

R&S® ZNrun

Automated Test Software

PC-based server platform for automated VNA tests



R&S®ZNrun Automated Test Software At a glance

In production environments, measurements need to be performed on devices under test (DUTs) with an ever-increasing number of ports. Vector network analyzers (VNAs) are often used in combination with other test equipment in order to perform these tests as quickly and efficiently as possible. With the R&S®ZNrun automated test software, Rohde & Schwarz offers a powerful control software application for automated measurements.

Characterization of a complex DUT, such as a frontend module, requires detailed configuration of the test setup and precise definition of the test sequence. The R&S®ZNrun automated test software simplifies these tasks. In a first step, the user sets the test equipment to be used, the number of ports on the DUT and the measurements to be performed. The R&S®ZNrun automated test software then takes over communications with the test equipment and configures it in accordance with the user's specifications.

The R&S®ZNrun automated test software helps users boost measurement speed. The software executes the preconfigured measurements in an optimized sequence that requires the fewest possible changes to the system between one measurement and the next. If a switch matrix is used, the software keeps the number of switch-operations and switching levels to a minimum.

To configure the test, the user can utilize the graphical user interface (GUI) as well as plug-ins. It is up to the user to decide whether to use one or the other, or a combination of the two. For example, a test can be configured in the GUI, and plug-ins can be used to add further test equipment to the VNA. This ability to mix and match gives users a powerful tool for obtaining the best possible performance from the equipment on hand.

Key facts

- ▮ Configuration of tests with vector network analyzers in production systems
- ▮ One software package to manage and control multiple test setups
- ▮ Optimization of production system speed
- ▮ Integration of external components (power supplies, multimeters, etc.) in test sequences by using plug-ins
- ▮ Control of DUT, e.g. via RFFE GPIO interface
- ▮ Efficient system error correction on test system
- ▮ Test setups centered around the DUT



R&S®ZRun

Automated Test Software

Benefits and key features

Flexible configuration and easy operation

- ▮ Configuring test scenarios independently of the test equipment
- ▮ R&S®ZRun server: management and control of test sequences
- ▮ Configuration client: connection plan and optimization of test sequences
- ▮ Calibration client: multiport calibration made easy
- ▮ Measurement client: initialization and execution of tests
- ▮ Plug-ins: control of DUT and integration of additional, external equipment

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The right view for every application

- ▮ Operator view and expert view
- ▮ Pass/fail display
- ▮ Extensive reporting functions

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When speed counts

- ▮ Optimized sequence of measurements; no unnecessary switching between test settings
- ▮ Connection plan: optimized DUT connection scheme for best possible RF performance
- ▮ Minimized switching operations when switch matrices are used

Focused on the DUT

- ▮ Test scenarios centered around the DUT
- ▮ Connection plan for the DUT for optimized test configuration and execution
- ▮ Test optimization oriented on DUT characteristics
- ▮ R&S®ZRun handles communications with the VNA and implements preconfigured settings

Convenient test sequence configuration and expansion

GUI	Plug-ins	File management
<ul style="list-style-type: none"> ▮ Select test equipment ▮ Define measurements (test steps) ▮ Control of DUT via internal interface, e.g. R&S®ZN-B15 	<ul style="list-style-type: none"> ▮ Include external test equipment ▮ Interface control (e.g. via GPIO) for external test equipment (e.g. power supply) ▮ Save measured data in user-defined formats, e.g. as .csv files 	<ul style="list-style-type: none"> ▮ Import partial and complete test setups ▮ Copy and save test setups ▮ Save reports

Flexible configuration and easy operation

Configuring test scenarios independently of the test equipment

The R&S®ZNRrun automated test software makes it very convenient to configure tests. The user need only specify the test equipment and the required measurements. The configured tests are independent of the test equipment used. As a result, a user could easily exchange a currently selected VNA for a different model, for example.

R&S®ZNRrun server: management and control of test sequences

The R&S®ZNRrun server is the core of the software. It runs in the background and manages the measurement execution units (MEUs). These are data structures that contain all information about the DUT, the test equipment and test adapters to be used and the required measurements along with the preconfigured test parameters. When configuring a new test sequence, these MEUs can be copied in whole or in part. R&S®ZNRrun-K2, the multiclient version of the automated test software, can even control multiple MEUs in parallel and execute the required measurements. This makes it possible to operate multiple test systems in parallel, even if they are configured differently.

Configuration client: connection plan and optimization of test sequences

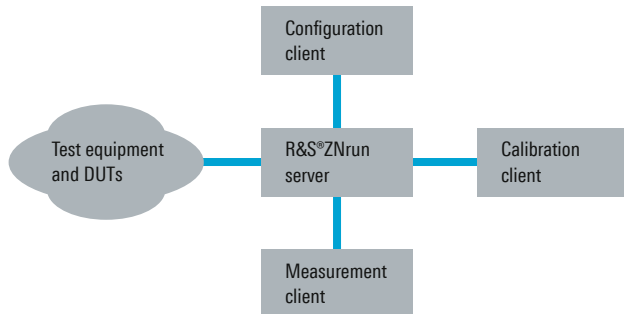
MEUs are created and modified in the configuration client. Based on the MEUs, the R&S®ZNRrun automated test software generates a connection plan. The connection plan shows in detail how the DUT should be connected to the test equipment in order to optimize the test run for the best possible RF performance. Moreover, the configuration client determines the ideal sequence of measurements to eliminate any unnecessary switching between test settings when switch matrices are used.

Calibration client: multiport calibration made easy

Test systems require regular system error correction. The higher the number of ports that are involved, the more tedious and complex this task becomes. The calibration client simplifies the process. For each step, it shows which port should be connected to a calibration unit, for example. To more easily distinguish between connections, ports can be marked with color-coded rings and user-specific labels.

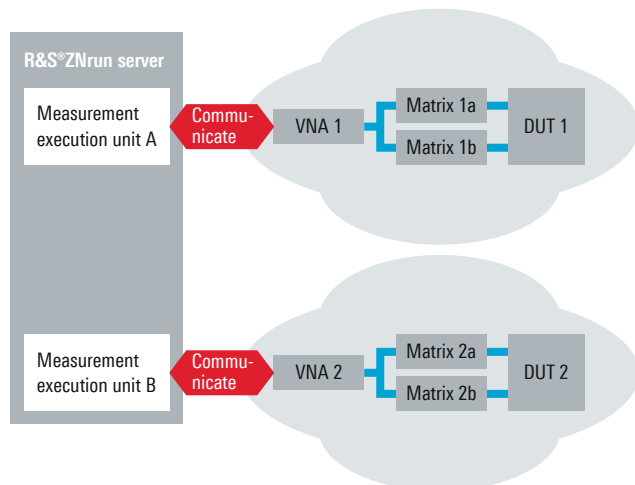
During system error correction, the user can see whether the individual calibration steps are actually performed. Calibration is followed by a report containing the date, the operator and any comments. This report can be used as evidence of calibration.

Functional model of R&S®ZNRrun software



The R&S®ZNRrun server controls communications between the test equipment, the DUT and the various clients of the software.

R&S®ZNRrun-K2 for controlling multiple test systems



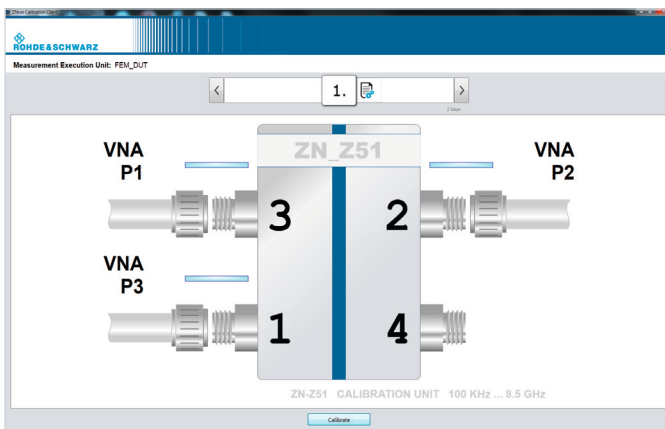
The R&S®ZNRrun-K2 multiclient version of the automated test software can be used to control multiple test systems in parallel, including differently configured systems.

Measurement client: initialization and execution of tests

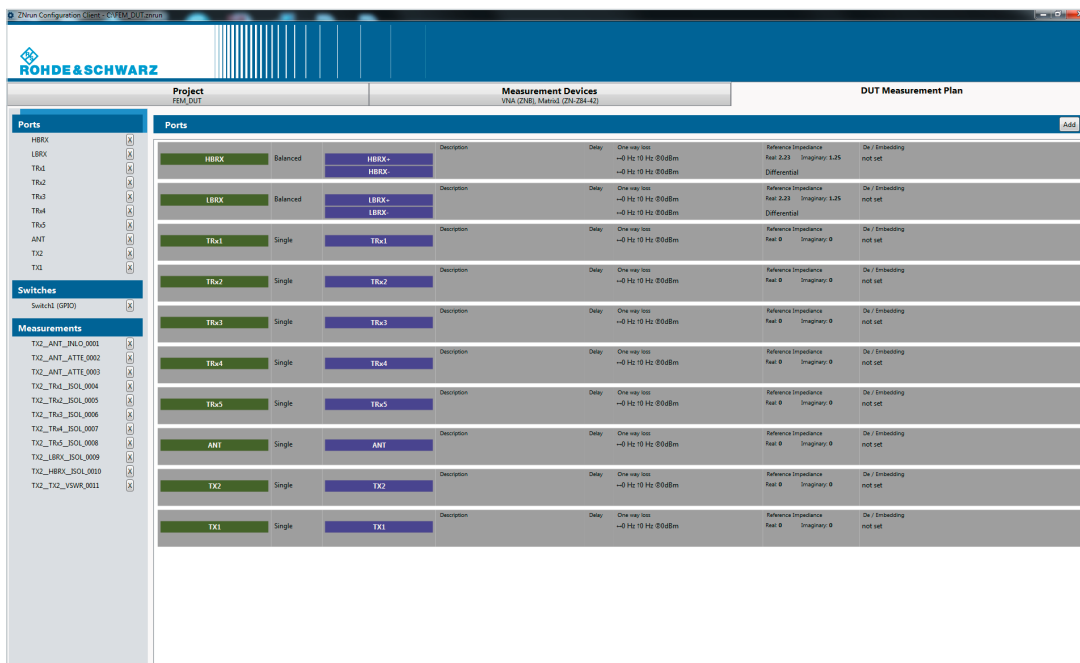
The measurement client performs the actual test. For this purpose, it loads the required measurement execution unit or units and initializes the test equipment to be used. During initialization, a check is made to ensure that the test equipment is connected. R&S®ZNrun then takes over communications with the VNA and sets up the test equipment as predefined in the configuration client. The test is then started.

Plug-ins: control of DUT and integration of additional, external test equipment

In many cases, control commands must be sent to the DUT and/or external test equipment before the test begins. For example, a GPIO interface can be used to output commands in order to control DUT switches or an external power supply. This functionality can be achieved by adding custom plug-ins. Plug-ins can also be used to save measured data in diverse user-defined formats, e.g. as user-formatted .csv files.



Operator view for the calibration client. The above view shows how to connect the ports of a VNA to a four-port R&S®ZN-Z51 calibration unit in an example application requiring only three ports to be calibrated.

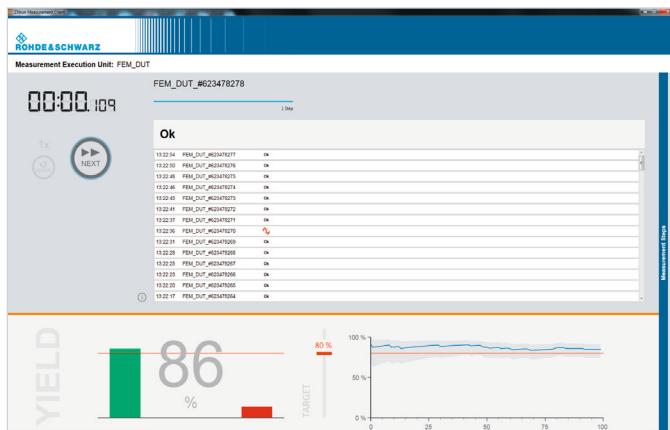


Definition of ports in the configuration client.

The right view for every application

Operator view and expert view

In a production environment, control applications are operated by very different types of users. The test engineer configures and checks the test, while the test system operator performs the test. A quality assurance verification that the measurements were executed correctly is additionally needed, and the production throughput must be monitored. To handle these varied tasks, the R&S®ZRun automated test software offers different views – the operator view and the expert view.



Operator view during the test.

The operator view includes only the information necessary to run the test correctly. The operator sees how to connect a DUT to the test equipment and how to connect a calibration unit. This view also allows tests to be started and stopped and indicates whether a test was successful.

Test engineers use the expert view to configure tests. This view provides more information. For example, the calibration client displays calibration parameters such as the frequency range and calibration method. This data can be used to create new calibration setups from existing ones.

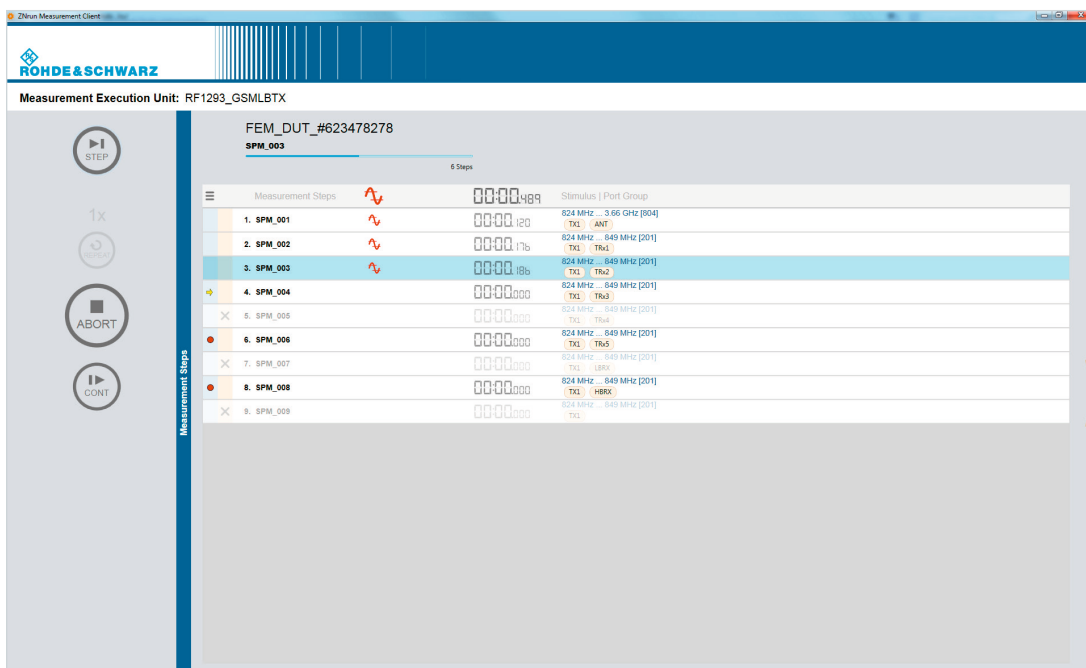
Test engineers can run through a test step by step, skip individual test steps or stop the test by setting a breakpoint at a specific location. This makes it possible to check the test sequence in detail before the start of production.

Pass/fail display

The most important result information delivered by the software is the pass/fail display during the test. This indicates how many of the measured DUTs comply with defined criteria. Defective DUTs can be removed from the production line immediately.

Extensive reporting functions

The R&S®ZRun automated test software offers extensive reporting functionality. After a calibration, information is saved about who performed the calibration and when. The DUT connection plan and the test plan can be generated as needed and likewise saved for documentation purposes.



Expert view: the test engineer can check and debug a test and control the individual test steps during the test.

Specifications

Recommended system configuration	
Operating system	Windows XP Service Pack 3 (32 bit), Windows Vista (32 bit), Windows 7 (32/64 bit)
Free hard disk space	600 Mbyte (32 bit), 1.5 Gbyte (64 bit)
Free RAM	512 Mbyte
Other requirements	Microsoft .NET Framework 4.0 or higher, Virtual Instrument Software Architecture (VISA), Microsoft Visual Studio 2010 (only for creating plug-ins and using the .NET interface)

Supported test equipment ¹⁾

Designation	Type	Order No.
Vector Network Analyzer, 2 or 4 ports, up to 40 GHz	R&S®ZNB	1311.6010.xx
Vector Network Analyzer, 4 to 24 ports, up to 8.5 GHz	R&S®ZNB-T	1318.7006.24
Switch Matrix, up to 24 ports, up to 8.5 GHz	R&S®Z-N-Z84	1319.4500.02
Switch Matrix, up to 12 ports, up to 20 GHz	R&S®Z-N-Z85	1326.4777.02
Calibration Unit, 2 or 4 ports, up to 8.5 GHz	R&S®Z-N-Z51	1319.5507.xx
Calibration Unit, 6 ports, up to 8.5 GHz	R&S®Z-N-Z152	1319.6003.xx
Calibration Unit, 4 ports, up to 8.5 GHz	R&S®Z-N-Z153	1319.6179.34
Calibration Unit, up to 24 ports, up to 8.5 GHz	R&S®Z-N-Z154	1319.5120.00
Calibration Unit, 4 ports, up to 24 GHz	R&S®Z-V-Z52	1164.0521.xx
Calibration Unit, 2 ports, up to 24 GHz	R&S®Z-V-Z53	1164.0473.xx
Calibration Unit, 2 ports, up to 40 GHz	R&S®Z-V-Z54	1164.0467.92
Calibration Unit, 2 ports, up to 50 GHz	R&S®Z-V-Z55	1164.0480.42
Calibration Unit, 8 ports, up to 8 GHz	R&S®Z-V-Z58	1164.0638.xx
Calibration Unit, 6 ports, up to 20 GHz	R&S®Z-V-Z59	1164.0450.36

For R&S®ZNRUN-K1 data sheet, see PD 3607.0875.22
 for R&S®ZNRUN-K2 data sheet, see PD 3606.9927.22
 and www.rohde-schwarz.com

Ordering information

Designation	Type	Order No.
Automated Test Software VNA ²⁾	R&S®ZNRUN-K1	1326.7124.02
Automated Test Software VNA (multiclient capability for R&S®ZNRUN-K1) ³⁾	R&S®ZNRUN-K2	1326.7130.02
License Dongle	R&S®ZNPC	1325.6601.02

¹⁾ A complete list of supported test equipment is provided in the R&S®ZNRUN manual.

²⁾ Requires R&S®ZNPC license dongle.

³⁾ Requires R&S®ZNRUN-K1.

Service that adds value

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

About Rohde & Schwarz

The Rohde & Schwarz electronics group is a leading supplier of solutions in the fields of test and measurement, broadcast and media, secure communications, cyber-security, and radiomonitoring and radiolocation. Founded more than 80 years ago, this independent global company has an extensive sales network and is present in more than 70 countries. The company is headquartered in Munich, Germany.

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

www.rohde-schwarz.com

Regional contact

- | Europe, Africa, Middle East | +49 89 4129 12345
customersupport@rohde-schwarz.com
- | North America | 1 888 TEST RSA (1 888 837 87 72)
customer.support@rsa.rohde-schwarz.com
- | Latin America | +1 410 910 79 88
customersupport.la@rohde-schwarz.com
- | Asia Pacific | +65 65 13 04 88
customersupport.asia@rohde-schwarz.com
- | China | +86 800 810 82 28 | +86 400 650 58 96
customersupport.china@rohde-schwarz.com

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R&S®ZRun Automated Test Software

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