

# 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.

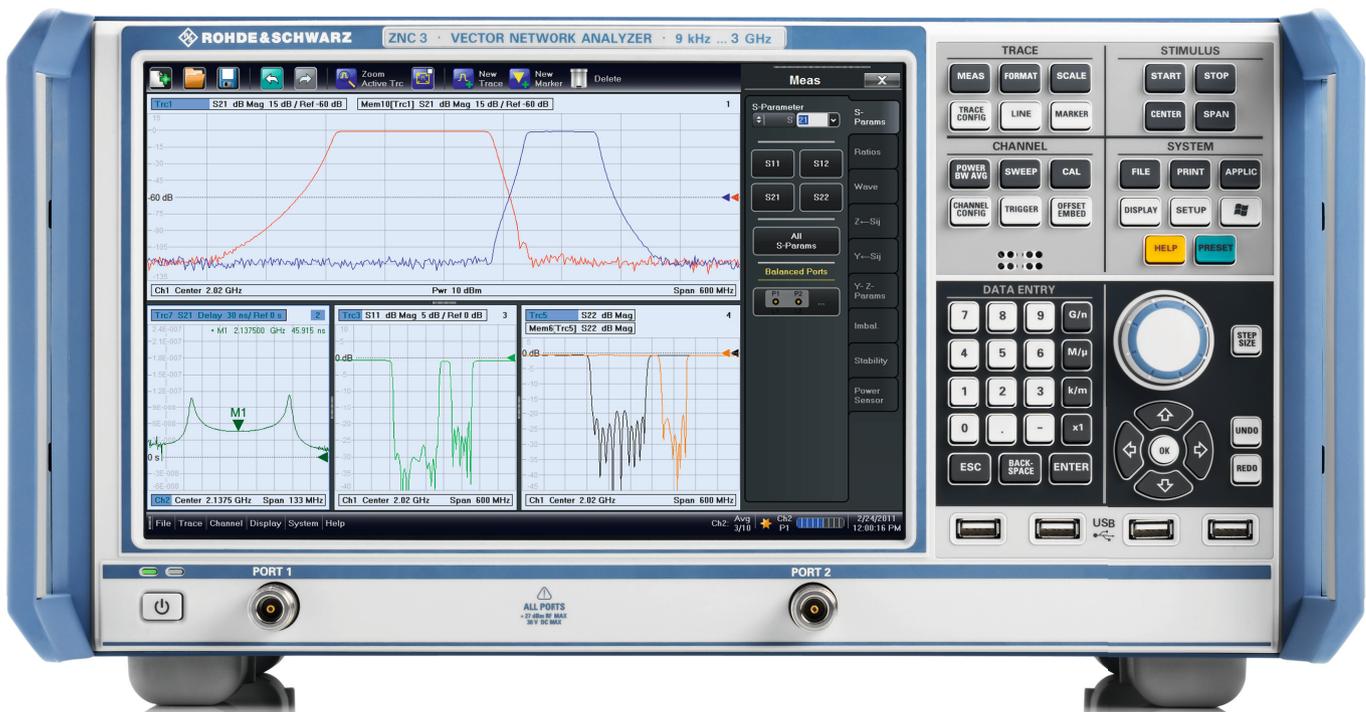
Operating in a range from 9 kHz to 3 GHz, the network analyzer is targeted at applications in the mobile radio and electronic goods industries. The R&S®ZNC is the right choice when it comes to developing, producing and servicing RF components such as filters and cables.

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



# R&S®ZNC Vector Network Analyzer

## 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

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### Simple calibration – manual or automatic

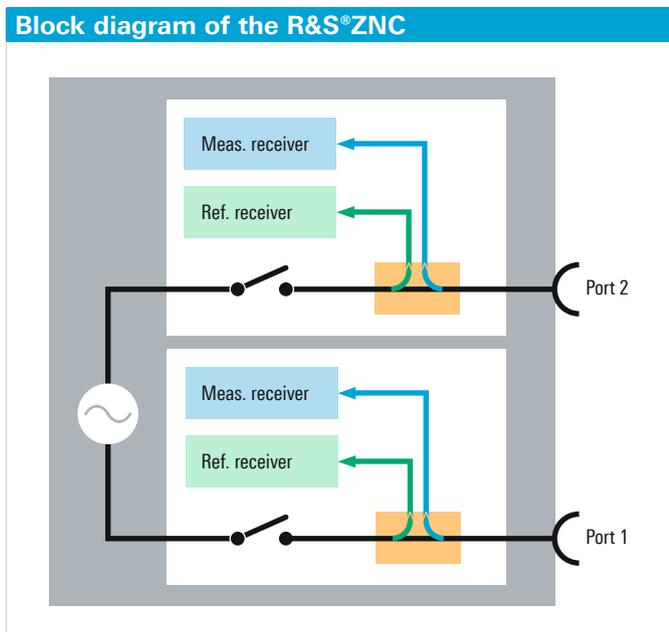
- ▮ The right calibration method for every test application
- ▮ TSM (Through, Short, Match) – full calibration in only five steps
- ▮ Simple and error-free – automatic calibration in 30 seconds
- ▮ High temperature stability for long calibration intervals

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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

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# Fast, precise and reliable – for high efficiency in development and production

## Short measurement times

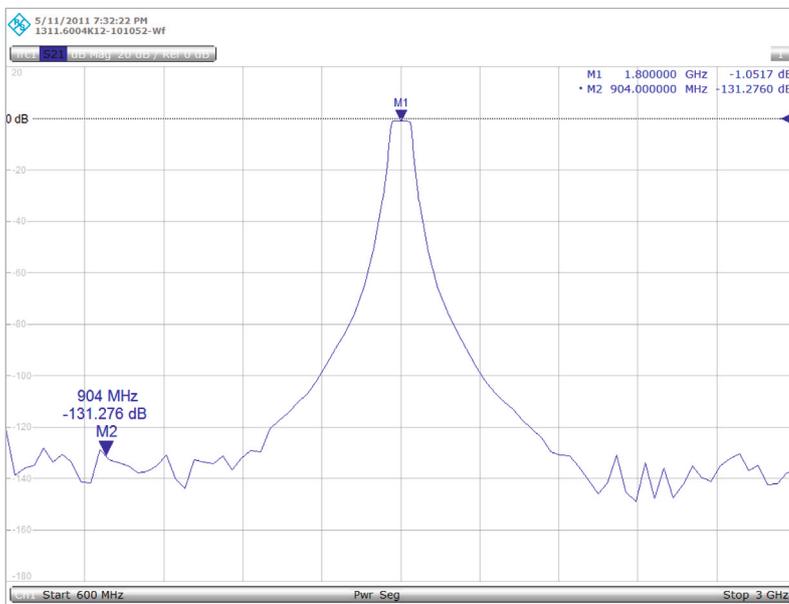
The R&S®ZNC features short measurement times, a result of fast synthesizer settling times, high-speed data processing up to the display, and fast LAN or IEC/IEEE bus data transfer to the controller. The analyzer's maximum IF bandwidth of 300 kHz, together with its fast synthesizers, yields a sweep time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

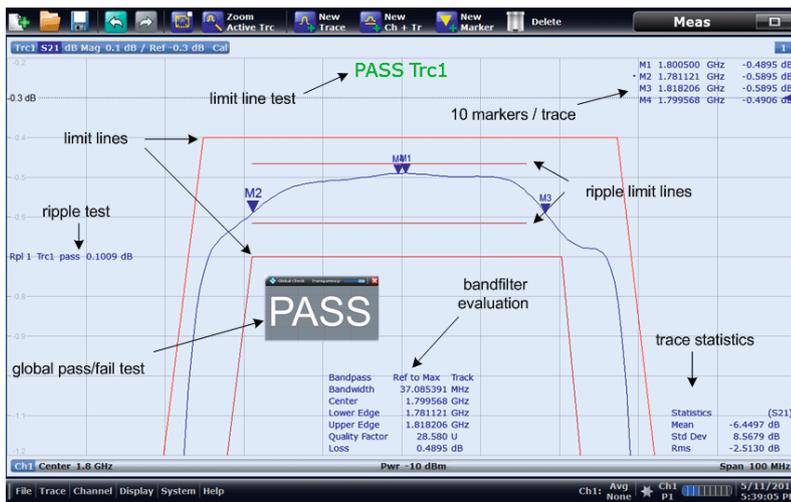
### Extensive analysis functions for convenient trace analysis

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

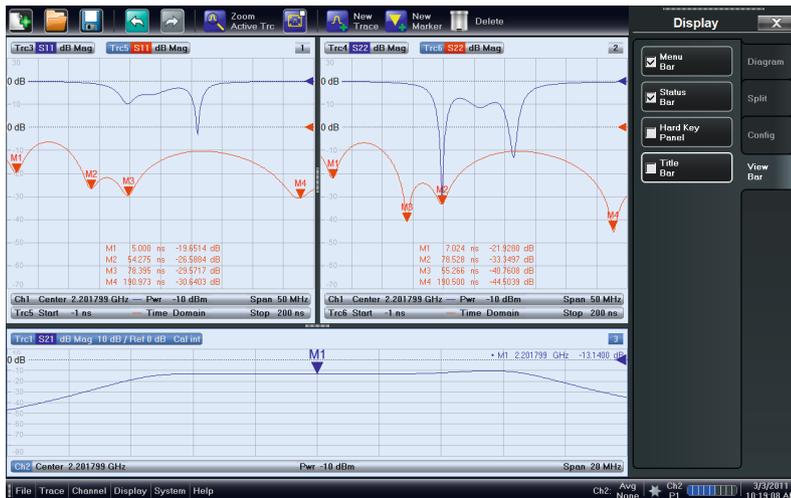
### Time-domain analysis for distance-to-fault (DTF) measurements and filter adjustment

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.



Wide range of analysis functions, e.g. for filter adjustment.



Filter adjustment using time-domain analysis.

# Network analysis made easy

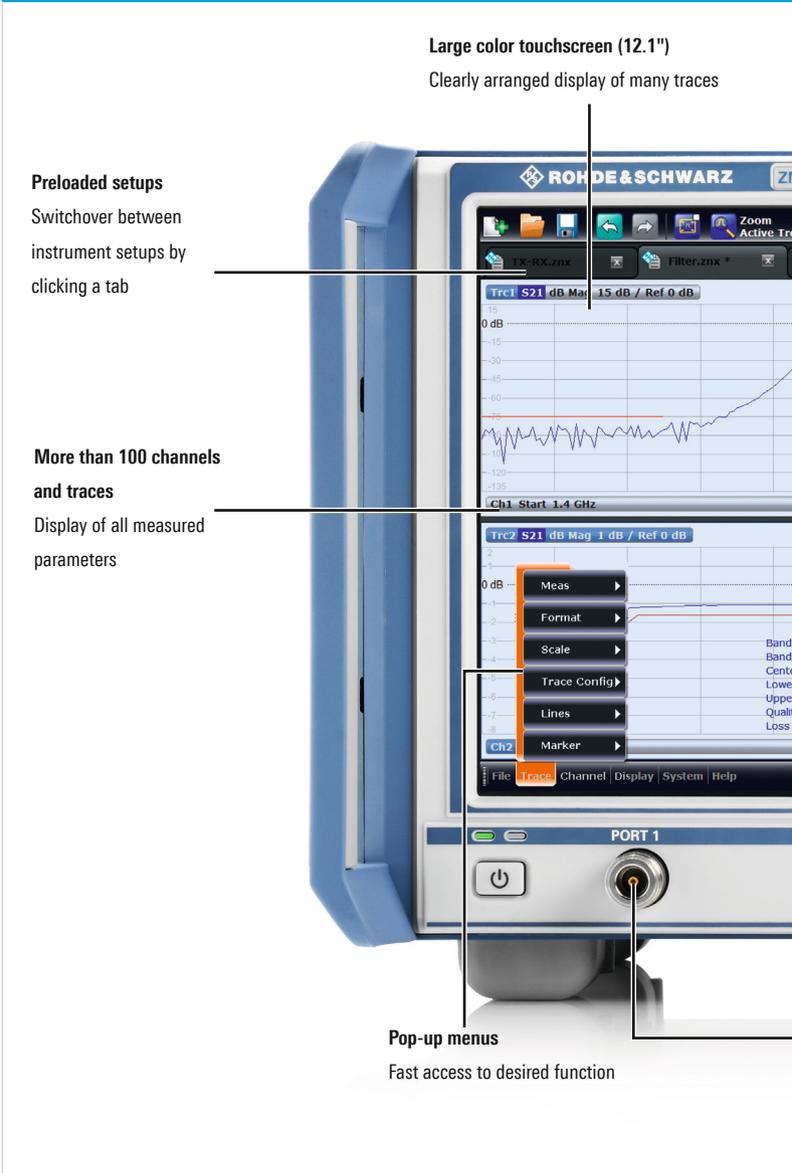
The R&S®ZNC vector network analyzer turns into reality what many users desire: configuration, measurement and analysis that are truly intuitive.

## 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

## Clearly structured user interface



## Optimal display configuration for each measurement task

The R&S®ZNC features a brilliant 12.1" WXGA color touchscreen. 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

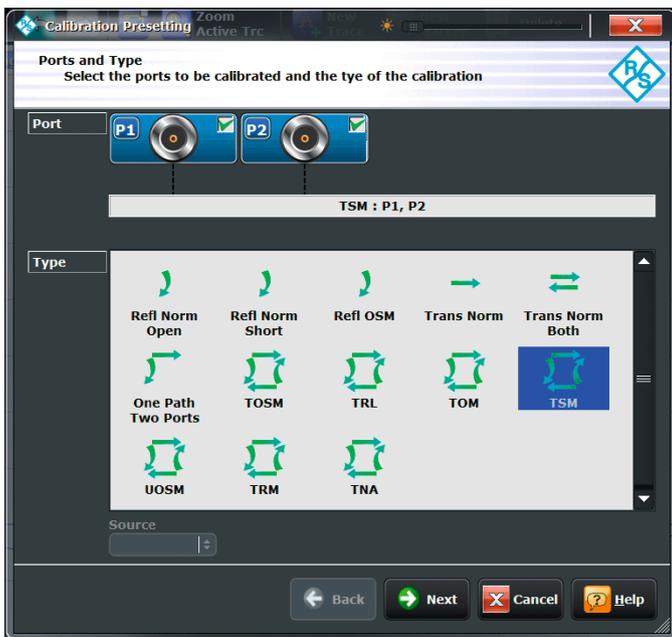
## The right calibration method for every test application

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

- ▮ **TOSM** calibration (**T**hrough, **O**pen, **S**hort, **M**atch)
- ▮ **TRL/LRL** calibration (**T**hrough, **R**eflect, **L**ine/Line, **R**eflect, **L**ine) for printed-board-based test structures and on-wafer applications
- ▮ **TRM** calibration (**T**hrough, **R**eflect, **M**atch) for applications using test fixtures
- ▮ **UOSM** calibration (**U**nknown Through, **O**pen, **S**hort, **M**atch) 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 problematic; 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.



R&S®ZNC calibration wizard.



Manual calibration standards.



R&S®ZV-Z53 calibration unit (automatic).

### 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		
	9 kHz to 100 kHz	100 kHz to 3 GHz
Directivity	46	45
Source match	41	40
Load match	44	45
Reflection tracking	0.02	0.02
Transmission tracking	0.028	0.018



R&S®ZV-Z270 calibration kit.



R&S®ZV-Z132 calibration kit.



R&S®ZV-Z121 calibration kit.

# A worthwhile investment

## 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.

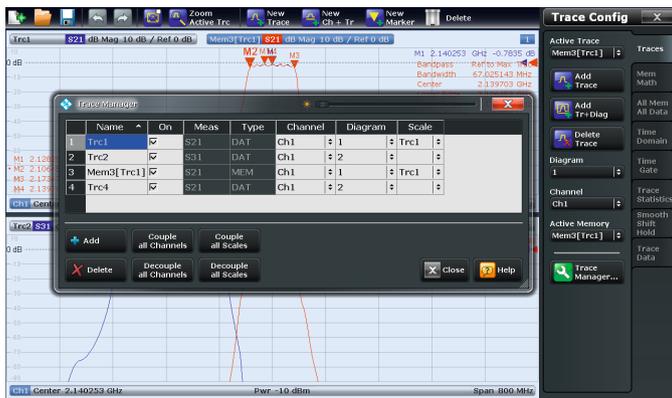
The R&S®ZNC can be quickly upgraded for new measurement tasks. Keeping the R&S®ZNC up to date, such as by adding a more powerful, next-generation controller or new functionality, involves only minimum downtime and service cost.

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.

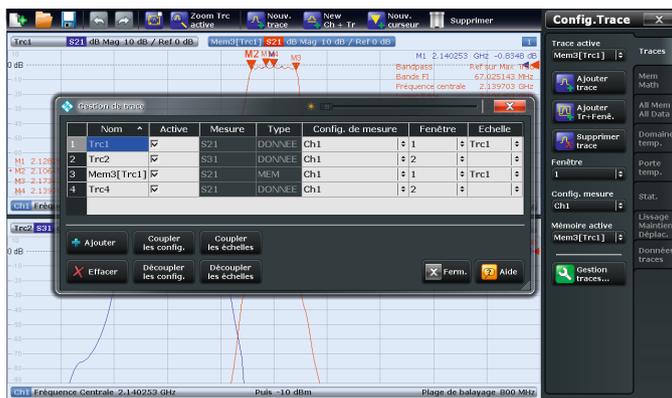
The R&S®ZNC supports the remote control command sets of practically all other Rohde&Schwarz network analyzers as well as those of other manufacturers' instruments. Replacing an obsolete analyzer with an R&S®ZNC therefore poses no problems. In most cases it is sufficient to verify the R&S®ZNC's response 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.



English GUI.



French GUI.



Chinese GUI.

# Ordering information

Designation	Type	Frequency range	Order No.
<b>Base unit</b>			
Vector Network Analyzer, Two Ports, 3 GHz, N	R&S®ZNC3	9 kHz to 3 GHz	1311.6004.12
<b>Options</b>			
Extended Power Range for R&S®ZNC3	R&S®ZNC3-B22	9 kHz to 3 GHz	1316.1752.02
GPIB Interface	R&S®ZNC-B10		1316.1617.02
Handler I/O (Universal Interface)	R&S®ZN-B14		1316.2459.02
Time Domain (TDR)	R&S®ZNC-K2		1316.1630.02
<b>Accessories</b>			
<b>Calibration kits (manual calibration)</b>			
Calibration Kit, N, 50 Ω	R&S®ZCAN	0 Hz to 3 GHz	0800.8515.52
Calibration Kit, N, 50 Ω	R&S®ZV-Z270	0 Hz to 18 GHz	5011.6536.02
Calibration Kit, 3.5 mm	R&S®ZV-Z235	0 Hz to 24 GHz	5011.6542.02
Calibration Kit, N (m), 50 Ω	R&S®ZV-Z121	0 Hz to 8 GHz	1164.0496.02
Calibration Kit, N (f), 50 Ω	R&S®ZV-Z121	0 Hz to 8 GHz	1164.0496.03
Calibration Kit, 3.5 mm (m), 50 Ω	R&S®ZV-Z132	0 Hz to 15 GHz	1164.1092.02
Calibration Kit, 3.5 mm (f), 50 Ω	R&S®ZV-Z132	0 Hz to 15 GHz	1164.1092.03
<b>Calibration units (automatic calibration)</b>			
Calibration Unit, Two ports, N (f)	R&S®ZN-Z151	100 kHz to 8.5 GHz	1317.9134.72
Calibration Unit, Two ports, 3.5 mm (f)	R&S®ZN-Z50	9 kHz to 9 GHz	1335.6904.30
Calibration Unit, Two Ports, N (f)	R&S®ZN-Z51	100 kHz to 8.5 GHz	1319.5507.72
Calibration Unit, Two Ports, 3.5 mm (f)	R&S®ZN-Z51	100 kHz to 8.5 GHz	1319.5507.32
<b>Test cables</b>			
N (m)/N (m), 50 Ω, 0.6 m/1 m length	R&S®ZV-Z91	0 Hz to 18 GHz	1301.7572.25/.38
N (m)/N (m), 50 Ω, 0.6 m/0.9 m length	R&S®ZV-Z191	0 Hz to 18 GHz	1306.4507.24/.36
N (m)/3.5 mm (m), 50 Ω, 0.6 m/1 m length	R&S®ZV-Z92	0 Hz to 18 GHz	1301.7589.25/.38
N (m)/3.5 mm (m), 50 Ω, 0.6 m/0.9 m length	R&S®ZV-Z192	0 Hz to 18 GHz	1306.4513.24/.36
<b>Hardware add-ons</b>			
USB Keyboard	PSL-Z2		1157.6870.04
USB Mouse	PSL-Z10		1157.7060.03
19" Rack Adapter	R&S®ZZA-KN5		1175.3040.00

<b>Warranty</b>		
Base unit		3 years
All other items <sup>1)</sup>		1 year
<b>Options</b>		
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	

<sup>1)</sup> 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 and 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.

## 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**

Certified Environmental Management

**ISO 14001**

## Rohde & Schwarz GmbH & Co. KG

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