

ARTISAN®
TECHNOLOGY GROUP

Your **definitive** source for quality pre-owned equipment.

**Artisan Technology Group**
(217) 352-9330 | sales@artisantg.com | artisantg.com

**Full-service, independent repair center**
with experienced engineers and technicians on staff.

**We buy your excess, underutilized, and idle equipment**
along with credit for buybacks and trade-ins.

**Custom engineering**
so your equipment works exactly as you specify.

- Critical and expedited services
- In stock / Ready-to-ship
- Leasing / Rentals / Demos
- ITAR-certified secure asset solutions

**Expert team | Trust guarantee | 100% satisfaction**

All trademarks, brand names, and brands appearing herein are the property of their respective owners.

**Visit our website - *Click HERE***




Version 04.00
January 2008

# R&S®ZVT Multiport Vector Network Analyzer

## Network analysis with up to eight test ports from 300 kHz to 20 GHz

- R&S®ZVT8
  - 300 kHz to 8 GHz
  - Up to eight test ports
- R&S®ZVT20
  - 10 MHz to 20 GHz
  - Up to six test ports
- High-performance pulse profile measurements with minimum instrumentation and control effort
- True differential measurements for reliable characterization of active devices with balanced ports
- Wide dynamic range
  >120 dB (test ports, eight-port model)
- High output power
  >13 dBm
- Wide power sweep range
  –40 dBm to 13 dBm
- High measurement speed
  <3.5 µs per test point
- More than 100 channels and traces
- Linear and nonlinear amplifier and mixer measurements
- DC inputs for current and voltage measurements
- Comprehensive calibration techniques
  - TOSM, TNA, TRL, TRM, TOM, UOSM
  - Automatic eight-port calibration unit
  - Waveguide calibration

ROHDE&SCHWARZ

# Outstanding multiport network analyzer ...

## Highlights

The R&S®ZVT8/ZVT20 is the world's first 8/20 GHz network analyzer to offer up to eight/six test ports in a single unit. Each port is equipped with a reflectometer that consists of a VSWR bridge, a measurement receiver, and a reference receiver. Each pair of reflectometers is equipped with an independent generator.

The R&S®ZVT8/ZVT20 thus features excellent network analyzer characteristics for two-port and multiport applications, irrespective of the number of test ports. It offers outstanding performance in terms of stability, reproducibility, accuracy, measurement time, output level, sensitivity, and dynamic range.

The instrument's intelligent and user-friendly operating concept simplifies the handling of the large number of parameters involved in measuring coaxial or balanced multiports. With its comprehensive measurement capabilities, flexible test set configuration, and various interfaces for controlling the instrument as well as external components, the R&S®ZVT8/ZVT20 is ideal for use in complex test systems.



# ... for flexible and powerful solutions

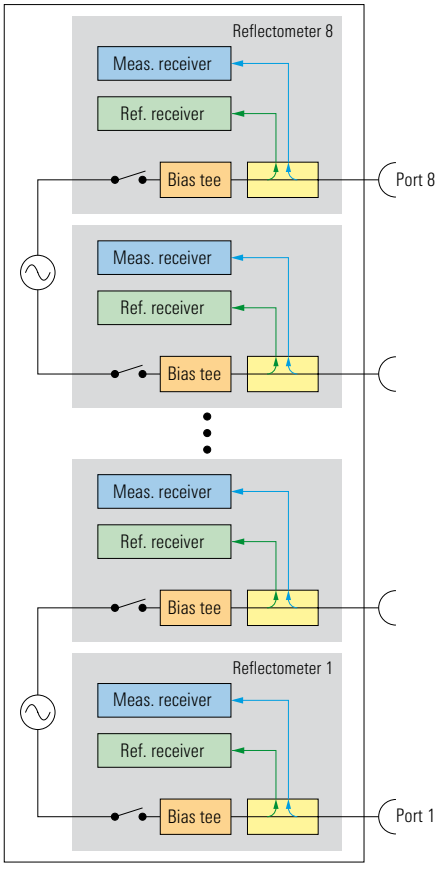
## Multiport measurements in production and in the lab

The R&S®ZVT8/ZVT20 is designed for system applications that involve operating it via remote control using an IEC/IEEE bus or LAN interface. Manual operation is also possible using an external monitor, keyboard, and mouse. Since the R&S®ZVT8/ZVT20 features the same Windows-based mouse operation as the R&S®ZVB and R&S®ZVA network analyzers, it can also be operated manually in the lab.

## Hardware architecture and applications

The R&S®ZVT8 contains up to four internal generators and up to 16 receivers. The R&S®ZVT20 includes up to three internal generators and up to 12 receivers. Both models feature a separate generator for each pair of test ports. Each generator path has an SPST RF switch, which allows parallel signal output at several test ports. Hardware options such as direct generator/receiver access for the individual ports enable versatile test set configuration. Based on this concept, the R&S®ZVT multiport vector network analyzers provide solutions for even the most demanding measurement tasks:

- Multiport measurements, avoiding any time loss due to matrix control
- Flexible configuration of test ports for balanced and single-ended measurements
- True differential measurements
- Multiple-signal measurements, e.g. intermodulation measurements on mixers or double-converting DUTs, requiring only a single unit and extremely short run times
- Enhanced performance by parallel measurements on several DUTs
- Multichannel receiver with simultaneous sampling of channels, e.g. for phase measurements on antenna arrays




***Block diagram of the R&S®ZVT***

## Condensed data

| | R&S®ZVT8 | R&S®ZVT20 |
|---|---|---|
| Number of test ports [1] | 2 to 8 | 2 to 6 |
| Frequency range | 300 kHz to 8 GHz | 10 MHz to 20 GHz |
| Measurement time (201 points) | 5 ms | |
| Data transfer time (201 points) | | |
| Via IEC/IEEE bus | <2.9 ms | |
| Via VX11 (100 Mbit/s LAN) | <1.3 ms | |
| Via RSIB (100 Mbit/s LAN) | <0.7 ms | |
| Switching time | | |
| Between channels | <1 ms | |
| Between instrument setups of up to 2001 points | <10 ms | |
| Electronic power sweep range | >50 dB | >40 dB |
| Dynamic range (at test ports) | 120 dB | |
| Output level | +13 dBm | +10 dBm |
| Sensitivity at 10 Hz measurement bandwidth | –110 dBm | –105 dBm |
| IF bandwidths | 1 Hz to 1 MHz [2] | |
| Number of channels and traces | >100 [3] | |
| Number of points per trace | 60001 | |
| Operating system | Windows XP Embedded | |

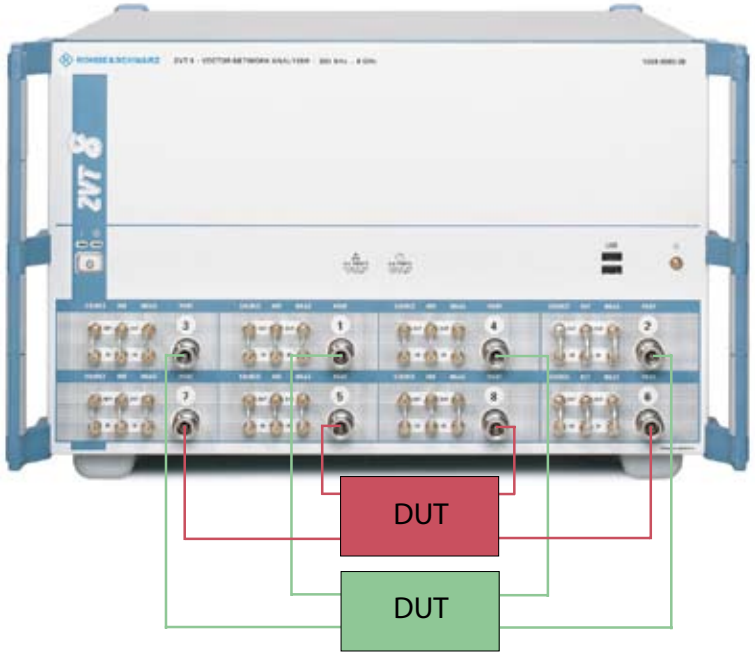
[1] Depending on options installed.
[2] 5 MHz with R&S®ZVA-K17 option.
[3] Limited by available RAM capacity.

# Unique features for maximum throughput

## True multiport architecture

The R&S®ZVT8/ZVT20 sets new standards in measurement speed. With its large bandwidths and its local oscillators featuring rapid tuning, the analyzer takes no more than 5 ms to capture a trace of 201 points.

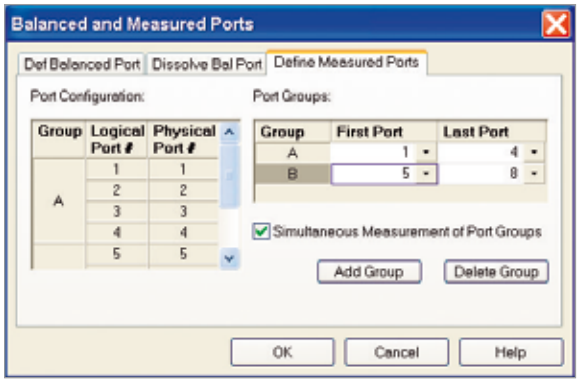
Based on a true multiport architecture with one reflectometer per port, the R&S®ZVT8/ZVT20 can perform measurements on all ports of a DUT simultaneously. This considerably reduces the number of sweeps in multiport measurements, in particular as compared with multiport systems based on switching matrices.



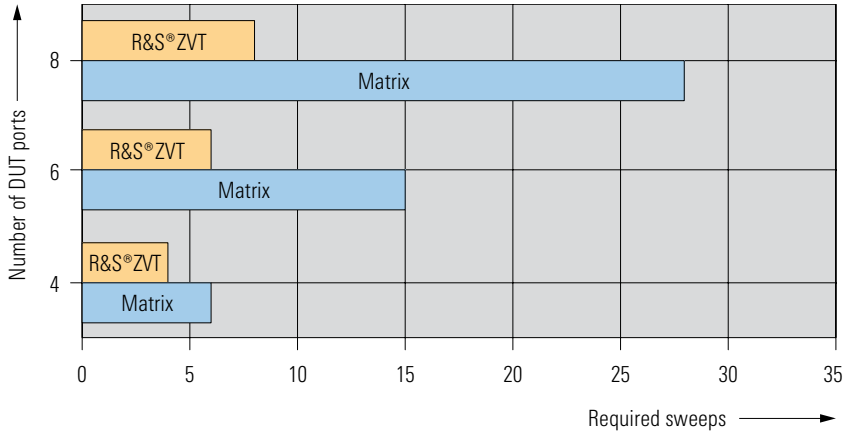

***Simultaneous measurement of two four-port DUTs***

## Simultaneous measurements on several DUTs

The R&S®ZVT8/ZVT20 multigenerator concept with a separate generator for each pair of reflectometers makes it possible to organize test ports in groups. Each test port group carries out measurements independently of the other groups; the measurements of all groups are performed simultaneously. This allows several DUTs, or several paths of one DUT, to be measured in parallel.



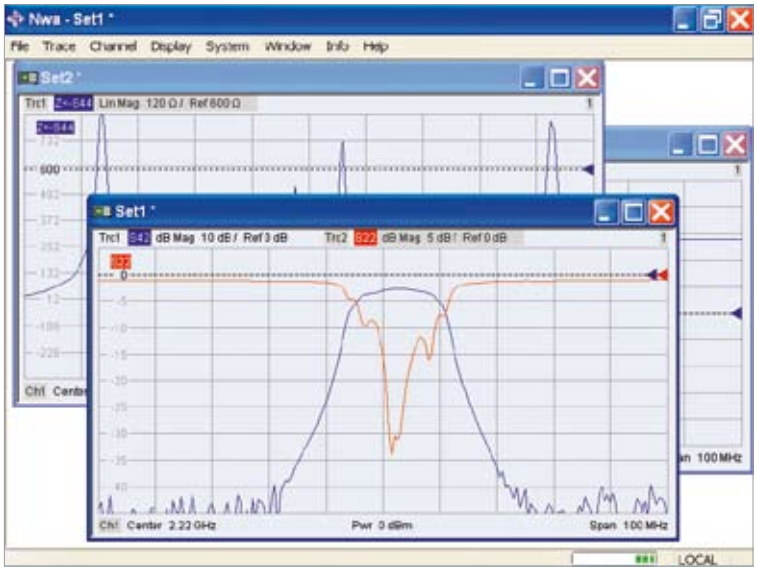

***Dialog for defining test port groups***




Matrix = two-port analyzer with multiport matrix

## Switching between instrument setups within 10 ms

Different instrument setups can be stored on hard disk and loaded into RAM as required. Several setups at a time can be loaded into RAM. In manual operation, simply use the mouse or menu keys to select between windows with different setups. In remote control, setup swapping considerably reduces the time for switching between different setups. Since the data of all loaded setups, including calibration data, is already in RAM, switching between these setups takes no more than 10 ms. With other instruments, recalling of setups can take up to one second.




***Setup swapping***

## Virtually unlimited number of channels and traces

A channel contains all settings used by the analyzer to capture measured data. It includes the parameters relevant to a measurement, e.g. the sweep mode, number of measurement points, power, measurement bandwidth, and calibration. By successively processing several different channels, the R&S®ZVT8/ZVT20 can characterize a DUT under many different conditions. To measure an amplifier, for example, different supply voltages and RF input levels can be applied. Different measurements, e.g. compression and intermodulation evaluation, can be combined in one diagram. For highly complex measurement tasks, a virtually unlimited[1] number of channels and traces are available on the R&S®ZVT8/ZVT20, with all parameters displayed in quasi-realtime. This eliminates the time-consuming task of loading new setups into RAM.

## Segmented sweep

Measurement speed can be further optimized by means of a segmented sweep, which can have an unlimited[1] number of segments. Sweep parameters such as the number of measurement points, measurement bandwidth, and source level can be adapted to the DUT for each frequency segment.

## Data transfer simultaneously with sweep

Since trace data can be transferred via the IEC/IEEE bus or LAN at the same time measured data is being captured, data transfer time on the R&S®ZVT8/ZVT20 is insignificant.

## Control of test cycles by TTL signals

To speed up automatic test cycles even further, a special port for trigger I/O signals is provided on the rear panel. These signals directly synchronize external devices of a test setup or the settings of a DUT to the internal measurement sequences of the R&S®ZVT8/ZVT20.

## 5 MHz receiver bandwidth

The R&S®ZVT has a maximum IF bandwidth of 1 MHz. To reduce measurement times even further, the R&S®ZVA-K17 software option offers IF bandwidths up to 5 MHz[2]. This reduces the net sampling time per point to approx. 430 ns. The option not only speeds up measurements in the frequency domain. It also provides improved performance for point-in-pulse and pulse profile measurements on pulses of a few microseconds length by means of easy-to-configure standard CW or time sweeps, where the S-parameters or amplitudes of pulses are measured as a function of time.

[1] Limited only by available RAM capacity.
[2] Selectable up to 10 MHz with restrictions.

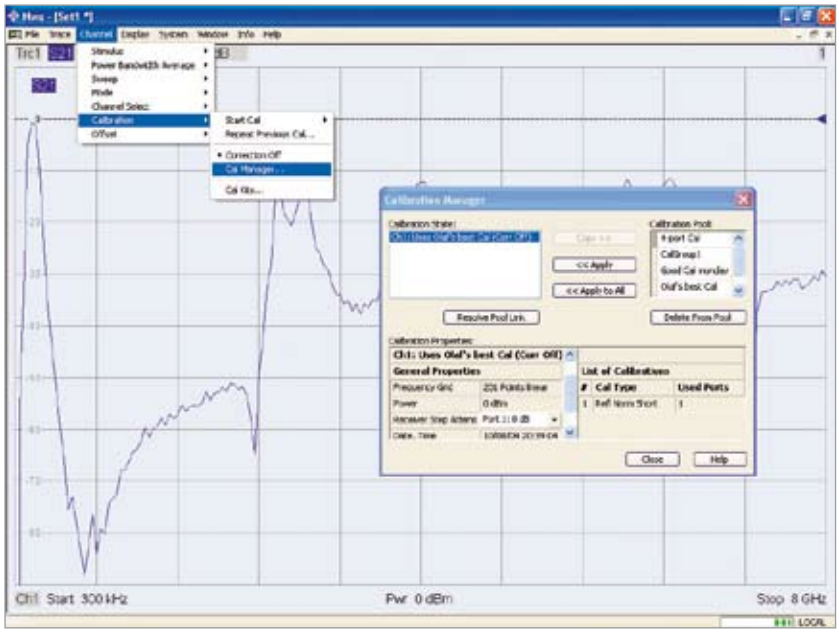
# Designed for maximum precision

## Comprehensive calibration techniques

Since each test port of the R&S®ZVT8/ZVT20 is equipped with a reference receiver of its own, modern calibration techniques can be used. In addition to standard TOSM two-port calibration (TOSM: **T**hrough, **O**pen, **S**hort, **M**atch), the analyzer offers 7-term calibration techniques largely patented for Rohde&Schwarz, such as TOM (**T**hrough, **O**pen, **M**atch), TRM (**T**hrough, **R**eflect, **M**atch), TNA (**T**hrough, **N**etwork, **A**ttenuator), and TRL (**T**hrough, **R**eflect, **L**ine).

The 7-term calibration technique offers the advantages of reduced effort and increased measurement accuracy. This applies especially to DUTs exhibiting good matching and strong reflection. Multiport calibration techniques for multiport applications are also available on the R&S®ZVT8/ZVT20.

The new UOSM (**U**nknown Through, **O**pen, **S**hort, **M**atch) calibration technique allows a through-connection with unknown parameters to be used as a standard. This makes it possible to use any adapter with any types of connectors as a "U"(adapter removal functionality), and thus supports calibration of a DUT with different connector types.




***Menu- and dialog-driven mouse operation***

## High precision, wide dynamic range

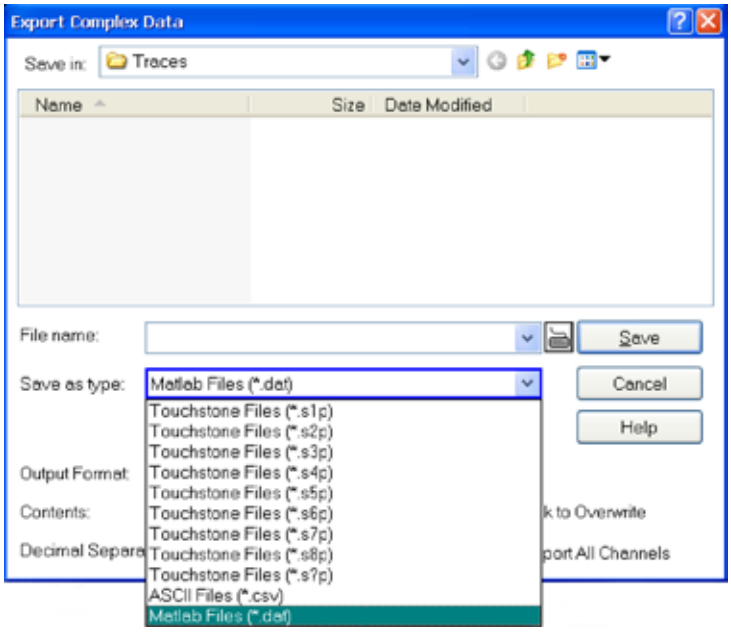
Featuring true multiport architecture with a separate reflectometer for each test port, the R&S®ZVT8/ZVT20 simultaneously measures all paths of a DUT in one direction. Data for all paths is captured and processed in parallel at all stages, from the RF test port and the IF through to the display of results. The receivers in the R&S®ZVT8/ZVT20 use a fundamental mixing concept that was introduced by Rohde&Schwarz for network analyzers over ten years ago and that ensures a wide dynamic range and low trace noise. Since no additional attenuation occurs between the test port and the measurement receiver, such as with switching matrices, for example, multiport measurements are highly stable, largely reproducible, and thus extremely accurate.

# Broad networking capabilities

## Result documentation

The use of the Windows XP Embedded operating system, in conjunction with a variety of interfaces, makes it easy to integrate measurement results into documentation by saving screen contents as *.bmp, *.png, *.jpg, or *.emf files and importing these files into a text processing system.

Trace data can be stored as Touchstone (*.snp), ASCII (*.csv), or MATLAB® (*.dat) files and subsequently analyzed and processed using other tools.




***Measured data can be stored in various formats, and thus easily be exported to external tools for further processing***

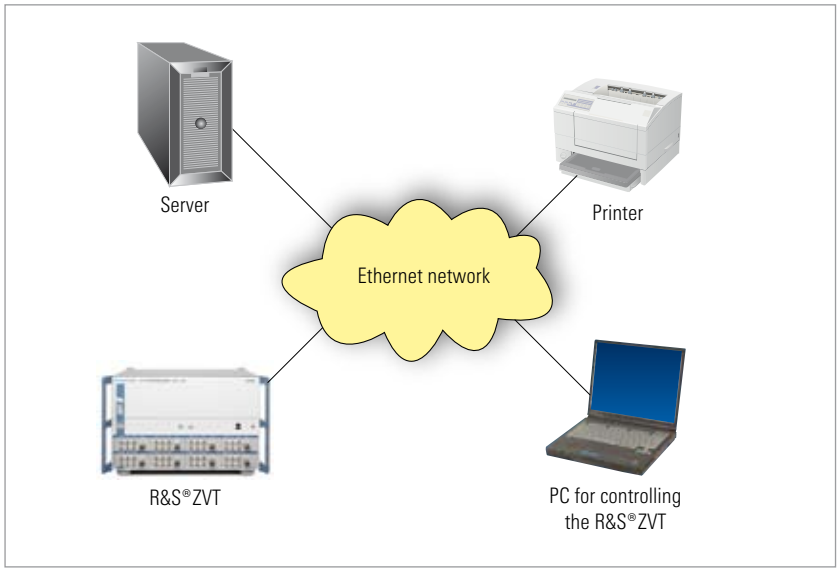
## State-of-the-art networking

Windows XP Embedded and the LAN interface (Ethernet 10/100BaseT), which is included as standard, open up broad networking capabilities:

- Configuration of the R&S®ZVT8/ZVT20 as a network workstation
- Printing on a central network printer
- Storage of result files on a central server

Remote control of the R&S®ZVT8/ZVT20 via an Ethernet network is even simpler. RSIB software connects the application to the TCP/IP protocol and is used like an IEC/IEEE bus driver.

The R&S®ZVT8/ZVT20 can thus be programmed and remote-controlled via a LAN in the same way as via the IEC/IEEE bus.




***The R&S®ZVT within a network***

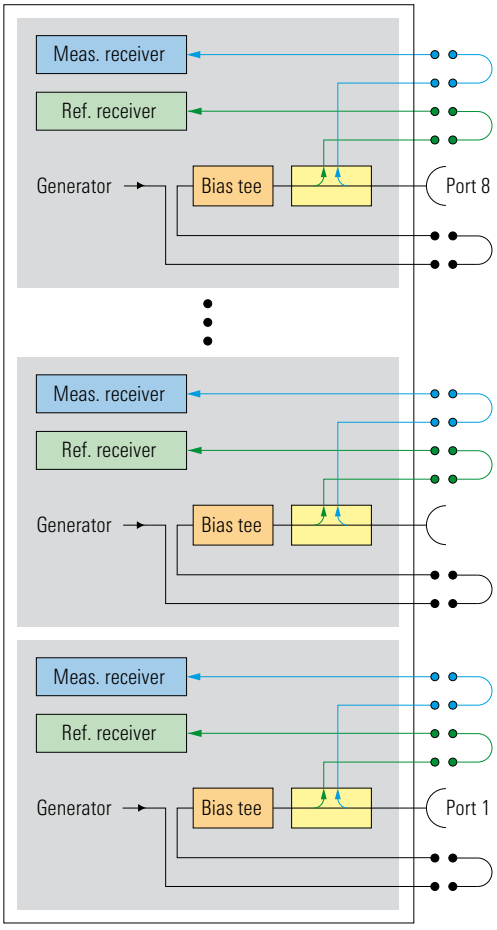
# Options for enhanced flexibility, level, and dynamic range

## Direct generator and receiver access for all ports

With the R&S®ZVT8-B16/ZVT20-B16 direct generator/receiver access options, the signal paths of the receivers and generators are taken directly to the front panel. You have direct access to the generators and receivers of all reflectometers, since the internal VSWR bridges or couplers are bypassed.

With a fully configured R&S®ZVT8, all 16 receivers can be used to capture and process measurement data in parallel.

*The R&S®ZVT with direct generator/receiver access*



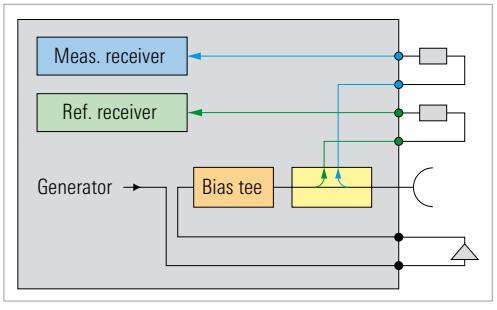

## Flexible test sets providing increased output power for amplifier measurements

Direct access to all generator and receiver paths allows the flexible configuration of complex external test sets. Such test sets may include filters for better harmonic distortion or preamplifiers for boosting the output level.

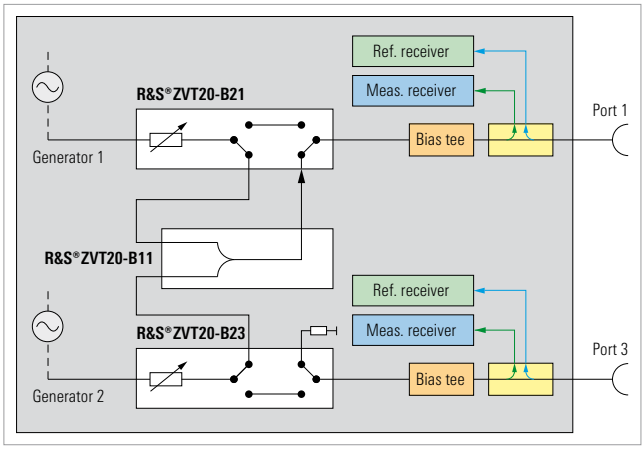
Inserting external components (especially amplifiers) in the generator path ahead of the reference path eliminates drift and temperature response in S-parameter measurements. Moreover, all calibration techniques are available, and the user fully benefits from the advantages of high measurement accuracy and long-term stability.

The internal combiner option for the R&S®ZVT20 combines the signals of two internal sources inside the analyzer to deliver a two-tone signal at port 1. The R&S®ZVT20 thus performs intermodulation measurements without requiring any external components.

*Boosting of source level by means of external amplifier*



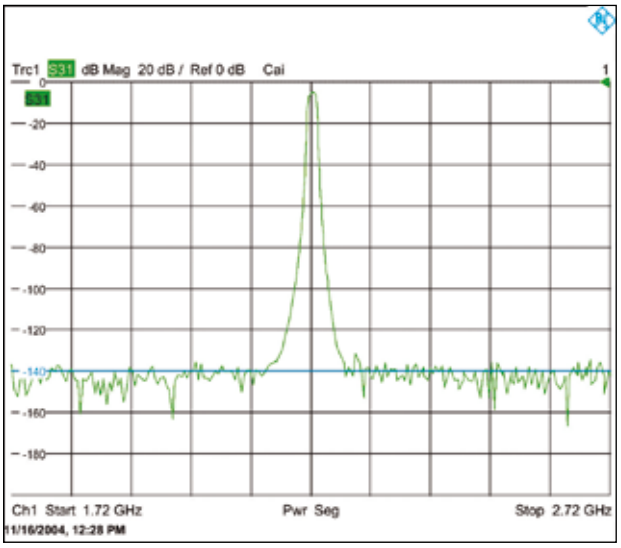

*Internal combiner and generator step attenuators for the R&S®ZVT20*



## Increased dynamic range for characterizing high-blocking filters

Since the attenuation introduced by the VSWR bridges or couplers is bypassed in the direct mode, measurements can be performed at a higher output level and higher sensitivity. This means that high-blocking DUTs can be measured with a dynamic range of up to 140 dB at 10 Hz IF bandwidth.

By connecting suitable external directional couplers, one- and two-port calibration techniques can be used to enhance measurement accuracy without any significant loss in dynamic range.

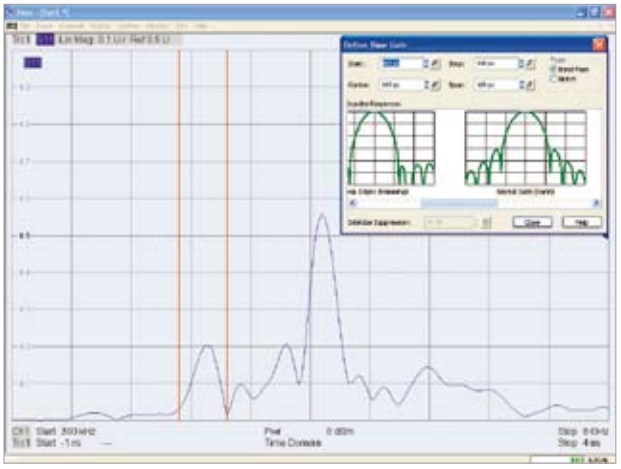



***Typical dynamic range with direct mode***

## High-speed time domain analysis with enhanced resolution capability

Using the time domain option, you can, for example, locate discontinuities in test fixtures and cables and analyze them, e.g. by means of a gated S-parameter measurement. You can display impedance versus length, which is of interest in cable measurements. Due to the high computing power of the R&S®ZVT8/ZVT20, the time domain option barely slows down sweep speed. Cavity resonator filters can therefore be adjusted quickly and easily using this option. The time domain option can be used in conjunction with various window functions such as Hamming, Hann, Bohman, or Dolph-Chebyshev.

With conventional TDR methods, the resolution, i.e. the width of reflected-signal peaks and the rise time of step responses, is limited by the network analyzer's frequency range.



***Discontinuity location using the R&S® ZVAB-K2 time domain option***

The R&S®ZVT8/ZVT20 does away with this limitation. Its linear prediction function expands the frequency spectrum by way of computation. Using this function, you can analyze considerably finer structures than was previously possible due to the limitation to the analyzer's actual frequency range. This function also allows narrowband and frequency-limited DUTs to be measured with higher accuracy.

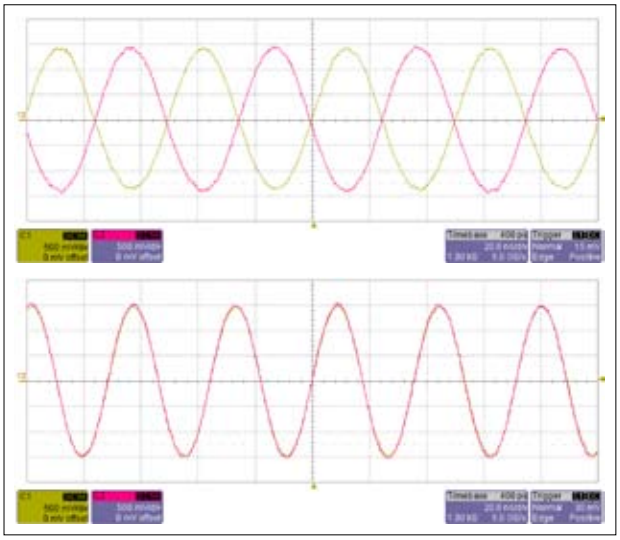
## Voltage and current measurements

Two floating DC inputs with a bandwidth of 1 MHz are provided on the analyzer's rear panel in addition to the RF test ports. During a frequency or power sweep, detector characteristics or supply currents of a module can be measured via these inputs.

# Measurement on multiports and balanced components

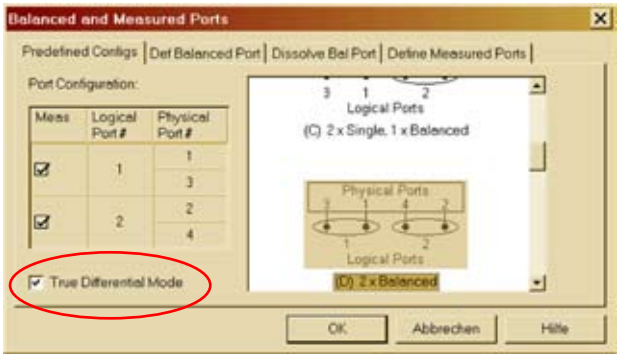
## True differential measurement mode

The R&S®ZVA-K6 option enables the reliable characterization of active components with differential ports, combining new test capabilities with maximum operating ease. The standard mode for measuring differential DUTs, i.e. the virtual differential mode, does not employ true differential stimulus signals. Instead, it treats each of the n conductors of a DUT as a single-ended port, to which stimulus signals are applied sequentially. The mixed-mode S-parameters are derived from the $n^2$ standard S-parameters by way of calculation.



***Output signals of two R&S®ZVT ports in true differential mode (measured with an oscilloscope) using stimulus signals with 0° or 180° phase difference***

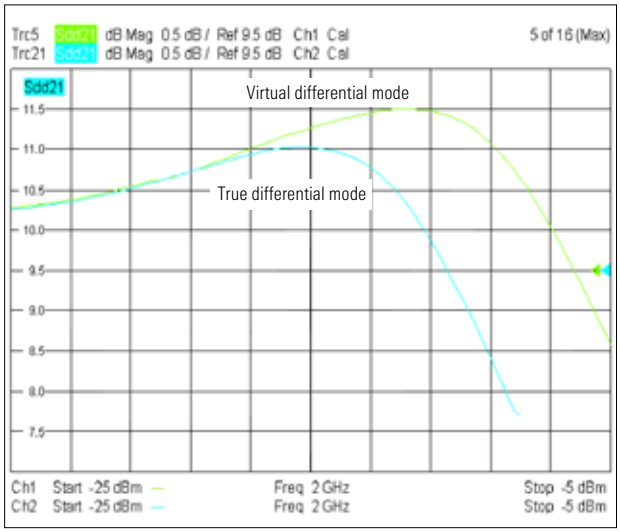
Active components in particular may show a distinctly different response to a stimulus signal, depending on whether the virtual (standard) or the true differential measurement mode is applied. To obtain reliable results even for active differential DUTs, the R&S®ZVA-K6 option provides true differential stimulation and measurements. The test signals delivered by two internal generators are applied at the reference plane simultaneously with 180° or 0° phase difference. The measurements on the selected test channels are performed simultaneously. The R&S®ZVT8 eight-port model can be configured for measurements on up to four differential ports and on combinations of single-ended and balanced ports.




***Dialog for configuring a balanced measurement: The true differential mode is selected at a single mouse click***

The R&S®ZVA-K6 option also supports true phase imbalance and true amplitude imbalance sweeps of the two stimulus signals.

As with standard measurements, calibration is performed either manually using a calibration kit, or automatically with a calibration unit.



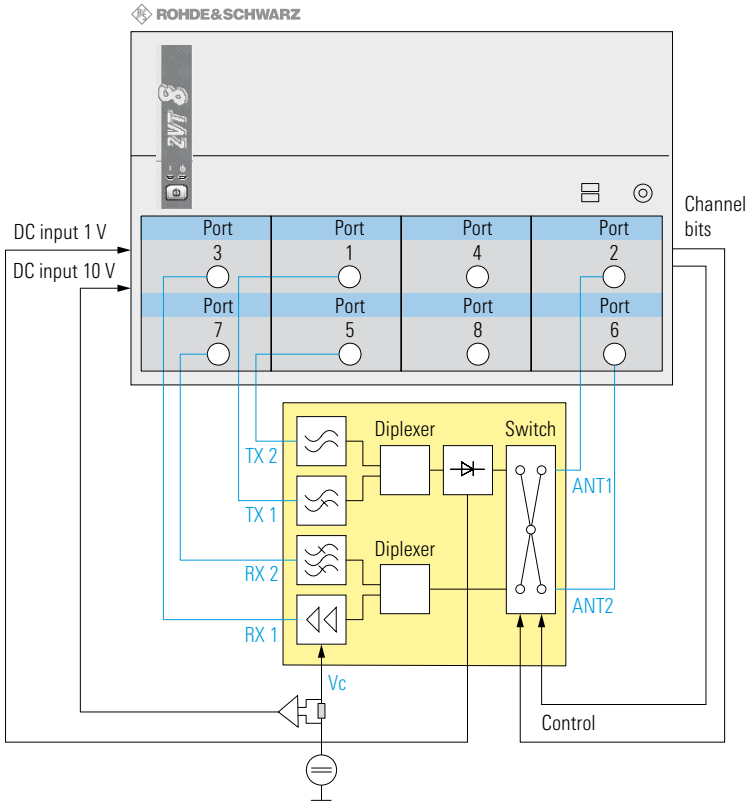

***Compression measurement of an amplifier – traces obtained for S21 in virtual and true differential mode***

# Complex analysis of passive and active modules

The demand for modules offering increasingly higher performance in ever smaller housings for mobile radio and WLAN applications is driving the trend toward higher levels of integration and functional density in modern RF modules. These modules call for increasingly complex tests in production, and these tests have to be performed in shorter and shorter periods of time.

The R&S®ZVT8/ZVT20 performs tests on such modules quickly and accurately, and the DUT has to be connected only once. This is due to a number of outstanding features, including special features for characterizing active and passive modules, as well as an increased number of test ports and thus generator and receiver channels. The analyzer's display concept, supporting arbitrary combinations of an almost unlimited number of channels and traces, enables full documentation of results.

| Features for amplifier measurements | Features for filter measurements |
|---|---|
| ◆ Bias tees at all test ports<br>◆ High output level (+13 dBm) at all test ports<br>◆ Wide power sweep range (50 dB)<br>◆ High 0.1 dB compression point<br>◆ Absolute power measurement<br>◆ PAE (power added efficiency) measurement<br>◆ Measurement of efficiency and stability factors<br>◆ Measurement of supply currents and level detector characteristics<br>◆ Determination of n dB compression point<br>◆ Y and Z parameter measurement<br>◆ Measurements on pulsed signals (high PRF mode, point-in-pulse, pulse profile)<br>◆ Measurements on frequency-converting DUTs (e.g. harmonics measurements, intermodulation of amplifiers and mixers, measurements on double-converting DUTs) | ◆ Wide dynamic range (>120 dB)<br>◆ Automatic measurement of filter parameters such as bandwidth, quality, etc<br>◆ Measurement of mixed-mode S-parameters of balanced DUTs<br>◆ Embedding of single-ended balanced DUTs into virtual networks<br>◆ Impedance conversion<br>◆ High-speed time domain option, e.g. to suppress triple transit in SAW filters |




***Measurement of antenna switching module***

## Comprehensive measurements on antenna switching modules

In the example shown opposite, the R&S®ZVT8/ZVT20 measures the transmission and isolation parameters between the RF ports of an antenna switching module. One DC input of the R&S®ZVT8/ZVT20 measures the current drain of the low-noise amplifier versus frequency and level. The other DC input determines the detector characteristic versus frequency and level. To select the paths required for the measurement, the switch of the DUT is controlled by "channel bits" from the R&S®ZVT8/ZVT20. These are digital signals that are brought out at the rear panel and are synchronous to the active measurement channel, i.e. the channel currently being swept.

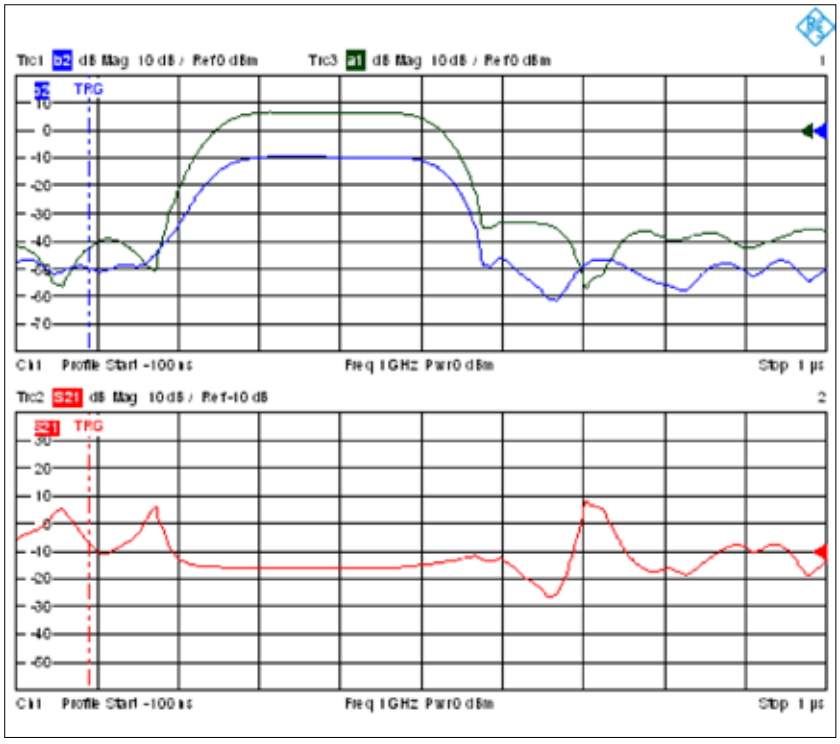
The TX→Ant paths and the RX→Ant paths are measured simultaneously by using test port groups, thus reducing measurement time by nearly half without any loss of performance.

# Pulsed measurements – pulse profile measurements

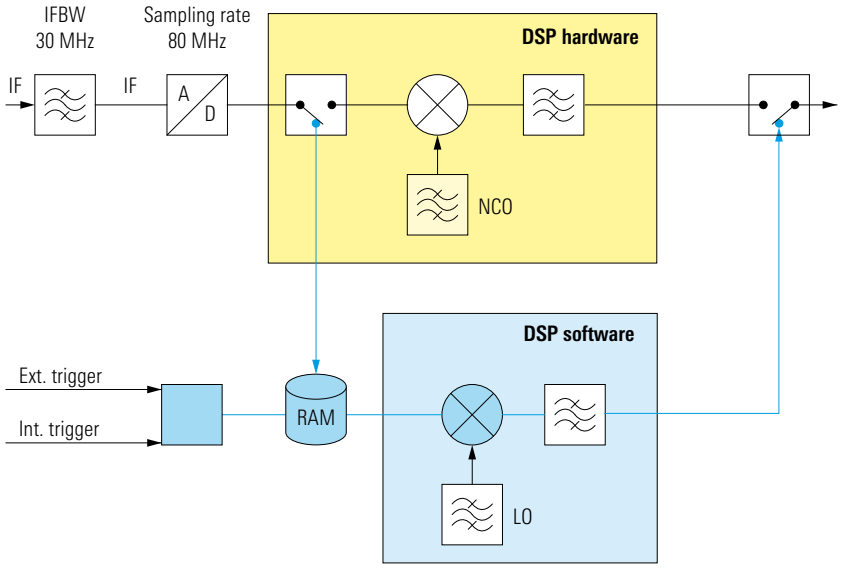
The R&S®ZVT8/ZVT20 performs typical pulsed-signal measurements such as point-in-pulse or high-PRF-mode measurements by means of the direct generator/receiver access and frequency conversion options. The R&S®ZVA-K7 pulsed measurements option provides a convenient, high-performance solution especially for pulse profile measurements[1]: Even the profiles of very short pulses with a duration far below 100 ns are represented with a resolution of 12.5 ns in the time domain. Traces are updated at a high rate, which greatly facilitates adjustment procedures.

The R&S®ZVT8/ZVT20 displays amplitude characteristics (the powers measured in the measurement and the reference channels, and their ratios), as well as S-parameters in magnitude and phase. Single pulses, double pulses, or pulse sequences up to 3 ms length can easily be measured. The option includes methods for compensating the group delay of the DUT, which makes it possible to measure pulses whose length is shorter than the group delay of the DUT. IF bandwidths up to 10 MHz are available for short pulse edges[2].

Data is captured and processed separately for each signal path. Therefore, all of the up to 16 receivers of the R&S®ZVT can be used independently of one another also for pulse profile measurements.




***Pulse profile measurement; amplitudes (i.e. powers of the reference and the measurement channel) and S-parameter***




***Procedure for pulse profile measurements***

## Procedure for pulse profile measurements

The A/D converter outputs uncorrected sampling values, which are first stored in a high-speed buffer (RAM), and then digitally processed block by block up to the display (see blue arrows in block diagram). Therefore, with sampling performed independently of signal processing, the pulse signal can be sampled at the converter's maximum rate of 80 MHz.

[1] The R&S®ZVA-K17 upgrade option may also be required, depending on the analyzer's manufacturing date.
[2] Selectable up to 30 MHz with restrictions.

# Interface description

| Interface | Function |
|---|---|
| LAN 1 | Control of the R&S®ZVT or subnetwork with the R&S®ZVT as the master, 8-pin RJ-45 connector |
| LAN 2 | Control of the R&S®ZVT or subnetwork with the R&S®ZVT as the master, 8-pin RJ-45 connector |
| IEC-BUS | Remote control of the R&S®ZVT |
| PORT BIAS | Input of DC power for supply of amplifiers via inner conductor of test port; one input and fuse per RF port; BNC connectors |
| USB | Standard 1.1 USB double port (for mouse, keyboard, printer, storage media, etc) |
| 10 MHz REF | Reference frequency I/O: 10 MHz reference can be input from, or output to, external devices; BNC connector |
| DC MEAS | Measurement inputs for DC voltage and PAE measurements; input voltage ranges ±1 V and ±10 V; Mini DIN connectors; required cable: R&S®ZV-Z71 (option) |
| MONITOR | For external VGA monitor; standard VGA connector |
| USER CONTROL | TTL I/O signals: sweep status indication, pass/fail indication, indication of active test port, indication of active channel by channel bits, trigger signals for fast control of external devices, e.g. generators, handshake with handlers, sequence control without programming effort; 25-pin D-Sub connector |
| EXT TRIGGER | Input of external TTL trigger signal for starting a sweep, sweep segment, test point, or partial measurement; BNC connector |



*Rear view of the R&S®ZVT*

# Ordering information

| Designation | Type | Frequency range | Order No. |
|---|---|---|---|
| **Base units** | | | |
| Multiport Vector Network Analyzer, 2 ports, 8 GHz | R&S®ZVT8 | 300 kHz to 8 GHz | 1300.0000.08 |
| Multiport Vector Network Analyzer, 2 ports, 20 GHz | R&S®ZVT20 | 10 MHz to 20 GHz | 1300.0000.20 |
| **Options** | | | |
| Converter WR10 (one unit) [1] | R&S®ZVA-Z110 | 75 GHz to 110 GHz | 1307.7000.02 |
| Converter Control Software [1] | R&S®ZVA-K8 | | 1307.7022.02 |
| Oven Quartz (OCXO) | R&S®ZVAB-B4 | | 1164.1757.02 |
| Time Domain (TDR) | R&S®ZVAB-K2 | | 1164.1657.02 |
| Frequency Conversion | R&S®ZVA-K4 | | 1164.1863.02 |
| True Differential Measurements [2] | R&S®ZVA-K6 | | 1164.1540.02 |
| Pulsed Measurements | R&S®ZVA-K7 | | 1164.1511.02 |
| Upgrade of Trigger Hardware [3] | R&S®ZVA-UK7 | | 1164.1463.02 |
| 5 MHz Receiver Bandwidth | R&S®ZVA-K17 | | 1164.1010.02 |
| **Specific options for the R&S®ZVT8 only** | | | |
| Direct Generator/Receiver Access for Port 1, 8 GHz | R&S®ZVT8-B16 | 300 kHz to 8 GHz | 1300.1706.11 |
| Direct Generator/Receiver Access for Port 2, 8 GHz | R&S®ZVT8-B16 | 300 kHz to 8 GHz | 1300.1706.12 |
| Direct Generator/Receiver Access for Port 3, 8 GHz | R&S®ZVT8-B16 | 300 kHz to 8 GHz | 1300.1706.13 |
| Direct Generator/Receiver Access for Port 4, 8 GHz | R&S®ZVT8-B16 | 300 kHz to 8 GHz | 1300.1706.14 |
| Direct Generator/Receiver Access for Port 5, 8 GHz | R&S®ZVT8-B16 | 300 kHz to 8 GHz | 1300.1706.15 |
| Direct Generator/Receiver Access for Port 6, 8 GHz | R&S®ZVT8-B16 | 300 kHz to 8 GHz | 1300.1706.16 |
| Direct Generator/Receiver Access for Port 7, 8 GHz | R&S®ZVT8-B16 | 300 kHz to 8 GHz | 1300.1706.17 |
| Direct Generator/Receiver Access for Port 8, 8 GHz | R&S®ZVT8-B16 | 300 kHz to 8 GHz | 1300.1706.18 |
| Additional Port 3 (ports 1 and 2 included in base unit) | R&S®ZVT8-B63 | 300 kHz to 8 GHz | 1300.1506.13 |
| Additional Port 4 (requires ports 1 to 3) | R&S®ZVT8-B64 | 300 kHz to 8 GHz | 1300.1506.14 |
| Additional Port 5 (requires ports 1 to 4) | R&S®ZVT8-B65 | 300 kHz to 8 GHz | 1300.1506.15 |
| Additional Port 6 (requires ports 1 to 5) | R&S®ZVT8-B66 | 300 kHz to 8 GHz | 1300.1506.16 |
| Additional Port 7 (requires ports 1 to 6) | R&S®ZVT8-B67 | 300 kHz to 8 GHz | 1300.1506.17 |
| Additional Port 8 (requires ports 1 to 7) | R&S®ZVT8-B68 | 300 kHz to 8 GHz | 1300.1506.18 |
| **Specific options for the R&S®ZVT20 only** | | | |
| Direct Generator/Receiver Access for Port 1, 20 GHz | R&S®ZVT20-B16 | 10 MHz to 20 GHz | 1300.1635.11 |
| Direct Generator/Receiver Access for Port 2, 20 GHz | R&S®ZVT20-B16 | 10 MHz to 20 GHz | 1300.1635.12 |
| Direct Generator/Receiver Access for Port 3, 20 GHz | R&S®ZVT20-B16 | 10 MHz to 20 GHz | 1300.1635.13 |
| Direct Generator/Receiver Access for Port 4, 20 GHz | R&S®ZVT20-B16 | 10 MHz to 20 GHz | 1300.1635.14 |
| Direct Generator/Receiver Access for Port 5, 20 GHz | R&S®ZVT20-B16 | 10 MHz to 20 GHz | 1300.1635.15 |
| Direct Generator/Receiver Access for Port 6, 20 GHz | R&S®ZVT20-B16 | 10 MHz to 20 GHz | 1300.1635.16 |
| Generator Step Attenuator for Port 1 | R&S®ZVT20-B21 | 10 MHz to 20 GHz | 1300.1558.02 |
| Generator Step Attenuator for Port 3 | R&S®ZVT20-B23 | 10 MHz to 20 GHz | 1300.1564.02 |
| Receiver Step Attenuator for Port 1 | R&S®ZVT20-B32 | 10 MHz to 20 GHz | 1300.1570.02 |
| Receiver Step Attenuator for Port 3 | R&S®ZVT20-B34 | 10 MHz to 20 GHz | 1300.1587.02 |
| Internal Combiner [4] | R&S®ZVT20-B11 | 10 MHz to 20 GHz | 1300.1658.02 |
| Additional Port 3 (ports 1 and 2 included in base unit) | R&S®ZVT20-B63 | 10 MHz to 20 GHz | 1300.1606.03 |
| Additional Port 4 (requires ports 1 to 3) | R&S®ZVT20-B64 | 10 MHz to 20 GHz | 1300.1606.04 |
| Additional Port 5 (requires ports 1 to 4) | R&S®ZVT20-B65 | 10 MHz to 20 GHz | 1300.1606.05 |
| Additional Port 6 (requires ports 1 to 5) | R&S®ZVT20-B66 | 10 MHz to 20 GHz | 1300.1606.06 |

| Designation | Type | Frequency range | Order No. |
|---|---|---|---|
| **Extras** | | | |
| Test Cables (single items) | | | |
| N (m)/N (m), 50 Ω, 63.5 cm | R&S®ZV-Z91 | 0 Hz to 18 GHz | 1301.7572.25 |
| N (m)/N (m), 50 Ω, 96.5 cm | R&S®ZV-Z91 | 0 Hz to 18 GHz | 1301.7572.38 |
| N (m)/3.5 mm (m), 50 Ω, 63.5 cm | R&S®ZV-Z92 | 0 Hz to 18 GHz | 1301.7589.25 |
| N (m)/3.5 mm (m), 50 Ω, 96.5 cm | R&S®ZV-Z92 | 0 Hz to 18 GHz | 1301.7589.38 |
| 3.5 mm (f)/3.5 mm (m), 50 Ω, 63.5 cm | R&S®ZV-Z93 | 0 Hz to 26.5 GHz | 1301.7595.25 |
| 3.5 mm (f)/3.5 mm (m), 50 Ω, 96.5 cm | R&S®ZV-Z93 | 0 Hz to 26.5 GHz | 1301.7595.38 |
| N (m)/N (m), 50 Ω, 61 cm | R&S®ZV-Z191 | 0 Hz to 18 GHz | 1306.4507.24 |
| N (m)/N (m), 50 Ω, 91 cm | R&S®ZV-Z191 | 0 Hz to 18 GHz | 1306.4507.36 |
| N (m)/3.5 mm (m), 50 Ω, 61 cm | R&S®ZV-Z192 | 0 Hz to 18 GHz | 1306.4513.24 |
| N (m)/3.5 mm (m), 50 Ω, 91 cm | R&S®ZV-Z192 | 0 Hz to 18 GHz | 1306.4513.36 |
| 3.5 mm (f)/3.5 mm (m), 50 Ω, 61 cm | R&S®ZV-Z193 | 0 Hz to 26.5 GHz | 1301.7595.25 |
| 3.5 mm (f)/3.5 mm (m), 50 Ω, 91 cm | R&S®ZV-Z193 | 0 Hz to 26.5 GHz | 1301.7595.38 |
| Calibration Kits | | | |
| Calibration Kit, N (m), 50 Ω, combined, 8 GHz | R&S®ZV-Z121 | 0 Hz to 8 GHz | 1164.0496.02 |
| Calibration Kit, N (f), 50 Ω, combined, 8 GHz | R&S®ZV-Z121 | 0 Hz to 8 GHz | 1164.0496.03 |
| Calibration Kit, N, 50 Ω | R&S®ZCAN | 0 Hz to 3 GHz | 0800.8515.52 |
| Calibration Kit, N, 50 Ω | R&S®ZV-Z21 | 0 Hz to 18 GHz | 1085.7099.02 |
| Calibration Kit, 3.5 mm | R&S®ZV-Z32 | 0 Hz to 26.5 GHz | 1128.3501.02 |
| Calibration Kit, 3.5 mm (with sliding matches) | R&S®ZV-Z33 | 0 Hz to 26.5 GHz | 1128.3518.02 |
| TRL Supplementary Calibration Kit, N, 50 Ω | R&S®ZV-Z26 | 0.4 Hz to 18 GHz | 1085.7318.02 |
| TRL Supplementary Calibration Kit, 3.5 mm | R&S®ZV-Z27 | 0.4 Hz to 26.5 GHz | 1085.7401.02 |
| Calibration Kit, 2.92 mm | R&S®ZV-Z34 | 0 GHz to 40 GHz | 1128.3530.02 |
| Calibration Kit, 2.92 mm (with sliding matches) | R&S®ZV-Z35 | 0 GHz to 40 GHz | 1128.3547.02 |
| Waveguide Calibration Kit WR10 (without sliding match) | R&S®ZV-WR10 | 75 GHz to 110 GHz | 1307.7100.10 |
| Waveguide Calibration Kit WR10 (with sliding match) | R&S®ZV-WR10 | 75 GHz to 110 GHz | 1307.7100.11 |
| Calibration Unit, 4 ports, 3.5 mm (f) | R&S®ZV-Z51 | 300 kHz to 8 GHz | 1164.0515.30 |
| Calibration Unit, 4 ports, N (f) | R&S®ZV-Z51 | 300 kHz to 8 GHz | 1164.0515.70 |
| Calibration Unit, 4 ports, 3.5 mm (f) | R&S®ZV-Z52 | 10 MHz to 24 GHz | 1164.0521.30 |
| Calibration Unit, 2 ports, N (f) | R&S®ZV-Z53 | 300 kHz to 18 GHz | 1164.0473.72 |
| Calibration Unit, 8 ports, 3.5 mm (f) | R&S®ZV-Z58 | 300 kHz to 8 GHz | 1164.0638.38 |
| Calibration Unit, 8 ports, N (f) | R&S®ZV-Z58 | 300 kHz to 8 GHz | 1164.0638.78 |
| Calibration Unit, 6 ports, 3.5 mm (f) | R&S®ZV-Z59 | 10 MHz to 20 GHz | 1164.0450.36 |
| **Hardware and measurement add-ons** | | | |
| USB-to-IEC/IEEE Adapter (for control of external generators via IEC/IEEE bus) | R&S®ZVAB-B44 | | 1302.5544.02 |
| Visa I/O Library | VISA I/O-BIB | | 1161.8473.02 |
| Upgrade Kit for Control Unit (FMR6/5 to FMR7/6)[5] | R&S®ZVx-U1 | | 1305.4610.02 |
| Control Unit FMR7/6 ex factory | R&S®ZVAB-B76 | | 1305.4610.03 |
| Upgrade Kit for Control Unit (FMR7/3 to FMR7/6)[5] | R&S®ZVAB-U76 | | 1305.4610.04 |

[1] The R&S®ZVA-Z110 and R&S®ZVA-K8 options can only be used with the R&S®ZVT20.

[2] Requires a second internal source, i.e. an R&S®ZVT8 with three or more test ports. Availability for the R&S®ZVT20 on demand.

[3] Depending on the manufacturing date of the R&S®ZVT8/ZVT20, the R&S®ZVA-K7 option may require the R&S®ZVA-UK7 option. Please contact your local Rohde&Schwarz office for details.

[4] Internal combiner to provide a two-tone signal at test port 1. Requires a second internal source (i.e. an R&S®ZVT20 with three or more test ports), and both generator step attenuator options (R&S®ZVT20 B21 and R&S®ZVT20-B23).

[5] All R&S®ZVT analyzers are equipped as standard with an FMR7/3 control unit as of September 2007. The FMR7/6 control unit with higher performance can be installed optionally.







For data sheet, see PD 0758.0651.22
and www.rohde-schwarz.com
(search term: ZVT)

ROHDE&SCHWARZ

**www.rohde-schwarz.com**
Europe, Latin America, Africa, Middle East: +49 1805 124242 or +49 89 4129 13774, customersupport@rohde-schwarz.com
North America +1 888 837 8772, customersupport@rohde-schwarz.com
Asia | Pacific +65 65 130 488, customersupport@rohde-schwarz.com

R&S® is a registered trademark of Rohde&Schwarz GmbH&Co. KG · Trade names are trademarks of the owners · Printed in Germany (ch)
PD 0758.0651.12 · Version 04.00 · January 2008 · R&S®ZVT · Data without tolerance limits is not binding · Subject to change

**Artisan Technology Group** is an independent supplier of quality pre-owned equipment

## Gold-standard solutions

Extend the life of your critical industrial, commercial, and military systems with our superior service and support.

## We buy equipment

Planning to upgrade your current equipment? Have surplus equipment taking up shelf space? We'll give it a new home.

## Learn more!

Visit us at **artisantg.com** for more info on price quotes, drivers, technical specifications, manuals, and documentation.

Artisan Scientific Corporation dba Artisan Technology Group is not an affiliate, representative, or authorized distributor for any manufacturer listed herein.

We're here to make your life easier. How can we help you today?

(217) 352-9330 | sales@artisantg.com | artisantg.com

ARTISAN® TECHNOLOGY GROUP