

Version  
02.02

September  
2006

# Vector Network Analyzer R&S®ZVA

## Specifications



MEASUREMENT RANGE .....	3
MEASUREMENT ACCURACY .....	6
EFFECTIVE SYSTEM DATA.....	7
TEST PORT OUTPUT .....	12
TEST PORT INPUT .....	15
ADDITIONAL FRONT PANEL CONNECTORS.....	17
DISPLAY.....	17
REAR PANEL CONNECTORS .....	18
GENERAL SPECIFICATIONS .....	20
ORDERING INFORMATION .....	23

Specifications are valid under the following conditions:

90 minutes warm-up time at ambient temperature, specified environmental conditions met, calibration cycle adhered to, and all internal adjustments performed. Data designated „overrange“ and data without tolerance limits is not binding. Unless otherwise stated, specifications apply to test ports and a nominal source power of –10 dBm.

## Measurement range

Impedance		50 $\Omega$
Test port connector	R&S®ZVA8 R&S®ZVA24 R&S®ZVA40	type N, female 3.5 mm, male 2.92 mm, male
Number of test ports	R&S®ZVA8 R&S®ZVA24 R&S®ZVA40	2 or 4 2 or 4 2 or 4
Frequency range	R&S®ZVA8 R&S®ZVA24 R&S®ZVA40	300 kHz to 8 GHz 10 MHz to 24 GHz 10 MHz to 40 GHz
Static frequency accuracy	without optional oven quartz with optional oven quartz	$8 \times 10^{-6}$ $1 \times 10^{-7}$
Frequency resolution		1 Hz
Number of measurement points	user-selectable	2 to 20001
Measurement bandwidths	1/2/5-steps	1 Hz to 1 MHz
Dynamic range of R&S®ZVA8 (without optional step attenuators and without optional direct generator/receiver access)	from PORT 1 to PORT 2 and from PORT 3 to PORT 4 300 kHz to 5 MHz 5 MHz to 100 MHz 100 MHz to 4 GHz 4 GHz to 7 GHz 7 GHz to 8 GHz	>100 dB, typ. 110 dB >120 dB, typ. 130 dB >130 dB, typ. 140 dB >125 dB, typ. 135 dB >120 dB, typ. 130 dB
Dynamic range of R&S®ZVA24 (without optional step attenuators and without optional direct generator/receiver access)	from PORT 1 to PORT 2 and from PORT 3 to PORT 4 10 MHz to 100 MHz 100 MHz to 700 MHz 700 MHz to 2 GHz 2 GHz to 13 GHz 13 GHz to 24 GHz	>90 dB, typ. 105 dB >105 dB, typ. 120 dB >125 dB, typ. 130 dB >130 dB, typ. 135 dB >125 dB, typ. 130 dB
Dynamic range of R&S®ZVA40 (without optional step attenuators and without optional direct generator/receiver access)	from PORT 1 to PORT 2 and from PORT 3 to PORT 4 10 MHz to 50 MHz 50 MHz to 500 MHz 500 MHz to 2 GHz 2 GHz to 20 GHz 20 GHz to 24 GHz 24 GHz to 32 GHz 32 GHz to 40 GHz	>90 dB, typ. 100 dB >105 dB, typ. 115 dB >125 dB, typ. 135 dB >130 dB, typ. 140 dB >125 dB, typ. 135 dB >115 dB, typ. 125 dB >110 dB, typ. 115 dB
Dynamic range at optional meas input (option direct generator/receiver access) of R&S®ZVA8	from PORT 1 to MEAS 2 IN 300 kHz to 10 MHz 10 MHz to 100 MHz 100 MHz to 8 GHz	typ. >125 dB typ. >135 dB typ. >145 dB
Dynamic range at optional meas input (option direct generator/receiver access) of R&S®ZVA24	from PORT 1 to MEAS 2 IN 10 MHz to 100 MHz 100 MHz to 13 GHz 13 GHz to 20 GHz 20 GHz to 24 GHz	typ. >135 dB typ. >145 dB typ. >140 dB typ. >130 dB
Dynamic range at optional meas input (option direct generator/receiver access) of R&S®ZVA40	from PORT 1 to MEAS 2 IN 10 MHz to 100 MHz 100 MHz to 20 GHz 20 GHz to 24 GHz 24 GHz to 32 GHz 32 GHz to 40 GHz	typ. >140 dB typ. >150 dB typ. >140 dB typ. >130 dB typ. >120 dB
The dynamic range is defined as the difference between the maximum source power and the rms value of the data trace of the transmission magnitude produced by noise and crosstalk with test ports short-circuited. The specification is valid without system error correction and at 10 Hz measurement bandwidth. The dynamic range can be increased by using a measurement bandwidth of 1 Hz.		

Diagram: Dynamic range in dB vs. frequency in GHz of R&S®ZVA8

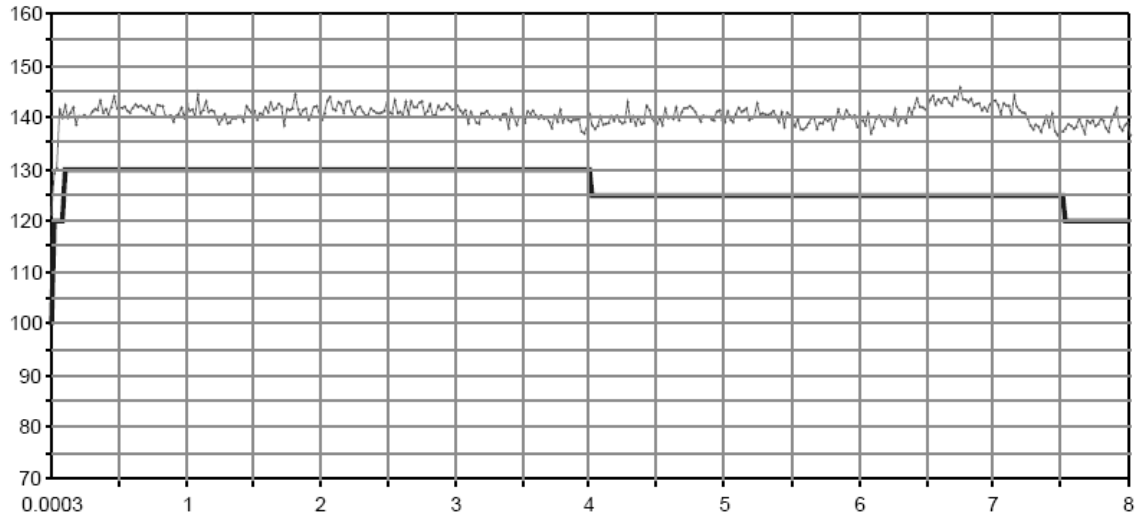


Diagram: Dynamic range in dB vs. frequency in GHz of R&S®ZVA24

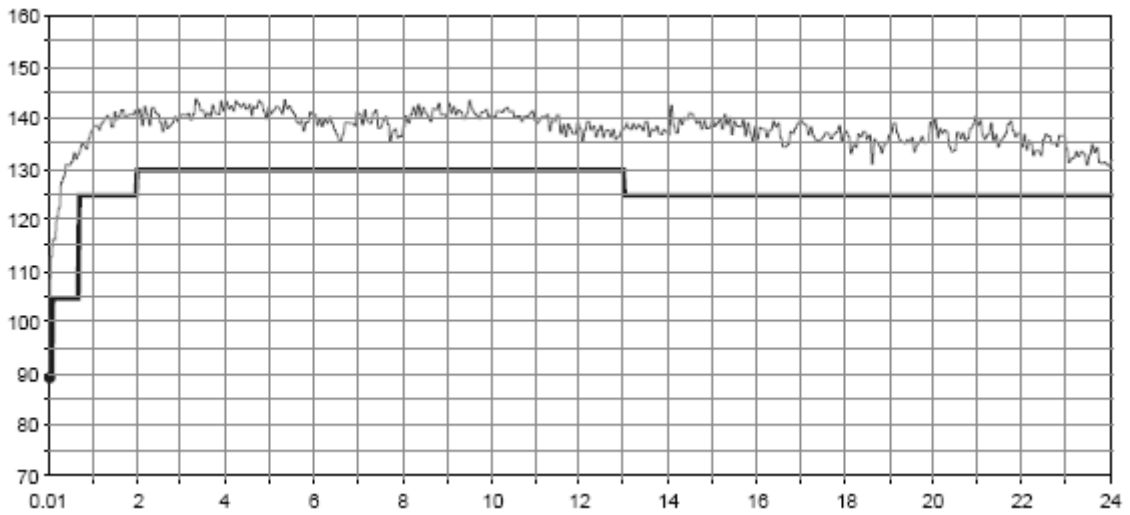
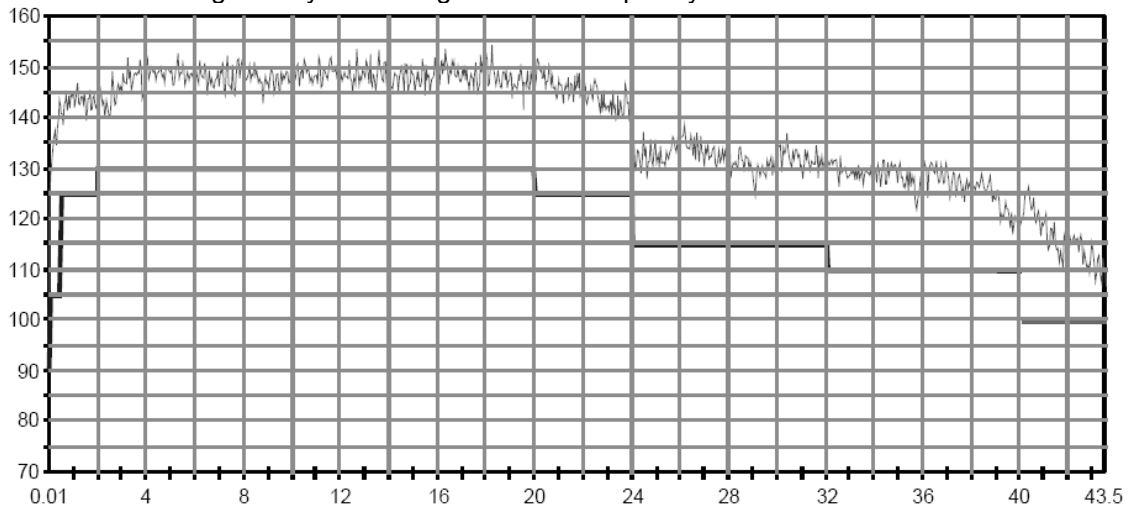


Diagram: Dynamic range in dB vs. frequency in GHz of R&S®ZVA40



## Measurement speed

Measurement time	for 201 measurements points, with span 100 MHz, 500 kHz measurement bandwidth, ALC and display switched off with center frequency 1.1 GHz with center frequency 5.1 GHz	<6 ms <4.5 ms
Measurement time per point	CW mode, 1 MHz measurement bandwidth	<3.5 $\mu$ s
Data transfer time	for 201 measurements points via IEC BUS via VX11 over 100 Mbit/s LAN via RSIB over 100 Mbit/s LAN	<2.9 ms <1.3 ms <0.7 ms
Time for measurement and data transfer	for 201 measurements 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 it is done 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

Table: Sweep times of R&S®ZVA

Number of measurement points	51	101	201	401	801	1601
------------------------------	----	-----	-----	-----	-----	------

Start frequency 5 GHz, stop frequency 5.2 GHz, ALC off, and 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 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 8 GHz (ZVA8) or 24 GHz (ZVA24), ALC off, and 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 by which the effective system data specified below is achieved. Frequency points, measurement bandwidth, and sweep time have to be identical for measurement and calibration (no interpolation allowed).

<b>Accuracy of transmission measurements</b>		
<b>R&amp;S® ZVA8</b>		
300 kHz to 50 MHz	for +15 dB to –30 dB for –30 dB to –45 dB	<0.2 dB or <2° <1 dB or <6°
50 MHz to 8 GHz	for +15 dB to +5 dB for +5 dB to –55 dB for –55 dB to –70 dB for –70 dB to –85 dB	<0.2 dB or <2° <0.1 dB or <1° <0.2 dB or <2° <1 dB or <6°
<b>R&amp;S® ZVA24</b>		
10 MHz to 50 MHz	for +15 dB to –30 dB	<1 dB or <6°
50 MHz to 400 MHz	for +15 dB to –30 dB for –30 dB to –45 dB	<0.2 dB or <2° <1 dB or <6°
400 MHz to 700 MHz	for +15 dB to +5 dB for +5 dB to –35 dB for –35 dB to –50 dB for –50 dB to –65 dB	<0.2 dB or <2° <0.1 dB or <1° <0.2 dB or <2° <1 dB or <6°
700 MHz to 24 GHz	for +15 dB to +5 dB for +5 dB to –55 dB for –55 dB to –70 dB for –70 dB to –85 dB	<0.2 dB or <2° <0.1 dB or <1° <0.2 dB or <2° <1 dB or <6°
<b>R&amp;S® ZVA40</b>		
10 MHz to 50 MHz	for +15 dB to –30 dB	<1 dB or <6°
50 MHz to 250 MHz	for +15 dB to –30 dB for –30 dB to –45 dB	<0.2 dB or <2° <1 dB or <6°
250 MHz to 2 GHz	for +15 dB to +5 dB for +5 dB to –50 dB for –50 dB to –65 dB for –65 dB to –80 dB	<0.3 dB or <3° <0.1 dB or <1° <0.2 dB or <2° <1 dB or <6°
2 GHz to 24 GHz	for +15 dB to +5 dB for +5 dB to –55 dB for –55 dB to –70 dB for –70 dB to –85 dB	<0.3 dB or <3° <0.1 dB or <1° <0.2 dB or <2° <1 dB or <6°
24 GHz to 32 GHz	for +15 dB to +5 dB for +5 dB to –45 dB for –45 dB to –60 dB for –60 dB to –75 dB	<0.3 dB or <3° <0.2 dB or <2° <0.3 dB or <3° <1 dB or <6°
32 GHz to 40 GHz	for +15 dB to +5 dB for +5 dB to –40 dB for –40 dB to –55 dB for –55 dB to –70 dB	<0.4 dB or <4° <0.2 dB or <2° <0.4 dB or <4° <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.		

Diagram: Typical accuracy of transmission magnitude and transmission phase measurements of R&S® ZVA8 in the frequency range 300 kHz to 4 GHz

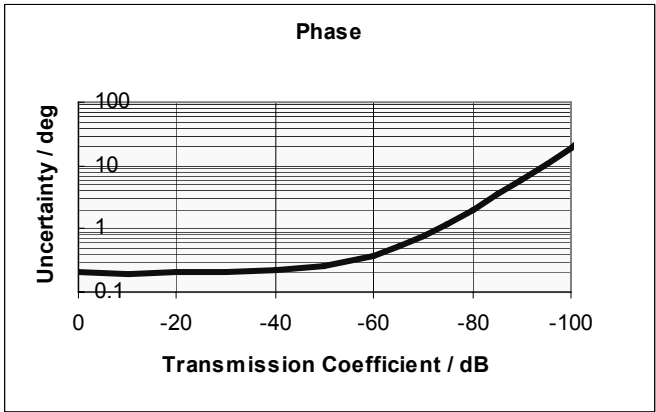
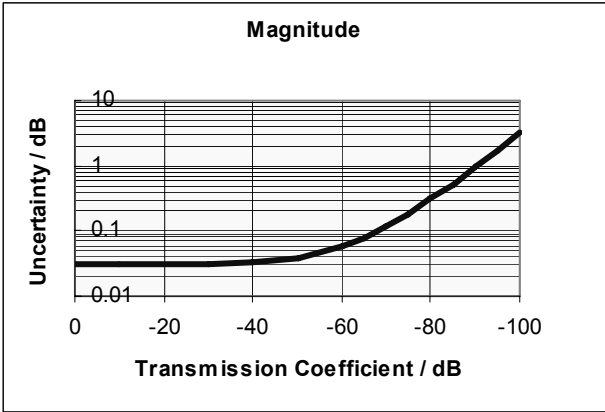


Diagram: Typical accuracy of transmission magnitude and transmission phase measurements of R&S® ZVA8 in the frequency range 4 GHz to 8 GHz

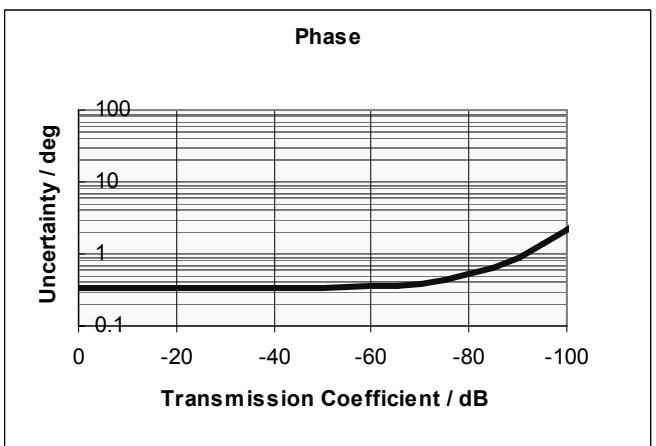
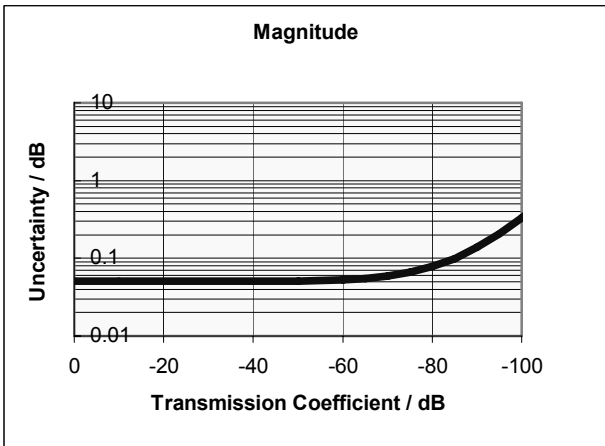


Diagram: Typical accuracy of transmission magnitude and transmission phase measurements of R&S® ZVA24 in the frequency range 10 MHz to 700 MHz

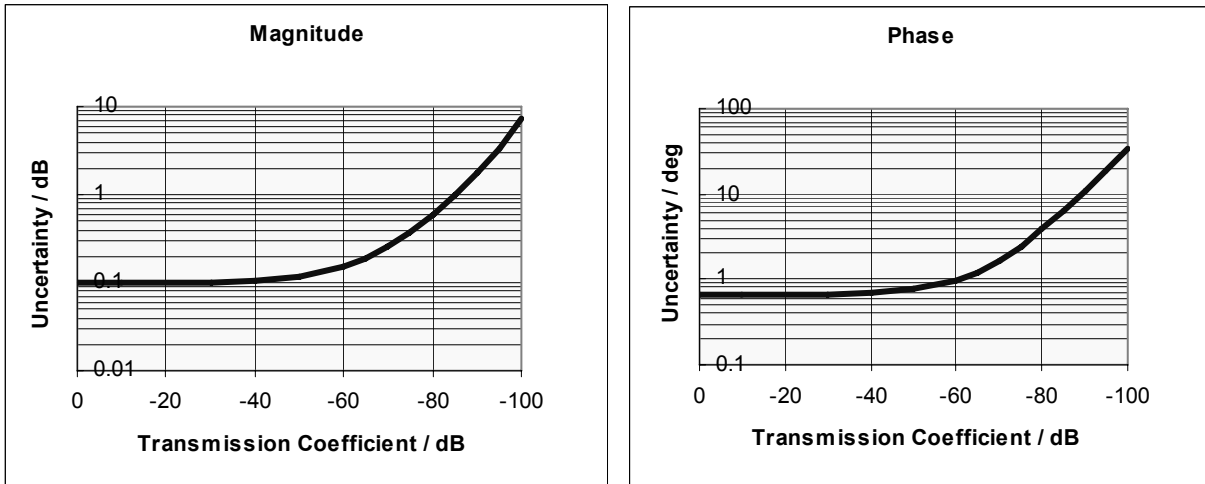


Diagram: Typical accuracy of transmission magnitude and transmission phase measurements of R&S® ZVA24 in the frequency range 700 MHz to 24 GHz

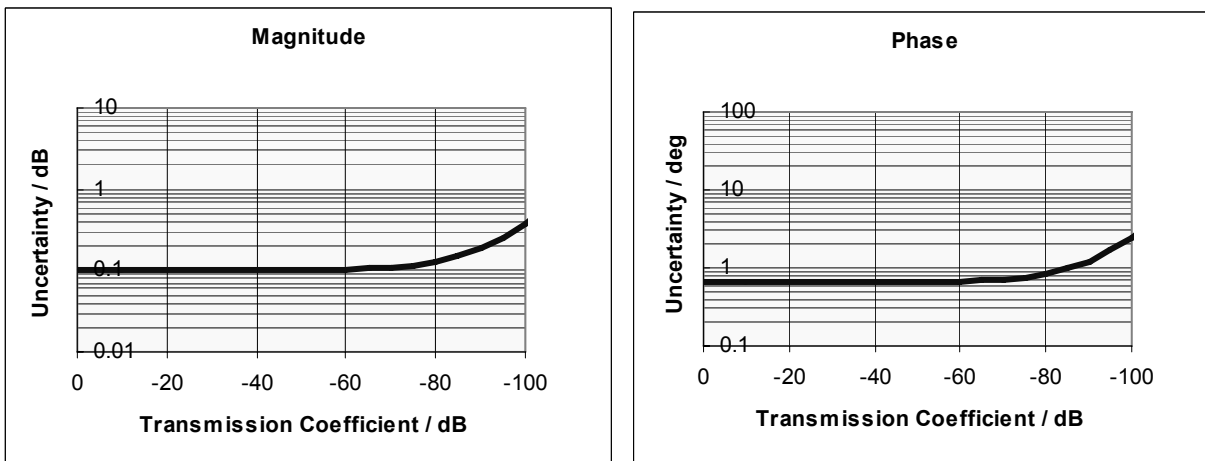




Diagram: Typical accuracy of transmission magnitude and transmission phase measurements of R&S® ZVA40 in the frequency range 10 MHz to 700 MHz

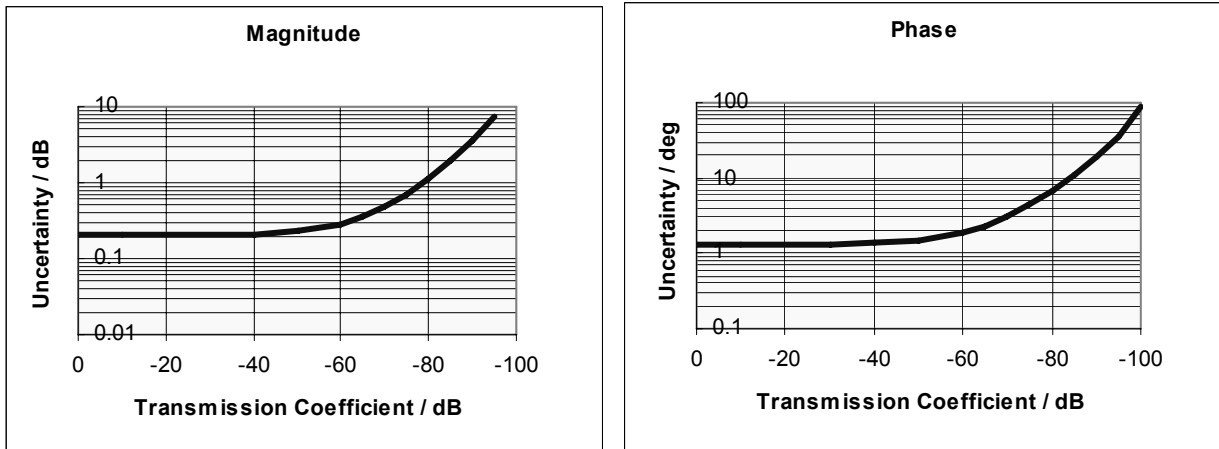


Diagram: Typical accuracy of transmission magnitude and transmission phase measurements of R&S® ZVA40 in the frequency range 700 MHz to 24 GHz

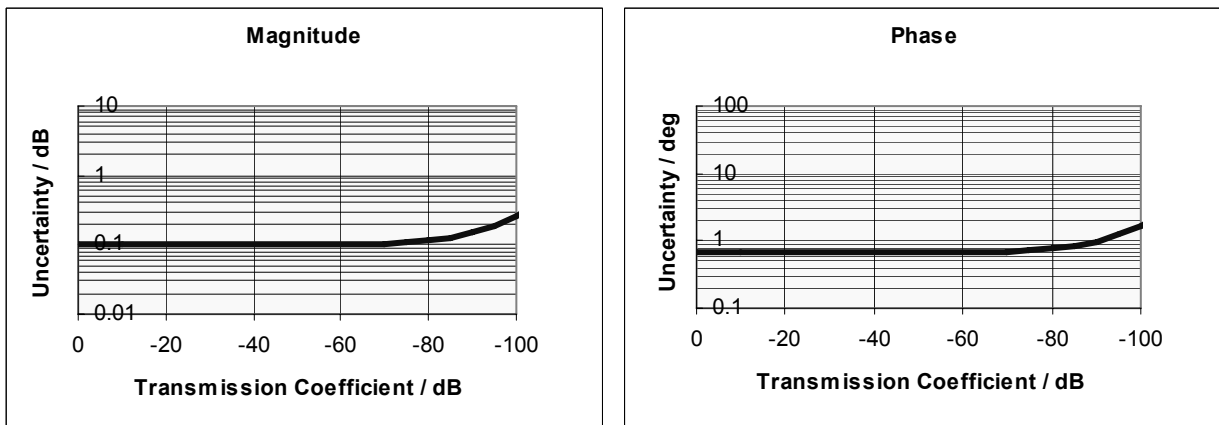
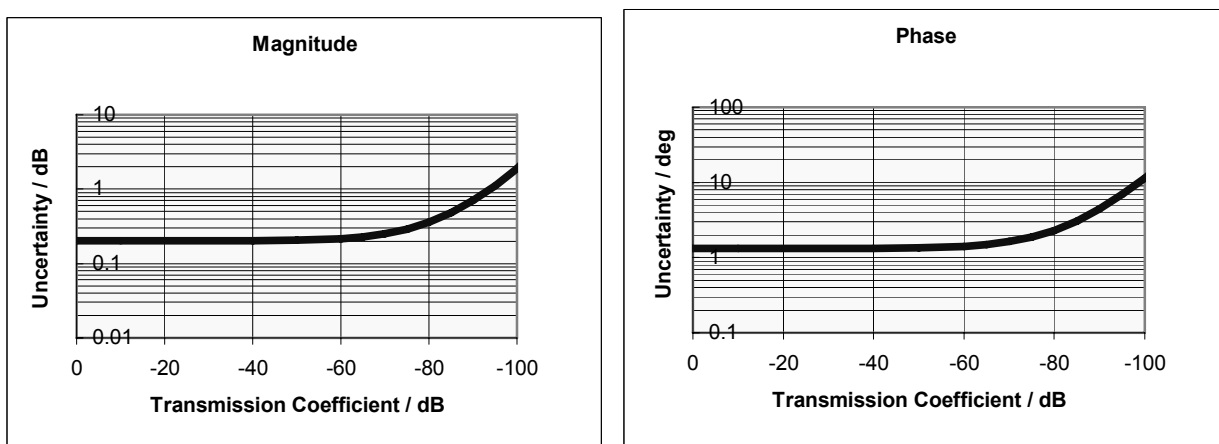
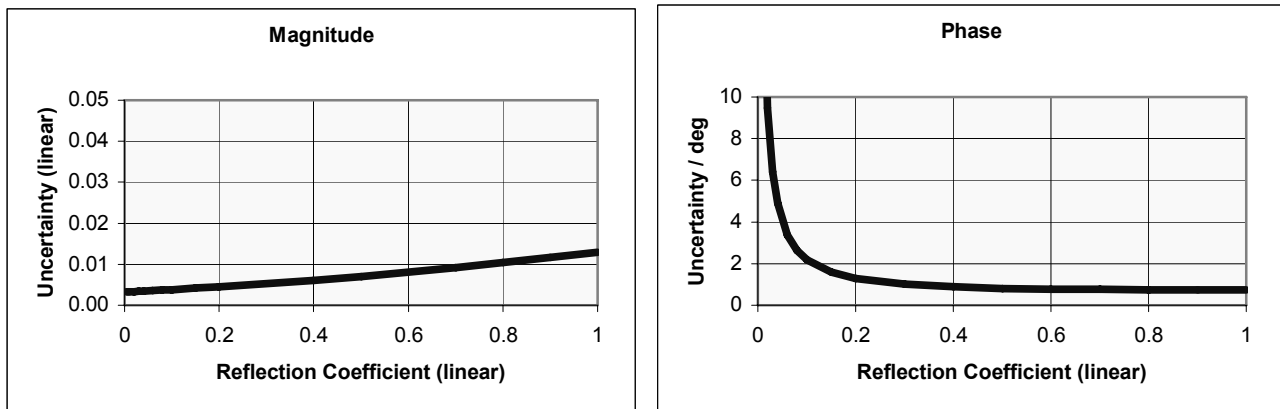


Diagram: Typical accuracy of transmission magnitude and transmission phase measurements of R&S® ZVA40 in the frequency range 24 GHz to 40 GHz



Accuracy of reflection measurements		
<b>R&amp;S®ZVA8</b>		
300 kHz to 8 GHz	for +10 dB to +3 dB for +3 dB to –15 dB for –15 dB to –25 dB for –25 dB to –35 dB	<0.6 dB or <4° <0.4 dB or <3° <1 dB or <6° <3 dB or <20°
<b>R&amp;S®ZVA24</b>		
10 MHz to 50 MHz	for +3 dB to –15 dB for –15 dB to –25 dB	<1 dB or <6° <3 dB or <20°
50 MHz to 24 GHz	for +10 dB to +3 dB for +3 dB to –15 dB for –15 dB to –25 dB for –25 dB to –35 dB	<0.6 dB or <4° <0.4 dB or <3° <1 dB or <6° <3 dB or <20°
<b>R&amp;S®ZVA40</b>		
10 MHz to 50 MHz	for +3 dB to –15 dB for –15 dB to –25 dB	<1 dB or <6° <3 dB or <20°
50 MHz to 40 GHz	for +10 dB to +3 dB for +3 dB to –15 dB for –15 dB to –25 dB for –25 dB to –35 dB	<0.6 dB or <4° <0.4 dB or <3° <1 dB or <6° <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.		

Diagram: Typical accuracy of reflection magnitude and reflection phase measurements of R&S®ZVA8 in the frequency range 300 kHz to 8 GHz, of R&S®ZVA24 in the frequency range 50 MHz to 24 GHz, and of R&S®ZVA40 in the frequency range 50 MHz to 40 GHz



Trace stability		
Trace noise of S11 (rms) R&S®ZVA8 300 kHz to 8 GHz R&S®ZVA24 700 MHz to 24 GHz R&S®ZVA40 700 MHz to 24 GHz 24 GHz to 40 GHz	at 0 dBm source power and 0 dB reflection and 1 kHz measurement bandwidth	<0.004 dB, typ. 0.001 dB <0.004 dB, typ. 0.001 dB <0.004 dB, typ. 0.001 dB <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® ZVA8</b>		
Directivity	300 kHz to 4 GHz 4 GHz to 8 GHz	>46 dB, typ. 50 dB >40 dB, typ. 50 dB
Source match	300 kHz to 4 GHz 4 GHz to 8 GHz	>40 dB, typ. 46 dB >36 dB, typ. 40 dB
Reflection tracking	300 kHz to 4 GHz 4 GHz to 8 GHz	<0.04 dB, typ. 0.01 dB <0.1 dB, typ. 0.01 dB
Load match	300 kHz to 4 GHz 4 GHz to 8 GHz	>46 dB, typ. 50 dB >40 dB, typ. 46 dB
Transmission tracking	300 kHz to 4 GHz 4 GHz to 8 GHz	<0.06 dB, typ. 0.01 dB <0.2 dB, typ. 0.05 dB
<b>R&amp;S® ZVA24</b>		
Directivity	10 MHz to 700 MHz 700 MHz to 24 GHz	>36 dB, typ. 40 dB >40 dB, typ. 50 dB
Source match	10 MHz to 700 MHz 700 MHz to 24 GHz	>30 dB, typ. 48 dB >30 dB, typ. 48 dB
Reflection tracking	10 MHz to 700 MHz 700 MHz to 24 GHz	<0.3 dB, typ. 0.05 dB <0.3 dB, typ. 0.05 dB
Load match	10 MHz to 700 MHz 700 MHz to 24 GHz	>36 dB, typ. 40 dB >40 dB, typ. 50 dB
Transmission tracking	10 MHz to 700 MHz 700 MHz to 24 GHz	<0.3 dB, typ. 0.1 dB <0.3 dB, typ. 0.1 dB
<b>R&amp;S® ZVA40</b>		
Directivity	10 MHz to 700 MHz 700 MHz to 24 GHz 24 GHz to 40 GHz	>30 dB, typ. 40 dB >36 dB, typ. 46 dB >30 dB, typ. 40 dB
Source match	10 MHz to 700 MHz 700 MHz to 24 GHz 24 GHz to 40 GHz	>30 dB, typ. 36 dB >30 dB, typ. 40 dB >30 dB, typ. 36 dB
Reflection tracking	10 MHz to 700 MHz 700 MHz to 24 GHz 24 GHz to 40 GHz	<0.3 dB, typ. 0.1 dB <0.3 dB, typ. 0.1 dB <0.3 dB, typ. 0.2 dB
Load match	10 MHz to 700 MHz 700 MHz to 24 GHz 24 GHz to 40 GHz	>32 dB, typ. 40 dB >36 dB, typ. 46 dB >32 dB, typ. 40 dB
Transmission tracking	10 MHz to 700 MHz 700 MHz to 24 GHz 24 GHz to 40 GHz	<0.3 dB, typ. 0.2 dB <0.3 dB, typ. 0.1 dB <0.3 dB, typ. 0.2 dB

## Test port output

Power range (without optional step attenuators and without optional direct generator/receiver access)	R&S®ZVA8 300 kHz to 50 MHz 50 MHz to 4 GHz 4 GHz to 7 GHz 7 GHz to 8 GHz R&S®ZVA24 10 MHz to 13 GHz 13 GHz to 24 GHz R&S®ZVA40 10 MHz to 50 MHz 50 MHz to 20 GHz 20 GHz to 32 GHz 32 GHz to 40 GHz	-40 dBm to +10 dBm, typ. -45 to +14 dBm -40 dBm to +13 dBm, typ. -45 to +15 dBm -40 dBm to +10 dBm, typ. -45 to +13 dBm -40 dBm to +8 dBm, typ. -45 to +12 dBm -30 dBm to +13 dBm, typ. -40 to +18 dBm -30 dBm to +10 dBm, typ. -40 to +16 dBm -30 dBm to +10 dBm, typ. -40 to +15 dBm -30 dBm to +13 dBm, typ. -40 to +18 dBm -30 dBm to +10 dBm, typ. -40 to +15 dBm -30 dBm to +6 dBm, typ. -40 to +12 dBm
Power accuracy (with ALC on and without power calibration)	R&S®ZVA8 at -10 dBm in temperature range 18 °C to 28 °C 50 MHz to 8 GHz R&S®ZVA24 at -10 dBm in temperature range 18 °C to 28 °C 500 MHz to 24 GHz R&S®ZVA40 at -10 dBm in temperature range 18 °C to 28 °C 500 MHz to 24 GHz 24 GHz to 40 GHz	<2 dB  <0.8 dB, typ. 0.3 dB  <3 dB  <0.8 dB, typ. 0.3 dB  <3 dB  <0.8 dB, typ. 0.3 dB  <2 dB, typ. 0.8 dB
Power linearity	referenced to -10 dBm above 50 MHz in temperature range 18 °C to 28 °C (with ALC on and without power cal.) R&S®ZVA8 above 50 MHz R&S®ZVA24 above 500 MHz R&S®ZVA40 above 500 MHz	<2 dB  <0.8 dB, typ. 0.3 dB <0.8 dB, typ. 0.3 dB <0.8 dB, typ. 0.3 dB
Power resolution		0.01 dB
Harmonics (Output power is referenced to maximum specified output power)	R&S®ZVA8 300 kHz to 50 MHz at -3 dB 50 MHz to 4 GHz at -5 dB 4 GHz to 7 GHz at -2 dB 7 GHz to 8 GHz at 0 dB R&S®ZVA24 10 MHz to 50 MHz at -3 dB 50 MHz to 13 GHz at -3 dB 13 GHz to 24 GHz at 0 dB R&S®ZVA40 10 MHz to 50 MHz at -3 dB 50 MHz to 20 GHz at -3 dB 20 GHz to 32 GHz at 0 dB 32 GHz to 40 GHz at 0 dB	typ. <-30 dBc <-20 dBc, typ. <-30 dBc <-20 dBc, typ. <-30 dBc <-20 dBc, typ. <-30 dBc typ. <-30 dBc <-20 dBc, typ. <-30 dBc <-20 dBc, typ. <-30 dBc typ. <-30 dBc <-20 dBc, typ. <-30 dBc <-20 dBc, typ. <-30 dBc <-20 dBc, typ. <-30 dBc

Diagram: Maximum output power in dBm vs. frequency in GHz of R&S®ZVA8

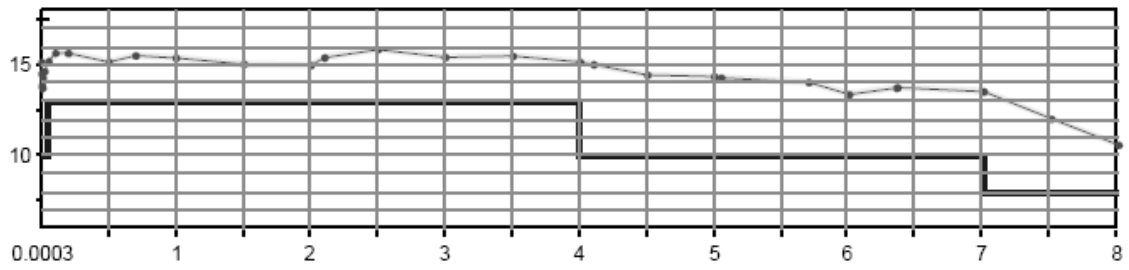


Diagram: Maximum output power in dBm vs. frequency in GHz of R&S®ZVA24

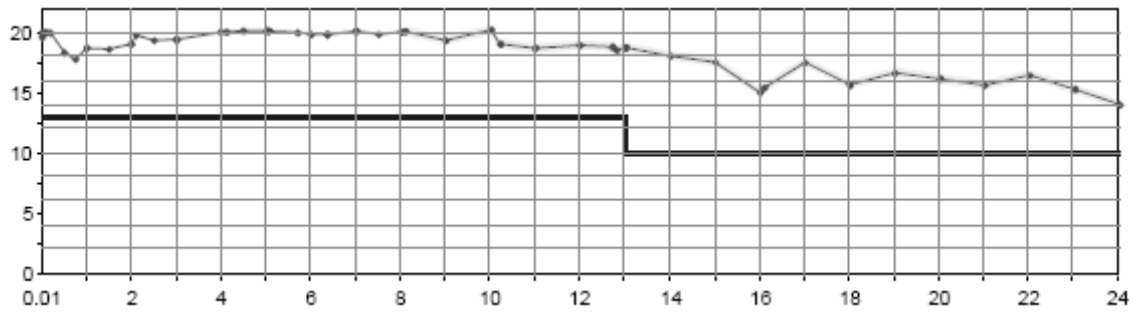


Diagram: Maximum output power in dBm vs. frequency in GHz of R&S®ZVA40

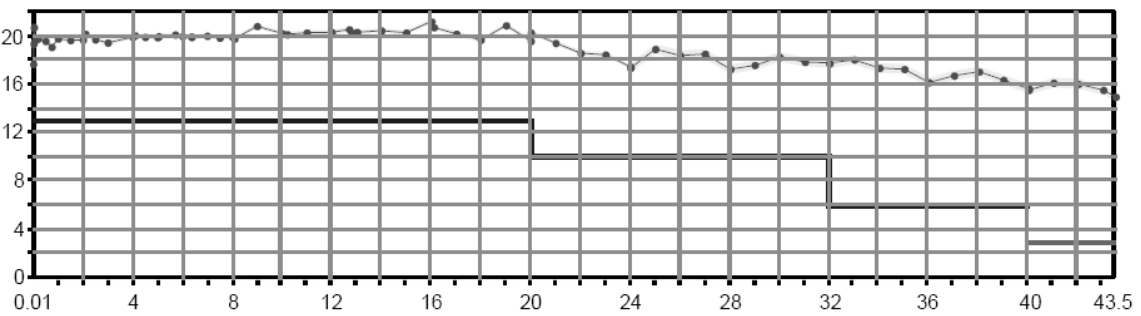


Diagram: Output power accuracy in dB vs. frequency in GHz of R&S®ZVA8

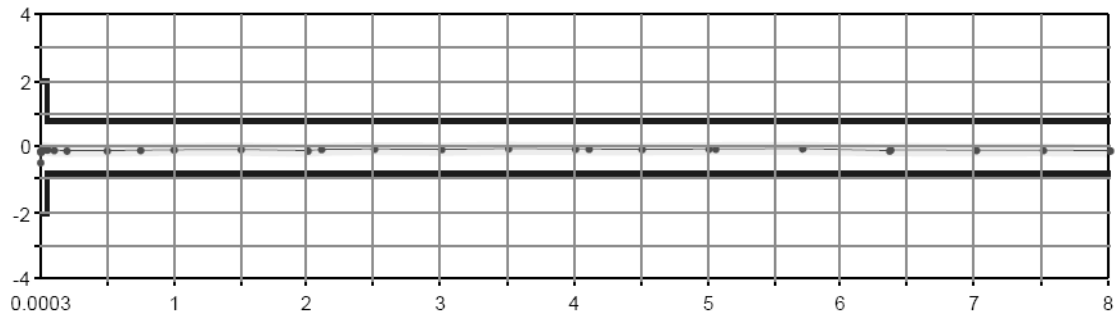


Diagram: Output power accuracy in dB vs. frequency in GHz of R&S®ZVA24

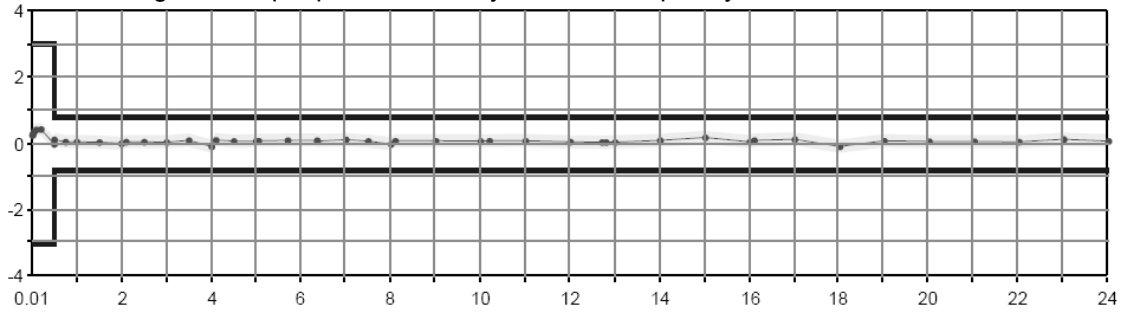
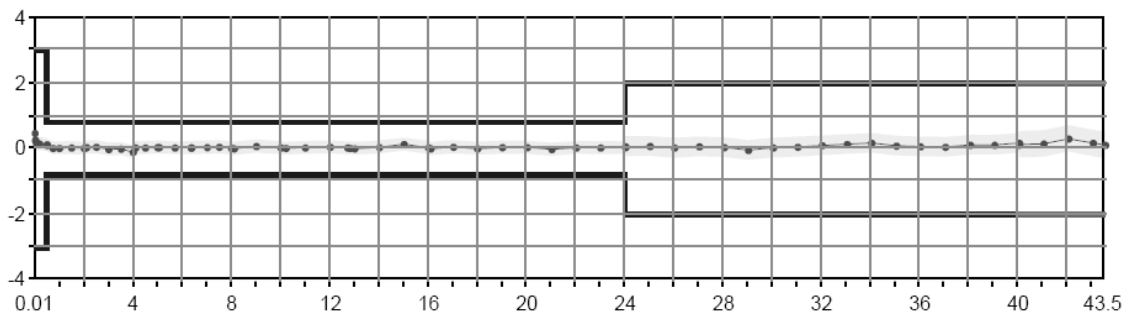


Diagram: Output power accuracy in dB vs. frequency in GHz of R&S®ZVA40



## Test port input

Match	without system error correction R&S®ZVA8 300 kHz to 7 GHz 7 GHz to 8 GHz R&S®ZVA24 10 MHz to 50 MHz 50 MHz to 2 GHz 2 GHz to 24 GHz R&S®ZVA40 10 MHz to 4 GHz 4 GHz to 24 GHz 24 GHz to 40 GHz	>16 dB >14 dB >10 dB >12 dB >8 dB >12 dB >8 dB >6 dB
Maximum nominal input level	R&S®ZVA8 300 kHz to 8 GHz R&S®ZVA24 10 MHz to 13 GHz 13 GHz to 24 GHz R&S®ZVA40 10 MHz to 13 GHz 13 GHz to 24 GHz 24 GHz to 40 GHz	+13 dBm +15 dBm +10 dBm +10 dBm +6 dBm +3 dBm
Power measurement accuracy	at -10 dBm without power calibration in temperature range 18 °C to 28 °C R&S®ZVA8 10 MHz to 8 GHz R&S®ZVA24 10 MHz to 13 GHz 13 GHz to 24 GHz R&S®ZVA40 10 MHz to 13 GHz 13 GHz to 24 GHz 24 GHz to 40 GHz	1 dB 1 dB 2 dB 1 dB 2 dB 3 dB
Receiver linearity	referenced to -10 dBm in temperature range 18 °C to 28 °C R&S®ZVA8 for +20 dB to -60 dB 50 MHz to 8 GHz R&S®ZVA24 for +20 dB to -30 dB 50 MHz to 700 MHz for +20 dB to +10 dB 700 MHz to 24 GHz for +10 dB to -45 dB 700 MHz to 24 GHz R&S®ZVA40 for +20 dB to -30 dB 50 MHz to 250 MHz for +15 dB to +10 dB 250 MHz to 40 GHz for +10 dB to -45 dB 250 MHz to 40 GHz	0.1 dB 0.1 dB 0.3 dB 0.1 dB 0.1 dB 0.3 dB 0.1 dB
Damage level		+27 dBm
Damage DC voltage		30 V
Noise level (without optional step attenuators and without optional direct generator/receiver access)	at 10 Hz measurement bandwidth R&S®ZVA8 300 kHz to 100 MHz 100 MHz to 8 GHz R&S®ZVA24 100 MHz to 700 MHz 700 MHz to 2 GHz 2 GHz to 13 GHz 13 GHz to 24 GHz R&S®ZVA40 100 MHz to 500 MHz 500 MHz to 2 GHz 2 GHz to 20 GHz 20 GHz to 24 GHz 24 GHz to 32 GHz 32 GHz to 40 GHz	<-100 dBm <-115 dBm <-80 dBm <-110 dBm <-115 dBm <-110 dBm <-80 dBm <-110 dBm <-115 dBm <-110 dBm <-100 dBm <-95 dBm

Noise level at optional meas input (option direct generator/receiver access)	at 10 Hz measurement bandwidth	
	R&S®ZVA8 100 MHz to 8 GHz	typ. <-130 dBm
	R&S®ZVA24 100 MHz to 24 GHz	typ. <-130 dBm
	R&S®ZVA40 100 MHz to 24 GHz 24 GHz to 40 GHz	typ. <-130 dBm typ. <-120 dBm
The noise level is defined as the rms value of the indicated noise floor.		



## Additional front panel connectors

USB	(two) Universal Serial Bus connectors for connecting USB devices (USB 1.1); two additional USB connectors at the rear panel
-----	--

## Optional front panel connectors

SOURCE OUT	output of internal source signal (SMA female)
SOURCE IN	input for external source signal (SMA female)
REF OUT	output of internal reference signal (SMA female)
REF IN	input for external reference signal (SMA female)
MEAS OUT	output of internal measurement signal (SMA female)
MEAS IN	input for external measurement signal (SMA female)

## Display

Screen	26 cm (10.4") diagonal colour LCD
Resolution	800 × 600 × 262144 (high colour)

## Rear panel connectors

<b>IEC BUS</b>	remote control according to IEEE488, IEC60625; 24 pins
----------------	--

<b>LAN 1</b>	first Local Area Network connector, 8 pins, RJ-45
--------------	---

<b>LAN 2</b>	second Local Area Network connector, 8 pins, RJ-45
--------------	--

<b>USB</b>	(two) Universal Serial Bus connectors for connecting USB devices (USB 1.1); two additional USB connectors at the front panel
------------	--

<b>10 MHz REF</b>	alternatively input or output for external frequency reference signal	
Connector type		BNC, female
Input frequency		10 MHz
Maximum allowed deviation		1 kHz
Input power		-3 dBm ± 8 dB
Input impedance		50 Ω
Output frequency		10 MHz
Output frequency accuracy		80 Hz
Output power		-3 dBm ± 8 dB 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
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
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 Sub-D (for external monitor)
----------------	--

<b>USER CONTROL</b>	several control and trigger signals, 25-pin Sub-D, 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 (user-selectable)		positive or negative
Minimum pulse width		1 $\mu$ s
Input impedance		>10 k $\Omega$

# Options

<b>Generator Step Attenuators</b>	extend the lower limit of the output power range by 70 dB.	
Frequency range	R&S®ZVA8 R&S®ZVA24 R&S®ZVA40	300 kHz to 8 GHz 10 MHz to 24 GHz 10 MHz to 40 GHz
Power range	R&S®ZVA8 300 kHz to 8 GHz 300 kHz to 8 GHz R&S®ZVA24 10 MHz to 13 GHz 13 GHz to 24 GHz 10 MHz to 24 GHz R&S®ZVA40 10 MHz to 13 GHz 13 GHz to 24 GHz 24 GHz to 40 GHz 10 MHz to 40 GHz	upper limit is reduced by 1 dB lower limit is extended by 70 dB  upper limit is reduced by 1 dB upper limit is reduced by 2 dB lower limit is extended by 70 dB  upper limit is reduced by 1 dB upper limit is reduced by 2 dB upper limit is reduced by 3 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 (with ALC off)	above -70 dBm from -70 dBm to -100 dBm	<2 dB <3 dB
Dynamic range	R&S®ZVA8 300 kHz to 8 GHz R&S®ZVA24 10 MHz to 13 GHz 13 GHz to 24 GHz R&S®ZVA40 10 MHz to 13 GHz 13 GHz to 24 GHz 24 GHz to 40 GHz	is reduced by 1 dB  is reduced by 1 dB is reduced by 2 dB  is reduced by 1 dB is reduced by 2 dB is reduced by 3 dB

<b>Receiver Step Attenuators</b>	permit the level of the input signal to be attenuated in 5 dB steps up to 35 dB.	
Frequency range	R&S®ZVA8 R&S®ZVA24 R&S®ZVA40	300 kHz to 8 GHz 10 MHz to 24 GHz 10 MHz to 40 GHz
Attenuation		0 dB to 35 dB
Attenuation steps		5 dB
Attenuation accuracy		2 dB
Dynamic range	R&S®ZVA8 300 kHz to 8 GHz R&S®ZVA24 10 MHz to 13 GHz 13 GHz to 24 GHz R&S®ZVA40 10 MHz to 13 GHz 13 GHz to 24 GHz 24 GHz to 40 GHz	is reduced by 1 dB  is reduced by 1 dB is reduced by 2 dB  is reduced by 1 dB is reduced by 2 dB is reduced by 3 dB
Noise level	R&S®ZVA8 300 kHz to 8 GHz R&S®ZVA24 10 MHz to 13 GHz 13 GHz to 24 GHz R&S®ZVA40 10 MHz to 13 GHz 13 GHz to 24 GHz 24 GHz to 40 GHz	is reduced by 1 dB  is reduced by 1 dB is reduced by 2 dB  is reduced by 1 dB is reduced by 2 dB is reduced by 3 dB

<b>Direct Generator/Receiver Access</b>	These options permit the direct access to the internal source output as well as to the internal reference and measurement receiver inputs via front panel connectors (SMA)	
Frequency range	R&S®ZVA8 R&S®ZVA24 R&S®ZVA40	300 kHz to 8 GHz 10 MHz to 24 GHz 10 MHz to 40 GHz
Dynamic range	R&S®ZVA8 300 kHz to 8 GHz R&S®ZVA24 10 MHz to 13 GHz 13 GHz to 24 GHz R&S®ZVA40 10 MHz to 13 GHz 13 GHz to 24 GHz 24 GHz to 40 GHz	is reduced by 2 dB  is reduced by 2 dB is reduced by 4 dB  is reduced by 2 dB is reduced by 4 dB is reduced by 6 dB
Power range	R&S®ZVA8 300 kHz to 8 GHz R&S®ZVA24 10 MHz to 13 GHz 13 GHz to 24 GHz R&S®ZVA40 10 MHz to 13 GHz 13 GHz to 24 GHz 24 GHz to 40 GHz	upper limit is reduced by 1 dB  upper limit is reduced by 1 dB upper limit is reduced by 2 dB  upper limit is reduced by 1 dB upper limit is reduced by 2 dB upper limit is reduced by 3 dB
Noise level	R&S®ZVA8 300 kHz to 8 GHz R&S®ZVA24 10 MHz to 13 GHz 13 GHz to 24 GHz R&S®ZVA40 10 MHz to 13 GHz 13 GHz to 24 GHz 24 GHz to 40 GHz	is increased by 1 dB  is increased by 1 dB is increased by 2 dB  is increased by 1 dB is increased by 2 dB is increased by 3 dB

## General data

Temperature loading	specs complied with operating temperature range storage temperature range	5 °C to 40 °C 5 °C to 40 °C –40 °C to 70 °C meets IEC 60068-2-1 and IEC 60068-2-2
Damp heat		40 °C at 95 % rel. humidity, meets IEC 60068-2-30
Mechanical resistance	vibration, sinusoidal	5 Hz to 150 Hz, meets IEC 60068-2-6
	vibration, random	10 Hz to 300 Hz, meets IEC 60068-2-64
	shock	40 g shock spectrum, meets IEC 60068-2-27, MIL-STD 810
Calibration interval		1 year
EMC, RF emission		meets CISPR 11/EN 55011 Group 1 Class A (for a shielded test set-up)
EMC, other emissions and immunity		meets IEC/EN 61326, emission class B (residential environment), immunity industrial environment (excluding operating frequency)
Safety		meets IEC 61010-1, EN61010-1, 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 to VDE 411
Power consumption		450 W typ. 310 W (Standby: typ. 10 W)
Test mark		VDE, GS, CSA, CSA-NRTL/C, CE conformity mark
Dimensions ( W × H × D )		465.1 mm × 286.2 mm × 495.0 mm
Weight		25 kg

## Ordering information

Designation	Type	Order No.
Vector Network Analyzer, 8 GHz, 2 ports	R&S®ZVA8	1145.1110.08
Vector Network Analyzer, 8 GHz, 4 ports	R&S®ZVA8	1145.1110.10
Vector Network Analyzer, 24 GHz, 2 ports	R&S®ZVA24	1145.1110.24
Vector Network Analyzer, 24 GHz, 4 ports	R&S®ZVA24	1145.1110.26
Vector Network Analyzer, 40 GHz, 2 ports	R&S®ZVA40	1145.1110.40
Vector Network Analyzer, 40 GHz, 4 ports	R&S®ZVA40	1145.1110.42
<b>Options</b>		
<b>Direct Generator/Receiver Access</b>		
for R&S®ZVA8 with two ports	R&S®ZVA8-B16	1164.0209.08
for R&S®ZVA8 with four ports	R&S®ZVA8-B16	1164.0209.10
for R&S®ZVA24 with two ports	R&S®ZVA24-B16	1164.0209.24
for R&S®ZVA24 with four ports	R&S®ZVA24-B16	1164.0209.26
for R&S®ZVA40 with two ports	R&S®ZVA40-B16	1164.0209.40
for R&S®ZVA40 with four ports	R&S®ZVA40-B16	1164.0209.42
<b>Generator Step Attenuator Port 1</b>		
for R&S®ZVA8	R&S®ZVA8-B21	1164.0009.02
for R&S®ZVA24	R&S®ZVA24-B21	1164.0109.02
for R&S®ZVA40	R&S®ZVA40-B21	1302.5409.02
<b>Generator Step Attenuator Port 2</b>		
for R&S®ZVA8	R&S®ZVA8-B22	1164.0015.02
for R&S®ZVA24	R&S®ZVA24-B22	1164.0115.02
for R&S®ZVA40	R&S®ZVA40-B22	1302.5415.02
<b>Generator Step Attenuator Port 3</b>		
for R&S®ZVA8 with four ports	R&S®ZVA8-B23	1164.0021.02
for R&S®ZVA24 with four ports	R&S®ZVA24-B23	1164.0121.02
for R&S®ZVA40 with four ports	R&S®ZVA40-B23	1302.5421.02
<b>Generator Step Attenuator Port 4</b>		
for R&S®ZVA8 with four ports	R&S®ZVA8-B24	1164.0038.02
for R&S®ZVA24 with four ports	R&S®ZVA24-B24	1164.0138.02
for R&S®ZVA40 with four ports	R&S®ZVA40-B24	1302.5438.02
<b>Receiver Step Attenuator Port 1</b>		
for R&S®ZVA8	R&S®ZVA8-B31	1164.0044.02
for R&S®ZVA24	R&S®ZVA24-B31	1164.0144.02
for R&S®ZVA40	R&S®ZVA40-B31	1302.5444.02
<b>Receiver Step Attenuator Port 2</b>		
for R&S®ZVA8	R&S®ZVA8-B32	1164.0050.02
for R&S®ZVA24	R&S®ZVA24-B32	1164.0150.02
for R&S®ZVA40	R&S®ZVA40-B32	1302.5450.02
<b>Receiver Step Attenuator Port 3</b>		
for R&S®ZVA8 with four ports	R&S®ZVA8-B33	1164.0067.02
for R&S®ZVA24 with four ports	R&S®ZVA24-B33	1164.0167.02
for R&S®ZVA40 with four ports	R&S®ZVA40-B33	1302.5467.02
<b>Receiver Step Attenuator Port 4</b>		
for R&S®ZVA8 with four ports	R&S®ZVA8-B34	1164.0073.02
for R&S®ZVA24 with four ports	R&S®ZVA24-B34	1164.0173.02
for R&S®ZVA40 with four ports	R&S®ZVA40-B34	1302.5473.02
<b>Oven Quartz (OCXO)</b>	R&S®ZVAB-B4	1164.1757.02
<b>Time Domain</b>	R&S®ZVAB-K2	1164.1657.02
<b>Frequency Conversion</b>	R&S®ZVA-K4	1164.1863.02



For product brochure, see PD 5213.5680.12  
and [www.rohde-schwarz.com](http://www.rohde-schwarz.com)  
(search term: ZVA)



**ROHDE & SCHWARZ**

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

Europe: +49 1805 12 4242, [customersupport@rohde-schwarz.com](mailto:customersupport@rohde-schwarz.com)  
USA and Canada: +1-888-837-8772, [customer.support@rsa.rohde-schwarz.com](mailto:customer.support@rsa.rohde-schwarz.com)  
Asia: +65 65 130 488, [customersupport.asia@rohde-schwarz.com](mailto:customersupport.asia@rohde-schwarz.com)