R&S®ZNrun
VECTOR NETWORK ANALYZER AUTOMATION SUITE

Platform for automated VNA tests

ROHDE&SCHWARZ

Make ideas real

AT A GLANCE

Each stakeholder in the production chain from development to quality control has different requirements towards the testing of a product. R&S®ZNrun consolidates the tools every user needs in a single software suite featuring easy to use interfaces and an automation and optimization intelligence.

For a facility manager the yardstick for optimization could be maximizing the daily production yield, while for a test-engineer optimizing might mean being able to easily define a test setup and have it loaded on each device in the factory in a few seconds. A tester instead might be interested in seeing only the pass/fail results of the measurements, after having started it by scanning a barcode, while quality managers might find it convenient to be able to download documentation and real-time yield statistics, while on their way to the factory.

The R&S®ZNrun software suite was designed with optimization in mind and acknowledges these requirements by offering each party the possibility to expedite their workflows as much as possible by automating processes. The software takes advantage of all the Rohde & Schwarz RF measurement experience to make the most complicated measurements with vector network analyzers fast, accurate and most of all easily accessible for everyone.

The software suite relies on a structure defined by server and client applications, whose functions differ from one another: Test developers are able to control the test setup through a tool called R&S®ZNrun workbench, while with R&S®ZNrun measurement client test operators have a control panel where the tests can be started and the result verified. The workflow is in this case as easy as clicking on one button.

For the overview of measured data, the software suite offers the R&S®ZNrun visualization client tool, which can not only display charts and traces in a compact and orderly fashion, but also provides the opportunity to export it for documentation purposes.

BENEFITS

R&S®ZNrun workbench
▶ All tools for test development
▶ DUT-centric graphic user interface
▶ Streamlined workflow
▶ Flexible and customizable
▶ Free test definition

R&S®ZNrun measurement client
▶ Uncomplicated control for challenging tests
▶ Guidance for calibration and setup
▶ Even more customizable

R&S®ZNrun visualization client
▶ Compact display of all the data
▶ Intelligent data managing and document creation

R&S®ZNrun advanced capabilities
▶ Simultaneous multi-client control
▶ Synchronized measurements of multiple DUTs with different VNAs
▶ Test tuning

R&S®ZNrun WORKBENCH

All-in-one development and analysis tool

All the tools for test-development

The R&S®ZNrun workbench is one application included in the software suite and is designed for every user whose tasks range from test developing to results analysis.

Its brand new framework addresses the end users with two major use cases: defining complicated test scenarios easily and modifying or combining configurations to generate new setups and use them as future templates. Furthermore, a tuning tool is available to troubleshoot configurations and adjust them to fit the needs of a test scenario perfectly. Measurements can be started directly from the R&S®ZNrun workbench interface and their outcome can be visualized in the embedded R&S®ZNrun visualization client.

DUT-centric graphic user interface

The R&S®ZNrun workbench interface focuses on the device under test. The user is only required to characterize the DUT by specifying its ports and the input stimuli.

Provided that R&S®ZNrun workbench and any number of Rohde & Schwarz VNAs are connected to the same LAN segment, the software recognizes the available instruments and lets the user choose the appropriate one for the measurement. However, there is no need to actually know the specifics of each instruments: R&S®ZNrun workbench allows a generic VNA to be selected and validates the project just like a compiler does with a program. In case of errors, the software gives the user warnings on the compatibility of selected instruments with the defined setup.

DUT definition in R&S®ZNrun workbench

Measurement definition in R&S®ZNrun workbench

Streamlined workflow

Every specification to the test (e.g.: parameter to be measured, triggers, etc.) is added step-by-step through a wizard-like guide, which streamlines the workflow and allows the user to save each piece of configuration. This allows to load the configuration again or combine different ones, e.g. importing a particular stimulus for a completely new defined DUT.

Flexible and customizable

R&S®ZNrun does not require any time consuming adaptation of controls that are already implemented to drive sequencers, trigger post processing software, or even ask for user input. Its architecture provides .NET remoting API, a C# plug-in interface and a generic plug-in to support Python code snippets. This ensures the coexistence of existing solutions and R&S®ZNrun. Simply specify the control code to be used in the R&S®ZNrun workbench plugin section and integrate custom actions into the measurement cycle. Every custom action will be executed as a single measurement step within the full test cycle.

Free test definition

R&S®ZNrun is a software suite that can be downloaded for free from the Rohde&Schwarz website. By starting the R&S®ZNrun workbench the user can already go through the measurement definition steps such as the setup of ports, stimulus and VNA devices. In order to perform measurements a R&S®ZNrun server with a valid license (R&S®ZNRUN-K1) is required. The license is contained in the R&S®ZNPC dongle and must be installed on the same machine where the R&S®ZNrun server runs. Any additional R&S®ZNrun option purchased is always linked to the R&S®ZNRUN-K1 core license, thus to a R&S®ZNPC dongle.

R&S®ZNPC dongle
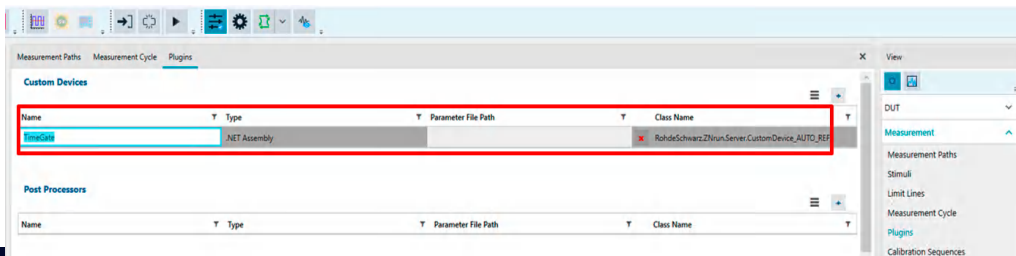
Import of a plug-in in R&S®ZNrun workbench (above) and its inclusion in the measurement workflow (below)
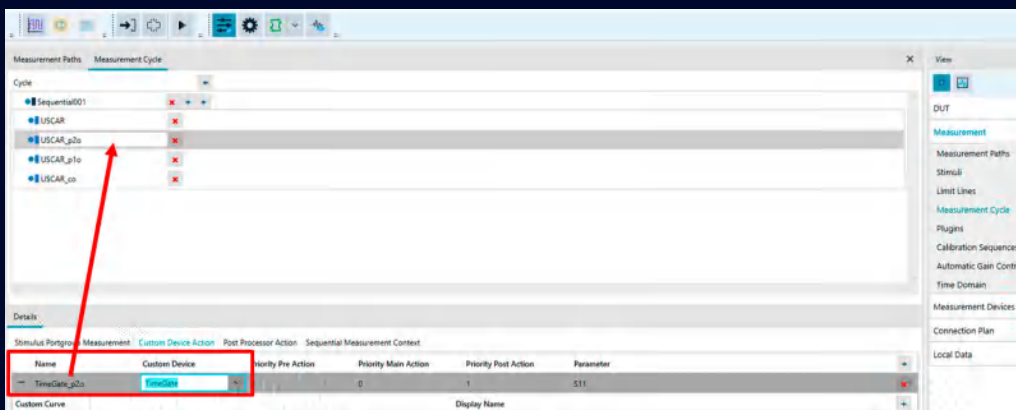
R&S®ZNrun MEASUREMENT CLIENT

Trouble-free test control

Easy control for challenging tests

The R&S®ZNrun measurement client is programmed to give measurement operators an interface that contains only the functions they really use. If needed, the measurement can simply be started with a click, without any need of additional configurations, and only meaningful results such as pass/fail tests or measurement speed can be visualized. The R&S®ZNrun measurement client is a standalone client that can be installed where the tests are actually taking place and allows a straightforward control of the most challenging measurements.

The R&S®ZNrun measurement client is suitable for experienced users, too, as it allows to define breakpoints or disable particular measurement steps for debugging purposes.

R&S®ZNrun measurement client
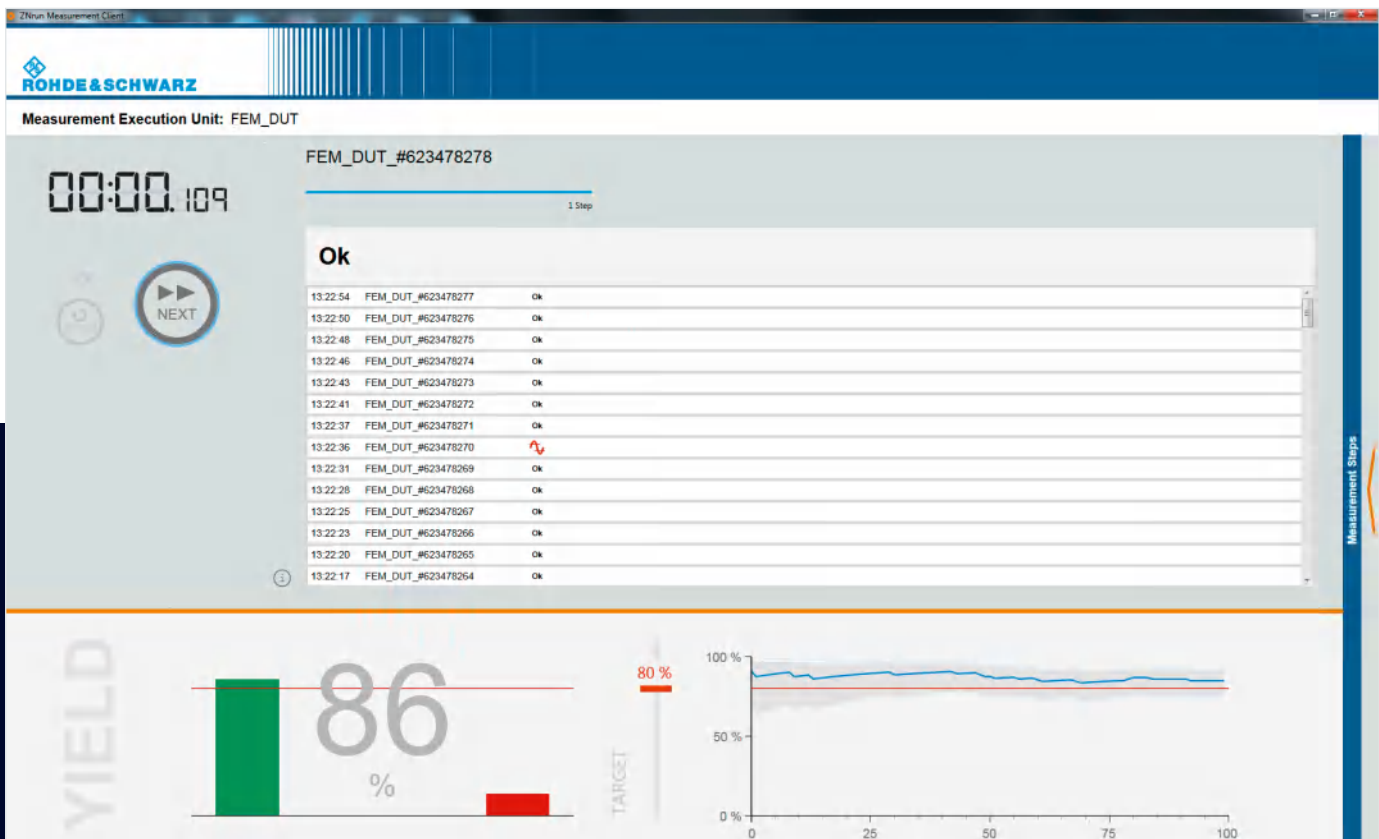
Guidance for calibration and setup

The calibration of multi-port devices might be elaborate and time consuming, especially if they are used in a serial production context. R&S®ZNrun offers the possibility of a completely guided calibration with the R&S®ZNrun calibration client, which shows all required steps to the user, to obtain the optimal accuracy with the least number of connection steps between VNA or switch matrix and calibration unit or kit.

Moreover, the R&S®ZNrun server can generate the connection plan of the specific measurement scenario for each measurement unit, so the human error in connecting VNAs, switch matrices, fixtures and DUTs can be minimized.

Even more customizable

As customers have individual requirements for their testing, Rohde & Schwarz engineers are able to operate customizations on the R&S®ZNrun measurement client, so that measurement operators have the ultimate tool for their tests.

Our engineers are free to reprogram the GUI and adapt it to your application needs and according to the test-operators need-to-know principle. Those, on the other hand, can benefit from an tailored interface, which allows only the operations they need to perform with the least amount of clicks.

R&S®ZNrun calibration client
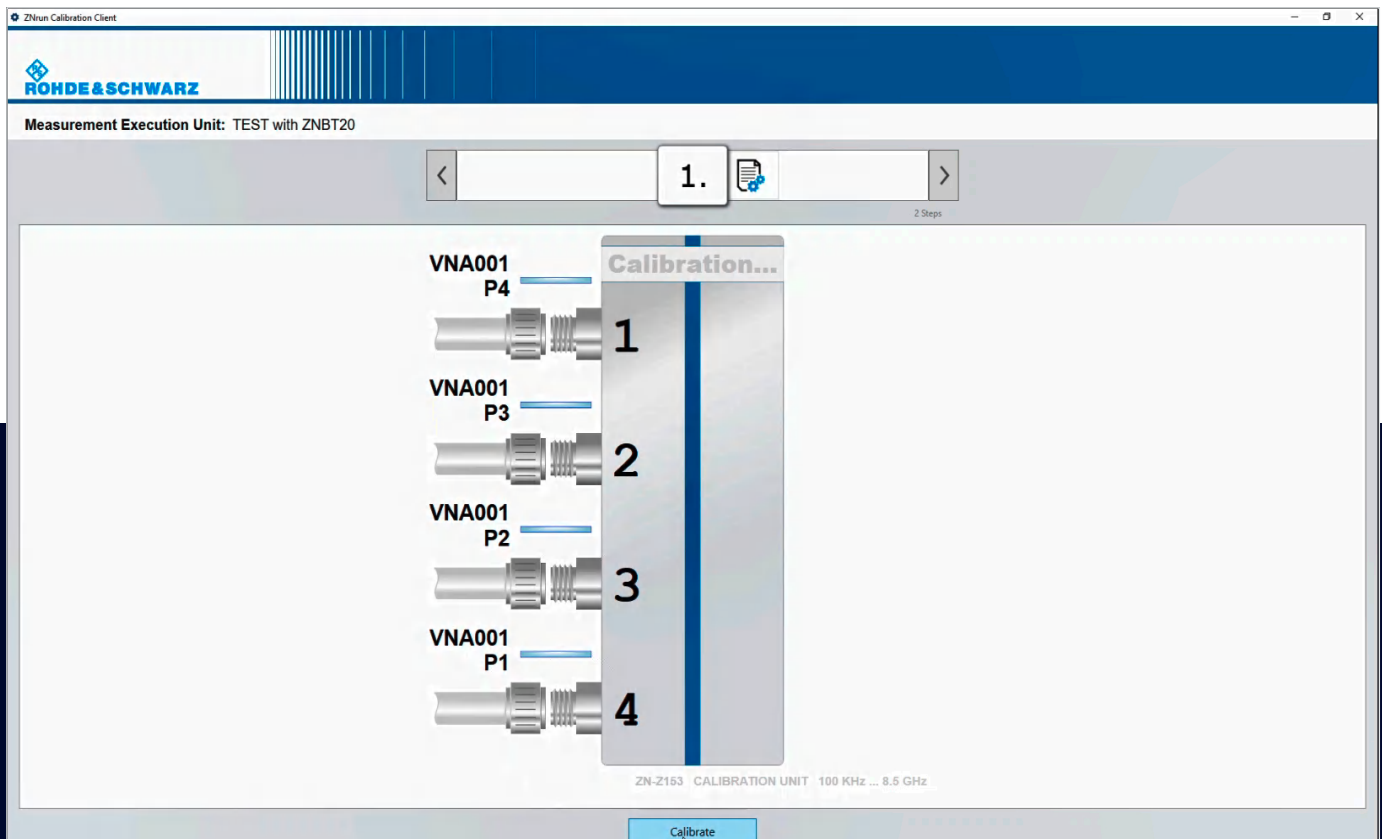
R&S®ZNrun VISUALIZATION CLIENT

Smart control tower

Compact display of all the data

Most developers would like to have an overall view at different measured parameters at a time. The R&S®ZNrun visualization client version introduces a smart way to display data, which allows a better overview of the measurement. Moreover it is also possible to display customized charts depending on the user´s needs.

The interface of R&S®ZNrun visualization client allows users to visualize every single executed measurement in real-time too, thus providing a better understanding of the resulting data.

Intelligent data-managing and document creation

The R&S®ZNrun visualization client has the ability to manage the data outcome from the user's measurements. Changes of data range, or structure that may occur due to changes of the stimulus during the tuning phase is automatically recognized, and the charts are consequentially rescaled.

The measurement result charts can be exported easily in the most common portable data format, but may also be documented both in numeric and drawing format as needed via plug-in.

R&S®ZNrun visualization client within the R&S®ZNrun workbench
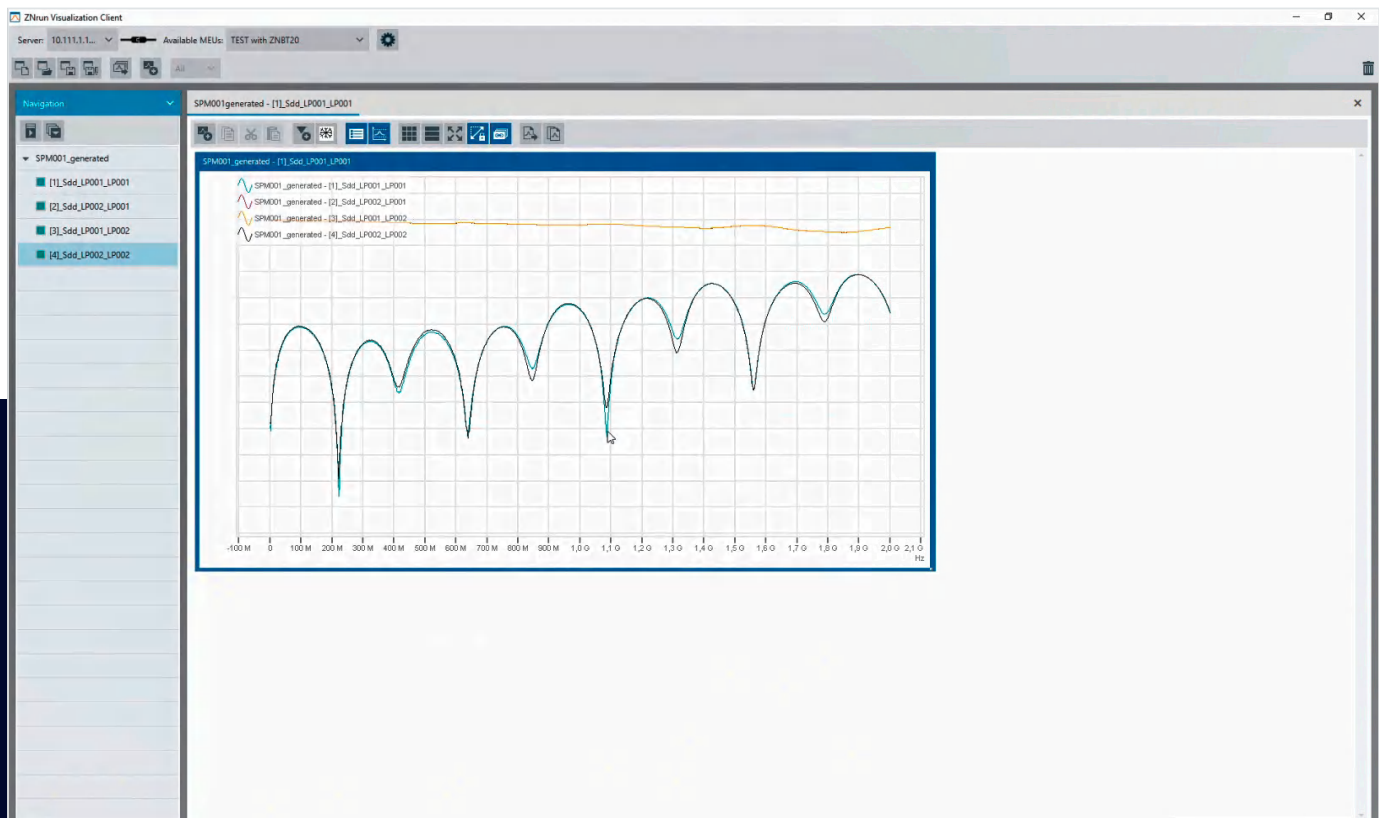
R&S®ZNrun ADVANCED CAPABILITIES

Optional features

Simultaneous multi-client control

In a mass production environment, it is important for test engineers to run multiple measurements at the same time. The R&S®ZNRUN-K2 multi-client capability option allows more than one measurement execution unit to run on the R&S®ZNRUN server, where in this case a single license with the additional R&S®ZNRUN-K2 option is needed.

Synchronized measurements of multiple DUTs with different VNAs

The parallel characterization of several RF paths in different RF bands has become more and more required, especially in the production of frontend chips for mobile telecommunications, the characterization of MIMO antennas, or even cavity filters. The R&S®ZNRUN-K5 multiplicity option allows parallel measurements. Thanks to this unique optional feature, the user can connect one vector network analyzer from Rohde & Schwarz to more DUTs or controllers of the same type (e.g. two handlers) and measure in parallel. In addition, the R&S®ZNRUN-K5 option enables measuring a complex DUT using different vector network analyzers from Rohde & Schwarz (provided the DUT does not need crossbar measurements between VNAs) and collecting the result data as one test only.

Test tuning

When a new product is introduced, it is very uncommon that the test engineers know exactly how to measure that specific product by perfectly balancing speed and accuracy with the equipment they have.

By initiating a full calibration on the whole frequency range supported by the DUT, and using the smallest IF bandwidth and maximum number of points settings, the user can reach a starting point to test with. With R&S®ZNRUN-K6 option the R&S®ZNrun workbench is the perfect tool for a test engineer to tune a specific measurement configuration for optimization purposes. The option allows tweaking a setup according to real-time observations.

Further optimization steps can be executed for example by producing a segmented sweep perfectly fitting to the DUT or applying a delay or a loss at a particular frequency/DC value. The tuned measurement can be finally saved, or even temporarily stored as a snapshot with the possibility of a rollback to the previous one.

Optimization of a test with the R&S®ZNrun visualization client and the R&S®ZNRUN-K6 option
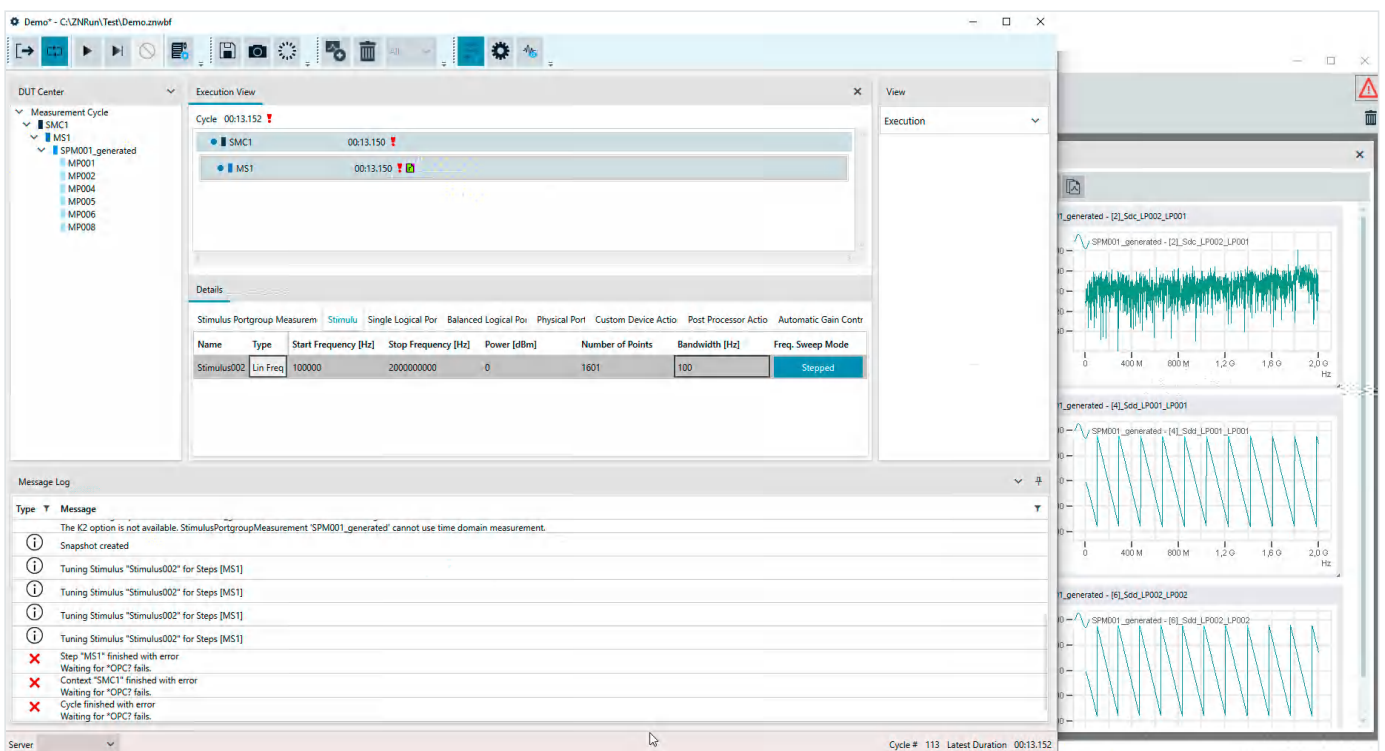
SYSTEM REQUIREMENTS

| Requirements	
System	
Personal computer (x86, x64)	32-bit (x86) or 64-bit (x64) processor, 1 GHz or faster
Memory	
RAM	1 Gbyte (x86)
	1.5 Gbyte (x64)
Disk space	600 Mbyte available (x86)
	1.5 Gbyte (x64)
	Smart card reader or USB port (for R&S®ZNPC license dongle)
Operating system	Windows 10
Microsoft .NET Framework 4.7.2 or higher	Available during installation of R&S®ZNrun
Virtual instrument software architecture (VISA) library	Available with the installation of R&S®ZNrun since version 1.5
Plug-in development	
Microsoft Visual Studio 2017 or higher	installed, corresponding to the system requirements

ORDERING INFORMATION

Designation	Type	Order No.
Software and license dongle		
Automated test software for vector network analyzer	R&S®ZNRUN-K1	1326.7124.02
Multi-client capability	R&S®ZNRUN-K2	1326.7130.02
DUT/VNA multiplicity	R&S®ZNRUN-K5	1334.4237.02
Measurement tuning capability	R&S®ZNRUN-K6	1334.4250.02
License dongle	R&S®ZNPC	1325.6601.02
Software maintenance		
Software maintenance for R&S®ZNRUN-K1	R&S®ZNRUNSWMK1	1334.4214.81
Software maintenance for R&S®ZNRUN-K5	R&S®ZNRUNSWMK5	1334.4243.81
Software maintenance for R&S®ZNRUN-K6	R&S®ZNRUNSWMK6	1334.4220.81

FROM PRE-SALE 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 stages of the project:
► Solution finding/purchase
► Technical startup/application development/integration
► Training
► Operation/calibration/repair
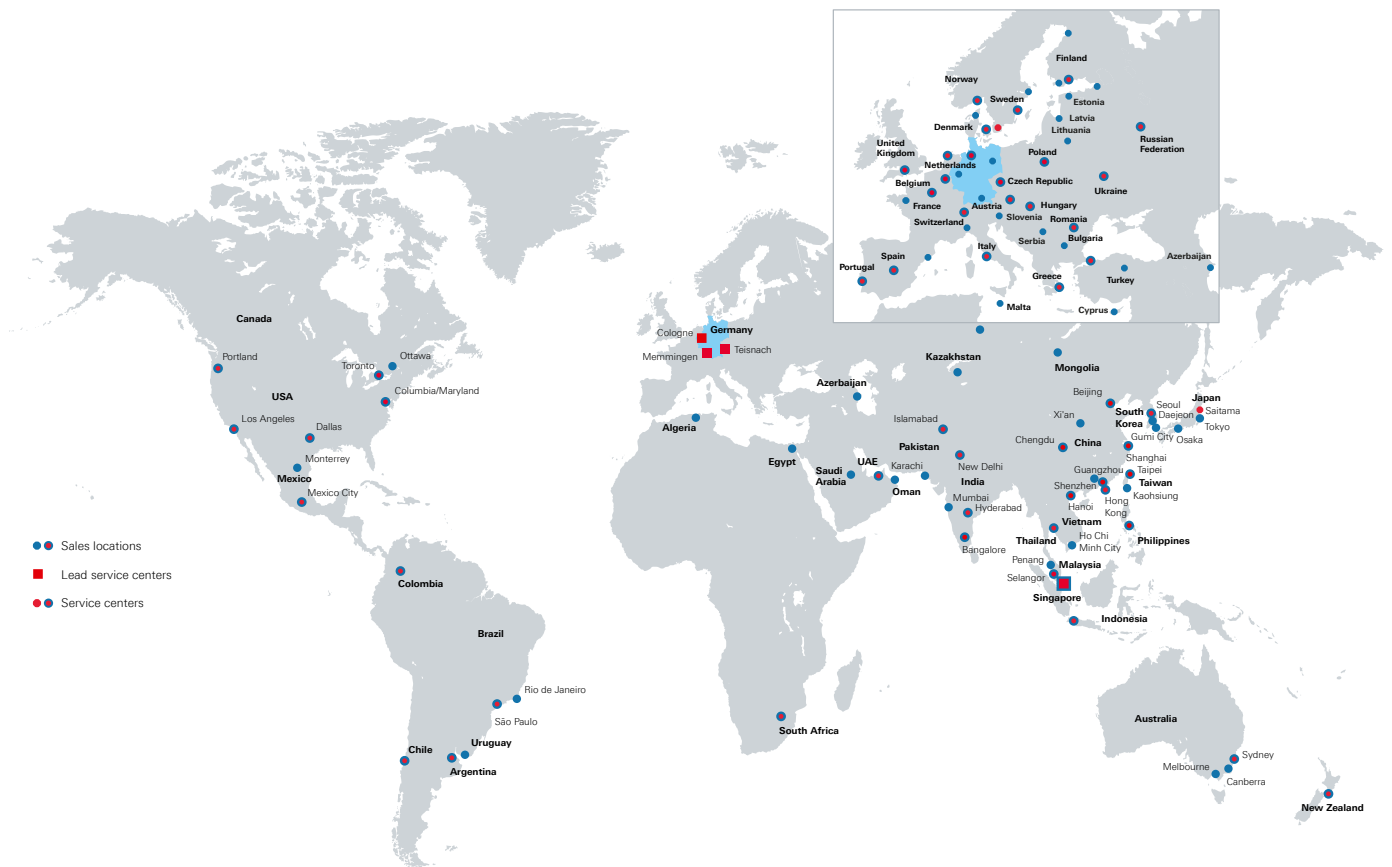
- Sales locations
- Lead service centers
- Service centers

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.

www.rohde-schwarz.com

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▶ Energy efficiency and low emissions
▶ Longevity and optimized total cost of ownership

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ISO 9001

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