

R&S® ZNLE VECTOR NETWORK ANALYZER

Measurements as easy as ABC



Product Brochure
Version 04.00

ROHDE & SCHWARZ

Make ideas real



AT A GLANCE

The R&S®ZNL E makes vector network analyzer measurements as easy as ABC: easy to configure, easy to calibrate, easy to measure. The renowned high-quality design, an innovative user interface and its compact size make the R&S®ZNL E ideal for basic VNA applications.

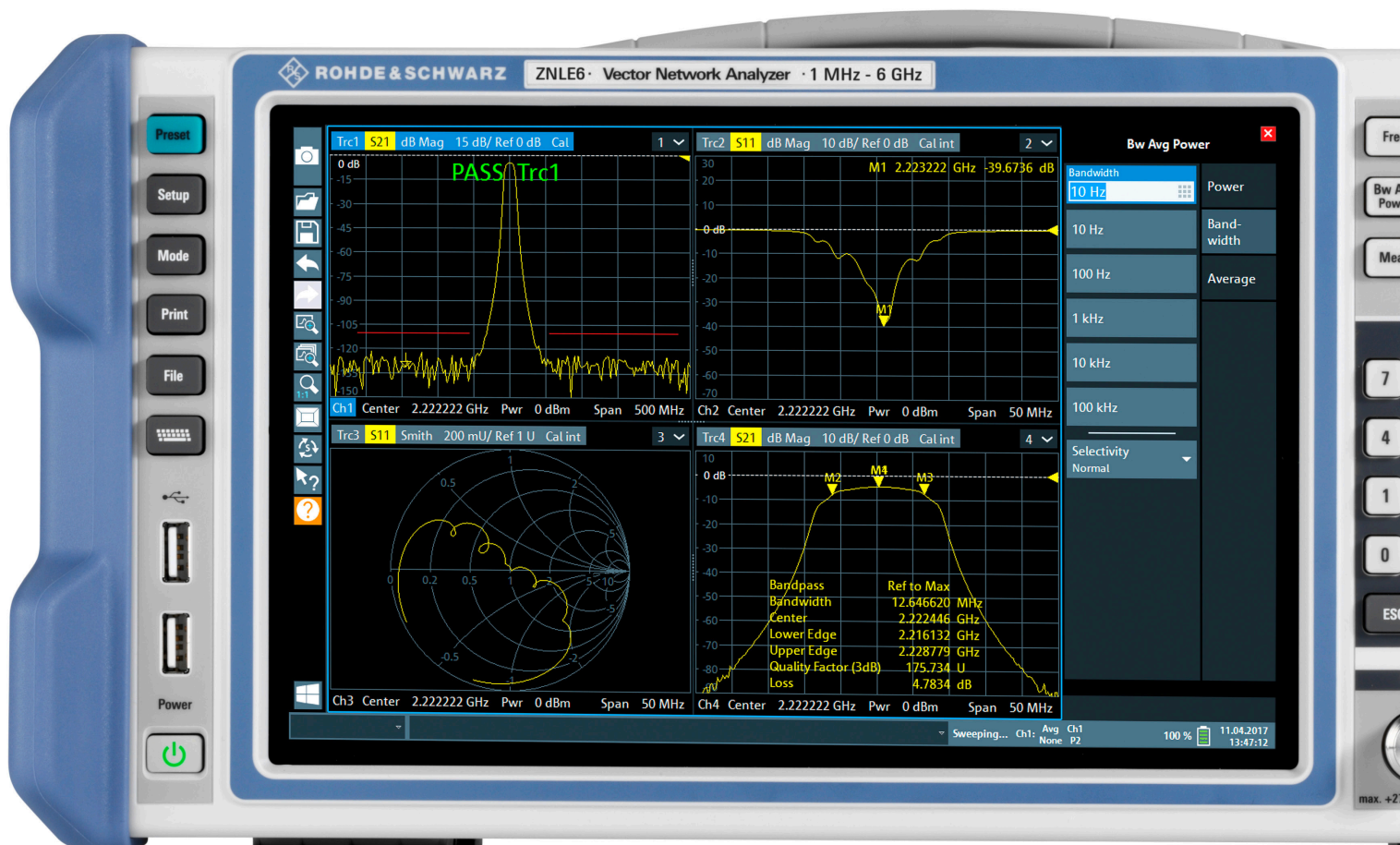
The R&S®ZNL E is a two-port vector network analyzer that can be used for bidirectional measurements of S-parameters S_{11} , S_{21} , S_{12} and S_{22} on passive components.

Configuring the R&S®ZNL E requires only three decisions:

- ▶ Choose the frequency range
- ▶ Decide whether you need a GPIB interface
- ▶ Decide whether you need to perform time domain analysis or distance-to-fault measurements

The analyzer is available with a frequency range of 100 kHz to 3 GHz (R&S®ZNL E3 with R&S®ZNL E-B100 option), 100 kHz to 4.5 GHz (R&S®ZNL E4 with R&S®ZNL E-B100 option) or 100 kHz to 6 GHz (R&S®ZNL E6 with R&S®ZNL E-B100 option). The optional GPIB interface lets you connect a controller to remotely control the R&S®ZNL E.

As a standalone instrument, the R&S®ZNL E does not require an external PC to configure the setup. You can start measuring immediately after you switch on the instrument. The time domain analysis option (R&S®ZNL E-K2) and distance-to-fault measurements option (R&S®ZNL E-K3) enhance the R&S®ZNL E with essential features for general purpose testing.



BENEFITS

An economical instrument with solid performance

- ▶ Compact vector network analyzer
- ▶ Low trace noise for high accuracy
- ▶ High measurement speed
- ▶ [page 4](#)

User interface with multitouch screen

- ▶ Wide 10.1" WXGA multitouch screen
- ▶ Clearly structured user interface
- ▶ Undo/redo softkey for user-friendly operation
- ▶ Fully integrated context-sensitive help menu
- ▶ [page 5](#)

Standard instrument for use in a lab

- ▶ Calibration units for quick calibration
- ▶ De/embedding functionality and fixture compensation
- ▶ Time domain analysis and distance-to-fault (DTF) measurements
- ▶ Remote controllable with LAN and GPIB option
- ▶ [page 8](#)

Key features

- ▶ Frequency range from 100 kHz to 3 GHz, 100 kHz to 4.5 GHz or 100 kHz to 6 GHz
- ▶ Two-port vector network analyzer with a full S-parameter test set for bidirectional measurements on passive components
- ▶ Wide dynamic range of up to typ. 120 dB
- ▶ Measurement bandwidths from 1 Hz to 500 kHz
- ▶ Fast measurements, i.e. 8.7 ms for 401 points (100 kHz IFBW, 200 MHz span, correction off)
- ▶ Compact size (depth of 24 cm) and low weight (6 kg)
- ▶ Standalone instrument with 10.1" WXGA touchscreen
- ▶ Windows 10 operating system



AN ECONOMICAL INSTRUMENT WITH SOLID PERFORMANCE

The R&S®ZNLE is a plug-and-play vector network analyzer containing everything needed to start a measurement. With a fully integrated powerful PC platform running the Windows 10 operating system, the R&S®ZNLE is a complete standalone analyzer. The solid-state hard disk delivers fast boot time and the reliability required for demanding applications. Configure measurements right on the R&S®ZNLE and save valuable bench space since there is no need for a mouse, keyboard and external monitor. Simply plug in the instrument and start measuring.

Compact vector network analyzer

Vector network analyzers such as the R&S®ZNLE characterize electronic networks by measuring the magnitude and phase of S-parameters. Featuring an instrument depth of less than 24 cm and weighing only around 6 kg, the R&S®ZNLE is the most compact instrument in its class.

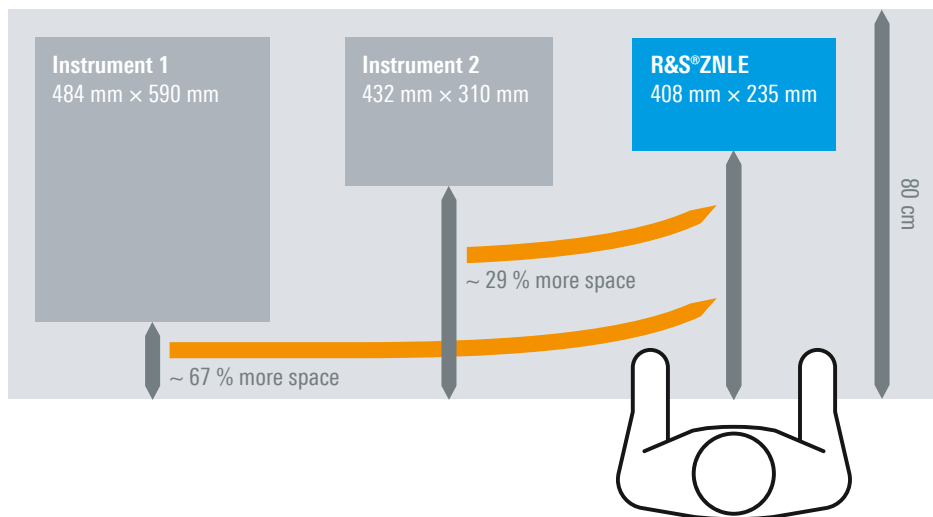
Low trace noise for high accuracy

The R&S®ZNLE offers a low trace noise of typ. 0.001 dB (at 10 kHz measurement bandwidth). This allows highly accurate, stable and repeatable measurements even at wider IF bandwidths. Using larger measurement bandwidths, the R&S®ZNLE can perform faster measurements while still delivering excellent trace stability.

High measurement speed

The R&S®ZNLE is up to 10 times faster than similar instruments. With a measurement speed of 9.6 ms for 201 points (100 kHz IFBW, 200 MHz span, full two-port calibration) and fast LAN or IEC/IEEE data transfer, the R&S®ZNLE meets the speed requirements encountered in production and in everyday testing.

Comparison of footprint of different VNAs



USER INTERFACE WITH MULTITOUCH SCREEN

Wide 10.1" WXGA multitouch screen

The wide 10.1" multitouch screen is perfect for displaying setups and arranging measurements as required by the current application. Simply drag&drop to adapt the layout to your needs. The multitouch capability of the R&S®ZNLE lets you do more than just move the traces around with the touch of a finger. You can also use gesturing to zoom in and out.

Clearly structured user interface

The R&S®ZNLE features a user interface that is simple and clearly structured. Configure measurements in just a few steps. Drag and drop traces, channels and diagrams to achieve your ideal layout. Save, reload and switch between different setups with just a few screen taps.

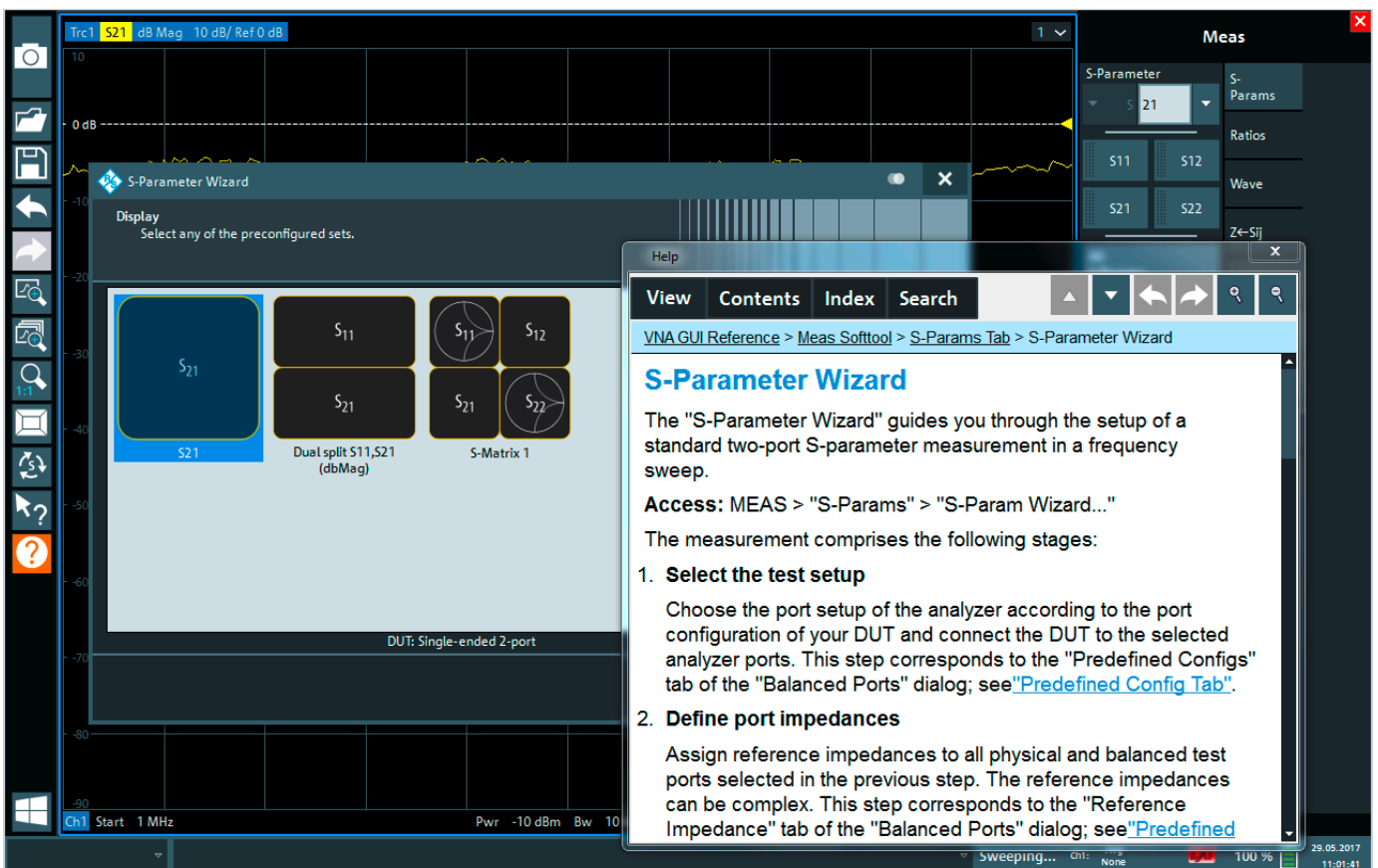
Undo/redo softkey for user-friendly operation

Use the undo and redo softkeys to cancel and restore measurement configurations. Check the influence of a measurement setting and revise it quickly, without having to reconfigure the entire measurement. To restart a setup from scratch, just press the Preset key.

Fully integrated context-sensitive help menu

Thanks to the fully integrated help menu, help is just a click away. In every dialog window, the R&S®ZNLE has a help button that takes you directly to the relevant section of the user manual. The help softkey is located on the left side of the display and can be accessed at any time. An integrated search function lets you quickly find different topics and functions.

Overview of the R&S®ZNLE user interface. Here the wizard for easy configuration of S-parameters and the context-sensitive help menu are open.



FRONT PANEL OVERVIEW

10.1" high-resolution display

- ▶ 1280 × 800 pixel

Toolbar

- ▶ With standard application functions such as print, save/open file, undo, redo, help

System keys

- ▶ For setup, presets, settings, etc.

Two USB 2.0 ports

- ▶ For storage media
- ▶ For connecting accessories

Status bar



Softkey bar

- ▶ Quick access to key tools
- ▶ Hardware settings at a glance

Numerical keypad

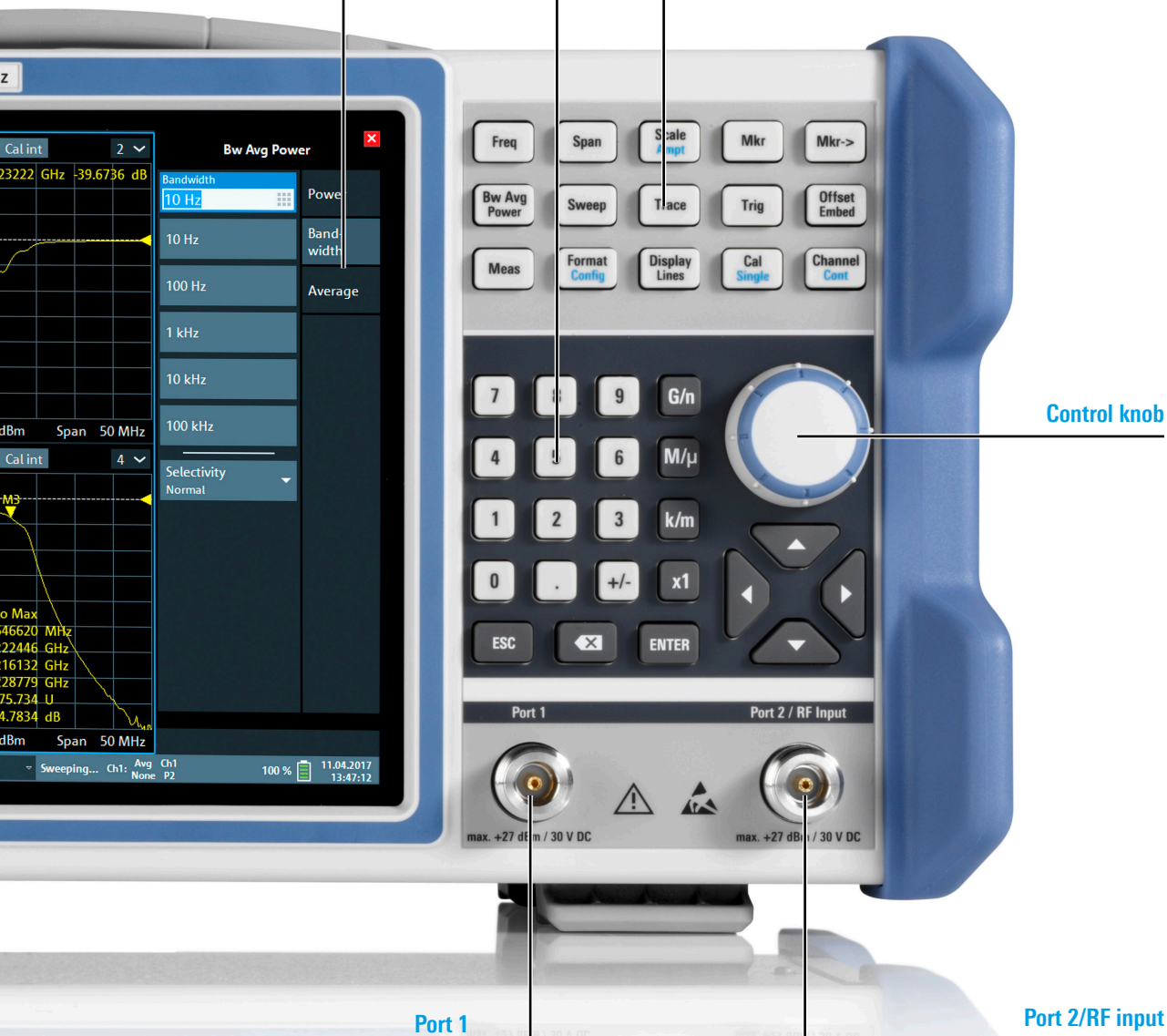
- ▶ With unit keys for frequency and level

Function keys

Control knob

Port 1

Port 2/RF input



STANDARD INSTRUMENT FOR USE IN A LAB

In development, it is often necessary to measure passive components quickly. The R&S®ZNLE not only delivers solid RF performance, it also offers features that make your life easier.

Calibration units for quick calibration

The R&S®ZNLE calibration wizard guides you through the calibration process. Manual calibration kits and automatic calibration units are supported.

The analyzer's automatic 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®ZNLE. It only takes a few steps to calibrate the setup. This is especially an advantage in production environments, helping you save time and maximize throughput.

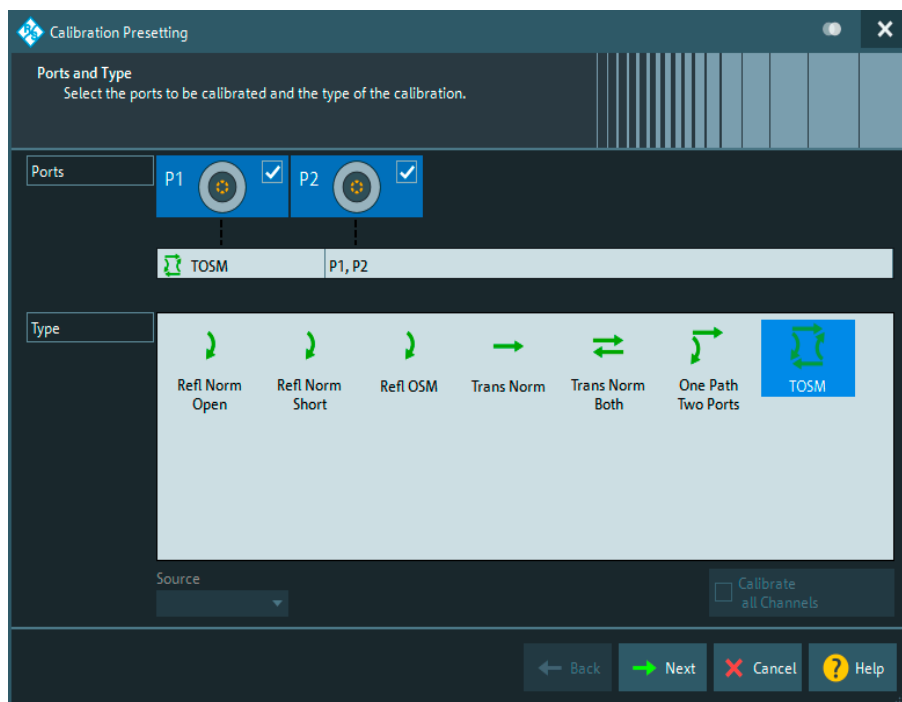
The following calibration procedures are available:

- ▶ Reflection normalization open or short
- ▶ Reflection OSM (OSL)
- ▶ Enhanced reflection normalization OM or SM
- ▶ Transmission normalization (response calibration)
- ▶ Transmission normalization both (response calibration)
- ▶ One path two ports
- ▶ TOSM (SOLT)
- ▶ UOSM (only with calibration unit)

De/embedding functionality and fixture compensation

It is often necessary to characterize single components that are specified together with a matching network. The R&S®ZNLE can embed the DUT into virtual matching networks to achieve realistic conditions when simulating the DUT in its operational environment. The R&S®ZNLE offers a choice of predefined matching network topologies. It is also possible to read *.s2p files into the R&S®ZNLE and use them for deembedding/embedding.

The fixture compensation feature corrects the measurement results by compensating for the effect of a test fixture.



The calibration wizard provides an overview of the possible calibration methods for easy selection.

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

Some measurements require the characterization of a specific component of a composite DUT (for example an antenna of an IoT device). With the R&S®ZNL-K2 option, the R&S®ZNL lets you analyze the DUT in the time domain and use the time gating function to isolate the required circuit section.

The distance-to-fault measurements option (R&S®ZNL-K3) lets you detect cable discontinuities, which is important for example for base station antenna installation. You can select from a range of common cable types with pre-defined velocity factor and frequency-dependent attenuation, or create your own cable profiles. The R&S®ZNL-K2 and R&S®ZNL-K3 options use internal DC extrapolation. The optional frequency extension down to 100 kHz (R&S®ZNL-B100) is helpful as it provides improved accuracy.

Remote controllable with LAN and GPIB option

The R&S®ZNL can be remote controlled via the integrated LAN interface. The optional GPIB interface lets you connect a controller to remotely control 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, the R&S®ZNL has virtually negligible data transfer time.

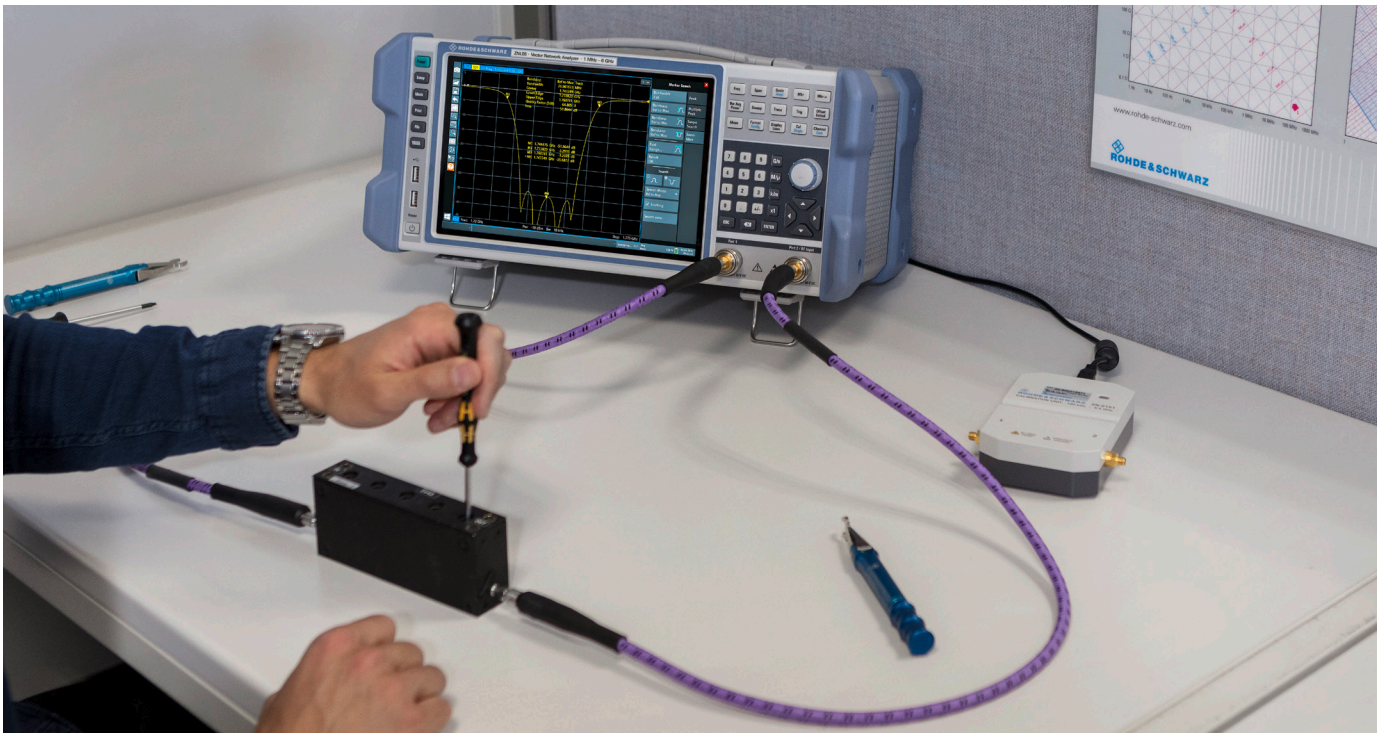


The fixture compensation menu offers a good overview of all available compensation methods.

SPECIFICATIONS IN BRIEF

| Specifications in brief | | |
|------------------------------|---|---|
| Frequency range | R&S®ZNLE3 | 1 MHz to 3 GHz |
| | R&S®ZNLE4 | 1 MHz to 4.5 GHz |
| | R&S®ZNLE6 | 1 MHz to 6 GHz |
| | R&S®ZNLE3 with R&S®ZNLE-B100 option | 100 kHz to 3 GHz |
| | R&S®ZNLE4 with R&S®ZNLE-B100 option | 100 kHz to 4.5 GHz |
| Measurement time | R&S®ZNLE6 with R&S®ZNLE-B100 option | 100 kHz to 6 GHz |
| | 201 points, 100 kHz IFBW, 200 MHz span, full two-port calibration | 9.6 ms |
| Data transfer time | IEC/IEEE (201 points) | typ. 3.0 ms |
| | HiSLIP with 1 Gbit/s LAN | typ. 2.5 ms |
| Dynamic range | 10 Hz measurement bandwidth | up to typ. 120 dB |
| Output power | | up to typ. +2 dBm |
| Measurement bandwidths | | 1 Hz to 500 kHz (in steps of 1/1.5/2/3/5/7) |
| Frequency resolution | | 1 Hz |
| Measurement points per trace | | 1 to 5001 |
| Operating system | | Windows 10 |

The R&S®ZNLE saves a lot of space on the workbench for measurements setups, e.g. to tune filters.



ORDERING INFORMATION

| Designation | Type | Order No. |
|--|---------------|-----------------|
| Base unit | | |
| Vector network analyzer, 1 MHz to 3 GHz, two ports, N(f) | R&S®ZNLE3 | 1323.0012.53 |
| Vector network analyzer, 1 MHz to 4.5 GHz, two ports, N(f) | R&S®ZNLE4 | 1323.0012.54 |
| Vector network analyzer, 1 MHz to 6 GHz, two ports, N(f) | R&S®ZNLE6 | 1323.0012.56 |
| Options | | |
| Extended frequency range, lower end, 1 MHz to 100 kHz | R&S®ZNLE-B100 | 1303.9272.02 |
| GPIO interface | R&S®FPL1-B10 | 1323.1890.02 |
| Time domain analysis | R&S®ZNL-K2 | 1323.1819.02 |
| Distance-to-fault measurements | R&S®ZNL-K3 | 1323.1825.02 |
| 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, 3.5mm (m), 50 Ω, 0 Hz to 26.5 GHz | R&S®ZN-Z135 | 1328.8157.02 |
| Calibration kit, 3.5mm (f), 50 Ω, 0 Hz to 26.5 GHz | R&S®ZN-Z135 | 1328.8157.03 |
| Calibration units | | |
| 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, 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 |
| Cables | | |
| N (m)/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)/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)/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 |
| Accessories | | |
| Protective hard cover | R&S®FPL1-Z1 | 1323.1960.02 |
| Transport bag, transparent cover | R&S®FPL1-Z2 | 1323.1977.02 |
| Carrying vest holster | R&S®FPL1-Z3 | 1323.1683.02 |
| Anti-glare film | R&S®FPL1-Z5 | 1323.1690.02 |
| Rackmount kit | R&S®FPL1-Z6 | 1323.1954.02 |

| Warranty | | |
|---|---------|---|
| Base unit | | 3 years |
| All other items ¹⁾ | | 1 year |
| Options | | |
| Extended warranty, one year | R&S®WE1 | |
| Extended warranty, two years | R&S®WE2 | |
| Extended warranty with calibration coverage, one year | R&S®CW1 | Please contact your local Rohde & Schwarz sales office. |
| 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 that are installed, the remaining base unit warranty applies if longer than 1 year. Exception: all batteries have a 1 year warranty.

Service that adds value

- ▶ Worldwide
- ▶ Local und personalized
- ▶ Customized and flexible
- ▶ Uncompromising quality
- ▶ Long-term dependability

Rohde & Schwarz

The Rohde & Schwarz electronics group offers innovative solutions in the following business fields: test and measurement, broadcast and media, secure communications, cybersecurity, monitoring and network testing. Founded more than 80 years ago, the independent company which is headquartered in Munich, Germany, has an extensive sales and service network with locations in more than 70 countries.

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Sustainable product design

- ▶ Environmental compatibility and eco-footprint
- ▶ Energy efficiency and low emissions
- ▶ Longevity and optimized total cost of ownership

Certified Quality Management
ISO 9001

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