Version 03.01
May 2009

R&S®ZVL Vector Network Analyzer

The cost-efficient compact class in network analysis

- Wide frequency range: 9 kHz to 3 GHz/6 GHz/13.6 GHz
- Wide dynamic range: >115 dB, typ. 123 dB
- Bidirectional test set: display of all four S-parameters
- 75 Ω version from 9 kHz to 3 GHz for TV/CATV
- Complete spectrum analyzer as an option
- Digital communications standards
- Accurate power measurement (USB connector for R&S®NRP-Z power sensor series)
- Compact size and low weight (<7 kg)
- 12 V DC operation and internal battery
- Connection for external monitor

ROHDE&SCHWARZ

Versatile – compact – future-proof

- **Network and spectrum analysis** in a single instrument
- **Digital communications standards**
- **Bidirectional test set** for displaying all four S-parameters
- **R&S®ZVL3-75**: 75 Ω vector network analyzer for TV and CATV measurements
- **Multitrace display** for displaying all relevant parameters
- **Distance-to-fault measurement** for detecting cable faults
- **Time domain analysis**
- **Operation with mouse or hardkeys/softkeys** – convenient user interface with wizards and context menus
- **Online help** – context-sensitive with remote-control commands
- **Undo/Redo softkey** for reversing up to six preceding operating steps
- **USB connector** for R&S®NRP-Z power sensor series for precise power measurements
- **DVI-D connector** for external monitor
- **Small and compact** – 37 cm instrument depth suitable for every workbench
- **Lightweight and portable** with a weight <7 kg

Versatile solution

The R&S®ZVL is a compact, powerful, and future-proof network analyzer, and is therefore ideal for use in development, production, and service.

It is the only instrument to combine the functions of a network analyzer, spectrum analyzer, and power meter in a single box, and will thus tremendously increase your work efficiency.

The R&S®ZVL is ideal for lab applications where the measurement tasks vary frequently; it can be used to measure S-parameters as well as the output spectrum, ACP, and TOI without having to reconnect the device under test (DUT). With the R&S®ZVL, production lines can now be run even more flexibly, as the switchover from network analyzer to spectrum analyzer can easily be effected via remote control. Moreover, an R&S®NRP-Z power sensor, which can be directly connected to the R&S®ZVL, ensures precise power measurements.

Favorable price and high performance reduce costs

The R&S®ZVL combines a wide dynamic range and excellent measurement speed with versatile functionality. The segmented sweep, the multitrace display, and the powerful marker and trace evaluation are only some examples of the functions that speed up measurement sequences and reduce tuning and measurement times. The price/performance ratio of the R&S®ZVL makes the instrument unique among the compact network analyzers in its class.

Compact dimensions and low weight save space and facilitate mobile operation

Weighing less than 7 kg and featuring an instrument depth of only 37 cm, the R&S®ZVL is by far the most compact instrument in its class. It is easy to carry and does not require much space on your workbench. And as the R&S®ZVL can be battery-operated, it is ideal for mobile applications.

Upgradeability and compatibility within the instrument family protect your investment

No matter what the challenge, the R&S®ZVL quickly takes it on and thus grows with the demands. You can install hardware options as needed on-site in line with the plug&play concept. You can easily replace a damaged connector of the R&S®ZVL3-75 (75 Ω version of the R&S®ZVL3) on-site without downtime and need for recalibration. The user interface and the remote-control command set of the R&S®ZVL are similar to those of the R&S®ZVB and R&S®ZVA. Thus, these network analyzers are interchangeable in development and production – eliminating the need to familiarize yourself with a completely new instrument or to invest in new remote-control programs.

TV and CATV applications

The R&S®ZVL3-75, the 75 Ω version of the R&S®ZVL3, is the ideal tool for TV and CATV measurement applications. It has 75 Ω connectors with exchangeable inner conductor.

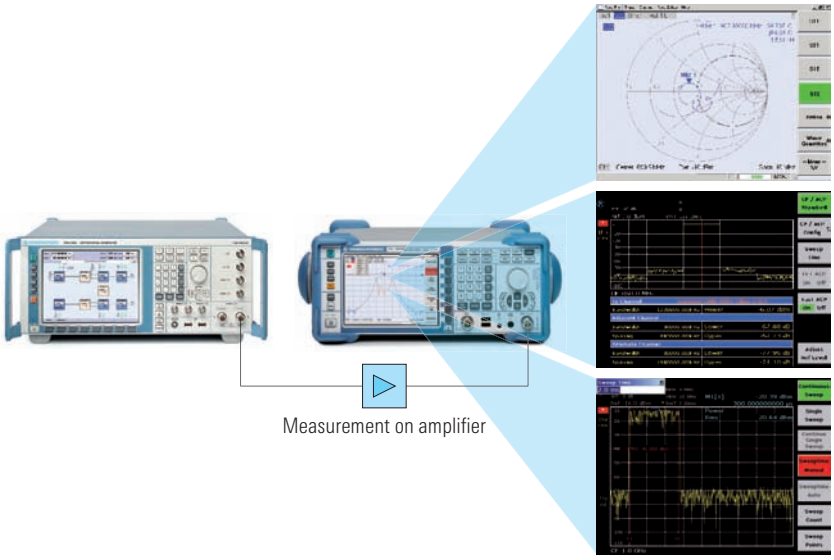
Easy replacement of a damaged connector of the R&S®ZVL3-75

All-in-one solution

Wide scope of functions

Offering excellent specifications and a wide range of functions at a favorable price, the R&S®ZVL is every development engineer's ideal network analyzer.

- Wide dynamic range for characterizing filters of high rejection
- High power-handling capability of its receivers for analyzing active devices
- Integrated step attenuator for measurements on devices with up to 27 dBm output power
- Compact size for optimal utilization of the work space
- Simultaneous display of all relevant DUT parameters for fast tuning
- Possible connection of an R&S®NRP-Z power sensor for precise power measurement (R&S®FSL-K9 option)
- Optional spectrum analysis with the R&S®FSL scope of functions
  - Channel and adjacent channel power measurement
  - Measurement of occupied bandwidth
  - CCDF measurement (amplitude statistics of signals)
  - 20 MHz I/Q demodulation bandwidth



Universal tool for installation and service

- Performance of sophisticated measurement tasks by offering network analysis, spectrum analysis, and power measurement in a single box
- Convenient loading of instrument setups with pass/fail criteria from the hard disk or USB stick
- Operation independent of AC supply due to an optional internal battery or 12 V car supply system
- Easy transportation owing to compact size and low weight
- Shock-resistant housing and ergonomic carrying handle
- Carrying bag for accessories such as additional batteries, power sensors, and calibration standards

High throughput in production

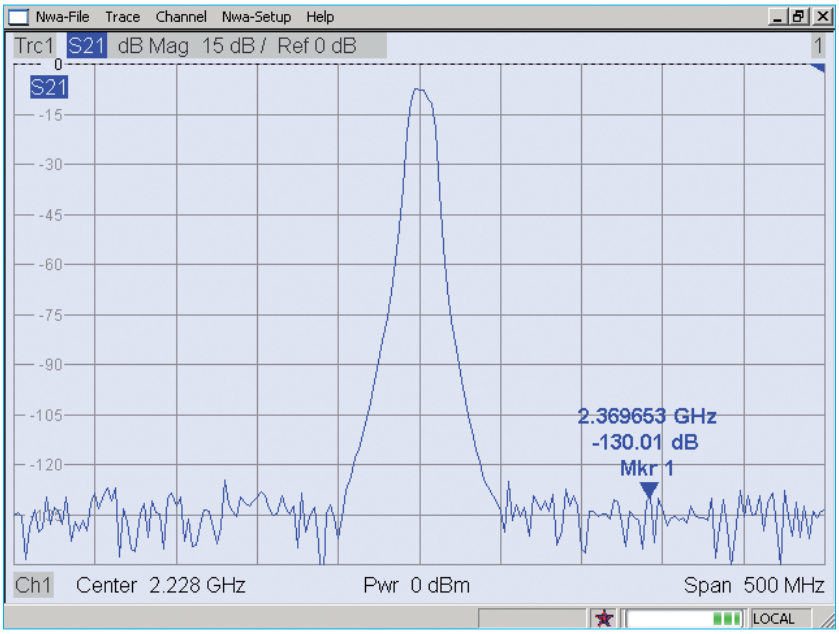
Dynamic range and speed for complex DUTs

Large measurement bandwidths up to 500 kHz and fast synthesizers make for short measurement times and thus high throughput in manual tuning and automated production sequences. Due to the analyzer's wide dynamic range at large measurement bandwidths, this advantage in speed does not affect measurement accuracy. The R&S®ZVL is thus the ideal tool for measuring and tuning selective DUTs such as duplex filters for base stations.

Sweep modes adapted to the task reduce measurement time

Using different sweep modes, the R&S®ZVL achieves optimal measurement times for a wide range of DUTs:

- For narrowband DUTs such as bandpass filters, the linear sweep with equidistant measurement points is the most suitable solution. Depending on the DUT, the number of measurement points can be selected between 2 and 4001
- The R&S®ZVL measures broadband DUTs such as cables or lowpass filters within a minimum of time by using the logarithmic sweep. In this case, the step size is proportional to the current measurement frequency
- The segmented sweep is ideal for filter tuning. It allows the test point spacing, measurement bandwidth, and source power to be specifically set for different frequency segments. By selecting the appropriate setting in the passband and the stopband, minimum sweep times, and maximum dynamic range and accuracy can be achieved

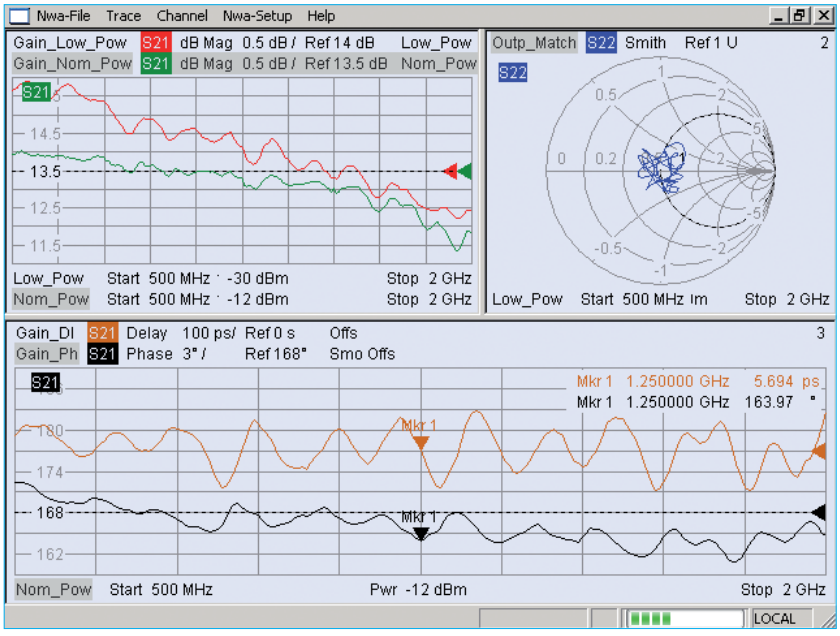


Dynamic range at 10 Hz IF bandwidth

Multitrace display for faster DUT characterization

Several traces can be combined in diagrams as required and assigned to different measurement channels[1]. Thus, the R&S®ZVL characterizes DUTs using a variety of stimulus conditions, and simultaneously displays all relevant parameters on the screen. The names of the traces and channels can be edited and replaced by user-specific names to make them easy to identify. The number of traces is limited only by the instrument's RAM capacity; more than 100 traces are available for remote-control applications, for example.

[1] A measurement channel refers to an independent set of test parameters including, for example, sweep mode, test point spacing, power, measurement bandwidth, and calibration.

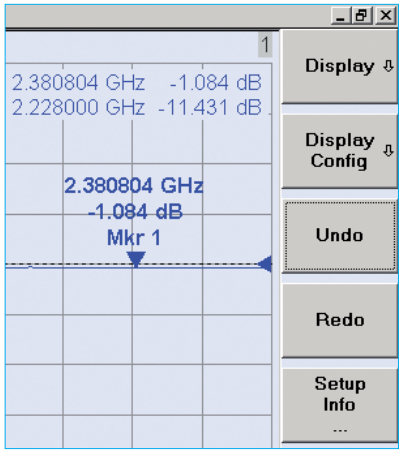


Multitrace display

Easy and intuitive operation

User-friendly and error-tolerant even for complex measurement tasks
The R&S®ZVL features the tried-and-tested operating concept of the R&S®ZVA and R&S®ZVB high-end network analyzers.

- Control by mouse or hardkeys/ softkeys (whichever you prefer)
- Dialogs and wizards for complex functions quickly guide you step by step to the required measurement
- Undo/Redo function for canceling up to six operating steps – including a preset, for reversing operating errors, and for fast switching between two modes



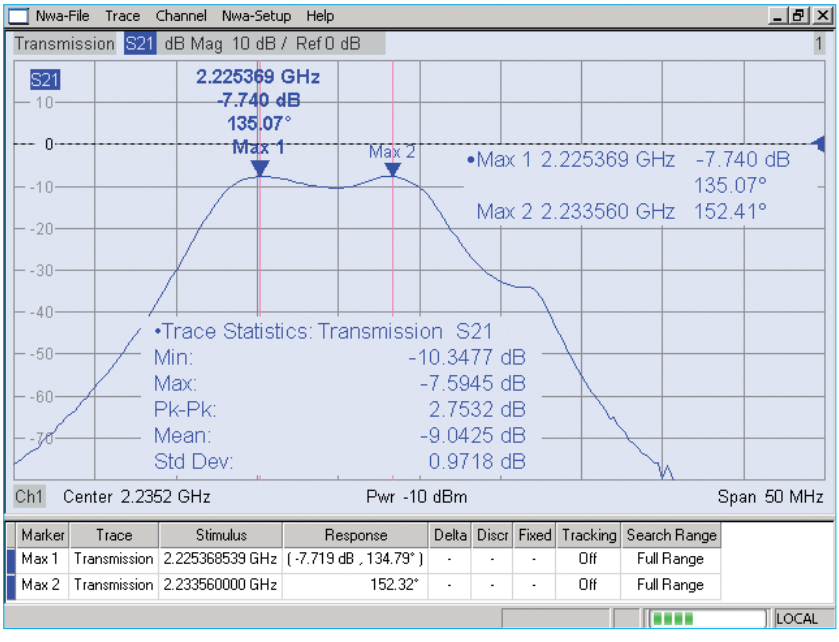
- Context-sensitive help including detailed description of the active function and display of the associated remote-control commands supports also untrained users and simplifies programming

Trace evaluation and marker functions facilitate manual filter tuning
A wide range of trace evaluation and marker functions support the tuning of complex DUTs, such as duplex filters for base stations.

- Up to 10 markers per trace in different output formats such as magnitude and phase, impedance, admittance, or VSWR
- Marker output formats can be selected independent of the trace format
- User-specific names for markers and traces
- Trace evaluation functions for user-definable frequency ranges such as max, min, RMS, peak to peak, bandwidth, quality, etc (see figure below)
- Marker and pass/fail information windows that can be shifted and adjusted in size
- Output of the marker information at the marker position, in the marker info field in the diagram, or as a table

Easy export and import of measurement results for quick documentation or comparison with a golden device
To make documentation easy, the R&S®ZVL provides different graphical and data formats for exporting measurement results. Moreover, data compiled with external tools can be loaded. For this purpose, the R&S®ZVL provides different formats and interfaces:

- Storage of measurement results internally to the hard disk or externally to a USB memory stick
- Export of hard copies in *.BMP, *.WMF, or *.EMF format
- Export of memory and measurement traces, e.g. as Touchstone or ASCII files for further processing in spreadsheet analysis programs, MATLAB®, or simulation programs
- Import of Touchstone files as memory trace to compare the current measurements with simulations
- Import of ASCII or Touchstone files as limit lines



Functions and options

R&S®ZVL-K1 spectrum analysis
The R&S®ZVL-K1 spectrum analysis option makes the R&S®ZVL a full-featured spectrum analyzer by adding the R&S®FSL's scope of functions, including channel and adjacent channel power, occupied bandwidth, CCDF measurement, and 20 MHz I/Q demodulation bandwidth.

R&S®ZVL-K2 distance-to-fault measurement
The R&S®ZVL-K2 option allows the detection of cable faults and connectors, which is important for antenna installation, for example.

All common cable types can be selected and are predefined with velocity factor and frequency-dependent attenuation.

R&S®ZVL-K3 time domain analysis
The R&S®ZVL-K3 option displays discontinuities, reflection factors or impedance versus delay/length. It contains step and impulse response, lowpass/bandpass frequency spacing and gated S-parameters.

R&S®FSL-B6 TV trigger
The R&S®FSL-B6 option offers a TV trigger function, which is important especially in analog TV service applications.

The option generates a trigger in response to selectable lines, or the horizontal or vertical blanking interval. It is capable of handling video formats with 525 or 625 lines and positive or negative modulation.
Requires the R&S®ZVL-K1 option

R&S®FSL-B8 gated sweep
The R&S®FSL-B8 option can display the modulation spectra of GSM or WLAN signals.
Requires the R&S®ZVL-K1 option

R&S®FSL-K30 application firmware for noise figure and gain measurements
The R&S®FSL-K30 application firmware adds the capability to perform noise figure measurements. This makes the R&S®ZVL an ideal choice for amplifier measurements, as it allows all relevant parameters such as noise figure, harmonics, intermodulation, ACPR, and S-parameters to be measured by means of a single instrument.
Requires the R&S®ZVL-K1 option

R&S®FSL-K7 AM/FM/φM measurement demodulator
The R&S®FSL-K7 AM/FM/φM measurement demodulator turns the R&S®ZVL into an analog modulation analyzer for amplitude-, frequency-, or phase-modulated signals.
Requires the R&S®ZVL-K1 option

R&S®FSL-K8 Bluetooth® TX measurements (1.1 and 2.0+EDR) [1]
The R&S®FSL-K8 application firmware expands the R&S®ZVL to include measurements on Bluetooth transmitters. All measurements are carried out in line with the Bluetooth RF Test Specification (Bluetooth SIG) Rev. 2.0+EDR.
Requires the R&S®ZVL-K1 option

R&S®FSL-K14 spectrogram measurements
The R&S®FSL-K14 option adds a spectrogram display to the R&S®ZVL. The spectrogram view gives a history of the spectrum and helps to analyze variations in frequency and level versus time.
Requires the R&S®ZVL-K1 option

R&S®FSL-K20 analog and digital cable TV measurements
The R&S®FSL-K20 CATV option provides easy-to-use push-button measurements for analog and digital cable TV networks as well as for analog TV transmitters.

R&S®FSL-K72 3GPP FDD BTS application firmware
The R&S®FSL-K72 option expands the R&S®ZVL by the capability to perform code domain power measurements on 3GPP downlink signals including HSDPA. This makes the R&S®ZVL an ideal tool for the maintenance and installation of networks.
Requires the R&S®ZVL-K1 option

R&S®FSL-K91 WLAN IEEE 802.11a/b/g/j application firmware
The R&S®FSL-K91 WLAN application firmware enhances the range of applications of the R&S®ZVL to include spectrum and modulation measurements on signals in line with the WLAN IEEE 802.11a/b/g/j standards. This makes the R&S®ZVL an ideal WLAN tester in production.
Requires the R&S®ZVL-K1 option

R&S®FSL-K93 WiMAX[2] IEEE 802.16 OFDM/OFDMA application firmware
The R&S®FSL-K93 WiMAX application firmware performs spectrum and modulation measurements on IEEE 802.16-2004 and IEEE 802.16e-2005 WiMAX and WiBro signals. The R&S®ZVL thus becomes a full-featured spectrum and network analyzer for WiMAX applications both in R&D and production.
Requires the R&S®ZVL-K1 option

For detailed information on the R&S®FSL options, refer to the corresponding data sheets.

[1] The Bluetooth word mark and logos are owned by the Bluetooth SIG, Inc., and any use of such marks by Rohde&Schwarz is under license.
[2] WiMAX Forum® is a registered trademark of the WiMAX Forum. "WiMAX", the WiMAX Forum logo, "WiMAX Forum Certified," and the WiMAX Forum Certified logo are trademarks of the WiMAX Forum.

Network analysis

Function	Description
Measured quantities	S-parameters (S11, S12, S21, S22), impedance, admittance, stability
Measurement formats	dB mag, lin mag, phase, polar, real, imag., Smith chart, group delay, SWR, inverted Smith chart, unwrapped phase
Markers	Ten markers per trace; display in different formats; size and position of the display windows can be changed using the mouse; editable names
Marker search	Coupled markers, max, min, peak, target
Trace evaluation	Max, min, peak to peak, RMS, mean, standard deviation, electrical length, phase delay; for up to ten definable stimulus ranges
Bandfilter search	Bandwidth, quality, attenuation, center frequency; evaluation referenced to maximum or marker value
Calibration method	Transmission and reflection normalization, OSM (full one-port), TOSM (full two-port), one-path two-port
Traces, channels, and diagrams	Unlimited number[1] of traces and channels, overlay display of traces also of different channels in one diagram, editable names, coupled scaling of different traces
Online help	Context-sensitive help including remote-control command documentation
Sweep modes	Linear, logarithmic, segmented, for optimal distribution of measurement points, and bandwidth and power optimization
Limit lines	Upper/lower, unlimited number of segments, use of traces as limit lines, graphical evaluation of pass/fail test, global limit test across all channels
Trace mathematics	Data/Mem, Data-Mem
Remote-control compatibility	Compatible with the R&S®ZVA, R&S®ZVB, and instruments from other manufacturers
Export of screen hardcopy	*.WMF *.EMF, *.BMP
Data export/import	*.SNP, *.CSV, *.DAT, can be read and displayed in memory traces
Power measurement (R&S®FSL-K9 option with R&S®ZVL-K1)	Connection of an R&S®NRP-Z power sensor directly to the USB interface
Undo/Redo	Reversal of up to six operating steps including preset
Calibration manager	Storage of calibration data independent of instrument setup, assignment of stored calibration data to traces and channels
Offset	Automatic or manual shifting of the reference plane by a specific electrical or mechanical length; determination of phase linearity

[1] Limited by RAM.

Spectrum analysis

Function	Description
Level units	dBm, dBµV, dBmV, dBµA, dBpW, V, W, A
Full selection of detectors	RMS, quasi peak, average, auto peak, pos. peak, neg. peak, sample
TOI measurement	Determination of third-order intercept point (IP3), automatic recognition of data carriers and determination of intermodulation sidebands
Harmonic distortion	Automatic determination of harmonic distortion
Noise measurement (noise marker)	Noise measurement in dBm (1 Hz) using the noise marker, taking into account all necessary corrections such as filter noise bandwidth, detector used, and averaging
Phase noise measurement	Phase noise measurement in dBc (1 Hz) with selectable carrier offset using the phase noise marker, taking into account all necessary corrections such as filter noise bandwidth, detector used, and averaging
Channel and adjacent channel power measurement	Power measurement within a definable channel bandwidth by means of trace integration (IBW method); use of the RMS detector to ensure good repeatability and accuracy; setting of channel width by selecting from a list of different transmission standards or by user selection; entry of different widths for channels and adjacent channels and channel spacing for up to twelve channels and three adjacent channels
Fast adjacent channel power measurement	Adjacent channel power measurement with standard-specific channel filters such as RRC filters in the time domain, reduction of measurement time by up to a factor of ten, easy measurement of the transient, time-dependent adjacent channel power
Burst power measurement (time domain power)	Measurement of the burst power in the time domain; display lines limit the evaluation range, e.g. to determine the power during the 147 useful bits of the GSM burst
Occupied bandwidth (OBW)	Measurement of the bandwidth occupied by a signal (for this purpose, the analyzer determines the channel bandwidth where 99 % of the overall power occur, for example; fully synchronous frequency sweep and high number of trace points ensure high measurement accuracy)
Frequency counter	Exact determination of the signal frequency on the marker position with 1 Hz resolution
Carrier/noise ratio (C/N)	Determination of the carrier-to-noise ratio referenced to 1 Hz bandwidth or a selectable bandwidth

Hardware options of the R&S®ZVL

1. *Battery pack (R&S®FSL-B31)*
2. *DC power supply (R&S®FSL-B30)*
3. *IEC/IEEE (GPIB) bus interface (R&S®FSL-B10)*
4. *OCXO (R&S®FSL-B4)*
5. *Additional interfaces (R&S®FSL-B5)*

Specifications in brief

Network analysis

Frequency range	**R&S®ZVL3, R&S®ZVL6:** 9 kHz to 3 GHz/6 GHz (specified) 5 kHz to 3 GHz/6 GHz (unspecified) **R&S®ZVL13:** 9 kHz to 13.6 GHz (specified) 5 kHz to 15.0 GHz (unspecified)
Measurement time (201 measurement points, full two-port-calibrated)	< 75 ms
Data transfer (201 measurement points)	
Via RSIB over 100 Mbit/s LAN	1.5 ms
Dynamic range at 10 Hz measurement bandwidth	> 115 dB, typ. 123 dB
Output power	> 0 dBm, typ. +10 dBm
Measurement bandwidths	10 Hz to 500 kHz in 1/2/5 steps
Weight (without battery)	< 7 kg (15.43 lb)
Number of channels, diagrams, and traces	> 100[1)]
Number of measurement points per trace	2 to 4001
Operating system	Windows XP

Spectrum analysis

Frequency range	**R&S®ZVL3, R&S®ZVL6:** 9 kHz to 3 GHz/6 GHz (specified) 5 kHz to 3 GHz/6 GHz (unspecified) **R&S®ZVL13:** 9 kHz to 13.6 GHz (specified) 5 kHz to 15.0 GHz (unspecified)
Frequency uncertainty	1×10^{-6}
With R&S®FSL-B4 option	1×10^{-7}
Resolution bandwidths	
Standard	300 Hz to 10 MHz in 1/3 steps, 20 MHz at zero span
With R&S®FSL-B7 option	(1 Hz) 10 Hz to 10 MHz in 1/3 steps
Video bandwidths	10 Hz to 10 MHz
I/Q demodulation bandwidth	20 MHz
SSB phase noise at 500 MHz	typ. –103 dBc (1 Hz), 10 kHz carrier offset
Displayed average noise level	
Without preamplifier at 1 GHz	< –140 dBm (1 Hz)
With preamplifier at 1 GHz	< –156 dBm (1 Hz), typ. –163 dBm (1 Hz)
IP3	> +5 dBm, typ. +12 dBm
Detectors	max/min peak, auto peak, RMS, quasi peak, average, sample
Level measurement uncertainty (95 % confidence level)	< 0.5 dB

[1)] Limited by RAM.

Ordering information

Designation	Type	Frequency range	Order No.
Vector Network Analyzer, 3 GHz, test ports: N (f), 50 Ω	R&S®ZVL3	9 kHz to 3 GHz	1303.6509.03
Vector Network Analyzer, 3 GHz, test ports: N (f), 75 Ω	R&S®ZVL3-75	9 kHz to 3 GHz	1303.6509.75
Vector Network Analyzer, 6 GHz, test ports: N (f), 50 Ω	R&S®ZVL6	9 kHz to 6 GHz	1303.6509.06
Vector Network Analyzer, 13.6 GHz, test ports N (f), 50 Ω	R&S®ZVL13	9 kHz to 13.6 GHz	1303.6509.13
Options			
OCXO Reference Frequency	R&S®FSL-B4		1300.6008.02
Additional Interfaces for spectrum analysis option [2) 8)]	R&S®FSL-B5		1300.6108.02
TV Trigger [2)]	R&S®FSL-B6		1300.5901.02
Narrow Resolution Filters, 10 Hz to 300 Hz, for spectrum analysis option [2)]	R&S®FSL-B7		1300.5601.02
Gated Sweep [2)]	R&S®FSL-B8		1300.5701.02
GPIB Interface	R&S®FSL-B10		1300.6208.02
RF Preamplifier for spectrum analysis option [2)]	R&S®FSL-B22		1300.5953.02
DC Power Supply, 12 V to 28 V	R&S®FSL-B30		1300.6308.02
NiMH Battery Pack [1)]	R&S®FSL-B31		1300.6408.02
R&S®NRP-Z Power Sensor Support for spectrum analysis option [2) 3)]	R&S®FSL-K9		1301.9530.02
Spectrogram Measurements [2)]	R&S®FSL-K14		1302.0913.02
Cable TV and TV Measurements [2)]	R&S®FSL-K20		1301.9675.02
Spectrum Analysis for R&S®ZVL	R&S®ZVL-K1		1306.0301.01
Distance-to-Fault Measurement	R&S®ZVL-K2		1306.0101.02
Time Domain Analysis	R&S®ZVL-K3		1306.0201.02
Options for the R&S®ZVL3/R&S®ZVL6/R&S®ZVL13 only			
AM/FM/φM Measurement Demodulator [2)]	R&S®FSL-K7		1301.9246.02
Bluetooth® TX Measurements (1.1 and 2.0+EDR) [2)]	R&S®FSL-K8		1301.9398.02
Application Firmware for Noise Figure and Gain Measurements [2) 4)]	R&S®FSL-K30		1301.9817.02
3GPP FDD BTS Application Firmware [2)]	R&S®FSL-K72		1302.0620.02
WLAN IEEE 802.11a/b/g/j Application Firmware [2)]	R&S®FSL-K91		1302.0094.02
WiMAX IEEE 802.16 OFDM/OFDMA Application Firmware [2)]	R&S®FSL-K93		1302.0736.02
Extras			
Test Cable (50 Ω) [4)]			
N (m)/N (m), 25", 630 mm/38", 960 mm (high precision)	R&S®ZV-Z91	0 Hz to 18 GHz	1301.7572.25/38
N (m)/3.5 mm (f), 25", 630 mm/38", 960 mm (high precision)	R&S®ZV-Z92	0 Hz to 18 GHz	1301.7589.25/38
N (m)/N (m), 24", 610 mm/36", 910 mm	R&S®ZV-Z191	0 Hz to 18 GHz	1306.4507.24/36
N (m)/3.5 mm (f), 24", 610 mm/36", 910 mm	R&S®ZV-Z192	0 Hz to 18 GHz	1306.4513.24/36
N(m) 75 Ω/N(m) 75 Ω, 24", 610 mm/ 36", 910 mm	R&S®ZV-Z194	0 Hz to 3 GHz	1306.4542.24/36
Calibration Kits			
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, 75 Ω	R&S®ZCAN	0 Hz to 3 GHz	0800.8515.72
N (m), 50 Ω	R&S®ZV-Z121	0 Hz to 8 GHz	1164.0496.02
N (f), 50 Ω	R&S®ZV-Z121	0 Hz to 8 GHz	1164.0496.03
3.5 mm (m)	R&S®ZV-Z132	0 Hz to 8 GHz	1164.1092.02
3.5 mm (f)	R&S®ZV-Z132	0 Hz to 8 GHz	1164.1092.03
3.5 mm	R&S®ZV-Z32	0 Hz to 26.5 GHz	1128.3501.02
3.5 mm (including sliding matches)	R&S®ZV-Z33	0 Hz to 26.5 GHz	1128.3518.02
Matching Pad, 75 Ω, L section	R&S®RAM	0 Hz to 2.7 GHz	0358.5414.02

Designation	Type	Frequency range	Order No.
Matching Pad, 75 Ω, series resistor 25 Ω	R&S®RAZ	0 Hz to 2.7 GHz	0358.5714.02
Matching Pad, 75 Ω, L section, N to BNC	R&S®FSH-Z38	0 Hz to 1 GHz	1300.7740.02
Instruments and test equipment			
19" Rackmount Adapter	R&S®ZZA-S334		1109.4487.00
Soft Carrying Bag	R&S®FSL-Z3		1300.5401.00
Additional Charger Unit	R&S®FSL-Z4		1300.5430.02
Spare part: inner conductor for R&S®ZVL3-75			1303.7286.00
Power sensors [2) 6) 7)]			
Average Power Sensor 200 mW	R&S®NRP-Z11	10 MHz to 8 GHz	1138.3004.02
Average Power Sensor 200 mW	R&S®NRP-Z21	10 MHz to 18 GHz	1137.6000.02
Average Power Sensor 2 W	R&S®NRP-Z22	10 MHz to 18 GHz	1137.7506.02
Average Power Sensor 15 W	R&S®NRP-Z23	10 MHz to 18 GHz	1137.8002.02
Average Power Sensor 30 W	R&S®NRP-Z24	10 MHz to 18 GHz	1137.8502.02
Average Power Sensor 200 mW	R&S®NRP-Z91	9 kHz to 6 GHz	1168.8004.02
Thermal Power Sensor 100 mW	R&S®NRP-Z51	0 Hz to 18 GHz	1138.0005.02
Thermal Power Sensor 100 mW	R&S®NRP-Z55	0 Hz to 40 GHz	1138.2008.02

[1)] Requires R&S®FSL-B30.
[2)] Requires R&S®ZVL-K1 spectrum analysis option.
[3)] Requires R&S®NRP-Z power sensor with R&S®NRP-Z3/4 or R&S®FSL-B5.
[4)] Requires R&S®FSL-B5 additional interfaces option.
[5)] One cable.
[6)] Requires R&S®FSL-K9.
[7)] Requires R&S®NRP-Z3/4 or R&S®FSL-B5.
[8)] Video out, IF out, noise source control, AUX port, connector for R&S®NRP-Zxx power sensors.