

# Test Equipment Solutions Datasheet

Test Equipment Solutions Ltd specialise in the second user sale, rental and distribution of quality test & measurement (T&M) equipment. We stock all major equipment types such as Spectrum Analyzers, Signal Generators, Oscilloscopes, Power Meters, Network Analyzers etc from all the major suppliers such as Keysight, Tektronix, Anritsu and Rohde & Schwarz.

We are focused at the professional end of the marketplace, primarily working with customers for whom high performance, quality and service are key, whilst realising the cost savings that second user equipment offers. We fully test & refurbish equipment in our in-house, traceable Lab. Items are supplied with manuals, accessories and typically a full no-quibble 1 year warranty. Our staff have extensive backgrounds in T&M which enables us to deliver industry-leading service and support. We endeavour to be customer focused in every way right down to the detail, such as offering free delivery on sales, presenting flexible technical + commercial solutions and supplying a loan unit during warranty repair, if available.

As well as the headline benefit of cost saving, second user offers shorter lead times, higher reliability and multivendor solutions. Rental, of course, is ideal for shorter term needs and offers fast delivery, flexibility, try-before-you-buy, zero capital expenditure, lower risk and off balance sheet accounting. Both second user and rental improve the key business measure of Return On Capital Employed.

We are based in at Oakley, Bedfordshire in the UK from where we supply test equipment worldwide. Our facility incorporates Sales, Support, Admin, Logistics and our own in-house Lab.

All products supplied by Test Equipment Solutions include:

- No-quibble parts & labour warranty (we provide transport for UK mainland addresses).
- Free loan equipment during warranty repair, if available.
- Full electrical, mechanical and safety refurbishment in our 40GHz in-house Lab.
- Certificate of Conformance (calibration available on request).
- Manuals and accessories required for normal operation.
- Free insured delivery to your UK mainland address (sales).
- Support from our team of seasoned Test & Measurement engineers.
- ISO9001 quality assurance.

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Version  
06.00

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## R&S® ZVB Vector Network Analyzers

Frequency ranges up to 4 GHz, 8 GHz, 14 GHz and 20 GHz, with two or four test ports

- ◆ Short measurement time  
( $<4.5 \mu\text{s}$  per point)
- ◆ Wide dynamic range  $>123 \text{ dB}$   
High output power  $+13 \text{ dBm}$
- ◆ High power sweep range  $>50 \text{ dB}$
- ◆ Balanced measurements
- ◆ Parallel measurements
- ◆ Innovative user interface
- ◆ Convenient and flexible analysis  
function

# Highlights

Built using innovative hardware and software concepts, the vector network analyzers of the R&S®ZVB family set new standards: One generator can feed two test ports simultaneously. This makes parallel measurements possible and thus significantly increases performance despite the complexity of the measurement task at hand. In particular, multiport measurements such as performed on balanced SAW filters, duplex filters or antenna switching modules can, therefore, be completed very quickly.

R&S®ZVB 4: 300 kHz to 4 GHz

R&S®ZVB 8: 300 kHz to 8 GHz

R&S®ZVB 14: 10 MHz to 14 GHz

R&S®ZVB 20: 10 MHz to 20 GHz

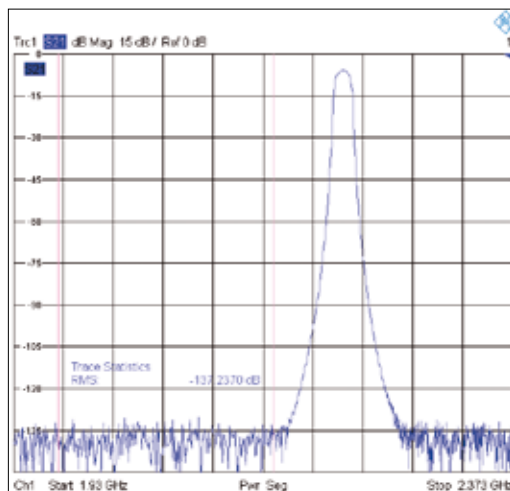
The R&S®ZVB combines excellent performance with low weight and compact design. Intelligent and user-friendly functions offer maximum ease of operation. They allow the large number of measured quantities involved in multiport and balanced measurements to be handled easily, and also offer a variety of ways to optimize production sequences – a smart solution that satisfies even the most challenging demands.



R&S®ZVB 4, two-port model, compact size

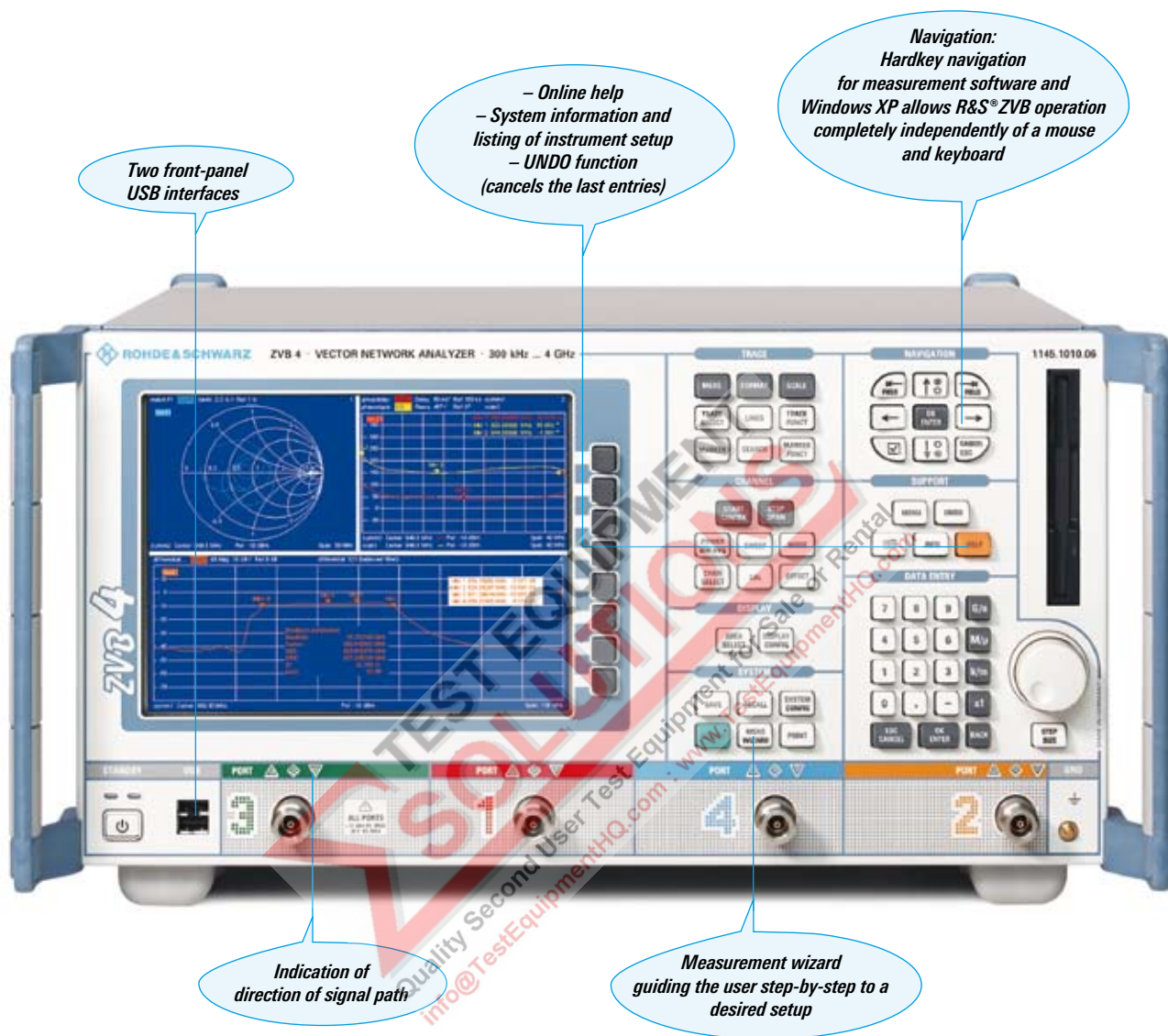


R&S®ZVB 20, four-port model with direct generator/receiver access



Typical dynamic range of the R&S®ZVB (between test ports; at 1 Hz IF bandwidth)

# Innovative concept ...



The R&S®ZVB's innovative concept significantly enhances measurement speed, configuration capabilities and system characteristics. The test set consists of reflectometers that have their own measurement and reference channels. The signal from each RF generator is split in order to supply two test ports. Electronic switches in the generator paths permit both alternating and simultaneous signal output at the ports.

Electronic switches for forward/reverse switchover of measurement paths are not required in the test set. For this reason, no asymmetries occur between the analyzer test ports as may otherwise be the case as a result of the cascading of switches.

This means, for example, that the maximum output power of over +13 dBm is available at each of the four test ports irrespective of the direction of measurement. With a maximum dynamic range between the test ports of over >123 dB, the R&S®ZVB features very fast measurement times – even for applications requiring a high dynamic range. The optional direct generator/receiver access increases sensitivity and dynamic range by typically 10 dB.

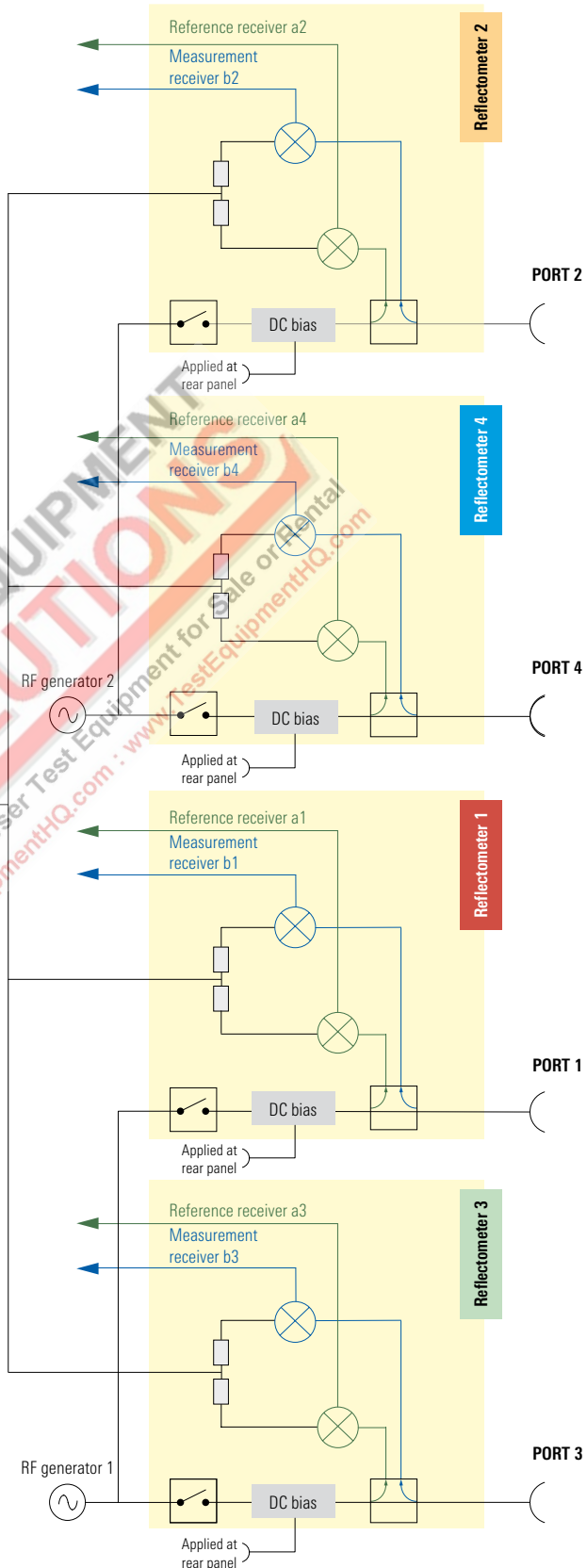
# ... for future-oriented performance

High-speed parallel measurements can be achieved because the generator signal can be output to multiple test ports simultaneously, plus data can be captured at multiple ports simultaneously and all displayed at the same time. For example, the R&S®ZVB four-port version makes it possible to measure two two-port DUTs simultaneously, thus doubling performance. It is also possible to measure and display the four reflection parameters S11 to S44 simultaneously on a four-port DUT (provided that DUT ports are uncoupled). This reduces measurement time by a factor of 4 compared with instruments featuring just one generator and a conventional switching technique.

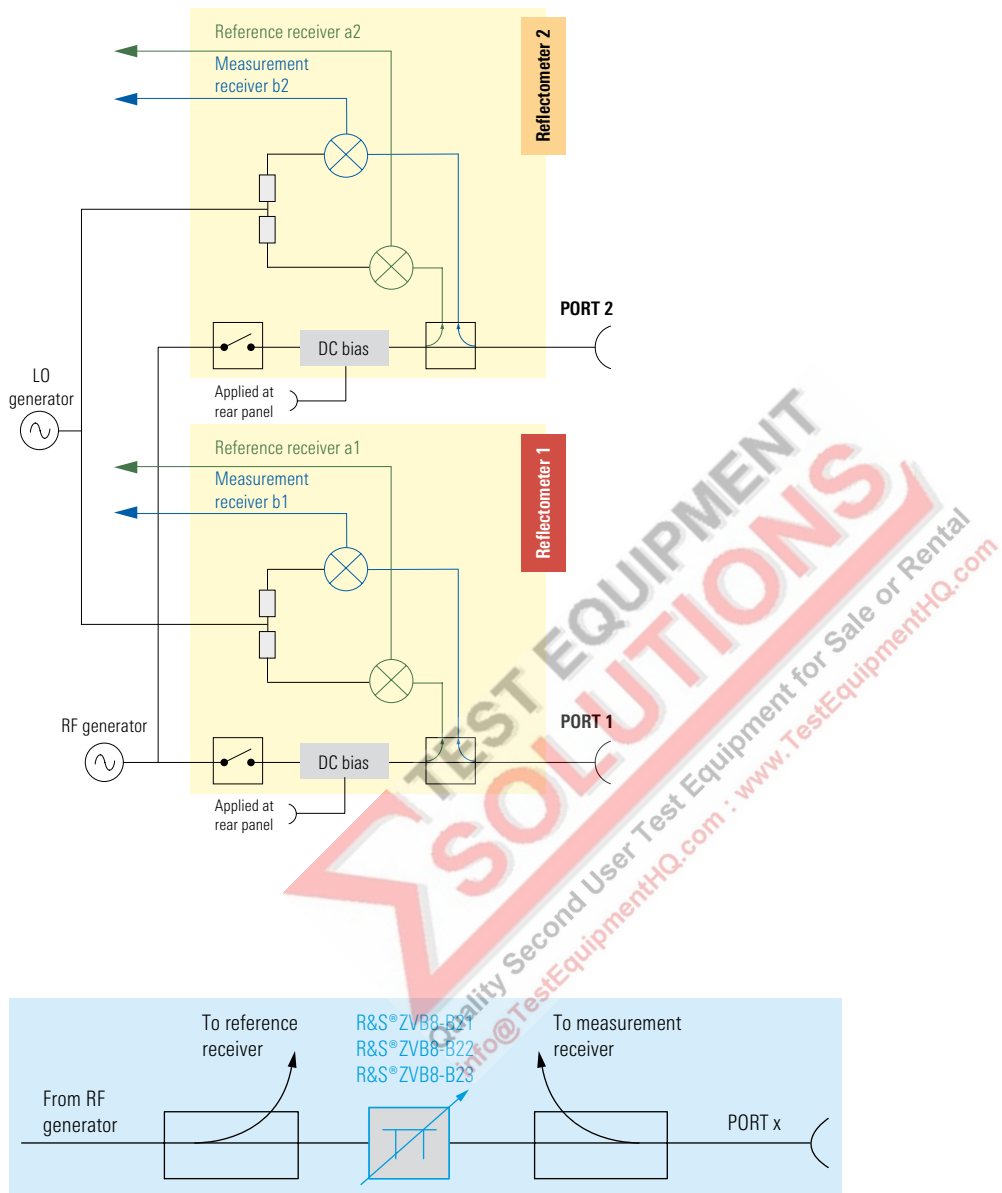
Data processing in the instrument is also carried out in parallel, ranging from RF and IF through to digitization and display. Moreover, data transfer can be performed simultaneously with measurement. The entire execution time for measurements with repeated data transfer via IEC/IEEE bus or LAN is thus determined solely by the measurement time, i.e. transfer time has no effect. This means extremely fast execution times even with complex tasks such as multi-port measurements.

For measurements on active DUTs, power is supplied by a DC bias applied via the inner conductor of each test port. The required DC voltages are supplied to dedicated connectors on the R&S®ZVB rear panel.

## R&S®ZVB test set: four-port model

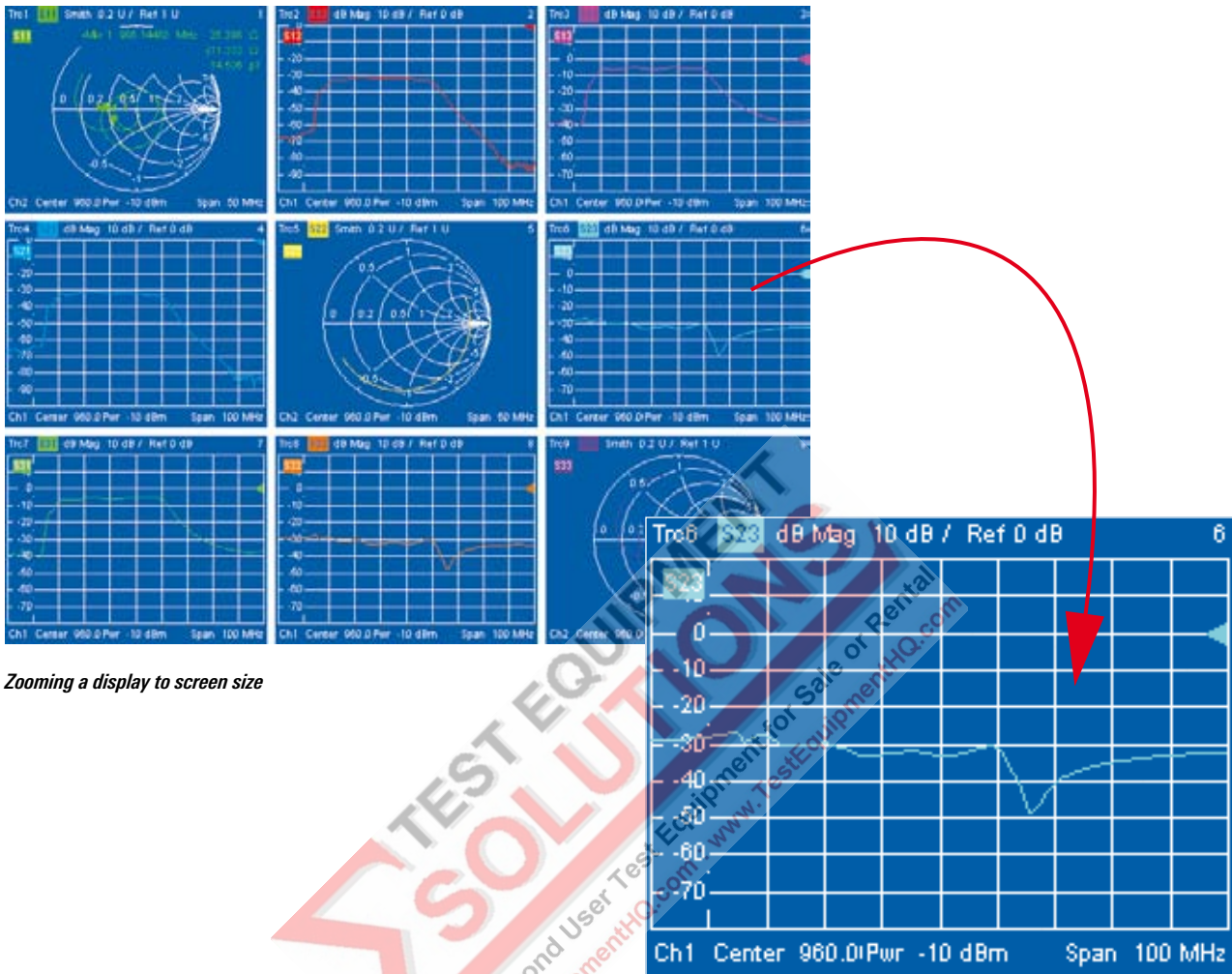


## R&S®ZVB test set: two-port model



*Test set with optional step attenuator*

# A new dimension ...



Zooming a display to screen size

## User-configurable display of results

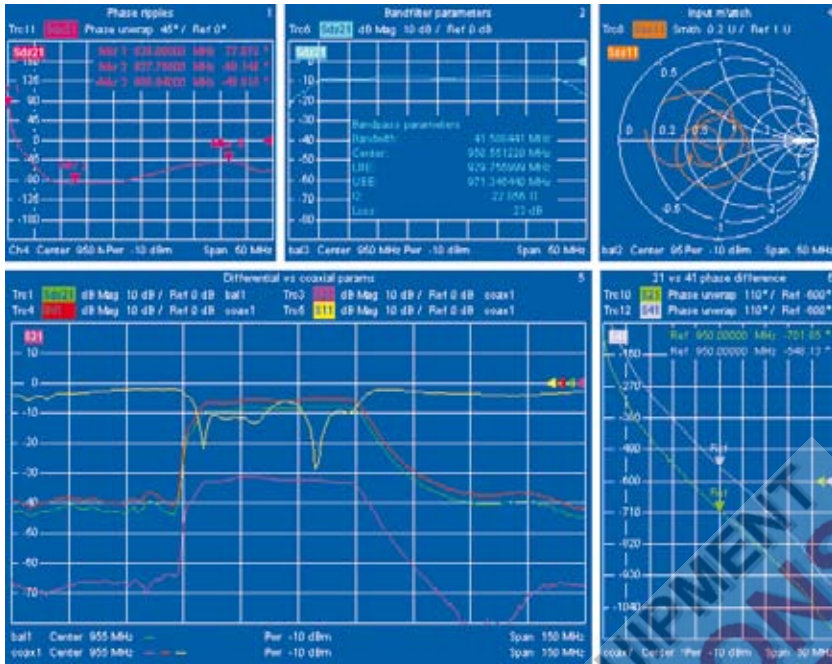
- ◆ More than 100 traces and diagrams
- ◆ Flexible assignment of traces to diagrams; hiding and deleting of traces
- ◆ Any combination of channels<sup>1)</sup> and traces
- ◆ Adjustment of diagram size by mouse

<sup>1)</sup> A channel is understood to designate an independent set of test parameters including, for example, the measurement mode, frequency range, number of measurement points, output power, calibration data and trigger mode. The number of channels is limited only by the instrument's internal memory.

- ◆ Enlarging of individual diagrams to full screen size for optimum readability by clicking the mouse or pressing a key
- ◆ User-definable labeling of diagrams, setups, markers, traces and channels for straightforward documentation

## Independent channels

- ◆ Simultaneous management of more than 100 independent channels<sup>1)</sup>
- ◆ User-definable coupling of traces and channels
- ◆ Simultaneous display of numerous parameters of a DUT under different stimulus conditions

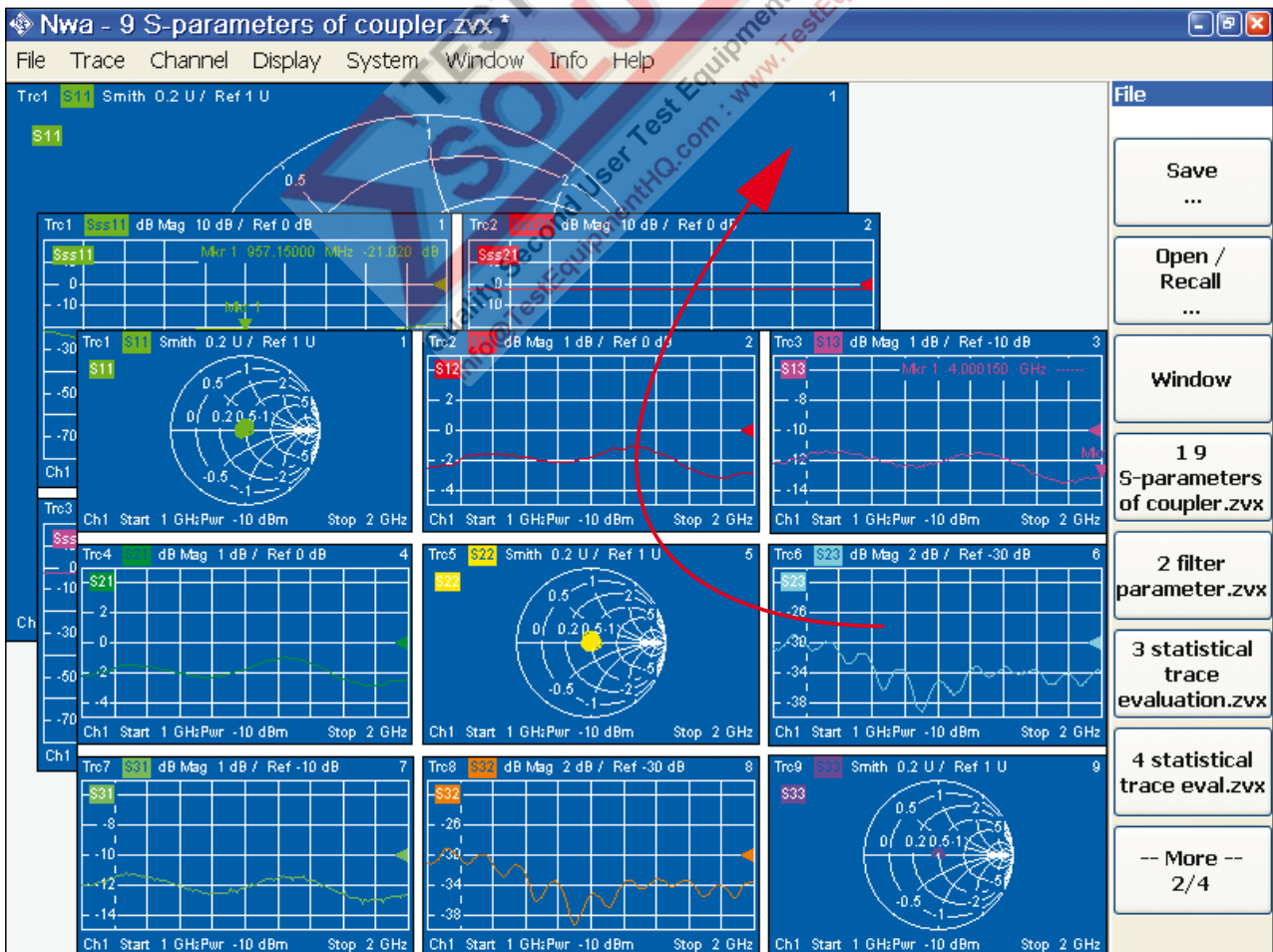


## Fast switching between instrument setups

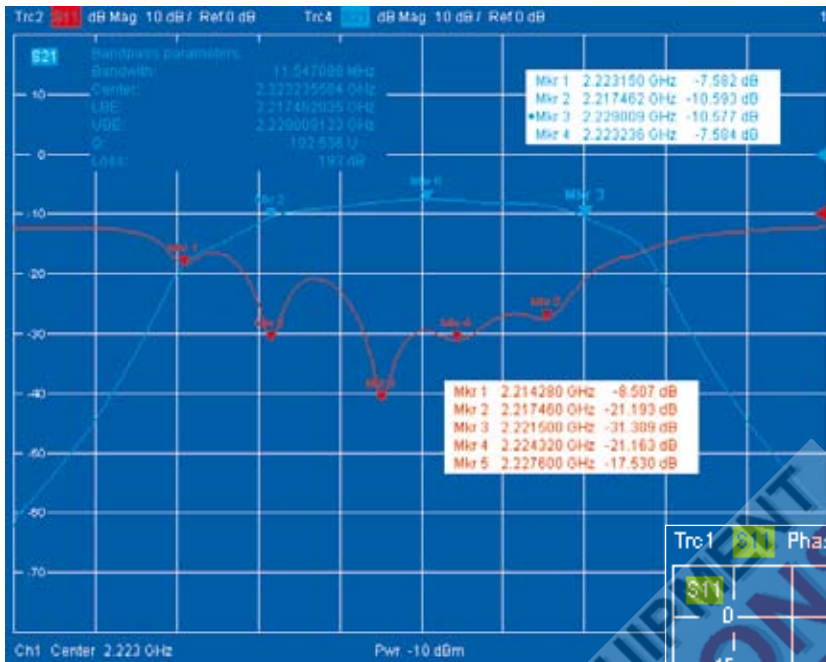
- ◆ Simultaneous loading of several complete instrument setups into RAM (preloading)
- ◆ Each instrument setup represented by a separate measurement window
- ◆ Switching between instrument setups (setup swap) simply by switching between measurement windows by clicking the mouse or pressing a key
- ◆ Extremely fast setup swap by IEC/IEEE bus command in <10 ms
- ◆ Easy management and clear-cut representation of data – even with a large number of different measurements and measured quantities

Measurements on a balanced filter

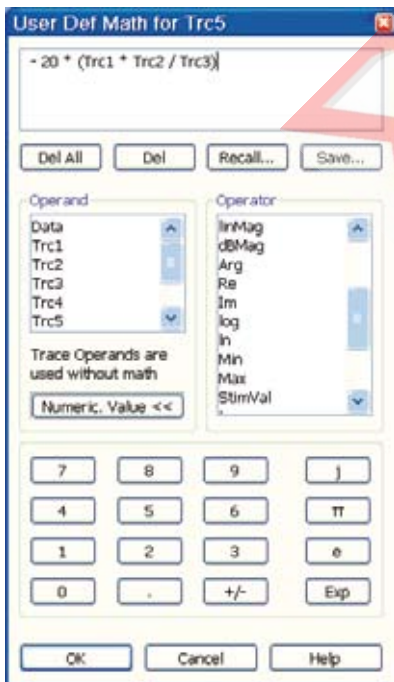
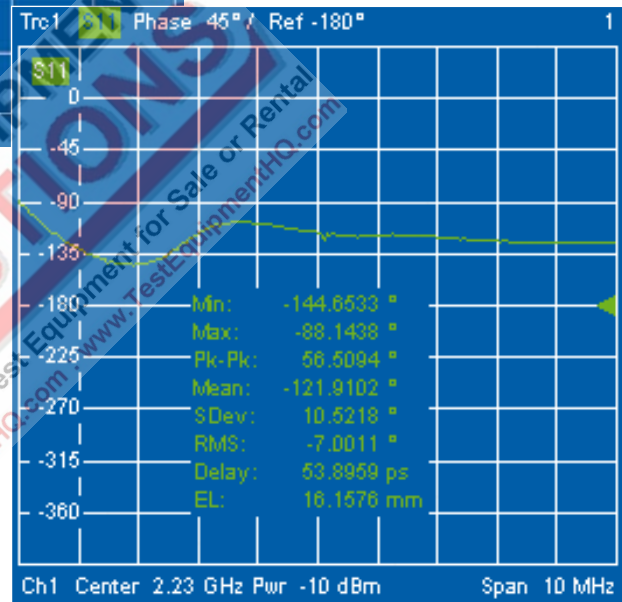
Switching the setup by activating the corresponding window



# ... in functionality



Statistical trace analysis



Universal equation editor

## Convenient marker and analysis functions

- ◆ Up to 10 markers per trace
- ◆ Various marker data formats
- ◆ Detailed definition of marker properties (line/triangle, information at marker position, etc)
- ◆ Marker information can be positioned on screen as required

- ◆ Marker values can optionally be displayed and printed in the form of a list for clear-cut documentation
- ◆ Marker analysis functions (max./min. search function, analysis functions for filters, compression points, etc)

## Editor for trace mathematics

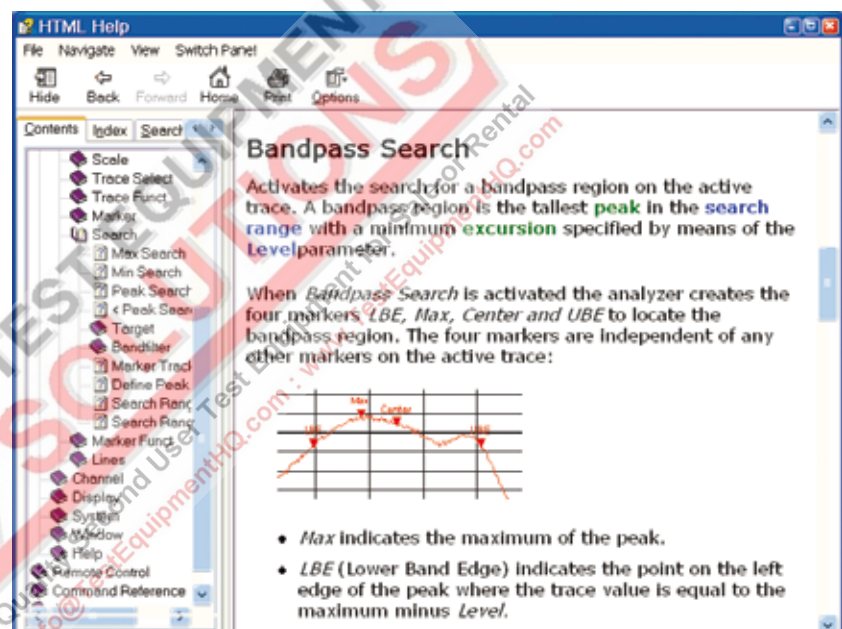
- ◆ Editor with numerous mathematical functions
- ◆ Generation of equations of high complexity
- ◆ Realtime display of almost any quantity derived from data or memory traces

## Integrated PC with Windows XP

- ◆ Access to Windows XP operating system for simple integration of peripherals (e.g. CD-ROM drives, USB storage media, printers)
- ◆ Control and analysis software can be run directly on the R&S® ZVB
- ◆ Connectivity via LAN, IEC/IEEE bus, USB, user control (digital I/O)

## Manual operation support

- ◆ Operation via hardkeys and softkeys or keyboard and mouse
- ◆ Online help providing information about current menu item including associated IEC/IEEE bus commands
- ◆ Measurement wizard guiding the user step-by-step to the desired setup



Online help for the active function

# Applications ...

## Multiport measurements

- ◆ Minimum number of sweeps through parallel data acquisition
- ◆ Extremely fast measurement of multiport devices
- ◆ Excellent accuracy due to multiport calibration

## Balanced measurements

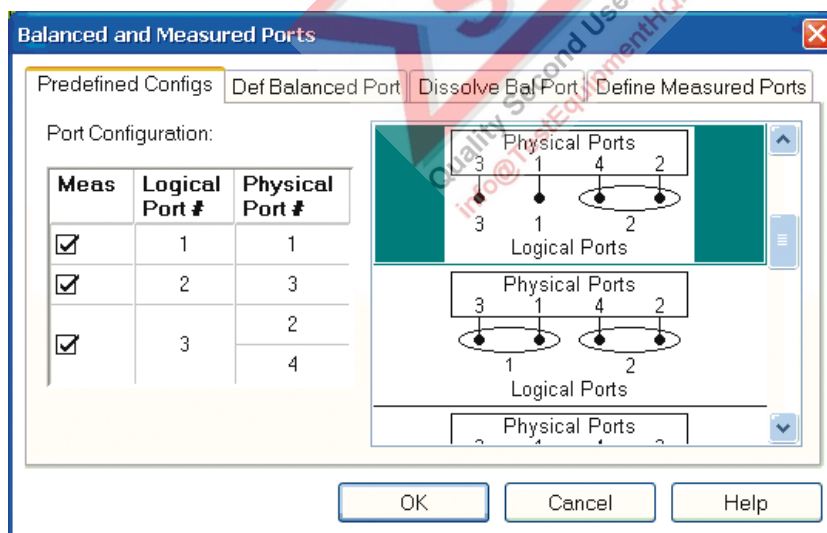
- ◆ Analyzer model with up to four integrated test ports
- ◆ Calculation of mixed-mode S-parameters
- ◆ Complete characterization of DUTs with balanced test ports or with mixed single-ended and balanced test ports
- ◆ S-parameters, impedances, admittances, Z- and Y-parameters as well as stability factors can also be measured on differential DUTs

## Response power calibration and power measurements

- ◆ Enhanced power accuracy for internal and external generators and for receiver channels
- ◆ Correction of frequency response of test setup and preamplifiers
- ◆ Calibration to within defined tolerance limits
- ◆ Control of external power measurement equipment via USB, IEC/IEEE bus or LAN
- ◆ Power measurements versus frequency and power by means of R&S®NRP power sensors connected directly to the analyzer's USB interfaces
- ◆ Scalar inputs and scalar network analysis through external R&S®NRP power sensors

## Filter measurements and adjustments

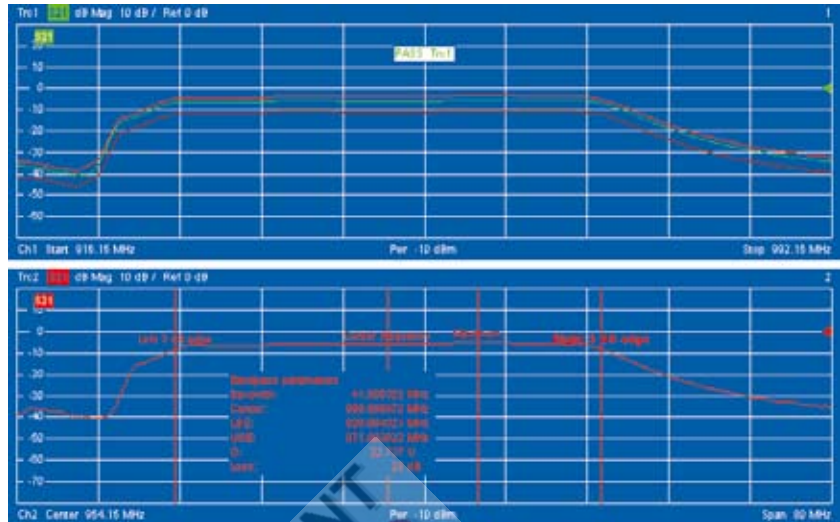
- ◆ User-configurable diagrams and high sweep speed for convenient manual tuning
- ◆ Marker functions and equation editor for determination of filter characteristics and realtime derivation of desired quantities
- ◆ Limit lines for tuning procedures, including pass/fail indication
- ◆ Generation of limit lines from imported data sets or active trace data
- ◆ Segmented sweep for minimized sweep time and data volume



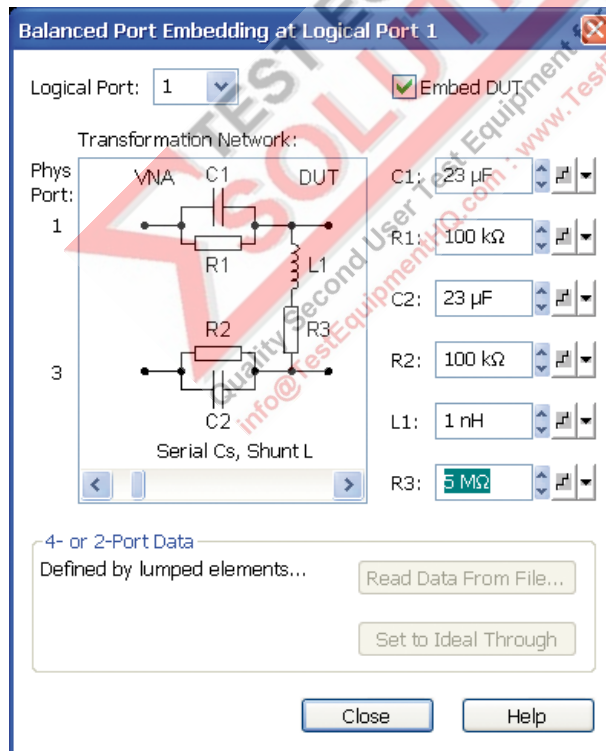
Configuration of a balanced measurement

## Measurements on active components

- ◆ Wide power sweep range of more than 50 dB and excellent power linearity for compression measurements
- ◆ High compression point and TOI of receiver for high accuracy at high input levels
- ◆ Two DC measurement inputs with voltage ranges  $\pm 1$  V and  $\pm 10$  V
- ◆ Display of DC values and quantities derived from the DC values by means of the equation editor
- ◆ Efficiency measurements on amplifiers
- ◆ K and  $\mu$  stability factors of amplifiers



Filter measurements with limit lines, pass/fail indication, bandwidth measurement



User-definable network for embedding/deembedding

## Integrated embedding/deembedding function

- ◆ DUT embedding in matching networks
- ◆ Inclusion of parasitic effects
- ◆ Predefined user-definable networks for single-ended and balanced systems
- ◆ Import of \*.s2p and \*.s4p files for embedding/deembedding
- ◆ Simultaneous use of predefined single-ended, balanced and imported networks
- ◆ Clear-cut dialog for configuring measurement ports and parameters for embedding/deembedding

## ... and measurements

### Highlights of the R&S®ZVB in production

#### Integrated PC with Windows XP for automated procedures and data management

- ◆ Analysis and control programs for test and production sequences can be run directly on the R&S®ZVB
- ◆ The R&S®ZVB can be networked with system components such as measuring instruments or handlers via its LAN, IEC/IEEE bus and USB interfaces or its universal TTL interface

#### Optimization of test and production sequences

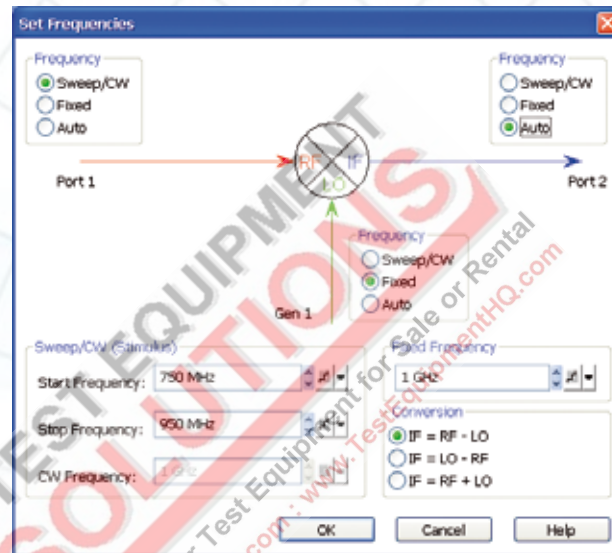
- ◆ Switchover between several channels instead of loading setups
- ◆ Simultaneous loading of several instrument setups into RAM (pre-loading) for extremely fast and simple switching between multiple setups via the IEC/IEEE bus in less than 10 ms or at a keystroke or mouse click
- ◆ Segmented sweep for minimized number of points and optimized sweep parameters
- ◆ Flexible trigger options for starting a sweep, sweep segment, point or partial measurement
- ◆ Digital I/O port with signals synchronized to test sequence for fast and direct control of external system components and output of pass/fail information
- ◆ Reflectometer concept for parallel measurements on different ports (e.g. measurement of two two-port DUTs with the R&S®ZVB four-port model)

### Mixer and harmonics measurements

- ◆ Conversion loss of mixers versus frequency and power
- ◆ Amplitude of harmonics of any order versus frequency and power
- ◆ LO signal supplied by second internal generator or external generator

### Data import and export

- ◆ Export and import of traces in \*.snp (Touchstone), ASCII or MATLAB® format
- ◆ Display of imported traces as memory traces or limit lines
- ◆ Access to correction values
- ◆ Access to measured values of calibration standards



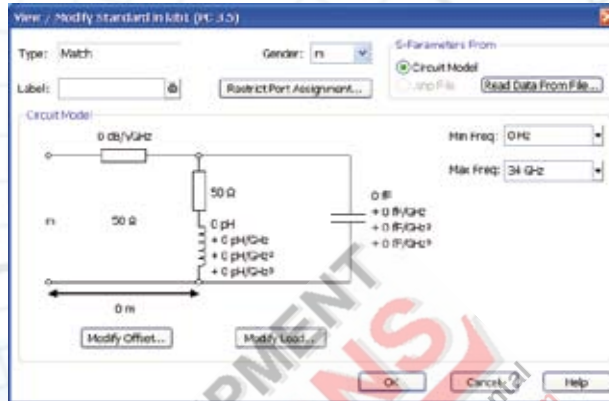
Configuration of a mixer measurement

### Measurement times and data transfer times

- ◆ Data transfer via LAN or IEC/IEEE bus
- ◆ Data transfer simultaneous with data acquisition

### Calibration functions for maximum flexibility at minimum effort

- ◆ Expanded equivalent circuit models for defining calibration standards (e.g. non-ideal standards for on-wafer calibrations)
- ◆ Definition of calibration standards using S-parameter files
- ◆ Definition of calibration standards in different parameter formats
- ◆ Flexible calibration manager for managing calibrations and assigning them to measurement channels
- ◆ Automatic calibration unit



Equivalent circuit model for defining a MATCH

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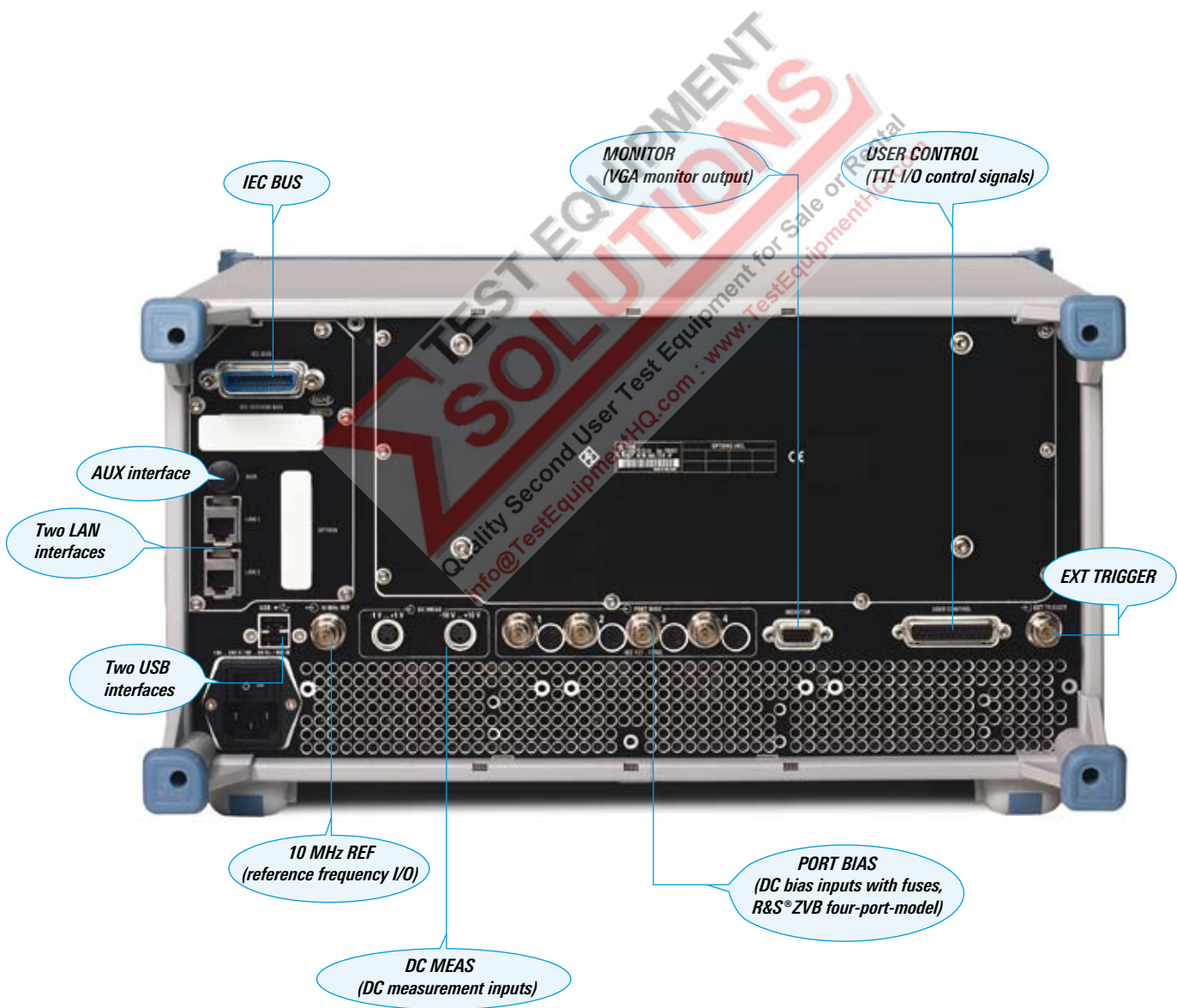
# Functions and options

| Function   | Description   | Standard/option                           |
|--|---|---|
| Two or four test ports   | Integrated bidirectional RF test ports  | Standard with corresp. instrument version |
| Active test set (PORT BIAS)  | Input of DC power for supply of amplifiers via inner conductor of test port; requires external DC power supply  | Standard                                  |
| Multiport measurements   | Complete S-parameter matrix, wave quantities, wave quantity ratios, impedances, admittances, Z- and Y-parameters of multiport DUTs  | Standard                                  |
| Balanced measurements  | Mixed-mode S-parameters, mixed-mode Z- and Y-parameters, impedances and admittances of balanced DUTs  | Standard                                  |
| Mixer and harmonics measurements   | Conversion loss of mixers versus frequency or power. Can be used when one of the RF, IF or LO system frequencies is constant. Magnitude of harmonics of any order versus frequency or power. <sup>1)</sup>  | Option R&S®ZVB-K3                         |
| Calibration techniques   | TOSM, TRL/LRL, TOM, TRM, TNA, normalization, one path two port  | Standard                                  |
| Power calibration  | UOSM for calibration with an unknown through. Includes adapter removal function   | Standard                                  |
| Power measurement and scalar network analysis  | Increased power accuracy and test set response calibration. For frequency and power sweeps. Requires an external power meter <sup>1)</sup> . Maximum convenience with R&S®NRP USB sensors.  | Standard                                  |
| Power measurement and scalar network analysis  | R&S®NRP power measurement sensors connected directly to the USB ports provide additional inputs: Display of power versus frequency or versus power. In addition to wave quantities, further power measurements or wideband scalar network analysis are thus possible, e.g. for mixer measurements with internal LO (R&S®NRP sensor not included). | Standard                                  |
| Automatic level control (ALC)  | Control of the output power via the signal fed to the reference channel. Corrects drift of preamplifiers and power uncertainty due to mismatch. Provides increased power accuracy and linearity.  | Standard                                  |
| User support   | Automatic calibration unit  | Options R&S®ZV-Z5x                        |
| High number of diagrams, traces and channels   | More than 100 traces and channels can be created and assigned to diagrams as required   | Standard                                  |
| Preloading of setups; setup swap   | Simultaneous loading of several instrument setups into RAM; fast switchover between instrument setups   | Standard                                  |
| Segmented sweep, lin/log sweep   | Optimization of sweep settings  | Standard                                  |
| Time sweep   | Determination of measured quantities as a function of time  | Standard                                  |
| 60 001 points per trace  | High sweep resolution, narrow frequency grid  | Standard                                  |
| IF bandwidths 1 Hz to 500 kHz (in 1/2/5 steps)   | Optimization of measurement speed and dynamic range   | Standard                                  |
| Power sweep  | Wide power sweep range of more than 50 dB for compression measurements  | Standard                                  |
| Online support functions   | Context-sensitive online help, UNDO function for canceling the last user operations, Windows XP key for accessing the operating system, complete listing of current instrument setup including calibration  | Standard                                  |
| Measurement wizard   | Step-by-step guidance to the desired instrument setup, including calibration if required  | Standard                                  |
| Trace mathematics, equation editor, marker functions, trace statistics                 | Functions for online computation of measurement data using complex equations, for adjustments and statistical evaluation (rms, MaxHold, etc)  | Standard                                  |
| Limit lines  | Generation of limit lines from traces; data import and export for limit lines   | Standard                                  |
| Trigger functions  | Triggers for sweeps, sweep segments, measurement points or partial measurements   | Standard                                  |
| Oven-controlled crystal oscillator   | Enhanced frequency accuracy   | Option R&S®ZVAB-B4                        |
| Interfaces (2 × LAN, 4 × USB, IEC BUS, 10 MHz REF, MONITOR, USER CONTROL, EXT TRIGGER) | Control of the R&S®ZVB, control of external devices or handlers by the R&S®ZVB, fast TTL handler and sequence control, connection of peripherals, e.g. printer or storage media (see also interface description)  | Standard                                  |
| DC inputs  | Measurement inputs for DC voltage, allowing PAE (power added efficiency) measurements   | Standard                                  |
| Time domain transform  | Display of discontinuities, reflection factor or impedance versus delay/length, step and impulse response, lowpass/bandpass frequency spacing, gated S-parameters   | Option R&S®ZVAB-K2                        |
| Embedding/deembedding  | Inclusion of virtual matching networks, parasitic effects, etc; for coaxial and balanced systems; correction of the influence of test set components; parameterizable predefined networks and/or import of S-parameter files for defining (matching) networks   | Standard                                  |
| Adapter removal  | Enables calibration with different types of connectors in the reference planes (e.g. 3.5 mm to N). Requires manual calibration kits of both types.  | Standard                                  |
| Generator step attenuators   | Extension of output power down to -110 dBm  | Options R&S®ZVB 8-B21/-B22/-B23           |
| Direct generator receiver access   | Increased sensitivity and dynamic range by typical 10 dB  | Options R&S®ZVB14/20-B16                  |

<sup>1)</sup> Option R&S®ZVAB-B44 required for IEC/IEEE-bus-controlled power meters or external generators. For control via LAN, the VISA I/O BIB option is required.

# Interface description

| Interface    | Function  |
|--------------|---|
| LAN 1        | Control of R&S®ZVB or subnetwork with R&S®ZVB as master, 8-pin RJ-45 connector  |
| LAN 2        | Control of R&S®ZVB or subnetwork with R&S®ZVB as master, 8-pin RJ-45 connector  |
| IEC BUS      | Remote control of R&S®ZVB   |
| AUX          | Auxiliary interface for future applications, BNC connector  |
| 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 $\pm 1$ V and $\pm 10$ V, Mini DIN connectors, cable: R&S®ZV-Z71 (option)  |
| MONITOR      | For external VGA monitor; output of measurement screen or Windows XP user interface, 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 measurement or partial measurement, BNC connector   |



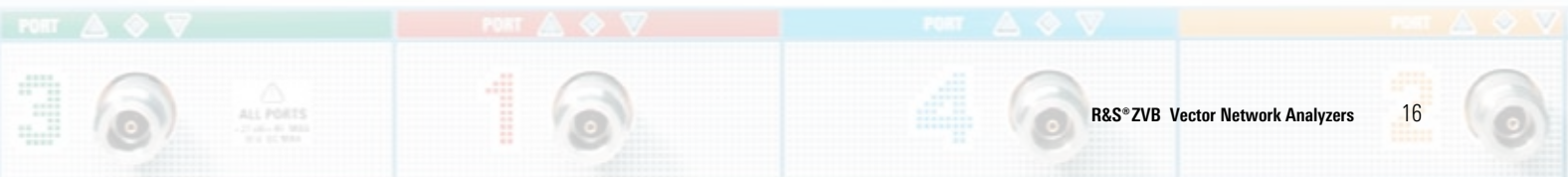
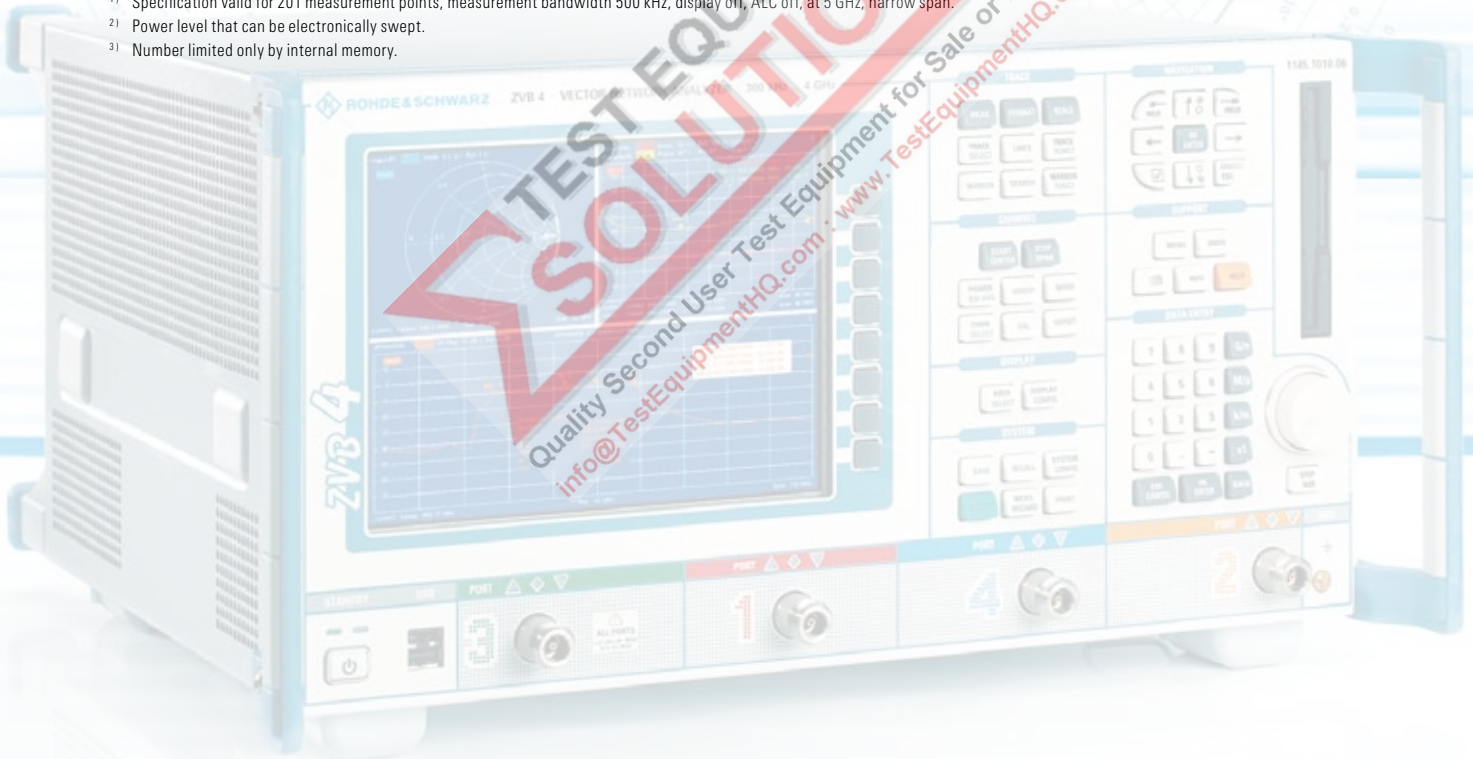
# Condensed data

|   |   |
|---|---|
| Measurement time per point (CW mode, at 500 kHz IF bandwidth)                                       | <4.5 $\mu$ s  |
| Measurement time (including any data transfer time) <sup>1)</sup>                                   | <4.5 ms   |
| Data transfer time  | data transfer simultaneous with measurement   |
| Dynamic range (at 10 Hz IF bandwidth)   | >123 dB   |
| Inherent noise  | <-110 dBm   |
| Power sweep range <sup>2)</sup>   | -40 dBm to +13 dBm  |
| IF bandwidths   | 1 Hz to 500 kHz   |
| Number of measurement points per trace  | 1 to 60 001   |
| <b>Platform</b>   |   |
| Number of test ports  | 2 or 4  |
| Number of measurement and reference receivers   | one measurement and one reference receiver per test port                                      |
| Number of integrated generators   | one generator per test port pair  |
| Calibration techniques  | TOSM, UOSM, TRL/LRL, TOM, TRM, TNA, automatic calibration unit                                |
| Operating system and internal PC  | Windows XP  |
| Operation   | hardkeys/softkeys, keyboard and mouse, online help system, measurement and calibration wizard |
| Number of traces, diagrams, independent channels, setups that can be simultaneously loaded into RAM | >100 <sup>3)</sup> , traces can be assigned to diagrams as required                           |

<sup>1)</sup> Specification valid for 201 measurement points, measurement bandwidth 500 kHz, display off, ALC off, at 5 GHz, narrow span.

<sup>2)</sup> Power level that can be electronically swept.

<sup>3)</sup> Number limited only by internal memory.



# Ordering information

| Designation   | Type          | Frequency range     | Order No.    |
|---|---------------|---------------------|--------------|
| <b>Vector Network Analyzer<sup>1)</sup></b>   |               |                     |              |
| 2 ports compact size  | R&S®ZVB 4     | 300 kHz to 4 GHz    | 1145.1010.04 |
| 4 ports compact size  | R&S®ZVB 4     | 300 kHz to 4 GHz    | 1145.1010.06 |
| 2 ports compact size  | R&S®ZVB 8     | 300 kHz to 8 GHz    | 1145.1010.08 |
| 4 ports compact size  | R&S®ZVB 8     | 300 kHz to 8 GHz    | 1145.1010.10 |
| 2 ports compact size  | R&S®ZVB 14    | 10 MHz to 14 GHz    | 1145.1010.14 |
| 2 ports   | R&S®ZVB 14    | 10 MHz to 14 GHz    | 1145.1010.17 |
| 4 ports   | R&S®ZVB 14    | 10 MHz to 14 GHz    | 1145.1010.19 |
| 2 ports compact size  | R&S®ZVB 20    | 10 MHz to 20 GHz    | 1145.1010.20 |
| 2 ports   | R&S®ZVB 20    | 10 MHz to 20 GHz    | 1145.1010.23 |
| 4 ports   | R&S®ZVB 20    | 10 MHz to 20 GHz    | 1145.1010.25 |
| <b>Options</b>  |               |                     |              |
| Time Domain   | R&S®ZVAB-K2   |                     | 1164.1657.02 |
| Mixer and Harmonic Measurements   | R&S®ZVB-K3    |                     | 1164.1592.02 |
| Oven Quartz (OCXO)  | R&S®ZVAB-B4   |                     | 1164.1757.02 |
| Direct Generator/Receiver Access for 2-Port R&S®ZVB14 1145.1010.17                    | R&S®ZVB14-B16 | 10 MHz to 14 GHz    | 1164.1240.17 |
| Direct Generator/Receiver Access for 4-Port R&S®ZVB14 1145.1010.19                    | R&S®ZVB14-B16 | 10 MHz to 14 GHz    | 1164.1240.19 |
| Direct Generator/Receiver Access for 2-Port R&S®ZVB20 1145.1010.23                    | R&S®ZVB20-B16 | 10 MHz to 20 GHz    | 1164.1240.23 |
| Direct Generator/Receiver Access for 4-Port R&S®ZVB20 1145.1010.25                    | R&S®ZVB20-B16 | 10 MHz to 20 GHz    | 1164.1240.25 |
| Generator Step Attenuator Port 1, for R&S®ZVB 4/8 70 dB in 10 dB steps <sup>2)</sup>  | R&S®ZVB 8-B21 | 300 kHz to 8 GHz    | 1302.5480.02 |
| Generator Step Attenuator Port 2, for R&S®ZVB 4/8 70 dB in 10 dB steps <sup>2)</sup>  | R&S®ZVB8-B22  | 300 kHz to 8 GHz    | 1302.5073.02 |
| Generator Step Attenuator Port 3, for R&S®ZVB 4/8, 70 dB in 10 dB steps <sup>2)</sup> | R&S®ZVB8-B23  | 300 kHz to 8 GHz    | 1302.5496.02 |
| <b>Extras</b>   |               |                     |              |
| <b>Test Cable</b>   |               |                     |              |
| 63.5 cm/25", N (m)/N(m) <sup>3)</sup>   | R&S®ZV-Z91    | 0 Hz to 18 GHz      | 1301.7572.25 |
| 96.5 cm/38", N (m)/N(m) <sup>3)</sup>   | R&S®ZV-Z91    | 0 Hz to 18 GHz      | 1301.7572.38 |
| 63.5 cm/25", N(m)/3.5 mm (m) <sup>3)</sup>  | R&S®ZV-Z92    | 0 Hz to 18 GHz      | 1301.7589.25 |
| 96.5 cm/38", N(m)/3.5 mm (m) <sup>3)</sup>  | R&S®ZV-Z92    | 0 Hz to 18 GHz      | 1301.7589.38 |
| 63.5 cm/25", 3.5 mm (f)/3.5 mm (m) <sup>3)</sup>                                      | R&S®ZV-Z93    | 0 Hz to 26.5 GHz    | 1301.7595.25 |
| 96.5 cm/38", 3.5 mm (f)/3.5 mm (m) <sup>3)</sup>                                      | R&S®ZV-Z93    | 0 Hz to 26.5 GHz    | 1301.7595.38 |
| 61 cm / 24" N (m)/N (m) <sup>3)</sup>   | R&S®ZV-Z191   | 0 Hz to 18 GHz      | 1306.4507.24 |
| 91 cm / 36" N (m)/N (m) <sup>3)</sup>   | R&S®ZV-Z191   | 0 Hz to 18 GHz      | 1306.4507.36 |
| 61 cm / 24" N (m)/3.5 mm (m) <sup>3)</sup>  | R&S®ZV-Z192   | 0 Hz to 18 GHz      | 1306.4513.24 |
| 91 cm / 36" N (m)/3.5 mm (m) <sup>3)</sup>  | R&S®ZV-Z192   | 0 Hz to 18 GHz      | 1306.4513.36 |
| 61 cm / 24" 3.5 mm (f)/3.5 mm (m) <sup>3)</sup>                                       | R&S®ZV-Z193   | 0 Hz to 26.5 GHz    | 1306.4520.24 |
| 91 cm / 36" 3.5 mm (f)/3.5 mm (m) <sup>3)</sup>                                       | R&S®ZV-Z193   | 0 Hz to 26.5 GHz    | 1306.4520.36 |
| <b>Calibration Kits</b>   |               |                     |              |
| N, 50 Ω   | R&S®ZV-Z21    | 0 Hz to 18 GHz      | 1085.7099.02 |
| N, 50 Ω   | R&S®ZCAN      | 0 Hz to 3 GHz       | 0800.8515.52 |
| N (male), 50 Ω  | R&S®ZV-Z121   | 0 Hz to 8 GHz       | 1164.0496.02 |
| N (female), 50 Ω  | R&S®ZV-Z121   | 0 Hz to 8 GHz       | 1164.0496.03 |
| N 75 Ω  | R&S®ZCAN      | 0 Hz to 3 GHz       | 0800.8515.72 |
| PC 3.5 mm   | R&S®ZV-Z32    | 0 Hz to 26.5 GHz    | 1128.3501.02 |
| PC 3.5 mm (incl. sliding matches)   | R&S®ZV-Z33    | 0 Hz to 26.5 GHz    | 1128.3518.02 |
| TRL add-on N 50 Ω   | R&S®ZV-Z26    | 0.2 GHz to 18 GHz   | 1085.7318.02 |
| TRL add-on PC 3.5 mm  | R&S®ZV-Z27    | 0.4 GHz to 26.5 GHz | 1085.7401.02 |

<sup>1)</sup> Accessories supplied: operating manual on CD-ROM, quick start guide.

<sup>2)</sup> Maximum of 2 step attenuators possible per instrument.

<sup>3)</sup> One cable.

| Designation  | Type          | Frequency range   | Order No.                  |
|--|---------------|-------------------|----------------------------|
| <b>Automatic Calibration Units</b>                         |               |                   |                            |
| 4 ports, type N (f)  | R&S® ZV-Z51   | 300 kHz to 8 GHz  | 1164.0515.70               |
| 4 ports, PC 3.5 mm (f)                                     | R&S® ZV-Z51   | 300 kHz to 8 GHz  | 1164.0515.30               |
| 2 ports, type N (f)  | R&S® ZV-Z53   | 300 kHz to 18 GHz | 1164.0473.32               |
| 4 ports, PC 3.5 mm (f)                                     | R&S® ZV-Z52   | 10 MHz to 24 GHz  | 1164.0521.30               |
| <b>Sliding Matches</b>                                     |               |                   |                            |
| N (m), 50 Ω  | R&S® ZV-Z41   | 1.7 GHz to 18 GHz | 1085.8095.02               |
| N (f), 50 Ω  | R&S® ZV-Z41   | 1.7 GHz to 18 GHz | 1085.8095.03               |
| PC 3.5 mm (m/f pair)                                       | R&S® ZV-Z42   | 2 GHz to 26.5 GHz | 1128.3524.02               |
| <b>Hardware and Measurement Add-Ons</b>                    |               |                   |                            |
| USB-to-IEC/IEEE Adapter (includes VISA I/O driver library) | R&S® ZVAB-B44 |                   | 1302.5544.02               |
| Visa I/O Library for instrument control                    | VISA I/O BIB  |                   | 1161.8473.02               |
| Removable Flash Disk                                       | R&S® ZVAB-B18 |                   | 1164.0715.03               |
| 2nd Removable Flash Disk                                   | R&S® ZVAB-B19 |                   | 1164.1111.02               |
| Cable for DC Input <sup>4)</sup> (pair)                    | R&S® ZV-Z71   |                   | 1164.1005.02               |
| Bias Network   | R&S® ZV-Z61   | 2 MHz to 4 GHz    | 1106.8130.02               |
| DC Block   | R&S® FSE-Z3   | 5 MHz to 7 GHz    | 4010.3895.00               |
| Power Splitter 2 × 50 Ω                                    | R&S® RVZ      | 0 Hz to 2.7 GHz   | 0800.6612.52               |
| <b>Attenuators</b>   |               |                   |                            |
| 1 W  | R&S® DNF      | 0 Hz to 12.4 GHz  | 0272.4x10.50 <sup>5)</sup> |
| 50 W   | R&S® RBU 50   | 0 Hz to 2 GHz     | 1073.8695.xx <sup>6)</sup> |
| 100 W  | R&S® RBU 100  | 0 Hz to 2 GHz     | 1073.8495.xx <sup>6)</sup> |
| <b>Matching Pads 50 Ω → 75 Ω</b>                           |               |                   |                            |
| Series resistor  | R&S® RAZ      | 0 Hz to 2.7 GHz   | 0358.5714.02               |
| L-section  | R&S® RAM      | 0 Hz to 2.7 GHz   | 0358.6514.02               |
| <b>Miscellaneous</b>                                       |               |                   |                            |
| USB Keyboard   | R&S® PSL-Z2   |                   | 1157.6870.04               |
| USB Mouse  | R&S® PSL-Z10  |                   | 1157.7060.03               |
| 19" Rack Adapter with front handles <sup>7)</sup>          | R&S® ZZA-511  |                   | 1096.3290.00               |
| 19" Rack Adapter with front handles <sup>8)</sup>          | R&S® ZZA-611  |                   | 1096.3302.00               |
| Operating manual   |               |                   | 1145.1084.12               |

<sup>4)</sup> Mini DIN female to three banana plugs.

<sup>5)</sup> x = 0: 3 dB, x = 1: 6 dB, x = 2: 10 dB, x = 3: 20 dB, x = 4: 30 dB.

<sup>6)</sup> xx = 03: 3 dB, xx = 06: 6 dB, xx = 10: 10 dB, xx = 20: 20 dB, xx = 30: 30 dB.

<sup>7)</sup> For R&S® ZVB4, R&S® ZVB8, R&S® ZVB14 1145.1010.14, R&S® ZVB20 (2 ports) 1145.1010.20.

<sup>8)</sup> For R&S® ZVB14 1145.1010.17, 1145.1010.19, R&S® ZVB20 1145.1010.23, 1145.1010.25.



For data sheet, see PD 0758.1529.22  
and [www.rohde-schwarz.com](http://www.rohde-schwarz.com)  
(search term: ZVB)



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