R&S®ESSENTIALS

testforce

R&S®ZNL
VECTOR NETWORK ANALYZER

The 3-in-1 allrounder

Product Brochure
Version 06.00

3 year warranty

ROHDE&SCHWARZ

Make ideas real

AT A GLANCE

Measuring equipment for RF applications must satisfy high quality standards. Instruments should be easy to use and offer high versatility. Fast measurements and reliable performance are crucial. The R&S®ZNL meets all of these challenges, and the models up to 6 GHz offer an extra on top: they combine the functionality of a vector network analyzer, a spectrum analyzer and a power meter in a single, compact box.

With frequency ranges from 5 kHz up to 20 GHz, the R&S®ZNL is well suited for RF component tests in industrial electronics, EMC labs and wireless communications.

Responding to constantly changing measurement needs in diverse environments, e.g. on test benches or production lines, can be challenging. The R&S®ZNL helps to reduce investment costs as it offers a unique option concept. For the R&S®ZNL models up to 6 GHz, the base unit can be extended with a fully integrated spectrum analyzer[1]. Moreover, the models up to 6 GHz can be used as RF power meters[2].

[1] R&S®ZNL3-B1, R&S®ZNL4-B1 or R&S®ZNL6-B1 option.
[2] R&S®FPL1-K9 option; requires R&S®ZNL3-B1, R&S®ZNL4-B1 or R&S®ZNL6-B1 option and an R&S®NRP external power sensor.

The R&S®ZNL hosts a variety of different functionalities. Instead of investing in multiple instruments, research labs, service centers, universities and production facilities can benefit from a single, compact instrument that offers even higher measurement speed and better RF performance than dedicated instruments in comparable classes.When equipped with the R&S®ZNLx-B1 option, the models up to 6 GHz simultaneously display vector network analyzer and spectrum analyzer measurements on their 10.1" multitouch screen. Clear menu structures and numerous wizards make measurements convenient to configure.

The R&S®ZNL offers a wide range of functions in a very compact size. With a weight of only 6 kg to 8 kg, a carrying handle and an optional battery pack, the R&S®ZNL is fully portable and can be operated wherever needed.

KEY FEATURES

- ▶ Frequency range from 5 kHz to 3 GHz (R&S®ZNL3), 4.5 GHz (R&S®ZNL4), 6 GHz (R&S®ZNL6), 14 GHz (R&S®ZNL14) and 20 GHz (R&S®ZNL20)
- ▶ Two-port vector network analyzer for bidirectional measurements
- ▶ Universal instrument
  - Vector network analyzer
  - Fully integrated spectrum analyzer (optional, for models up to 6 GHz)
  - Support for external power sensors (optional, for models up to 6 GHz)
- ▶ Wide dynamic range of typ. 130 dB
- ▶ Output power range from –40 dBm to typ. + 3 dBm
- ▶ Measurement bandwidths from 1 Hz to 500 kHz
- ▶ Fast measurements, e.g. 16.7 ms for 401 points (100 kHz IFBW, 200 MHz span, two-port TOSM (SOLT))
- ▶ Compact size, low weight (6 kg to 8 kg)
- ▶ Optional battery pack
- ▶ Windows 10 operating system

BENEFITS

The 3-in-1 analyzer:
compact vector network analyzer
▶ page 4

The 3-in-1 analyzer: fully integrated spectrum analyzer up to 6 GHz
▶ page 6

The 3-in-1 analyzer:
RF power meter up to 6 GHz
▶ page 7

Clearly structured user interface
▶ page 8

User interface with multitouch screen
▶ page 10

Fully portable – ideal for field use
▶ page 11

THE 3-IN-1 ANALYZER: COMPACT VECTOR NETWORK ANALYZER

When equipped with the appropriate options, the R&S®ZNL models up to 6 GHz combine the functionality of a vector network analyzer, a spectrum analyzer and a power meter in a single, compact box, providing an all-in-one instrument ideal for environments that involve constantly changing test requirements in development, production and service.

Solid RF performance

Vector network analyzers such as the R&S®ZNL can characterize electronic networks in the frequency domain, e.g. by measuring the magnitude and phase of S-parameters. Components can also be analyzed in the time domain with the R&S®ZNL-K2 option.

High dynamic range

The R&S®ZNL features a wide dynamic range of up to 130 dB (typ. at 10 Hz IFBW) and an output power of typ. 3 dBm. These values facilitate measurements on high-rejection filters that call for a wide dynamic range.

Low trace noise for high accuracy

The R&S®ZNL offers low trace noise of less than 0.0005 dB (typ. at 10 kHz IFBW). This delivers stable, reproducible and precise measurements even at higher IF bandwidths. Using higher IF bandwidths, the R&S®ZNL can perform faster measurements while maintaining the stability normally only achieved with narrower IF bandwidths.

Fast measurements for high throughput

With measurement times of e.g. 16.7 ms for 401 points (full two-port calibration, 200 MHz span, 100 kHz IFBW), high-speed data processing and fast LAN or IEC/IEEE/GPIB data transfer, the R&S®ZNL meets the speed requirements encountered in production. Throughput can be maximized by using the segmented sweep function. Here, the frequency axis is divided into segments, and sweep parameters such as output power, IF bandwidth and number of points can be defined separately for each segment to optimally match the DUT characteristics. This increases measurement speed without any loss in accuracy.

Features for production and lab

Versatile calibration features, support for calibration units

The R&S®ZNL calibration wizard guides users through the calibration process. Manual calibration kits and automatic calibration units are supported. Using a calibration unit minimizes the time needed to perform full system error correction. The calibration unit is ready for use right after it is connected to the R&S®ZNL. Calibrating a setup takes just a few steps. This is especially advantageous in production environments, helping to save time and maximize throughput. The calibration unit performs calibration with a single click on the "Start Auto Cal" button.

De/embedding and fixture compensation

Components are often specified together with the networks that match them to the impedance of the surrounding circuit. To characterize such components in a production environment, the R&S®ZNL can embed the DUT into a virtual matching network to provide realistic conditions by simulating the DUT installed in its operational environment. The R&S®ZNL offers a choice of predefined matching network topologies. It is also possible to read touchstone files into the R&S®ZNL and use them for deembedding/embedding. In addition, fixture compensation is available for correcting measurement results. This feature eliminates the unwanted effects of a test fixture or adapter located between the calibrated reference plane and the DUT.

Remote control via LAN and optional GPIB interface

The R&S®ZNL can be remotely controlled via its standard LAN interface. The optional GPIB interface can be used to connect a controller for remote control of the R&S®ZNL. Data is transmitted bidirectionally on the 8-bit parallel bus. The data measured during a sweep is transferred to the controller while the next sweep is in progress. As a result, data transfer time on the R&S®ZNL is virtually negligible.

Time domain analysis and distance-to-fault (DTF) measurements

The R&S®ZNL offers powerful time domain analysis (R&S®ZNL-K2 option) to measure components such as filters and high-speed digital data cables in the frequency and time domain.

With 100 001 points per trace, the R&S®ZNL can measure electrically long DUTs such as long cables without any limitations. The gating function of the R&S®ZNL makes it easy to locate cable faults and analyze them in detail.

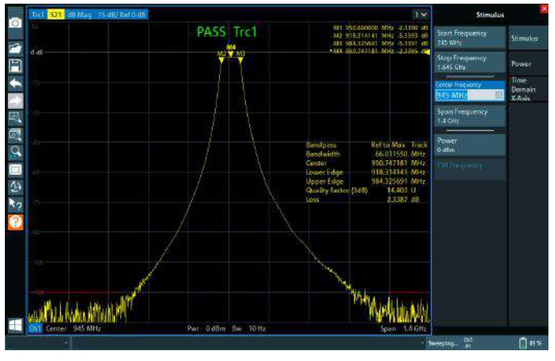
The distance-to-fault measurements option (R&S®ZNL-K3) allows the detection of cable discontinuities, which is important for base station antenna installation, for example. Users can select from a range of common cable types with predefined velocity factor and frequency-dependent attenuation, or create their own cable profiles. The R&S®ZNL-K2 and R&S®ZNL-K3 options use internal DC extrapolation. The low start frequency of 5 kHz is helpful as it provides improved accuracy.

Compact 3-in-1 instrument up to 6 GHz

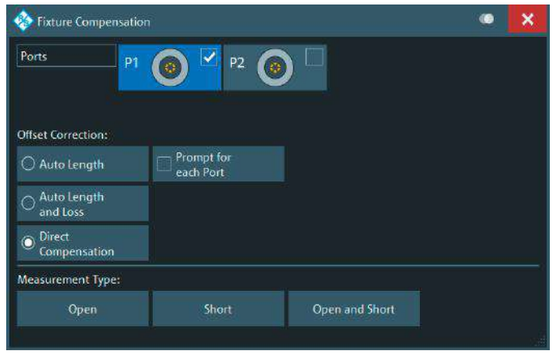
With a depth of less than 24 cm and a weight of only 6 kg to 8 kg, the R&S®ZNL is the most compact instrument in its class. The small footprint leaves plenty of space on the workbench – more than with any other comparable benchtop analyzer.

With the R&S®ZNL3-B1, R&S®ZNL4-B1 or R&S®ZNL6-B1 spectrum analyzer option installed, even more space is saved as the instrument offers the functionality of two analyzers in the same compact size. Adding support for R&S®NRP power sensors additionally provides power meter functionality, turning the R&S®ZNL into a 3-in-1 allrounder with a network analyzer, spectrum analyzer and power meter in a single box.

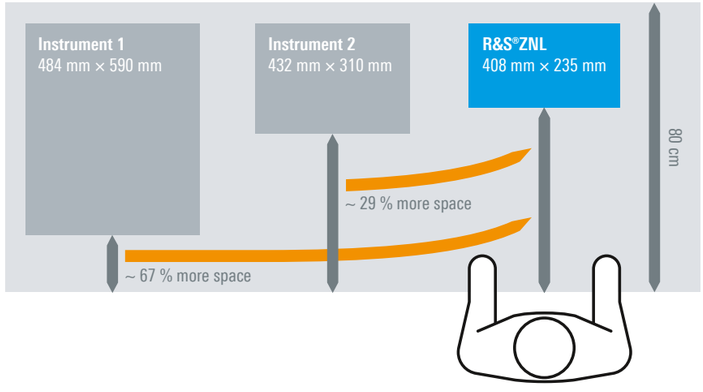
Measurement on a high-rejection bandpass filter using the bandpass filter function.



Fixture compensation menu, showing the available compensation methods.



Comparison of footprint of different VNAs



THE 3-IN-1 ANALYZER: FULLY INTEGRATED SPECTRUM ANALYZER UP TO 6 GHz

Different modes of operation turn the R&S®ZNL vector network analyzer into a versatile multipurpose instrument. The R&S®ZNL3-B1/R&S®ZNL4-B1/R&S®ZNL6-B1 hardware option extends the base unit (models up to 6 GHz) with a fully integrated spectrum analyzer on a dedicated hardware board. There is no need to reboot the instrument in order to switch between different modes.

Integrated hardware for solid RF performance

The R&S®ZNL3-B1, R&S®ZNL4-B1 and R&S®ZNL6-B1 options are dedicated hardware boards, delivering performance comparable to that of pure spectrum analyzers in the economy and midrange classes. The R&S®ZNL equipped with the spectrum analyzer hardware features a phase noise of typ. –108 dBc (1 Hz) at 10 kHz offset, a third-order intercept point of typ. +20 dBm, and a displayed average noise level (DANL) of typ. –150 dBm.

Spectrum analyzer function

In the spectrum analyzer mode, the instrument provides functions corresponding to those of a conventional spectrum analyzer. The analyzer measures the frequency spectrum of the RF input signal over the selected frequency range with the selected resolution and sweep time. Alternatively, it displays the waveform of the video signal for a fixed frequency. The application is available for the R&S®ZNL3, R&S®ZNL4 and R&S®ZNL6 models and requires the R&S®ZNL3-B1, R&S®ZNL4-B1 or R&S®ZNL6-B1 spectrum analyzer option.

The spectrum analyzer function includes an I/Q analyzer, which is the standard function for digital signal analysis. This application provides measurement and display functions for I/Q data. The captured I/Q data can be transferred to third-party software tools (e.g. MATLAB® or Python) for further analysis. The 40 MHz analysis bandwidth option (R&S®FPL1-B40) allows single-carrier signals with up to 40 MHz bandwidth to be analyzed and demodulated.

Analog demodulation

The R&S®FPL1-K7 option adds analog demodulation capabilities to the R&S®ZNL. It determines the characteristics of amplitude, frequency and phase modulated signals and also measures other components such as residual FM and synchronous modulation. Typical applications of the R&S®FPL1-K7 include:

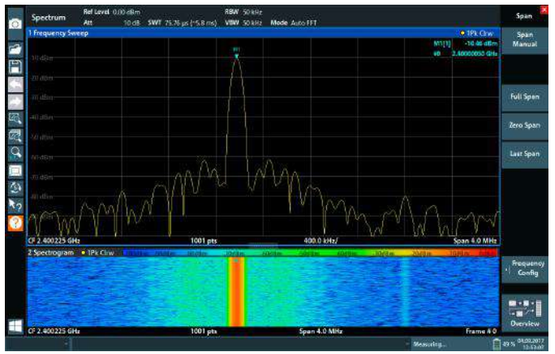
- Transient and settling time measurements of oscillators like VCOs and PLLs
- Troubleshooting of AM/FM transmitters
- Simple chirp analysis of pulsed and continuous wave signals

Digital demodulation

The R&S®ZNL equipped with an R&S®ZNL3-B1, R&S®ZNL4-B1 or R&S®ZNL6-B1 option can analyze and demodulate digitally modulated single-carrier signals with up to 40 MHz analysis bandwidth. The R&S®ZNL receives and digitizes the signal, which is then analyzed by the R&S®VSE vector signal explorer software which can be run on the R&S®ZNL or an external PC. [1)]

[1)] For further information, see R&S®VSE product brochure (PD 3607.1371.12) and www.rohde-schwarz.com/product/vse.

Spectrum analyzer mode: the R&S®ZNL provides the full functionality of a standard spectrum analyzer.



Overview of analog demodulation menu: all setting functions are accessible here.

THE 3-IN-1 ANALYZER: RF POWER METER UP TO 6 GHz

Precise power measurements

The R&S®FPL1-K9 option adds support for R&S®NRP power sensors [2)], enabling precise power measurements. This application requires the R&S®ZNL3-B1, R&S®ZNL4-B1 or R&S®ZNL6-B1 spectrum analyzer option.

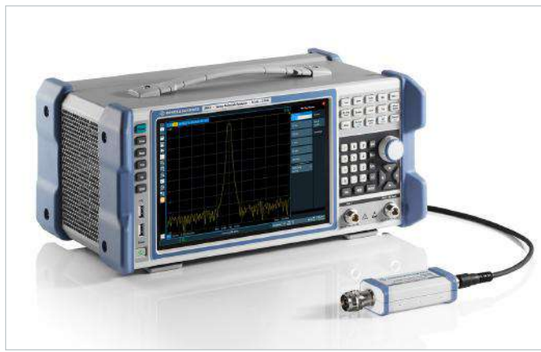
Power sensors can be connected via USB or via the ruggedized power sensor connector included in the R&S®FPL1-B5 additional interfaces option.

Up to four power sensors can be connected in parallel. Power sensors can also be used to trigger measurements at defined power levels.

[2)] The R&S®NRP power sensors supported by R&S®FPL1-K9 are listed in the R&S®ZNL data sheet (PD 3607.1071.22).

Examples of R&S®NRP power sensors:
R&S®NRP8SN and R&S®NRP8S three-path diode power sensors.

The R&S®ZNL with the R&S®FPL1-K9 option supports external R&S®NRP power sensors to deliver precise power measurements.

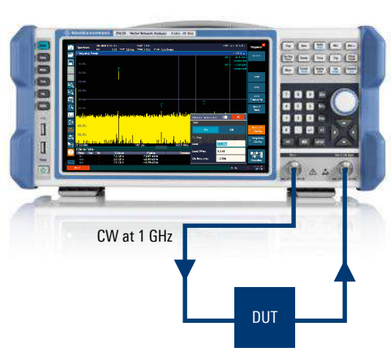


Independent continuous wave (CW) source

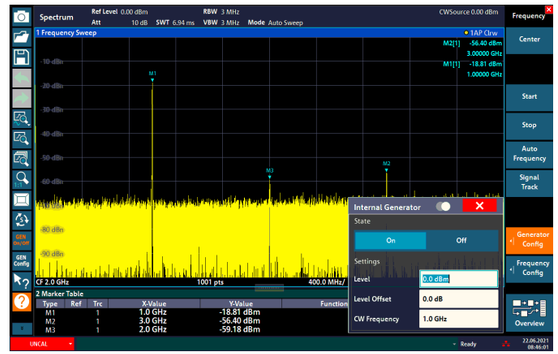
An R&S®ZNL3, R&S®ZNL4 or R&S®ZNL6 equipped with the R&S®ZNLx-B1 spectrum analyzer option in combination with the R&S®ZNL-K14 independent CW source option can measure the output frequency spectrum of a DUT connected to port 2, with the DUT input driven by a CW signal from port 1.

R&S®ZNL-K14 allows a more detailed analysis of a DUT's frequency response and makes it possible to measure parameters such as harmonics and search for spurious frequency components. The option also enables measurements on frequency-converting DUTs if an external signal source is provided in addition.

R&S®ZNL-K14 measurement concept



Frequency sweep of a common mode transformer output signal using a CW input signal of 0 dBm at 1 GHz.



CLEARLY STRUCTURED USER INTERFACE

10.1" high-resolution multitouch screen
- 1280 × 800 pixel

Softkey bar
- Quick access to key functions
- Hardware settings at a glance

Numerical keypad
- With unit keys for frequency and level

Toolbar
- Fast access to standard functions such as print, save/open file, undo, redo, help

Function keys

System keys
- For setups, presets, etc.

Two USB 2.0 ports
- For storage media
- For accessories

Control knob

Status bar

Port 1

Port 2/RF input

USER INTERFACE WITH MULTITOUCH SCREEN

Clear menu structures for efficient operation

The R&S®ZNL has a clearly structured user interface. Measurements can be configured in just a few steps.

Users can drag and drop traces, channels and diagrams to arrange and combine them in any desired way. Different instrument setups can be saved and reloaded, and switching between setups is possible with minimal effort.

The R&S®ZNL offers a variety of marker functions for efficient analysis of the measured trace:

- More than 100 markers per trace are available (up to 16 in spectrum analyzer mode). Results are represented in different formats such as magnitude, phase, impedance, admittance and VSWR.
- The unit of the marker can be chosen independently of the displayed trace format.
- Markers and traces can be named to describe the specific application.
- Available marker functions include maximum, minimum, RMS and peak-to-peak detection, as well as bandwidth measurement, etc.

Moreover, the user can define limit lines to verify compliance of the DUT with specified values and required standards. Limit lines can be defined as linear or logarithmic lines or using a mathematical formula.

Large 10.1" multitouch screen for convenient operation

The large 10.1" multitouch screen allows users to arrange measurement tasks as required and move and combine traces, channels and diagrams by using the drag&drop function.

Integrated PC

With its fully integrated, powerful PC platform running the Windows 10 operating system, the R&S®ZNL is a standalone solution. There is no need for an external PC or controller. The analyzer's solid state hard disk ensures fast boot-up time and high reliability to satisfy the most demanding requirements.

Simultaneous display of multiple measurement modes with MultiView function

To support full DUT characterization, the MultiView function simultaneously displays all active vector network analyzer, spectrum analyzer and power meter measurements. Measurements are updated in real time and can be accessed directly by tapping on the desired window.

With the test sequencer activated in MultiView mode, vector network analyzer measurements and spectrum analyzer measurements can be performed alternately.

In MultiView mode, all active measurements are displayed at the same time. Here, a vector network analyzer measurement (two different representations) is displayed along with a spectrum analyzer measurement.

FULLY PORTABLE – IDEAL FOR FIELD USE

Due to its unique hardware concept, the R&S®ZNL combines multiple functionalities in a compact form factor. Its weight is correspondingly low. Depending on the options installed, the R&S®ZNL weighs between 6 kg and 8 kg.

Battery and DC power supply for field use

With a carrying handle and an optional battery pack (R&S®FPL1-B31), the R&S®ZNL is a fully portable instrument ideal for field use and quick transfer between workstations in a lab.

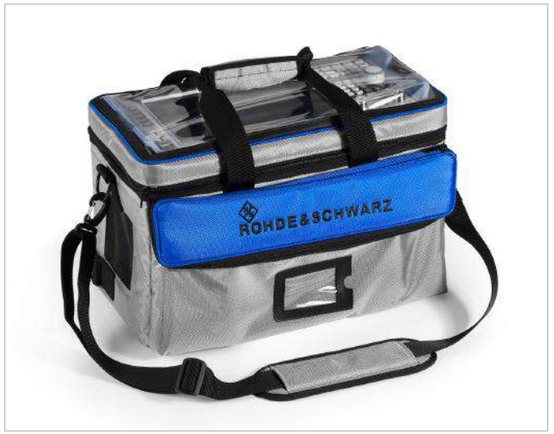
The optional 12 V/24 V DC power supply (R&S®FPL1-B30) is available for operation of the R&S®ZNL in vehicles.

Accessories for transport and field use

For transport and field deployment of the R&S®ZNL, the optional R&S®FPL1-Z2 transport bag protects the instrument against damage and the ingress of dirt. Side vents and a transparent top cover allow portable operation while the instrument is safely stored in the bag. A carrying vest holster (R&S®FPL1-Z3 option) is also available.

For outdoor use in challenging light conditions, the instrument display can be equipped with an anti-glare film (R&S®FPL1-Z5 option). This improves the contrast of the display and protects the screen against scratches.

The R&S®ZNL can be stowed and carried in a robust transport bag.



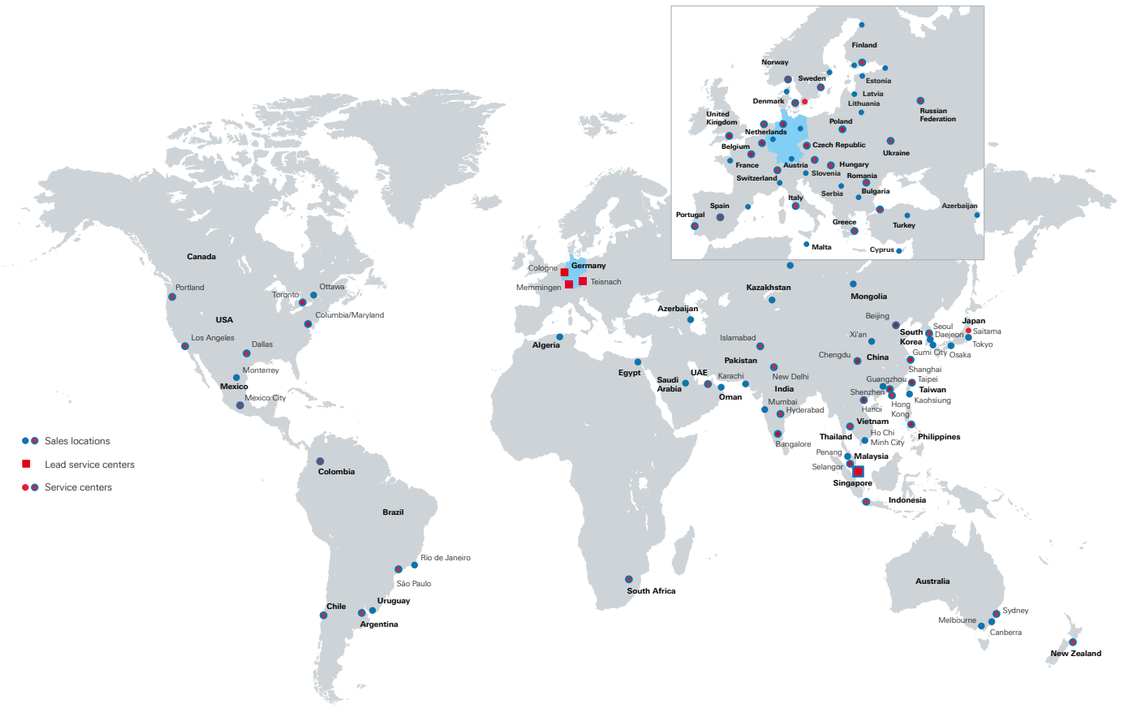
Rear view of the R&S®ZNL with battery compartment. The batteries can be easily accessed.

FROM PRESALES TO SERVICE. AT YOUR DOORSTEP.

The Rohde&Schwarz network in over 70 countries ensures optimum on-site support by highly qualified experts.

User risks are reduced to a minimum at all project stages:

- Solution finding/purchase
- Technical startup/application development/integration
- Training
- Operation/calibration/repair



SPECIFICATIONS IN BRIEF

Specifications in brief		
Network analysis		
Frequency range	R&S®ZNL3	5 kHz to 3 GHz
	R&S®ZNL4	5 kHz to 4.5 GHz
	R&S®ZNL6	5 kHz to 6 GHz
	R&S®ZNL14	5 kHz to 14 GHz
	R&S®ZNL20	5 kHz to 20 GHz
Dynamic range		> 120 dB (spec.); typ. > 130 dB
Output power		0 dBm (spec.); typ. + 3 dBm
Trace noise		< 0.0035 dB (spec.); typ. < 0.0005 dB
Measurement speed		
Sweep time	401 points, two-port TOSM, 200 MHz span, 100 kHz IFBW	16.7 ms
Data transfer	over IEC/IEEE/GPIB, 201 points	typ. 3 ms
	HiSLIP over 1 Gbit/s LAN	typ. 2.5 ms
Measurement parameters		S-parameters (S_{xy}), wave quantities, wave ratios, impedance parameters (Z_{xy}), admittance parameters (Y), stability factors
Display formats		dB, magnitude, phase, Smith chart, polar diagram, SWR, unwrapped phase, linear magnitude, inverse Smith chart, real, imaginary, delay
Calibration methods		reflection normalization (open or short), reflection (OSM (OSL)), enhanced reflection normalization (OM or SM), transmission normalization (response calibration), transmission normalization in both directions (response calibration), one-path two-port, TOSM (SOLT)
Number of points	vector network analyzer mode	1 to 100001
	spectrum analyzer mode	101 to 100001
IF bandwidth (IFBW)		selectable in steps of 1/1.5/2/3/5/7 · 1 Hz/10 Hz/.../100 kHz; max. upper limit: 500 kHz
Spectrum analysis (R&S®ZNL3 with R&S®ZNL3-B1, R&S®ZNL4 with R&S®ZNL4-B1 and R&S®ZNL6 with R&S®ZNL6-B1 option)		
Frequency range	R&S®ZNL3	5 kHz to 3 GHz (1 Hz resolution)
	R&S®ZNL4	5 kHz to 4.5 GHz (1 Hz resolution)
	R&S®ZNL6	5 kHz to 6 GHz (1 Hz resolution)
Displayed average noise level (DANL)	RF attenuation: 0 dB	< –140 dBm (spec.); typ. < –150 dBm
Phase noise	1 GHz, 10 kHz offset	< –105 dBc (1 Hz); typ. < –108 dBc (1 Hz)
Maximum signal analysis bandwidth	with R&S®FPL1-B40 option	40 MHz
Intermodulation		
Third-order intercept point (TOI)	300 MHz ≤ f_{in} ≤ 3 GHz	> 16 dBm (spec.); typ. > 20 dBm
Second-harmonic intercept (SHI)	900 MHz ≤ f_{in} ≤ 1.5 GHz	70 dBm (nom.)
General features		
Limit lines	vector network analyzer mode	single, segmented, upper limit, lower limit, linear, logarithmic, based on formula
Number of channels	within one vector network analyzer setup	no limitation
Number of channel setups		max. 14
Number of traces (simultaneous display)	vector network analyzer mode	no limitation
	spectrum analyzer mode (R&S®ZNL3-B1/ R&S®ZNL4-B1/ZNL6-B1 option)	6
Number of markers	vector network analyzer mode	no limitation
	spectrum analyzer mode (R&S®ZNL3-B1/ R&S®ZNL4-B1/ZNL6-B1 option)	16
General data		
Operating system		Windows 10
Display		10.1" (26.4 cm) WXGA color LCD, multitouch screen
Dimensions (W × H × D)		408 mm × 186 mm × 235 mm (16.06 in × 7.32 in × 9.25 in)
Weight	depending on configuration	6 kg to 8 kg (13.23 lb to 17.64 lb)

ORDERING INFORMATION

Designation	Type	Order No.
Base unit		
Vector network analyzer, 5 kHz to 3 GHz, two ports, N (f)	R&S®ZNL3	1323.0012.03
Vector network analyzer, 5 kHz to 4.5 GHz, two ports, N (f)	R&S®ZNL4	1323.0012.04
Vector network analyzer, 5 kHz to 6 GHz, two ports, N (f)	R&S®ZNL6	1323.0012.06
Vector network analyzer, 5 kHz to 14 GHz, two ports, N (f)	R&S®ZNL14	1323.0012.14
Vector network analyzer, 5 kHz to 20 GHz, two ports, 3.5 mm (m)	R&S®ZNL20	1323.0012.20
Hardware options		
Spectrum analyzer function for R&S®ZNL3	R&S®ZNL3-B1	1323.1802.02
Spectrum analyzer function for R&S®ZNL4	R&S®ZNL4-B1	1303.8099.02
Spectrum analyzer function for R&S®ZNL6	R&S®ZNL6-B1	1323.2067.02
Extended power range for R&S®ZNL3	R&S®ZNL3-B22	1323.1860.02
Extended power range for R&S®ZNL4	R&S®ZNL4-B22	1303.8118.02
Extended power range for R&S®ZNL6	R&S®ZNL6-B22	1323.2021.02
Extended power range for R&S®ZNL14	R&S®ZNL14-B22	1303.8153.02
Extended power range for R&S®ZNL20	R&S®ZNL20-B22	1303.9089.02
Receiver step attenuator for R&S®ZNL3, port 1	R&S®ZNL3-B31	1323.1848.02
Receiver step attenuator for R&S®ZNL3, port 2	R&S®ZNL3-B32	1323.1854.02
Receiver step attenuator for R&S®ZNL4, port 1	R&S®ZNL4-B31	1303.8124.02
Receiver step attenuator for R&S®ZNL4, port 2	R&S®ZNL4-B32	1303.8130.02
Receiver step attenuator for R&S®ZNL6, port 1	R&S®ZNL6-B31	1323.2038.02
Receiver step attenuator for R&S®ZNL6, port 2	R&S®ZNL6-B32	1323.2044.02
Receiver step attenuator for R&S®ZNL14, port 1	R&S®ZNL14-B31	1303.8160.02
Receiver step attenuator for R&S®ZNL14, port 2	R&S®ZNL14-B32	1303.8176.02
Receiver step attenuator for R&S®ZNL20, port 1	R&S®ZNL20-B31	1303.9095.02
Receiver step attenuator for R&S®ZNL20, port 2	R&S®ZNL20-B32	1303.9108.02
Additional removable PC board with SSD	R&S®ZNL-B19	1323.2938.02
OCXO accurate reference frequency	R&S®FPL1-B4	1323.1902.02
Additional interfaces	R&S®FPL1-B5	1323.1883.02
GPIB interface	R&S®FPL1-B10	1323.1890.02
DC power supply (12 V/24 V)	R&S®FPL1-B30	1323.1877.02
Lithium-ion battery pack	R&S®FPL1-B31	1323.1725.02
40 MHz analysis bandwidth [1]	R&S®FPL1-B40	1323.1931.02
Software options		
Time domain analysis	R&S®ZNL-K2	1323.1819.02
Distance-to-fault measurements	R&S®ZNL-K3	1323.1825.02
Independent CW source [2]	R&S®ZNL-K14	1303.8182.02
AM/FM/φM analog modulation analysis [1]	R&S®FPL1-K7	1323.1731.02
Measurements with R&S®NRP power sensors [1]	R&S®FPL1-K9	1323.1754.02
Noise figure measurements [1], [3]	R&S®FPL1-K30	1323.1760.02
R&S®VSE signal explorer software plus selected options [4]		Please contact your local Rohde&Schwarz sales office.
Recommended extras		
Calibration kits		
Calibration kit, N (m), 50 Ω, 0 Hz to 18 GHz	R&S®ZN-Z170	1328.8163.02
Calibration kit, N (f), 50 Ω, 0 Hz to 18 GHz	R&S®ZN-Z170	1328.8163.03
Calibration kit, 3.5 mm (m), 50 Ω, 0 Hz to 26.5 GHz	R&S®ZN-Z135	1328.8157.02
Calibration kit, 3.5 mm (f), 50 Ω, 0 Hz to 26.5 GHz	R&S®ZN-Z135	1328.8157.03
Calibration units		
Calibration unit, 1 port, N (f), 2 MHz to 4 GHz	R&S®ZN-Z103	1321.1828.02
Calibration unit, 1 port, N (f), 1 MHz to 6 GHz	R&S®ZN-Z103	1321.1828.12
Calibration unit, 2 ports, N (f), 5 kHz to 6 GHz	R&S®ZN-Z150	1335.6710.72
Calibration unit, 2 ports, SMA (f), 100 kHz to 8.5 GHz	R&S®ZN-Z151	1317.9134.32
Calibration unit, 2 ports, 3.5 mm (f), 100 kHz to 26.5 GHz	R&S®ZN-Z53	1335.7046.32
Calibration unit, 2 ports, N (f), 100 kHz to 18 GHz	R&S®ZN-Z53	1335.7046.72
Cables		
N (m) to N (m), 50 Ω, length: 0.6 m/0.9 m, 0 Hz to 18 GHz	R&S®ZV-Z191	1306.4507.24/36
N (m) to 3.5 mm (m), 50 Ω, length: 0.6 m/0.9 m, 0 Hz to 18 GHz	R&S®ZV-Z192	1306.4513.24/36
3.5 mm (f) to 3.5 mm (m), 50 Ω, length: 0.6 m/0.9 m, 0 Hz to 26.5 GHz	R&S®ZV-Z193	1306.4520.24/36
Active probes		
USB-powered adapter N (m) to probe plug	R&S®RT-ZA9	1417.0909.02
Active probe, single-ended, 0 Hz to 3 GHz [1], [5]	R&S®RT-ZS30	1410.4309.02
Active probe, single-ended, 0 Hz to 6 GHz [1], [5]	R&S®RT-ZS60	1418.7307.02
Active probe, differential, 0 Hz to 3 GHz [1], [5]	R&S®RT-ZD30	1410.4609.02
Active probe, differential, 0 Hz to 4 GHz [1], [5]	R&S®RT-ZD40	1410.5205.02
Power rail active probe, 0 Hz to 4 GHz [1], [5]	R&S®RT-ZPR40	1800.5406.02
Accessories		
Broadband limiter, N (m to f), 50 Ω, 50 MHz to 6 GHz	R&S®ZN-B13	1303.7840.02
Smart noise source, 10 MHz to 26.5 GHz [1], [6]	R&S®FS-SNS26	1338.8008.26
Protective hard cover	R&S®FPL1-Z1	1323.1960.02
Transport bag, with transparent cover	R&S®FPL1-Z2	1323.1977.02
Carrying vest holster	R&S®FPL1-Z3	1323.1683.02
Spare battery pack	R&S®FPL1-Z4	1323.1677.02
Anti-glare film	R&S®FPL1-Z5	1323.1690.02
Rackmount kit	R&S®FPL1-Z6	1323.1954.02
For a list of the R&S®NRP power sensors supported by R&S®FPL1-K9, refer to the R&S®ZNL data sheet (PD 3607.1071.22).		

[1] Requires R&S®ZNL3-B1, R&S®ZNL4-B1 or R&S®ZNL6-B1 hardware option.
[2] Available for the R&S®ZNL3, R&S®ZNL4 and R&S®ZNL6. Requires R&S®ZNL3-B1, R&S®ZNL4-B1 or R&S®ZNL6-B1 hardware option.
[3] Requires R&S®FPL1-B5 hardware option for noise source control.
[4] For further information on the R&S®VSE vector signal explorer software, see PD 3607.1371.12 and www.rohde-schwarz.com/product/vse.
[5] Requires R&S®RT-ZA9 accessory.
[6] Requires R&S®FPL1-K30 noise figure and gain measurements software option.

Warranty		
Base unit		3 years
All other items [1]		1 year
Options		
Extended warranty, one year	R&S®WE1	Please contact your local Rohde&Schwarz sales office.
Extended warranty, two years	R&S®WE2	
Extended warranty with calibration coverage, one year	R&S®CW1	
Extended warranty with calibration coverage, two years	R&S®CW2	
Extended warranty with accredited calibration coverage, one year	R&S®AW1	
Extended warranty with accredited calibration coverage, two years	R&S®AW2	

[1] For options installed, the remaining base unit warranty applies if longer than 1 year. Exception: all batteries have a 1 year warranty.

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Testforce Canada
9450 Trans Canada Hwy.
St. Laurent, QC, H4S 1R7
Tel: +1 (888) 880-6804
Email: sales@testforce.com

Testforce USA
15020 Beltway Dr.
Addison, TX, 75001
Tel: +1 (888) 880-6804
Email: sales@us.testforce.com

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