



Version  
06.01  
December  
2007

# R&S® ZVT Vector Network Analyzer

Data sheet

|                              |    |
|------------------------------|----|
| MEASUREMENT RANGE .....      | 3  |
| MEASUREMENT SPEED .....      | 4  |
| MEASUREMENT ACCURACY .....   | 5  |
| EFFECTIVE SYSTEM DATA .....  | 8  |
| TEST PORT OUTPUT .....       | 8  |
| TEST PORT INPUT .....        | 10 |
| REAR PANEL CONNECTORS .....  | 10 |
| OPTIONS .....                | 12 |
| GENERAL SPECIFICATIONS ..... | 13 |
| ORDERING INFORMATION .....   | 14 |

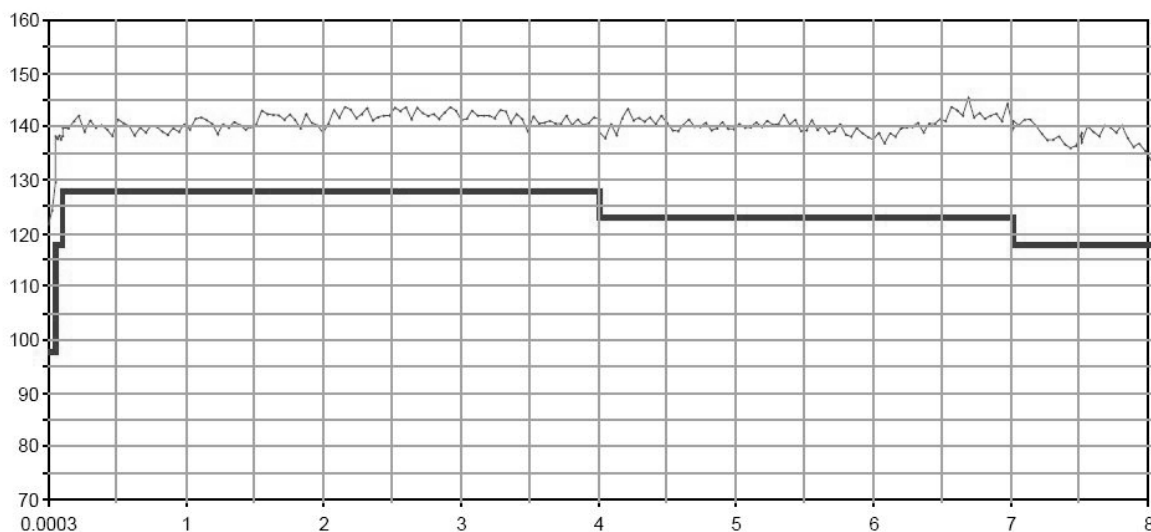
Specifications apply under the following conditions:

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 provided for information only. Unless stated otherwise, specifications apply to test ports and a nominal source power of -10 dBm.

## Measurement range

|   |   |                      |
|---|---|----------------------|
| Impedance                                   |   | 50 $\Omega$          |
| Test port connector                         | R&S <sup>®</sup> ZVT8                               | type N, female       |
|   | R&S <sup>®</sup> ZVT20                              | 3.5 mm, male         |
| Number of test ports                        | without additional PORT option                      | 2                    |
|   | R&S <sup>®</sup> ZVT8 with additional PORT options  | 3, 4, 5, 6, 7, or 8  |
|   | R&S <sup>®</sup> ZVT20 with additional PORT options | 3, 4, 5, or 6        |
| Frequency range                             | R&S <sup>®</sup> ZVT8                               | 300 kHz to 8 GHz     |
|   | R&S <sup>®</sup> ZVT20                              | 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 1 MHz        |
| Dynamic range of the R&S <sup>®</sup> ZVT8  | from PORT 1 to any other PORT                       |                      |
|   | 300 kHz to 50 MHz                                   | >98 dB, typ. 108 dB  |
|   | 50 MHz to 100 MHz                                   | >118 dB, typ. 128 dB |
|   | 100 MHz to 4 GHz                                    | >128 dB, typ. 138 dB |
|   | 4 GHz to 7 GHz                                      | >123 dB, typ. 133 dB |
|   | 7 GHz to 8 GHz                                      | >118 dB, typ. 128 dB |
| Dynamic range of the R&S <sup>®</sup> ZVT20 | from PORT 1 to any other PORT                       |                      |
|   | 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 16 GHz                                     | >110 dB, typ. 122 dB |
|   | 16 GHz to 20 GHz                                    | >105 dB, typ. 117 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>ZVT8

# 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   | <6 ms        |
|  | with center frequency 5.1 GHz   | <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/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 measurements points, with start frequency 1 GHz, stop frequency 1.1 GHz, 500 kHz measurement bandwidth, and display switched off<br>(No additional time for data transfer is needed, as this occurs simultaneously during the measurement.) | <6 ms        |
| Switching time between channels                          | with no more than 2001 points   | <1 ms        |
| Switching time between two preloaded instrument settings | with no more than 2001 points   | <10 ms       |

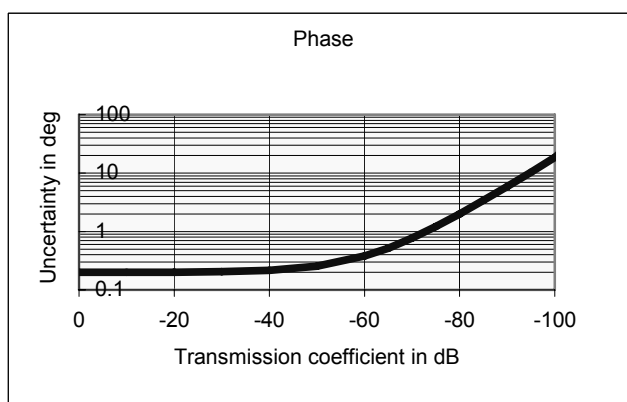
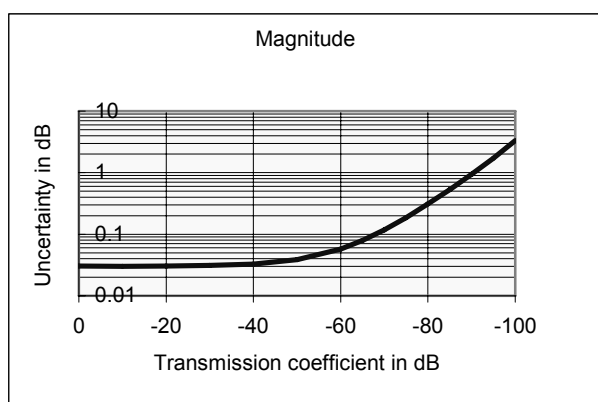
| Typical sweep times versus number of measurement points  |         |         |         |         |         |         |
|--|---------|---------|---------|---------|---------|---------|
| Number of measurement points   | 51      | 101     | 201     | 401     | 801     | 1601    |
| Start frequency 5 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 8 GHz (R&S®ZVT8) or 20 GHz (R&S®ZVT20), 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

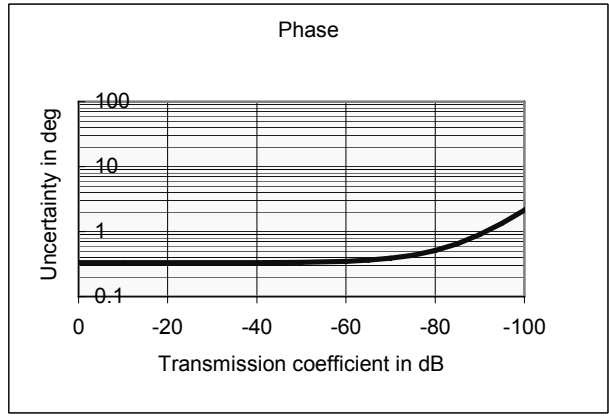
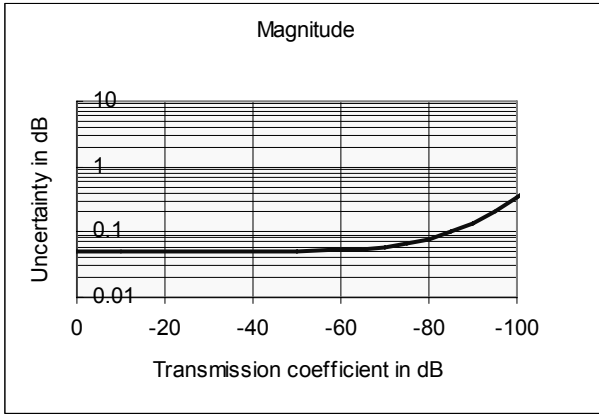
This data is valid between +18 °C and +28 °C, provided the temperature has not varied by more than 1 K after calibration. Validity of the data is conditional on the use of a suitable calibration kit. This calibration kit is used to achieve the effective system data specified below. Frequency points,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

| Accuracy of transmission measurements |                  |                |
|---------------------------------------|------------------|----------------|
| R&S®ZVT8                              |                  |                |
| 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°   |
| 50 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°   |
| R&S®ZVT20                             |                  |                |
| 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 -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°   |
| 8 GHz to 20 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°   |

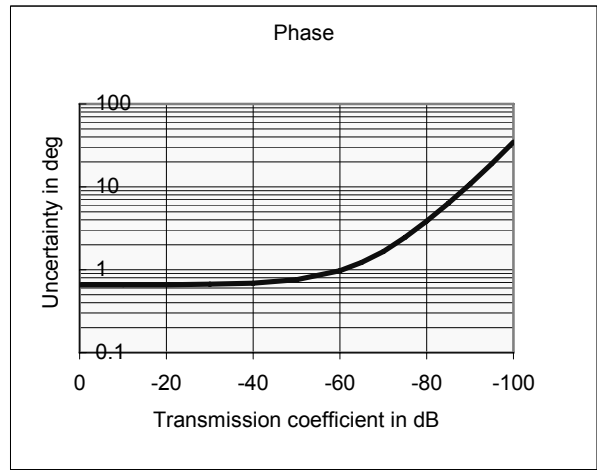
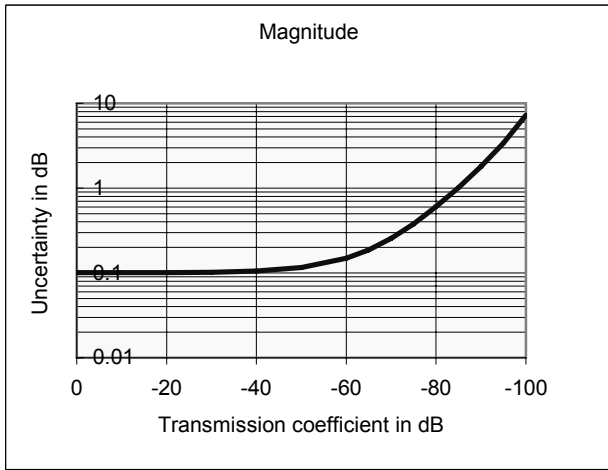
Specifications are based on a matched DUT, a measurement bandwidth of 10 Hz, and a nominal source power of -10 dBm.



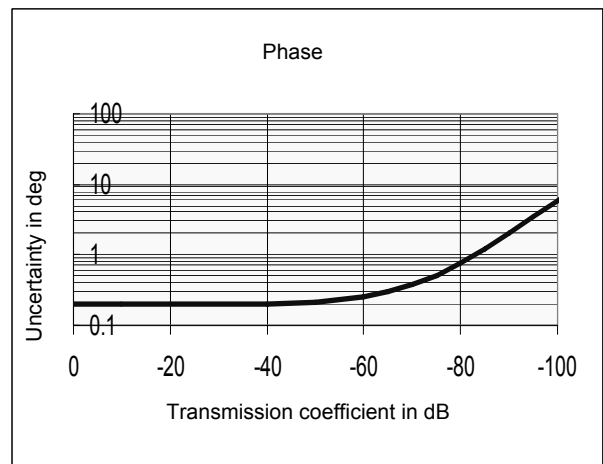
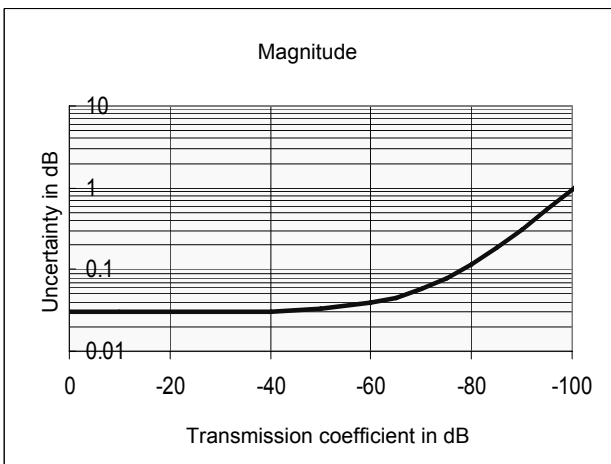
*Typical accuracy of transmission magnitude and transmission phase measurements of the R&S®ZVT8 in the frequency range from 300 kHz to 4 GHz*



*Typical accuracy of transmission magnitude and transmission phase measurements of the R&S®ZVT8 in the frequency range from 4 GHz to 8 GHz*



*Typical accuracy of transmission magnitude and transmission phase measurements of the R&S®ZVT20 in the frequency range from 10 MHz to 700 MHz*



*Typical accuracy of transmission magnitude and transmission phase measurements of the R&S®ZVT20 in the frequency range from 700 MHz to 20 GHz*

**Accuracy of reflection measurements**

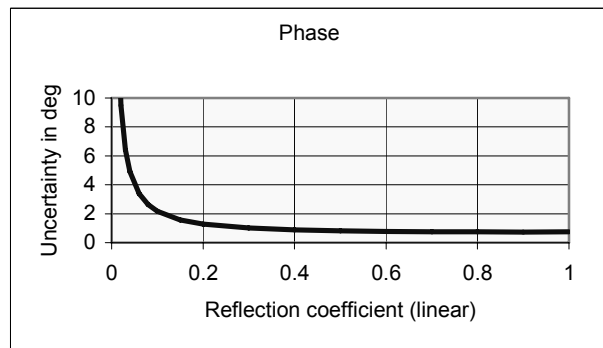
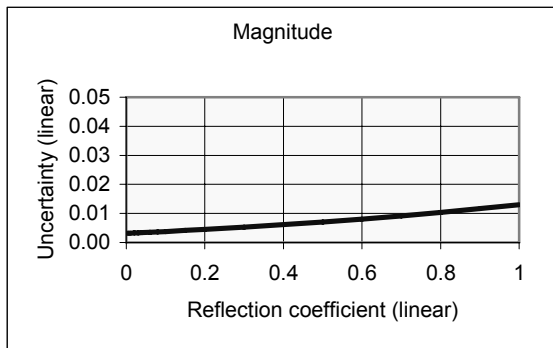
**R&S®ZVT8**

|               |                  |                |
|---------------|------------------|----------------|
| 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®ZVT20**

|                  |                  |                |
|------------------|------------------|----------------|
| 10 MHz to 50 MHz | +3 dB to -15 dB  | <1 dB or <6°   |
|                  | -15 dB to -25 dB | <3 dB or <20°  |
| 50 MHz to 20 GHz | +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®ZVT8 in the frequency range from 300 kHz to 8 GHz and of the R&S®ZVT20 in the frequency range from 50 MHz to 20 GHz*

**Trace stability**

|                          |   |                          |
|--------------------------|---|--------------------------|
| Trace noise of S11 (rms) | at 0 dBm source power, 0 dB reflection, and 1 kHz measurement bandwidth |                          |
|                          | R&S®ZVT8  |                          |
|                          | above 300 kHz   | <0.004 dB, typ. 0.001 dB |
|                          | R&S®ZVT20   |                          |
|                          | 700 MHz to 8 GHz  | <0.004 dB, typ. 0.001 dB |
|                          | 8 GHz to 20 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).

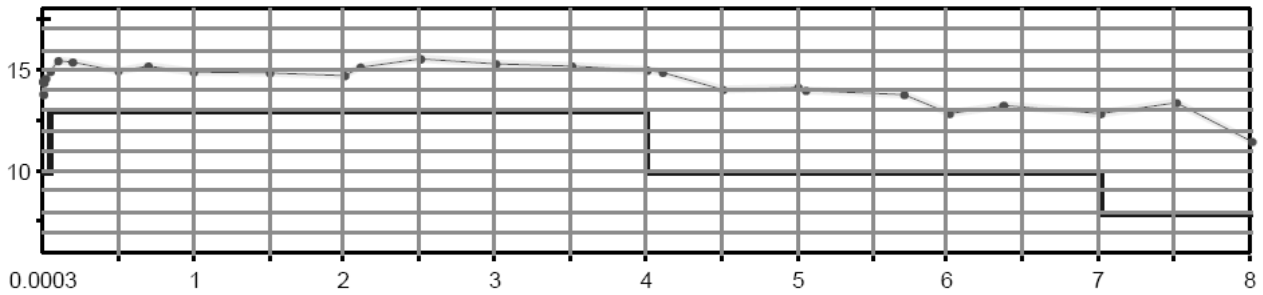
| R&S®ZVT8              |                   |                        |
|-----------------------|-------------------|------------------------|
| Directivity           | 300 kHz to 4 GHz  | >46 dB, typ. 50 dB     |
|                       | 4 GHz to 8 GHz    | >40 dB, typ. 50 dB     |
| Source match          | 300 kHz to 4 GHz  | >40 dB, typ. 46 dB     |
|                       | 4 GHz to 8 GHz    | >36 dB, typ. 40 dB     |
| Reflection tracking   | 300 kHz to 4 GHz  | <0.04 dB, typ. 0.01 dB |
|                       | 4 GHz to 8 GHz    | <0.1 dB, typ. 0.01 dB  |
| Load match            | 300 kHz to 4 GHz  | >46 dB, typ. 50 dB     |
|                       | 4 GHz to 8 GHz    | >40 dB, typ. 46 dB     |
| Transmission tracking | 300 kHz to 4 GHz  | <0.06 dB, typ. 0.01 dB |
|                       | 4 GHz to 8 GHz    | <0.1 dB, typ. 0.05 dB  |
| R&S®ZVT20             |                   |                        |
| Directivity           | 10 MHz to 700 MHz | >36 dB, typ. 40 dB     |
|                       | 700 MHz to 20 GHz | >40 dB, typ. 50 dB     |
| Source match          | 10 MHz to 700 MHz | >30 dB, typ. 48 dB     |
|                       | 700 MHz to 20 GHz | >30 dB, typ. 48 dB     |
| Reflection tracking   | 10 MHz to 700 MHz | <0.3 dB, typ. 0.05 dB  |
|                       | 700 MHz to 20 GHz | <0.3 dB, typ. 0.05 dB  |
| Load match            | 10 MHz to 700 MHz | >36 dB, typ. 40 dB     |
|                       | 700 MHz to 20 GHz | >40 dB, typ. 50 dB     |
| Transmission tracking | 10 MHz to 700 MHz | <0.2 dB, typ. 0.1 dB   |
|                       | 700 MHz to 20 GHz | <0.1 dB, typ. 0.05 dB  |

## Test port output

|  |  |  |
|--|--|--|
| Power range  | R&S®ZVT8   |  |
|  | 300 kHz to 50 MHz                                      | –40 dBm to +10 dBm,<br>typ. –45 dBm to +14 dBm |
|  | 50 MHz to 4 GHz  | –40 dBm to +13 dBm,<br>typ. –45 dBm to +15 dBm |
|  | 4 GHz to 7 GHz   | –40 dBm to +10 dBm,<br>typ. –45 dBm to +13 dBm |
|  | 7 GHz to 8 GHz   | –40 dBm to +8 dBm,<br>typ. –45 dBm to +12 dBm  |
|  | R&S®ZVT20  |  |
|  | 10 MHz to 13 GHz                                       | –30 dBm to +10 dBm,<br>typ. –40 dBm to +15 dBm |
|  | 13 GHz to 16 GHz                                       | –30 dBm to +5 dBm,<br>typ. –40 dBm to +10 dBm  |
| 16 GHz to 20 GHz   | –30 dBm to +3 dBm,<br>typ. –40 dBm to +7 dBm           |  |
| Power accuracy<br>(with ALC on and<br>without power calibration) | R&S®ZVT8   |  |
|  | at –10 dBm   | <2 dB  |
|  | in temperature range +18 °C to +28 °C<br>above 50 MHz  | <0.8 dB, typ. 0.3 dB                           |
|  | R&S®ZVT20  |  |
| at –10 dBm   | <3 dB  |  |
| in temperature range +18 °C to +28 °C<br>500 MHz to 20 GHz       | <0.8 dB, typ. 0.3 dB                                   |  |
| Power linearity  | referenced to –10 dBm                                  | <2 dB  |
|  | in temperature range +18 °C to +28 °C<br>above 500 MHz | <0.8 dB, typ. 0.2 dB                           |
| Power resolution   |  | 0.01 dB  |



|  |                            |                         |
|--|----------------------------|-------------------------|
| Harmonics<br>(output power referenced to maximum specified output power) | R&S® ZVT8                  |                         |
|  | 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    | <-20 dBc, typ. <-30 dBc |
|  | 7 GHz to 8 GHz at 0 dB     | <-20 dBc, typ. <-30 dBc |
|  | R&S® ZVT20                 |                         |
|  | 10 MHz to 50 MHz at -3 dB  | typ. <-30 dBc           |
| 50 MHz to 20 GHz at 0 dB   | <-20 dBc, typ. <-30 dBc    |                         |



Maximum output power in dBm versus frequency in GHz of the R&S® ZVT8

## Test port input

|   |   |           |
|---|---|-----------|
| Match   | without system error correction   |           |
|   | R&S® ZVT8   |           |
|   | 300 kHz to 7 GHz  | >16 dB    |
|   | 7 GHz to 8 GHz  | >14 dB    |
|   | R&S® ZVT20  |           |
|   | 10 MHz to 50 MHz  | >10 dB    |
|   | 50 MHz to 2 GHz   | >12 dB    |
| Maximum nominal input level   | 2 GHz to 20 GHz   | >8 dB     |
|   | R&S® ZVT8   | +13 dBm   |
|   | R&S® ZVT20  |           |
|   | 10 MHz to 8 GHz   | +10 dBm   |
| Power measurement accuracy  | 8 GHz to 20 GHz   | 0 dBm     |
|   | at –10 dBm without power calibration<br>in temperature range +18 °C to +28 °C |           |
|   | 10 MHz to 8 GHz   | <1 dB     |
|   | 8 GHz to 20 GHz   | <2 dB     |
| Receiver linearity  | referenced to –10 dBm<br>in temperature range +18 °C to +28 °C                |           |
|   | R&S® ZVT8   |           |
|   | for +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   |
|   | R&S® ZVT20  |           |
|   | for +20 dB to –30 dB  |           |
|   | 50 MHz to 700 MHz   | <0.1 dB   |
|   | for +20 dB to +10 dB  |           |
|   | 700 MHz to 8 GHz  | <0.3 dB   |
|   | for +15 dB to +10 dB  |           |
|   | 8 GHz to 20 GHz   | <0.3 dB   |
|   | for +10 dB to –45 dB  |           |
|   | 700 MHz to 20 GHz   | <0.1 dB   |
| Damage level  |   | +27 dBm   |
| Damage DC voltage   |   | 30 V      |
| Noise level   | at 10 Hz measurement bandwidth  |           |
|   | R&S® ZVT8   |           |
|   | 300 kHz to 100 MHz  | <–70 dBm  |
|   | 100 MHz to 4 GHz  | <–110 dBm |
|   | 4 GHz to 8 GHz  | <–105 dBm |
|   | R&S® ZVT20  |           |
|   | 100 MHz to 700 MHz  | <–70 dBm  |
|   | 700 MHz to 8 GHz  | <–105 dBm |
|   | 8 GHz to 16 GHz   | <–100 dBm |
| 16 GHz to 20 GHz  | <–98 dBm  |           |
| The noise level is defined as the rms value of the specified noise floor. |   |           |

## Rear panel connectors

|                |  |
|----------------|--|
| <b>IEC BUS</b> | remote control in line with IEEE 488, IEC 60625; 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 USB devices (USB 2.0);<br>two additional USB connectors on 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 permissible deviation |   | 1 kHz                            |
| Input power                   |   | 0 dBm $\pm$ 3 dB                 |
| Input impedance               |   | 50 $\Omega$                      |
| Output frequency              |   | 10 MHz                           |
| Output frequency accuracy     |   | 80 Hz                            |
| Output power                  |   | -3 dBm $\pm$ 8 dB at 50 $\Omega$ |

|                      |                      |                           |
|----------------------|----------------------|---------------------------|
| <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                    |
| Sample rate          |                      | 3 MHz                     |
| Input impedance      |                      | >10 k $\Omega$            |
| 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                   |
| Sample rate          |                      | 3 MHz                    |
| Input impedance      |                      | >10 k $\Omega$           |
| Damage voltage       |                      | 30 V                     |

|                                   |                                    |             |
|-----------------------------------|------------------------------------|-------------|
| <b>PORT BIAS 1 to PORT BIAS 8</b> | DC bias input for PORT 1 to PORT 8 |             |
| 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) |  |
|----------------|--|--|

|                                 |  |  |
|---------------------------------|--|--|
| <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<br>(for the R&S® ZVT20 only) | extend the lower limit of the output power range by 70 dB |                                  |
| Frequency range   |   | 10 MHz to 20 GHz                 |
| Power range   | 10 MHz to 13 GHz  | upper limit is reduced by 1 dB   |
|   | 13 GHz to 20 GHz  | upper limit is reduced by 2 dB   |
|   | 10 MHz to 20 GHz  | lower limit is extended by 70 dB |
| Power linearity<br>(with ALC OFF)                       | above -70 dBm   | <2 dB                            |
|   | from -70 dBm to -100 dBm                                  | <3 dB                            |
| Dynamic range   | 10 MHz to 13 GHz  | is reduced by 1 dB               |
|   | 13 GHz to 20 GHz  | is reduced by 2 dB               |

|  |   |                    |
|--|---|--------------------|
| Receiver step attenuators<br>(for the R&S® ZVT20 only) | permit the level of the input signal to be attenuated in 5 dB steps up to 35 dB |                    |
| Frequency range  |   | 10 MHz to 20 GHz   |
| Attenuation  |   | 0 dB to 35 dB      |
| Attenuation steps                                      |   | 5 dB               |
| Attenuation accuracy                                   |   | <2 dB              |
| Dynamic range  | 10 MHz to 13 GHz  | is reduced by 1 dB |
|  | 13 GHz to 20 GHz  | is reduced by 2 dB |
| Noise level  | 10 MHz to 13 GHz  | is reduced by 1 dB |
|  | 13 GHz to 20 GHz  | is reduced by 2 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 front panel connectors. Dynamic range with direct access utilizing these inputs is stated in the "Measurement range" section. If all the front panel jumper cables are directly connected between the outputs and inputs, the following specifications for the vector network analyzer apply. |                    |
| Front panel connectors           |   | SMA, female        |
| Frequency range                  | R&S® ZVT8   | 300 kHz to 8 GHz   |
|                                  | R&S® ZVT20  | 10 MHz to 20 GHz   |
| Match                            | R&S® ZVT20<br>16 GHz to 20 GHz  | is reduced by 1 dB |

|  |  |                                 |
|--|--|---------------------------------|
| Combiner (for the R&S® ZVT20 only)   | This option permits two-tone intermodulation measurement.                |                                 |
| Frequency range  |  | 10 MHz to 20 GHz                |
| Dynamic range  | from PORT 1 to PORT 3<br>100 MHz to 20 GHz                               | is reduced to 95 dB             |
|  | 10 MHz to 20 GHz   | is shifted by -5 dB             |
| Power accuracy for PORT 1 and PORT 3<br>(with combiner in signal path, ALC OFF<br>and without power calibration) | at -10 dBm<br>in temperature range +18 °C to +28 °C<br>500 MHz to 20 GHz | <2.5 dB<br><1.5 dB, typ. 0.8 dB |
|  | Third-order intermodulation<br>for 1 MHz spacing                         |                                 |
|  | 10 MHz to 13 GHz at 0 dBm  | <-80 dBc                        |
|  | 13 GHz to 20 GHz at -2 dBm   | <-70 dBc                        |

## General data

|                                    |   |  |
|------------------------------------|---|--|
| Temperature loading                | operating temperature range   | +5 °C to +40 °C  |
|                                    | permissible temperature range   | +5 °C to +40 °C  |
|                                    | storage temperature range   | -40 °C to +70 °C   |
| Damp heat                          |   | in line with IEC 60068-2-1 and IEC 60068-2-2<br>40 °C at 95 % rel. humidity, in line with IEC 60068-2-30   |
| Mechanical resistance              | vibration, sinusoidal   | 5 Hz to 150 Hz<br>in line with IEC 60068-2-6   |
|                                    | vibration, random   | 10 Hz to 300 Hz,<br>in line with IEC 60068-2-64  |
|                                    | shock   | 40 g shock spectrum,<br>in line with IEC 60068-2-27, MIL-STD-810   |
| Calibration interval               |   | 1 year   |
| EMC, RF emission                   | According to EN 61000-6-4, operation is not covered in residential, commercial, and business areas nor in small-size companies. Thus, the instrument must not be operated in residential, commercial, and business areas nor in small-size companies unless additional measures are taken to ensure that EN 61000-6-3 is met. | in line with CISPR 11/EN 55011 group 1 class A (for a shielded test set-up)<br><br>The instrument complies with the emission requirements stipulated by EN 55011 class A. This means that the instrument is suitable for use in industrial environments. |
| EMC, other emissions, and immunity |   | in line with IEC/EN 61326; emission: class B; immunity: industrial environment (excluding operating frequency)   |
| Safety                             |   | in line with IEC 61010-1, EN61010-1, and UL 61010B-1, CSA C22.2 No. 1010.1   |
| Power supply                       |   | 100 V to 240 V (AC) ± 10 %, 50 Hz to 60 Hz ± 5 %, protection class I to VDE 411  |
| Power consumption                  |   | 650 W, typ. 420 W (standby: typ. 15 W)   |
| Certification mark                 |   | VDE, GS, c CSA us  |
| Dimensions (W × H × D)             | R&S® ZVT8   | 465.1 mm × 286.2 mm × 495.0 mm (18.31 in × 11.26 in × 19.50 in)  |
|                                    | R&S® ZVT20 (two ports, no options)  | 465.1 mm × 286.2 mm × 495.0 mm (18.31 in × 11.26 in × 19.50 in)  |
|                                    | R&S® ZVT20 (six ports, all options)   | 465.1 mm × 286.2 mm × 495.0 mm (18.31 in × 11.26 in × 19.50 in)  |
| Weight                             | R&S® ZVT8   | 26 kg (57 lb)  |
|                                    | R&S® ZVT20 (two ports, no options)  | 19 kg (42 lb)  |
|                                    | R&S® ZVT20 (six ports, all options)   | 29 kg (64 lb)  |
| Shipping weight                    | R&S® ZVT8   | 38 kg (84 lb)  |
|                                    | R&S® ZVT20 (two ports, no options)  | 31 kg (68 lb)  |
|                                    | R&S® ZVT20 (six ports, all options)   | 41 kg (90 lb)  |

# Ordering information

| Designation   | Type          | Order No.    |
|---|---------------|--------------|
| Vector Network Analyzer, 8 GHz, 2 ports             | R&S®ZVT8      | 1300.0000.08 |
| Vector Network Analyzer, 20 GHz, 2 ports            | R&S®ZVT20     | 1300.0000.20 |
| <b>Options</b>                                      |               |              |
| Oven Quartz (OCXO)                                  | R&S®ZVAB-B4   | 1164.1757.02 |
| Time Domain   | R&S®ZVAB-K2   | 1164.1657.02 |
| Frequency Conversion                                | R&S®ZVA-K4    | 1164.1863.02 |
| True Differential Mode<br>(for the R&S®ZVT8 only)   | R&S®ZVA-K6    | 1164.1540.02 |
| Pulsed Measurements                                 | R&S®ZVA-K7    | 1164.1511.02 |
| 5 MHz Receiver Bandwidth                            | R&S®ZVA-K17   | 1164.1070.02 |
| <b>Specific options for the R&amp;S®ZVT8 only:</b>  |               |              |
| Direct Gen/Rec Access for PORT 1                    | R&S®ZVT8-B16  | 1300.1706.11 |
| Direct Gen/Rec Access for PORT 2                    | R&S®ZVT8-B16  | 1300.1706.12 |
| Direct Gen/Rec Access for PORT 3 <sup>1</sup>       | R&S®ZVT8-B16  | 1300.1706.13 |
| Direct Gen/Rec Access for PORT 4 <sup>1</sup>       | R&S®ZVT8-B16  | 1300.1706.14 |
| Direct Gen/Rec Access for PORT 5 <sup>1</sup>       | R&S®ZVT8-B16  | 1300.1706.15 |
| Direct Gen/Rec Access for PORT 6 <sup>1</sup>       | R&S®ZVT8-B16  | 1300.1706.16 |
| Direct Gen/Rec Access for PORT 7 <sup>1</sup>       | R&S®ZVT8-B16  | 1300.1706.17 |
| Direct Gen/Rec Access for PORT 8 <sup>1</sup>       | R&S®ZVT8-B16  | 1300.1706.18 |
| Additional PORT 3                                   | R&S®ZVT8-B63  | 1300.1506.13 |
| Additional PORT 4 <sup>2</sup>                      | R&S®ZVT8-B64  | 1300.1506.14 |
| Additional PORT 5 <sup>2</sup>                      | R&S®ZVT8-B65  | 1300.1506.15 |
| Additional PORT 6 <sup>2</sup>                      | R&S®ZVT8-B66  | 1300.1506.16 |
| Additional PORT 7 <sup>2</sup>                      | R&S®ZVT8-B67  | 1300.1506.17 |
| Additional PORT 8 <sup>2</sup>                      | R&S®ZVT8-B68  | 1300.1506.18 |
| <b>Specific options for the R&amp;S®ZVT20 only:</b> |               |              |
| Combiner <sup>3</sup>                               | R&S®ZVT20-B11 | 1300.1658.02 |
| Direct Gen/Rec Access for PORT 1                    | R&S®ZVT20-B16 | 1300.1635.11 |
| Direct Gen/Rec Access for PORT 2                    | R&S®ZVT20-B16 | 1300.1635.12 |
| Direct Gen/Rec Access for PORT 3 <sup>1</sup>       | R&S®ZVT20-B16 | 1300.1635.13 |
| Direct Gen/Rec Access for PORT 4 <sup>1</sup>       | R&S®ZVT20-B16 | 1300.1635.14 |
| Direct Gen/Rec Access for PORT 5 <sup>1</sup>       | R&S®ZVT20-B16 | 1300.1635.15 |
| Direct Gen/Rec Access for PORT 6 <sup>1</sup>       | R&S®ZVT20-B16 | 1300.1635.16 |
| Generator Step Attenuator for PORT 1                | R&S®ZVT20-B21 | 1300.1558.02 |
| Generator Step Attenuator for PORT 3 <sup>1</sup>   | R&S®ZVT20-B23 | 1300.1564.02 |
| Receiver Step Attenuator for PORT 2                 | R&S®ZVT20-B32 | 1300.1570.02 |
| Receiver Step Attenuator for PORT 4 <sup>1</sup>    | R&S®ZVT20-B34 | 1300.1587.02 |
| Additional PORT 3                                   | R&S®ZVT20-B63 | 1300.1606.03 |
| Additional PORT 4 <sup>2</sup>                      | R&S®ZVT20-B64 | 1300.1606.04 |
| Additional PORT 5 <sup>2</sup>                      | R&S®ZVT20-B65 | 1300.1606.05 |
| Additional PORT 6 <sup>2</sup>                      | R&S®ZVT20-B66 | 1300.1606.06 |

<sup>1</sup> Requires the matching additional PORT option.

<sup>2</sup> Requires all additional PORT options with lower port numbers.

<sup>3</sup> Requires generator step attenuators for PORT 1 and PORT 3.





For product brochure, see PD 0758.0651.12  
and [www.rohde-schwarz.com](http://www.rohde-schwarz.com)  
(search term: ZVT)



**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)  
Americas: +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)