R&S®ZNC Vector Network Analyzer
Solid performance on a future-oriented platform
R&S®ZNC Vector Network Analyzer

At a glance

High reliability, outstanding ease of operation, maximum precision and a wide dynamic range – this is what customers expect from a network analyzer. Using state-of-the-art technology and a user-friendly operating concept, Rohde & Schwarz has implemented all these features in its R&S®ZNC vector network analyzer.

Operating in a range from 9 kHz to 3 GHz, the network analyzer is targeted at applications in the mobile radio and electronic goods industries. The R&S®ZNC is the right choice when it comes to developing, producing and servicing RF components such as filters and cables.

The R&S®ZNC has a bidirectional test set for measuring all four S-parameters of active and passive DUTs. Plus, it offers calibration methods suitable for a wide range of T&M environments in development and production. The analyzer features excellent temperature and long-term stability, which ensures reliable measurements over several days without having to recalibrate the unit.

This short-depth, compact two-port analyzer leaves plenty of space on the workbench for the measurement application. It features low operating noise thanks to low power consumption and a sophisticated cooling concept. The low power consumption also reduces operating costs and protects the environment.

Key facts

- Frequency range from 9 kHz to 3 GHz
- Dynamic range of up to 130 dB
- Short sweep times of 11 ms for 401 points
- High temperature stability of typ. 0.01 dB/°C
- Wide power sweep range from –50 dBm to +13 dBm
- IF bandwidths from 1 Hz to 300 kHz
- Manual and automatic calibration
- Low trace noise of 0.004 dB RMS at 10 kHz IF bandwidth
- Large, high-resolution 12.1” screen
- Touchscreen user interface

Operating in a range from 9 kHz to 3 GHz, the network analyzer is targeted at applications in the mobile radio and electronic goods industries.
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Benefits and key features

Fast, precise and reliable – for high efficiency in development and production
- Short measurement times
- 20 sweeps/s with 100 dB dynamic range for straightforward filter adjustment
- Segmented sweep for high speed and accuracy
- Fast switching between instrument setups
- Extensive analysis functions for convenient trace analysis
- Time-domain analysis for distance-to-fault (DTF) measurements and filter adjustment
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Network analysis made easy
- Flat and clear menu structures for efficient operation
- Optimal display configuration for each measurement task
▷ page 6

Simple calibration – manual or automatic
- The right calibration method for every test application
- TSM (Through, Short, Match) – full calibration in only five steps
- Simple and error-free – automatic calibration in 30 seconds
- High temperature stability for long calibration intervals
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A worthwhile investment
- Ready for the future
- Upgrading test systems without rewriting system software
- An analyzer that speaks the user’s language
▷ page 10

Block diagram of the R&S®ZNC

Meas. receiver
Ref. receiver
Port 2
Meas. receiver
Ref. receiver
Port 1
Fast, precise and reliable – for high efficiency in development and production

Short measurement times
The R&S®ZNC features short measurement times, a result of fast synthesizer settling times, high-speed data processing up to the display, and fast LAN or IEC/IEEE bus data transfer to the controller. The analyzer’s maximum IF bandwidth of 300 kHz, together with its fast synthesizers, yields a sweep time as short as 11 ms for 401 points.

20 sweeps/s with 100 dB dynamic range for straightforward filter adjustment
The R&S®ZNC offers up to 130 dB dynamic range at 10 Hz IF bandwidth. At 10 kHz IF bandwidth, it provides typically 100 dB dynamic range, which enables the analyzer to perform more than 20 sweeps of 201 points per second. As a result, even high-blocking filters can easily be adjusted.

Segmented sweep for high speed and accuracy
When testing high-blocking DUTs such as repeater duplex filters, high IF bandwidths are required in the passband to provide short measurement times. In the stopband, on the other hand, such tests require high output powers and narrow IF bandwidths to provide the required dynamic range.

Filter measurement at 10 Hz IF bandwidth.

Filter measurement using segmented sweep.
The R&S®ZNC’s segmented sweep function divides the frequency axis into segments. 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.

**Fast switching between instrument setups**

To carry out complex measurements with different instrument setups, R&S®ZNC users do not need to load the setups from the hard disk each time. Once called, the setups for the required measurements, including calculated data such as calibration values, remain available in RAM. This reduces switching time, especially for measurements involving a large number of points. Switching between setups in remote operation is virtually instantaneous. Manually, all the user has to do is touch the screen to activate the setup needed for a desired DUT or measurement.

**Extensive analysis functions for convenient trace analysis**

The R&S®ZNC’s wide range of analysis and display functions help the user evaluate important parameters at a glance.

**Time-domain analysis for distance-to-fault (DTF) measurements and filter adjustment**

The R&S®ZNC offers powerful time-domain analysis to measure components such as cables or filters.

The R&S®ZNC’s gating function makes it easy to locate cable faults and analyze them in detail. Using prediction, the R&S®ZNC’s frequency range can be virtually extended by a factor of up to 10. This yields resolution substantially higher than would be expected from the upper frequency limit of 3 GHz. For many applications, this eliminates the need for a higher-frequency – and more expensive – network analyzer.
**Network analysis made easy**

The R&S®ZNC vector network analyzer turns into reality what many users desire: configuration, measurement and analysis that are truly intuitive.

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**Flat and clear menu structures for efficient operation**

The R&S®ZNC groups together logically related analyzer control functions at a single operational level, doing away with submenus and multilevel, nested menu structures.

- The R&S®ZNC features a soft panel that immediately shows all control elements that may be needed for a measurement and effectively helps users perform measurement tasks.
- Via the soft panel, users can access all instrument functions in a maximum of three operating steps.
- Pop-up menus allow many test parameters to be edited right where they are displayed.
- Wizards guide the user through the steps of an operating sequence, for example when calibrating the network analyzer, thereby reducing operator errors to a minimum.

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**Clearly structured user interface**

- Large color touchscreen (12.1")
- Clearly arranged display of many traces
- Preloaded setups
  - Switchover between instrument setups by clicking a tab
- More than 100 channels and traces
  - Display of all measured parameters
- Pop-up menus
  - Fast access to desired function
Optimal display configuration for each measurement task

The R&S®ZNC features a brilliant 12.1" WXGA color touch-screen. The user can set up the display as required by arranging diagrams, traces and channels in any desired combination. Traces can simply be dragged and dropped between diagrams, either with a finger or the mouse. The names of traces, channels and markers can be edited and replaced by user-specific names to make them easier to identify and to provide consistent result documentation.

With the R&S®ZNC, several instrument setups are available simultaneously. The user simply touches or clicks a tab to put the desired setup and diagrams in the foreground and start the associated measurements.

This convenient approach makes it possible to handle different measurement tasks simultaneously without overloading the display with diagrams that are not currently needed. The user can add further measurements for a given component without modifying the original measurement. This function allows the user to very quickly switch between setups, an essential prerequisite for high throughput in production.
Simple calibration –
manual or
automatic

The right calibration method for every test application
The R&S®ZNC supports all common calibration methods
for coaxial DUTs as well as calibration methods for mea-
urements on DUTs in test fixtures or on printed boards.
Graphical wizards guide the user step by step through
the calibration.

- TOSM calibration (Through, Open, Short, Match)
- TRL/LRL calibration (Through, Reflect, Line/Line, Reflect, Line) for printed-bord-based test structures
  and on-wafer applications
- TRM calibration (Through, Reflect, Match) for applications using test fixtures
- UOSM calibration (Unknown Through, Open, Short,
  Match) for DUTs equipped with different types of
  input and output connectors and for calibration with
  an unknown through standard. Compared with the
  conventional adapter removal calibration method,
  this method reduces the number of calibration steps
  from 14 to 7. This saves time and reduces the risk of
  calibration errors

TSM (Through, Short, Match) – full calibration in
only five steps
A network analyzer’s accuracy after calibration essentially
depends on the quality of the calibration standards used.
The quality of the standards, in turn, depends mainly on
how accurately the standards can be described by models.
Describing the open standard using a model may be prob-
lematic; Rohde & Schwarz therefore created the new TSM
calibration method for the R&S®ZNC. The new method
requires only a through, a short and a match standard;
an open standard is not needed. TSM provides accuracy
equivalent to that of TOSM, and reduces the number of
 calibration steps from seven to five.
Simple and error-free – automatic calibration in 30 seconds
Rohde & Schwarz offers automatic calibration units, which are immediately ready for operation and calibrate an R&S®ZNC in less than 30 seconds, covering 201 points. Users can connect adapters to the calibration unit to match different connector types used on the DUT. They can re-characterize the calibration unit, together with the adapters, and store the resulting data to the unit’s internal memory.

High temperature stability for long calibration intervals
The R&S®ZNC’s test set and receivers feature excellent temperature and long-term stability. The analyzer measures S-parameters with very low magnitude and phase drift of typically less than 0.01 dB/°C and 0.15°/°C. A calibrated R&S®ZNC allows precise measurements over several days without recalibration.

Typical effective system data of the R&S®ZNC

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<tr>
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<th>9 kHz to 100 kHz</th>
<th>100 kHz to 3 GHz</th>
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<tr>
<td>Directivity</td>
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<td>Source match</td>
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<td>Transmission tracking</td>
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R&S®ZV-Z270 calibration kit.

R&S®ZV-Z132 calibration kit.

R&S®ZV-Z121 calibration kit.
Ready for the future

Industrial network analyzers have a useful life of ten years or more, depending on the application. Measurement tasks often change during this time, and there is an obvious need to increase measurement speed.

The R&S®ZNC has a modular design, i.e. subassemblies such as the GPIB interface, the power supply, the controller and the hard disk are inserted into slots on the rear. All test applications can be activated with a key code.

The R&S®ZNC can be quickly upgraded for new measurement tasks. Keeping the R&S®ZNC up to date, such as by adding a more powerful, next-generation controller or new functionality, involves only minimum downtime and service cost.

Upgrading test systems without rewriting system software

Network analyzers are the core of many test systems, for example in RF component production. Using latest generation Rohde & Schwarz network analyzers, system performance can be significantly enhanced.

The R&S®ZNC supports the remote control command sets of practically all other Rohde & Schwarz network analyzers as well as those of other manufacturers’ instruments. Replacing an obsolete analyzer with an R&S®ZNC therefore poses no problems. In most cases it is sufficient to verify the R&S®ZNC’s response during a measurement sequence; there is no need for costly modifications in the system software.

An analyzer that speaks the user’s language

Many tasks are easiest solved in one’s native language; the R&S®ZNC therefore comes with a multilingual user interface. Currently available languages include English, French, Russian, Chinese and Japanese.
### Ordering information

<table>
<thead>
<tr>
<th>Designation</th>
<th>Type</th>
<th>Frequency range</th>
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<td><strong>Base unit</strong></td>
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<tr>
<td>Vector Network Analyzer, Two Ports, 3 GHz, N</td>
<td>R&amp;S®ZNC3</td>
<td>9 kHz to 3 GHz</td>
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<td>Extended Power Range for R&amp;S®ZNC3</td>
<td>R&amp;S®ZNC3-B22</td>
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<td>GPIB Interface</td>
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<td>Time Domain (TDR)</td>
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**Service options**

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For data sheet, see PD 5214.5610.22 and www.rohde-schwarz.com

Your local Rohde & Schwarz expert will help you determine the optimum solution for your requirements.

To find your nearest Rohde & Schwarz representative, visit www.sales.rohde-schwarz.com
About Rohde & Schwarz
Rohde & Schwarz is an independent group of companies specializing in electronics. It is a leading supplier of solutions in the fields of test and measurement, broadcasting, radiomonitoring and radiolocation, as well as secure communications. Established more than 75 years ago, Rohde & Schwarz has a global presence and a dedicated service network in over 70 countries. Company headquarters are in Munich, Germany.

Environmental commitment
❙ Energy-efficient products
❙ Continuous improvement in environmental sustainability
❙ ISO 14001-certified environmental management system

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