus number of measurement points

Number of measurement points	51	101	201	401	801	1601
Start frequency 5 GHz, stop frequency 5.2 GHz, ALC OFF, and a measurement bandwidth of 100 kHz						
With full one-port calibration or with correction switched OFF	2.4 ms	3.9 ms	6.3 ms	11 ms	20.4 ms	40.2 ms
With TOSM calibration	4.7 ms	8.6 ms	16.4 ms	32.4 ms	65 ms	170 ms
Start frequency 6 GHz, stop frequency 8 GHz, ALC OFF, and a measurement bandwidth of 100 kHz						
With full one-port calibration or with correction switched OFF	3.4 ms	6.2 ms	11 ms	17.3 ms	28.2 ms	49 ms
With TOSM calibration	5.3 ms	9.8 ms	18 ms	33 ms	63 ms	160 ms
Start frequency 10 MHz, stop frequency 4 GHz (R&S®ZVB4), 8 GHz (R&S®ZVB8), 14 GHz (R&S®ZVB14), or 20 GHz (R&S®ZVB20), ALC OFF, and a measurement bandwidth of 100 kHz						
With full one-port calibration or with correction switched OFF	8.4 ms	12.6 ms	19.5 ms	30.5 ms	53.2 ms	88.2 ms
With TOSM calibration	10.3 ms	16.6 ms	28 ms	47 ms	81 ms	190 ms

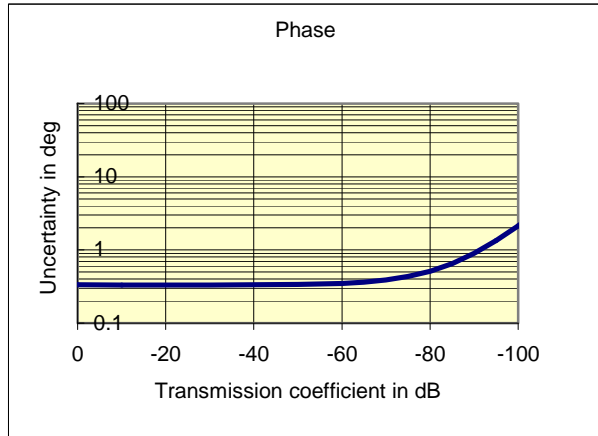
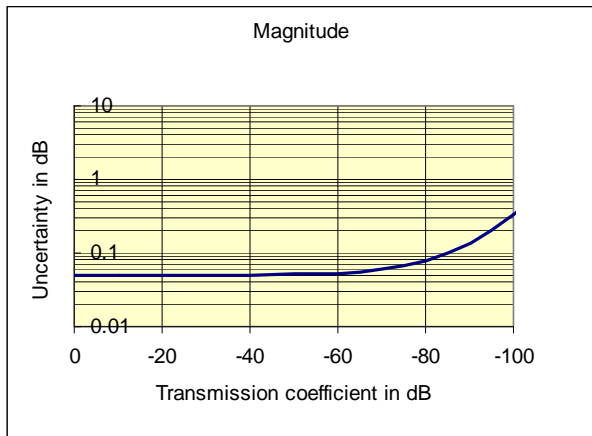
## Measurement accuracy

This data is valid between +18 °C and +28 °C, provided the temperature has not varied by more than 1 K after calibration. Validity of the data is conditional on the use of a suitable calibration kit. This calibration kit is used to achieve the effective system data specified below. Frequency points, measurement bandwidth, and sweep time have to be identical for measurement and calibration (no interpolation allowed).

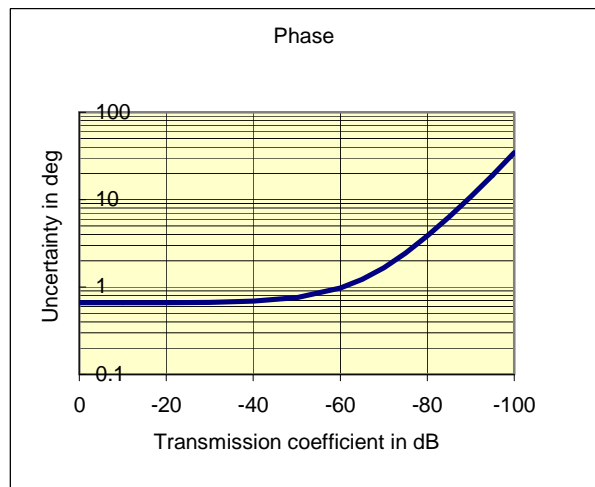
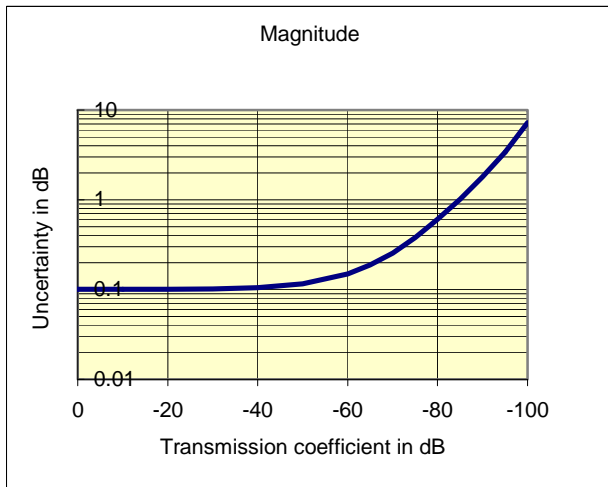
Accuracy of transmission measurements		
R&S®ZVB4 and R&S®ZVB8		
300 kHz to 1 MHz	+15 dB to –45 dB	< 1 dB or < 6°
1 MHz to 50 MHz	+15 dB to –30 dB	< 0.2 dB or < 2°
	–30 dB to –45 dB	< 1 dB or < 6°
Above 50 MHz	+15 dB to +5 dB	< 0.2 dB or < 2°
	+5 dB to –55 dB	< 0.1 dB or < 1°
	–55 dB to –70 dB	< 0.2 dB or < 2°
	–70 dB to –85 dB	< 1 dB or < 6°
R&S®ZVB14 and R&S®ZVB20		
10 MHz to 50 MHz	+15 dB to –30 dB	< 1 dB or < 6°
50 MHz to 400 MHz	+15 dB to –30 dB	< 0.2 dB or < 2°
	–30 dB to –45 dB	< 1 dB or < 6°
400 MHz to 700 MHz	+15 dB to +5 dB	< 0.2 dB or < 2°
	+5 dB to –35 dB	< 0.1 dB or < 1°
	–35 dB to –50 dB	< 0.2 dB or < 2°
	–50 dB to –65 dB	< 1 dB or < 6°
700 MHz to 8 GHz	+15 dB to +5 dB	< 0.2 dB or < 2°
	+5 dB to –55 dB	< 0.1 dB or < 1°
	–55 dB to –70 dB	< 0.2 dB or < 2°
	–70 dB to –85 dB	< 1 dB or < 6°
Above 8 GHz	+15 dB to +5 dB	< 0.2 dB or < 2°
	+5 dB to –35 dB	< 0.1 dB or < 1°
	–35 dB to –50 dB	< 0.2 dB or < 2°
	–50 dB to –65 dB	< 1 dB or < 6°
Specifications are based on a matched DUT, a measurement bandwidth of 10 Hz, and a nominal source power of –10 dBm.		



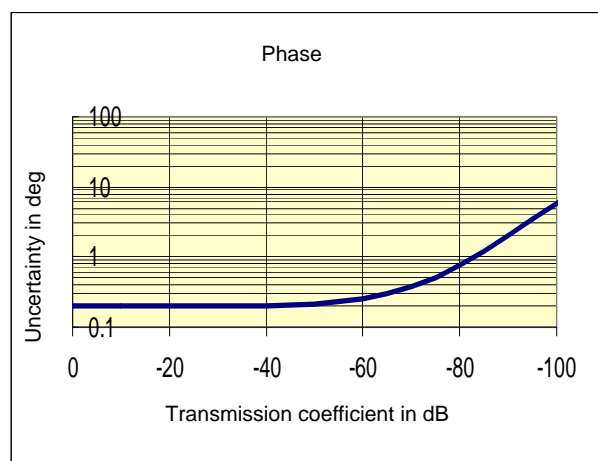
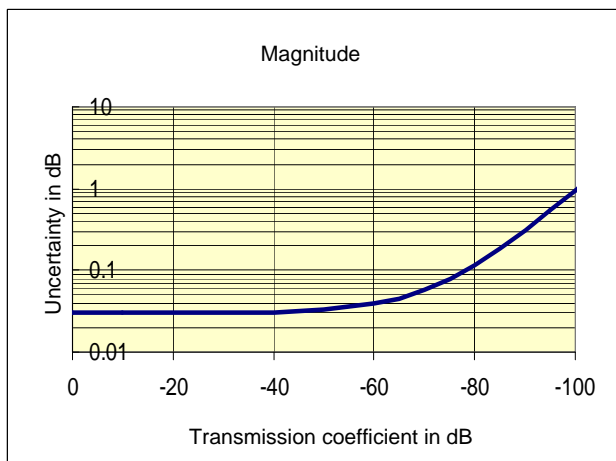
Typical accuracy of transmission magnitude and transmission phase measurements of the R&S®ZVB4 and the R&S®ZVB8 in the frequency range from 300 kHz to 50 MHz.



Typical accuracy of transmission magnitude and transmission phase measurements of the R&S®ZVB8 in the frequency range from 50 MHz to 8 GHz.



Typical accuracy of transmission magnitude and transmission phase measurements of the R&S®ZVB14 and the R&S®ZVB20 in the frequency range from 10 MHz to 700 MHz.



Typical accuracy of transmission magnitude and transmission phase measurements of the R&S®ZVB14 (in the frequency range from 700 MHz to 14 GHz) and the R&S®ZVB20 (in the frequency range from 700 MHz to 20 GHz).



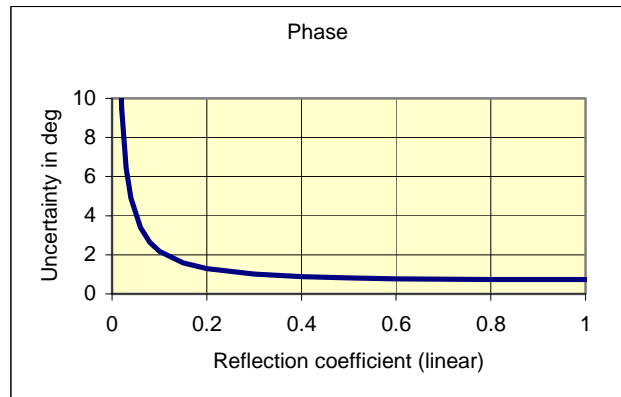
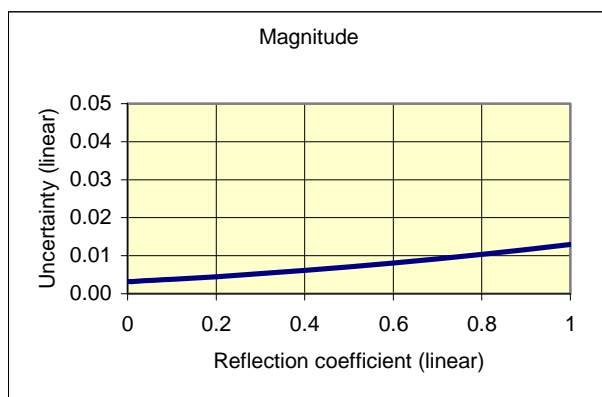
**Accuracy of reflection measurements****R&S®ZVB4 and R&S®ZVB8**

Above 300 kHz	+10 dB to +3 dB	< 0.6 dB or < 4°
	+3 dB to -15 dB	< 0.4 dB or < 3°
	-15 dB to -25 dB	< 1 dB or < 6°
	-25 dB to -35 dB	< 3 dB or < 20°

**R&S®ZVB14 and R&S®ZVB20**

10 MHz to 50 MHz	+3 dB to -15 dB	< 1 dB or < 6°
	-15 dB to -25 dB	< 3 dB or < 20°
Above 50 MHz	+10 dB to +3 dB	< 0.6 dB or < 4°
	+3 dB to -15 dB	< 0.4 dB or < 3°
	-15 dB to -25 dB	< 1 dB or < 6°
	-25 dB to -35 dB	< 3 dB or < 20°

Specifications are based on an isolating DUT, a measurement bandwidth of 10 Hz, and a nominal source power of -10 dBm.



*Typical accuracy of reflection magnitude and reflection phase measurements of the R&S®ZVB4 in the frequency range from 300 kHz to 4 GHz, of the R&S®ZVB8 in the frequency range from 300 kHz to 8 GHz, of the R&S®ZVB14 in the frequency range from 50 MHz to 14 GHz, and of the R&S®ZVB20 in the frequency range from 50 MHz to 20 GHz.*

**Trace stability**

Trace noise of $S_{11}$ (RMS)	at 0 dBm source power, 0 dB reflection, and 1 kHz measurement bandwidth	
	R&S®ZVB4 and R&S®ZVB8	
	above 300 kHz	< 0.004 dB, typ. 0.001 dB
	R&S®ZVB14 and R&S®ZVB20	
	700 MHz to 8 GHz	< 0.004 dB, typ. 0.001 dB
	above 8 GHz	< 0.015 dB, typ. 0.004 dB
Temperature dependence	at 0 dB transmission or reflection	< 0.05 dB/K or < 0.4°/K

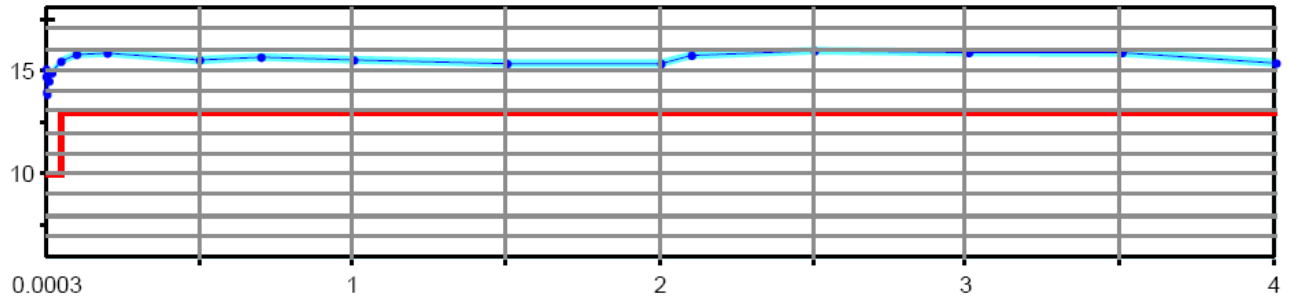
## Effective system data

This data is valid between +18 °C and +28 °C, provided the temperature has not varied by more than 1 K after calibration. The data is based on a measurement bandwidth of 10 Hz and system error calibration by means of a suitable calibration kit. Frequency points, measurement bandwidth, and sweep time have to be identical for measurement and calibration (no interpolation allowed).

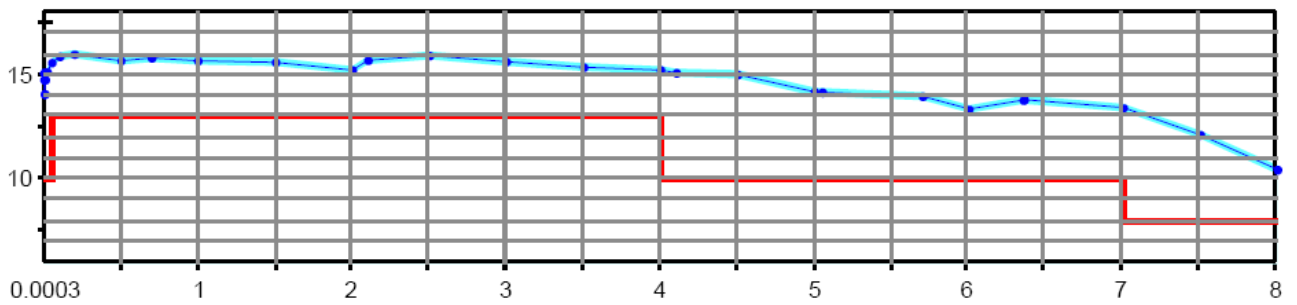
<b>R&amp;S®ZVB4 and R&amp;S®ZVB8</b>		
Directivity	300 kHz to 4 GHz	> 46 dB, typ. 50 dB
	4 GHz to 8 GHz (R&S®ZVB8 only)	> 40 dB, typ. 50 dB
Source match	300 kHz to 4 GHz	> 40 dB, typ. 46 dB
	4 GHz to 8 GHz (R&S®ZVB8 only)	> 36 dB, typ. 40 dB
Reflection tracking	300 kHz to 4 GHz	< 0.04 dB, typ. 0.01 dB
	4 GHz to 8 GHz (R&S®ZVB8 only)	< 0.1 dB, typ. 0.01 dB
Load match	300 kHz to 4 GHz	> 46 dB, typ. 50 dB
	4 GHz to 8 GHz (R&S®ZVB8 only)	> 40 dB, typ. 46 dB
Transmission tracking	300 kHz to 4 GHz	< 0.06 dB, typ. 0.01 dB
	4 GHz to 8 GHz (R&S®ZVB8 only)	< 0.1 dB, typ. 0.05 dB
<b>R&amp;S®ZVB14 and R&amp;S®ZVB20</b>		
Directivity	10 MHz to 700 MHz	> 36 dB, typ. 40 dB
	above 700 MHz	> 40 dB, typ. 50 dB
Source match	10 MHz to 700 MHz	> 30 dB, typ. 48 dB
	above 700 MHz	> 30 dB, typ. 48 dB
Reflection tracking	10 MHz to 700 MHz	< 0.3 dB, typ. 0.05 dB
	above 700 MHz	< 0.3 dB, typ. 0.05 dB
Load match	10 MHz to 700 MHz	> 36 dB, typ. 40 dB
	above 700 MHz	> 40 dB, typ. 50 dB
Transmission tracking	10 MHz to 700 MHz	< 0.2 dB, typ. 0.1 dB
	above 700 MHz	< 0.1 dB, typ. 0.05 dB

## Test port output

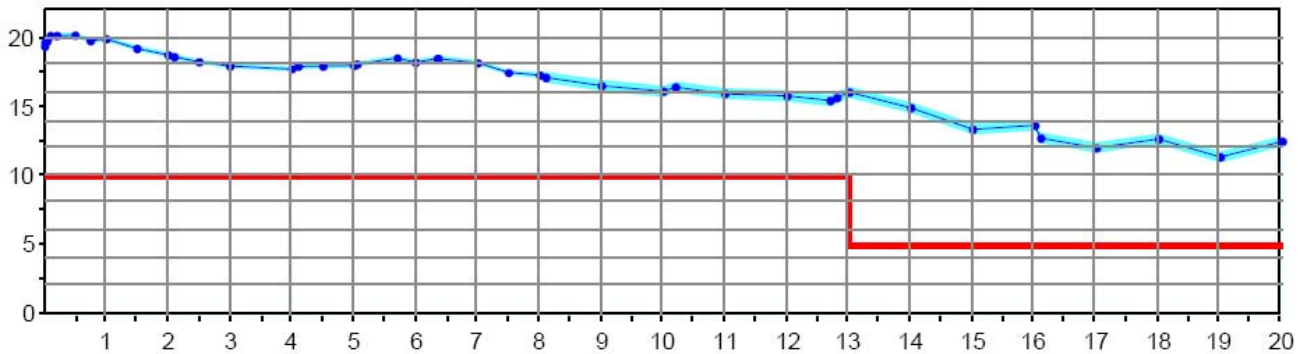
Power range (without optional step attenuators)	R&S®ZVB4 and R&S®ZVB8	
	300 kHz to 50 MHz	-40 dBm to +10 dBm, typ. -45 dBm to +14 dBm
	50 MHz to 4 GHz	-40 dBm to +13 dBm, typ. -45 dBm to +15 dBm
	4 GHz to 7 GHz (R&S®ZVB8 only)	-40 dBm to +10 dBm, typ. -45 dBm to +13 dBm
	7 GHz to 8 GHz (R&S®ZVB8 only)	-40 dBm to +8 dBm, typ. -45 dBm to +12 dBm
	R&S®ZVB14 and R&S®ZVB20	
	10 MHz to 13 GHz	-30 dBm to +10 dBm, typ. -40 dBm to +15 dBm
	above 13 GHz	-30 dBm to +5 dBm, typ. -40 dBm to +10 dBm
Power accuracy (with ALC ON and without power calibration)	R&S®ZVB4 and R&S®ZVB8	
	at -10 dBm	< 2 dB
	in temperature range +18 °C to +28 °C	
	above 50 MHz	< 0.8 dB, typ. 0.3 dB
	R&S®ZVB14 and R&S®ZVB20	
	at -10 dBm	< 3 dB
Power linearity	referenced to -10 dBm	
	in temperature range +18 °C to +28 °C	
	R&S®ZVB4 and R&S®ZVB8	
	above 50 MHz	< 0.8 dB, typ. 0.2 dB
	R&S®ZVB14 and R&S®ZVB20	
	above 500 MHz	< 0.8 dB, typ. 0.2 dB
Power resolution	0.01 dB	
Harmonics (output power referenced to maximum specified output power)	R&S®ZVB4 and R&S®ZVB8	
	300 kHz to 50 MHz at -3 dB	typ. < -30 dBc
	50 MHz to 4 GHz at -5 dB	< -20 dBc, typ. < -30 dBc
	4 GHz to 7 GHz at -2 dB (R&S®ZVB8)	< -20 dBc, typ. < -30 dBc
	7 GHz to 8 GHz at 0 dB (R&S®ZVB8)	< -20 dBc, typ. < -30 dBc
	R&S®ZVB14 and R&S®ZVB20	
	10 MHz to 50 MHz at -3 dB	typ. < -30 dBc
	50 MHz to 13 GHz at 0 dB	< -20 dBc, typ. < -30 dBc
above 13 GHz at 0 dB	< -20 dBc, typ. < -30 dBc	



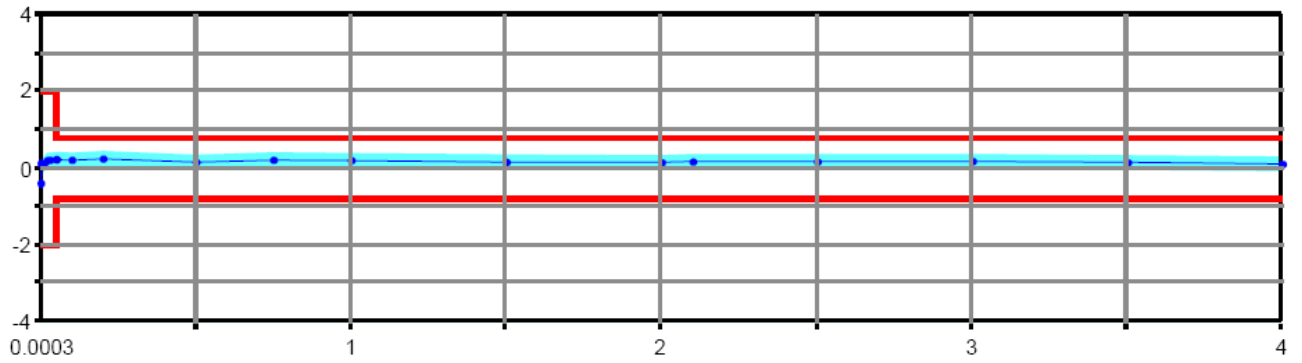
Maximum output power in dBm versus frequency in GHz of the R&S<sup>®</sup>ZVB4.



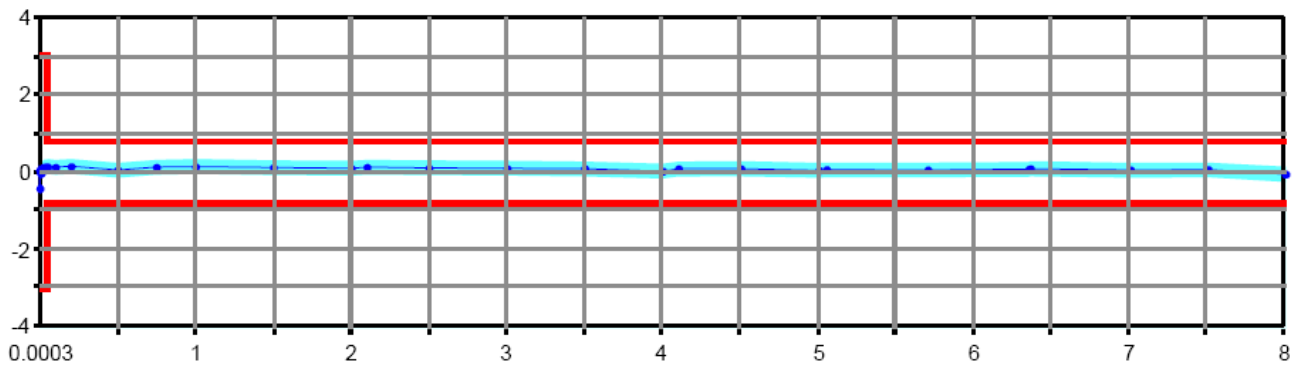
Maximum output power in dBm versus frequency in GHz of the R&S<sup>®</sup>ZVB8.



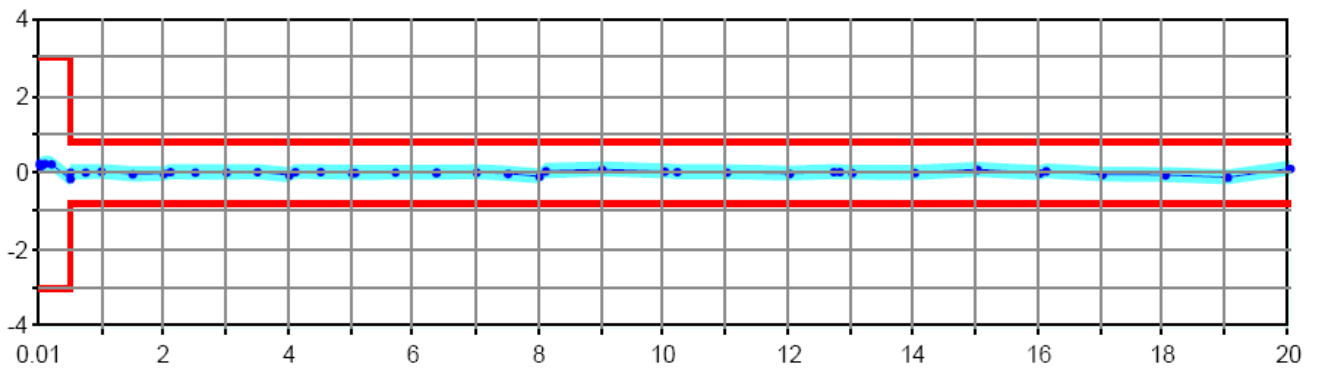
Maximum output power in dBm versus frequency in GHz of the R&S<sup>®</sup>ZVB14 (up to 14 GHz) and the R&S<sup>®</sup>ZVB20.



Output power accuracy in dB versus frequency in GHz of the R&S<sup>®</sup>ZVB4.



Output power accuracy in dB versus frequency in GHz of the R&S<sup>®</sup>ZVB8.



Output power accuracy in dB versus frequency in GHz of the R&S<sup>®</sup>ZVB14 (up to 14 GHz) and the R&S<sup>®</sup>ZVB20.

## Test port input

Match	without system error correction	
	R&S®ZVB4	
	300 kHz to 4 GHz	> 16 dB
	R&S®ZVB8	
	300 kHz to 7 GHz	> 16 dB
	7 GHz to 8 GHz	> 14 dB
	R&S®ZVB14 and R&S®ZVB20	
	10 MHz to 50 MHz	> 10 dB
	50 MHz to 2 GHz	> 12 dB
above 2 GHz	> 8 dB	
Maximum nominal input level	R&S®ZVB4 and R&S®ZVB8	
	R&S®ZVB14 and R&S®ZVB20	
	10 MHz to 8 GHz	+10 dBm
	above 8 GHz	+5 dBm
Power measurement accuracy	at -10 dBm without power calibration in temperature range +18 °C to +28 °C	
	10 MHz to 8 GHz	< 1 dB
	above 8 GHz (R&S®ZVB14 and R&S®ZVB20 only)	< 2 dB
Receiver linearity	referenced to -10 dBm in temperature range +18 °C to +28 °C	
	R&S®ZVB4 and R&S®ZVB8	
	for +20 dB to -60 dB	
	50 MHz to 4 GHz	< 0.1 dB
	4 GHz to 6 GHz (R&S®ZVB8 only)	< 0.1 dB
	6 GHz to 8 GHz (R&S®ZVB8 only)	< 0.2 dB
	for -60 dB to -130 dB	
	50 MHz to 4 GHz	typ. < 0.1 dB
	4 GHz to 6 GHz (R&S®ZVB8 only)	typ. < 0.1 dB
	6 GHz to 8 GHz (R&S®ZVB8 only)	typ. < 0.2 dB
	R&S®ZVB14 and R&S®ZVB20	
	for +20 dB to -30 dB	
	50 MHz to 700 MHz	< 0.1 dB
	for -30 dB to -130 dB	
	50 MHz to 700 MHz	typ. < 0.1 dB
	for +20 dB to +10 dB	
	700 MHz to 8 GHz	< 0.3 dB
	for +15 dB to +10 dB	
	above 8 GHz	< 0.3 dB
	for +10 dB to -45 dB	
above 700 MHz	< 0.1 dB	
for -45 dB to -122 dB		
above 700 MHz	typ. < 0.1 dB	
Damage level		+27 dBm
Damage DC voltage		30 V
Noise level	at 10 Hz measurement bandwidth	
	R&S®ZVB4 and R&S®ZVB8	
	300 kHz to 100 MHz	< -70 dBm
	100 MHz to 4 GHz	< -110 dBm
	4 GHz to 8 GHz (R&S®ZVB8 only)	< -105 dBm
	R&S®ZVB14 and R&S®ZVB20	
	100 MHz to 700 MHz	< -70 dBm
	700 MHz to 8 GHz	< -105 dBm
above 8 GHz	< -100 dBm	
The noise level is defined as the RMS value of the indicated noise floor.		

## Additional front panel connectors

<b>USB</b>	(two) universal serial bus connectors for connecting USB devices (USB 1.1); two additional USB connectors at the rear panel
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## Display

<b>Screen</b>	21 cm (8.4") diagonal color LCD
<b>Resolution</b>	800 × 600 × 262144 (high color)

## Rear panel connectors

<b>IEC BUS</b>	remote control in line with IEEE488, IEC60625; 24 pins
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<b>LAN 1</b>	first local area network connector, 8 pins, RJ-45
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<b>LAN 2</b>	second local area network connector, 8 pins, RJ-45
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<b>USB</b>	(two) universal serial bus connectors for connecting USB devices (USB 1.1); two additional USB connectors at the front panel
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<b>10 MHz REF</b>	alternatively input or output for external frequency reference signal	
Connector type		BNC, female
Input frequency		10 MHz
Maximum permissible deviation		1 kHz
Input power		-5 dBm to +10 dBm
Input impedance		50 Ω
Output frequency		10 MHz
Output frequency accuracy		80 Hz
Output power		-5 dBm to +10 dBm at 50 Ω

<b>DC MEAS 1 V</b>	DC measurement input	
Connector type		4-pin mini DIN, female
Voltage range		-1 V to +1 V
Measurement accuracy		2.5 % of reading + 2.5 mV
Resolution		12 bit
Bandwidth		< 100 kHz
Input impedance		> 10 kΩ
Damage voltage		30 V

<b>DC MEAS 10 V</b>	DC measurement input	
Connector type		4-pin mini DIN, female
Voltage range		-10 V to +10 V
Measurement accuracy		2.5 % of reading + 25 mV
Resolution		12 bit
Bandwidth		< 100 kHz
Input impedance		> 10 kΩ
Damage voltage		30 V

<b>PORT BIAS</b>	DC bias input for PORT	
Connector type		BNC, female
Maximum nominal input voltage		30 V
Maximum nominal input current		200 mA
Damage voltage		30 V
Damage current		500 mA

<b>MONITOR</b>	IBM PC compatible VGA monitor connector, 15-pin D-Sub (for external monitor)	
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<b>USER CONTROL</b>	several control and trigger signals, 25-pin D-Sub, 3.3 V TTL for controlling external generators, for limit checks, sweep signals, etc.	
FOOT SWITCH 1 and FOOT SWITCH 2	pin 24 and pin 25 (inputs)	control inputs
DRIVE PORT 1 to DRIVE PORT 4	pin 16 to pin 19 (outputs)	indicate driving port
CHANNEL BIT 0 to CHANNEL BIT 3	pin 8 to pin 11 (outputs)	channel-specific user-configurable bits
PASS 1 and PASS 2	pin 13 and pin 14 (outputs)	pass/fail results of limit checks
BUSY	pin 4 (output)	measurements running
READY FOR TRIGGER	pin 6 (output)	ready for trigger
EXT GEN TRIGGER	pin 21 (output)	control signal for external generator
EXT GEN BLANK	pin 22 (input)	handshake signal from external generator
EXTERNAL TRIGGER	pin 2 (input)	trigger input for analyzer

<b>EXT TRIGGER</b>	trigger input for analyzer	
Connector type		BNC, female
TTL signal (edge-triggered)		3 V
Polarity (selectable)		positive or negative
Minimum pulse width		1 $\mu$ s
Input impedance		> 10 k $\Omega$



## Options

Generator step attenuators	extend the lower limit of the output power range of the R&S®ZVB4 or the R&S®ZVB8 by 70 dB	
Frequency range	R&S®ZVB4	300 kHz to 4 GHz
	R&S®ZVB8	300 kHz to 8 GHz
Power range		upper limit is reduced by 8 dB, lower limit is extended by 70 dB
Power accuracy	at -10 dBm without power calibration	identical to specifications without optional step attenuators
Power linearity	above -30 dBm	identical to specifications without optional step attenuators
	-30 dBm to -70 dBm	< 2 dB
	-70 dBm to -100 dBm	< 3 dB
Match	without system error correction	
	R&S®ZVB4	
	300 kHz to 2 GHz	> 14 dB
	2 GHz to 4 GHz	> 16 dB
	R&S®ZVB8	
	300 kHz to 2 GHz	> 14 dB
	2 GHz to 7 GHz	> 16 dB
7 GHz to 8 GHz	> 14 dB	
Receiver linearity	referenced to -10 dBm, in temperature range +18 °C to +28 °C for +13 dB (typ. +20 dB) to -60 dB	
	50 MHz to 4 GHz	< 0.1 dB
	4 GHz to 6 GHz	< 0.1 dB
	6 GHz to 8 GHz	< 0.2 dB
Dynamic range		is reduced by 8 dB

Direct generator/receiver access	These options permit direct access to the internal source output as well as to the internal reference and measurement receiver inputs via the front panel connectors (SMA) of the R&S®ZVB14 or the R&S®ZVB20.	
Frequency range	R&S®ZVB14	10 MHz to 14 GHz
	R&S®ZVB20	10 MHz to 20 GHz
Dynamic range	R&S®ZVB14	
	10 MHz to 13 GHz	is reduced by 2 dB
	13 GHz to 14 GHz	is reduced by 4 dB
	R&S®ZVB20	
	10 MHz to 13 GHz	is reduced by 2 dB
	13 GHz to 20 GHz	is reduced by 4 dB
Power range	R&S®ZVB14	
	10 MHz to 13 GHz	upper limit is reduced by 1 dB
	13 GHz to 14 GHz	upper limit is reduced by 2 dB
	R&S®ZVB20	
	10 MHz to 13 GHz	upper limit is reduced by 1 dB
	13 GHz to 20 GHz	upper limit is reduced by 2 dB
Match	R&S®ZVB20	
	16 GHz to 20 GHz	is reduced by 1 dB
Noise level	R&S®ZVB14	
	10 MHz to 13 GHz	is increased by 1 dB
	13 GHz to 14 GHz	is increased by 2 dB
	R&S®ZVB20	
	10 MHz to 13 GHz	is increased by 1 dB
	13 GHz to 20 GHz	is increased by 2 dB

## General data

Temperature loading	operating 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 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
Calibration interval		1 year
EMC	RF emission	in line with CISPR 11/EN 55011 group 1 class A for a shielded test setup
	other emissions and immunity	in line with IEC/EN 61326, emission class B (residential environment), immunity industrial environment (excluding operating frequency)
Safety		in line with IEC 61010-1, EN 61010-1 and UL 3111-1
Power supply		100 V to 240 V (AC) with tolerance $\pm 10$ %, 50 Hz to 60 Hz with tolerance $\pm 5$ %, safety class I in line with VDE 411
Power consumption		450 W, typ. 350 W (standby: typ. 10 W)
Conformity mark		VDE, GS, CSA, CSA-NRTL/C, CE
Dimensions (W x H x D)	R&S <sup>®</sup> ZVB4 and R&S <sup>®</sup> ZVB8	465.1 mm x 241.8 mm x 417.0 mm (18.31 in x 9.52 in x 16.42 in)
	R&S <sup>®</sup> ZVB14 and R&S <sup>®</sup> ZVB20 with two ports and order numbers 1145.1010.14 and 11451010.20	465.1 mm x 241.8 mm x 417.0 mm (18.31 in x 9.52 in x 16.42 in)
	R&S <sup>®</sup> ZVB14 and R&S <sup>®</sup> ZVB20 with two ports and order numbers 1145.1010.17 and 11451010.23, or with four ports	465.1 mm x 286.2 mm x 417.0 mm (18.31 in x 11.27 in x 16.42 in)
Weight	R&S <sup>®</sup> ZVB4 and R&S <sup>®</sup> ZVB8	18 kg (40 lb)
	R&S <sup>®</sup> ZVB14 and R&S <sup>®</sup> ZVB20 with two ports and order numbers 1145.1010.14 and 11451010.20	16 kg (35 lb)
	R&S <sup>®</sup> ZVB14 and R&S <sup>®</sup> ZVB20 with two ports and order numbers 1145.1010.17 and 11451010.23, or with four ports	20 kg (44 lb)
Shipping weight	R&S <sup>®</sup> ZVB4 and R&S <sup>®</sup> ZVB8	29 kg (64 lb)
	R&S <sup>®</sup> ZVB14 and R&S <sup>®</sup> ZVB20 with two ports and order numbers 1145.1010.14 and 11451010.20	30 kg (66 lb)
	R&S <sup>®</sup> ZVB14 and R&S <sup>®</sup> ZVB20 with two ports and order numbers 1145.1010.17 and 11451010.23, or with four ports	32 kg (71 lb)

## Ordering information

Designation	Type	Order No.
Vector Network Analyzer, 4 GHz, 2 ports	R&S®ZVB4	1145.1010.04
Vector Network Analyzer, 4 GHz, 4 ports	R&S®ZVB4	1145.1010.06
Vector Network Analyzer, 8 GHz, 2 ports	R&S®ZVB8	1145.1010.08
Vector Network Analyzer, 8 GHz, 4 ports	R&S®ZVB8	1145.1010.10
Vector Network Analyzer, 14 GHz, 2 ports	R&S®ZVB14	1145.1010.14
Vector Network Analyzer, 14 GHz, 2 ports	R&S®ZVB14	1145.1010.17
Vector Network Analyzer, 14 GHz, 4 ports	R&S®ZVB14	1145.1010.19
Vector Network Analyzer, 20 GHz, 2 ports	R&S®ZVB20	1145.1010.20
Vector Network Analyzer, 20 GHz, 2 ports	R&S®ZVB20	1145.1010.23
Vector Network Analyzer, 20 GHz, 4 ports	R&S®ZVB20	1145.1010.25
<b>Options</b>		
Direct generator/receiver access		
Direct Generator/Receiver Access for the R&S®ZVB14 1145.1010.17 only	R&S®ZVB14-B16	1164.1240.17
Direct Generator/Receiver Access for the R&S®ZVB14 1145.1010.19 only	R&S®ZVB14-B16	1164.1240.19
Direct Generator/Receiver Access for the R&S®ZVB20 1145.1010.23 only	R&S®ZVB20-B16	1164.1240.23
Direct Generator/Receiver Access for the R&S®ZVB20 1145.1010.25 only	R&S®ZVB20-B16	1164.1240.25
Generator step attenuators (for the R&S®ZVB4 and R&S®ZVB8 only)		
Generator Step Attenuator for Port 1	R&S®ZVB8-B21	1302.5480.02
Generator Step Attenuator for Port 2	R&S®ZVB8-B22	1302.5073.02
Generator Step Attenuator for Port 3	R&S®ZVB8-B23	1302.5496.02
Oven Quartz (OCXO)	R&S®ZVAB-B4	1164.1757.02
Time Domain	R&S®ZVAB-K2	1164.1657.02
Mixer and Harmonic Measurements	R&S®ZVB-K3	1164.1592.02
<b>Service options</b>		
Two-Year Calibration Service	R&S®CO2ZVB	please contact your local Rohde & Schwarz sales office
Three-Year Calibration Service	R&S®CO3ZVB	
Five-Year Calibration Service	R&S®CO5ZVB	
One-Year Repair Service following the warranty period	R&S®RO2ZVB	
Two-Year Repair Service following the warranty period	R&S®RO3ZVB	
Four-Year Repair Service following the warranty period	R&S®RO5ZVB	

## Service you can rely on

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- | Uncompromising quality
- | Long-term dependability

## About Rohde & Schwarz

Rohde & Schwarz is an independent group of companies specializing in electronics. It is a leading supplier of solutions in the fields of test and measurement, broadcasting, radiomonitoring and radiolocation, as well as secure communications. Established more than 75 years ago, Rohde & Schwarz has a global presence and a dedicated service network in over 70 countries. Company headquarters are in Munich, Germany.

## Environmental commitment

- | Energy-efficient products
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- | ISO 14001-certified environmental management system

Certified Quality System  
**ISO 9001**

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