

R&S®ZVL3/6/3-75
Versatile ■ Compact ■ Future-Proof
Multi-Purpose Network Analyzer
World's First 75 Ω Network/Spectrum Analyzer



Rohde & Schwarz builds upon the success and acceptance of ZVL3/6, and introduces a key feature improvement and a new member to this product family. The new R&S® ZVL3-75 is a 75 Ω version of ZVL that covers the frequency range for TV, CATV and SAT-TV applications. Similar to ZVL3/6, the new ZVL3-75 is a fully bidirectional 2-port Network Analyzer that provides measurements both in the forward and reverse directions to measure magnitude and phase of all 4 S-parameters. As with ZVL3/6, the new ZVL3-75 can be retrofitted with the ZVL-K1 option to activate Spectrum Analyzer.

Now the entire product family is as cost-sensitive, versatile and future-proof line of instruments in the Network Analysis product line. The feature-set of all three (3) ZVL instruments cover middle and lower-end applications for both spectrum analysis and network analysis.

Finally, the new ZVL-K3 option adds Time Domain Analysis capability to all three members of this product family.

Key Applications

- ▶ Design Labs & Manufacture of RF filter, couplers, relay, amplifiers, cable, antennas, etc.
- ▶ Mobile Phone Base Station commissioning, service and installation
- ▶ Radio & TV Station commissioning, service and installation
- ▶ Remote location RF service application
- ▶ Educational Institutions and Research RF-Labs
- ▶ Military and Government Applications

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Key Characteristics

- ▶ Wider Frequency Range
 - 9 kHz to 3 GHz – ZVL3/3-75
 - 9 kHz to 6 GHz – ZVL6
- ▶ Fully bidirectional
- ▶ Measurement time (60 ms)
- ▶ Measurement Bandwidth (10 Hz to 500 kHz)
- ▶ Resolution (1 Hz)
- ▶ Dynamic Range (10 Hz) - >115 dB (123 dB typical)
- ▶ Output Power (-50 dBm to 0 dBm)
- ▶ Spectrum Analysis option (ZVL-K1)
- ▶ Time Domain Analysis option (ZVL-K3)
- ▶ Measurement Bandwidth (10 Hz to 500 kHz)
- ▶ Number of Traces, Channels, Diagram (>100)
- ▶ Trace Noise Magnitude (<0.005 dB (rms))
- ▶ Integrated step attenuator for measurements on devices with up to 27 dBm output power
- ▶ Number of Test Points (4001)
- ▶ Effective System Data
 - Directivity (>46 dB to 3 GHz / >40 dB 6 GHz – typically 50 dB for both 3 and 6 GHz)
 - Source Match (>40 dB to 3 GHz – typically 46 dB / >36 dB to 6 GHz – typically 40 dB)
 - Load Match (>46 dB to 3 GHz – typically 50 dB / >40 dB to 6 GHz – typically 46 dB)
 - Reflection Tracking (<0.04 dB to 3 GHz / 0.1 dB to 6 GHz – typically 0.01 dB for both 3/6 GHz)
 - Trans. Tracking (<0.06 dB to 3 GHz – typically 0.01 dB / <0.2 dB to 6 GHz – typically 0.05 dB)
- ▶ Display (6.5” VGA – 640 x 480)
- ▶ Portability with DC and battery operation (15.4 lbs and 14.57” deep)
- ▶ Best Price/Performance Ratio
- ▶ Lower Cost of Ownership

Key Features

- ▶ Ease of use
- ▶ Bidirectional Test-set
- ▶ Color Display and sunlight mode for enhanced visibility
- ▶ Instrument setup with pass/fail criteria from hard disk or USB memory device

New Features

- ▶ ZVL3-75
 - 75 Ω Test environment for TV/CATV/SAT-TV applications
 - On-site plug and play installation of hardware options
 - Easy to replace damaged N-connector with recalibration
- ▶ ZVL-K3 – Time Domain Analysis
 - Display discontinuities, reflection factor or impedance versus delay/length

Potential Customers

- ▶ Telecom Industry
- ▶ Network Operators (mobile communications and broadcast)
- ▶ Military
- ▶ Automotive / Electronic manufacturers
- ▶ Aerospace
- ▶ Service & Installation Personnel
- ▶ Service and Maintenance
- ▶ Education (universities, training centers, etc.)

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.

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Spectrum analysis

Function	Description
Level units	dBm, dB μ V, dBmV, dB μ A, 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

Specifications in brief

Network analysis

Frequency range	9 kHz to 3 GHz/6 GHz (typ. 5 kHz)
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 ⁹
Number of measurement points per trace	2 to 4001
Operating system	Windows XP

Spectrum analysis

Frequency range	9 kHz to 3 GHz/6 GHz
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