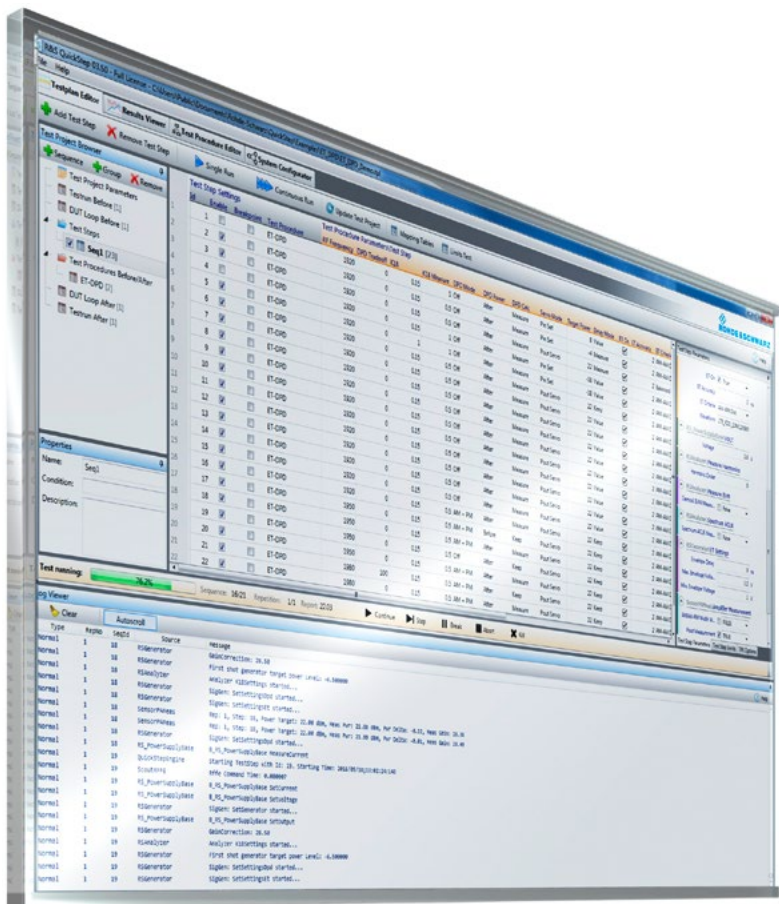


R&S®QuickStep

Test Executive Software

Flexibility and excellent performance



R&S®QuickStep Test Executive Software At a glance

The powerful R&S®QuickStep test executive software fulfills the demanding performance requirements of production tests and provides the flexibility for test automation in R&D and verification. The use of R&S®QuickStep in combination with Rohde & Schwarz instruments significantly increases test development efficiency and minimizes the effort of transferring and correlating tests between different test systems in R&D, verification and production.

R&S®QuickStep provides a high-speed test sequencer in combination with a powerful graphical user interface for the parameterization and control of test execution. Test procedures are designed in a graphical editor as flowcharts, based on the provided or additionally developed test functions. New test functions can be developed with Microsoft Visual Studio® in C++ or C# based on automatically generated source code templates. MATLAB® and Python scripts can also be easily integrated.

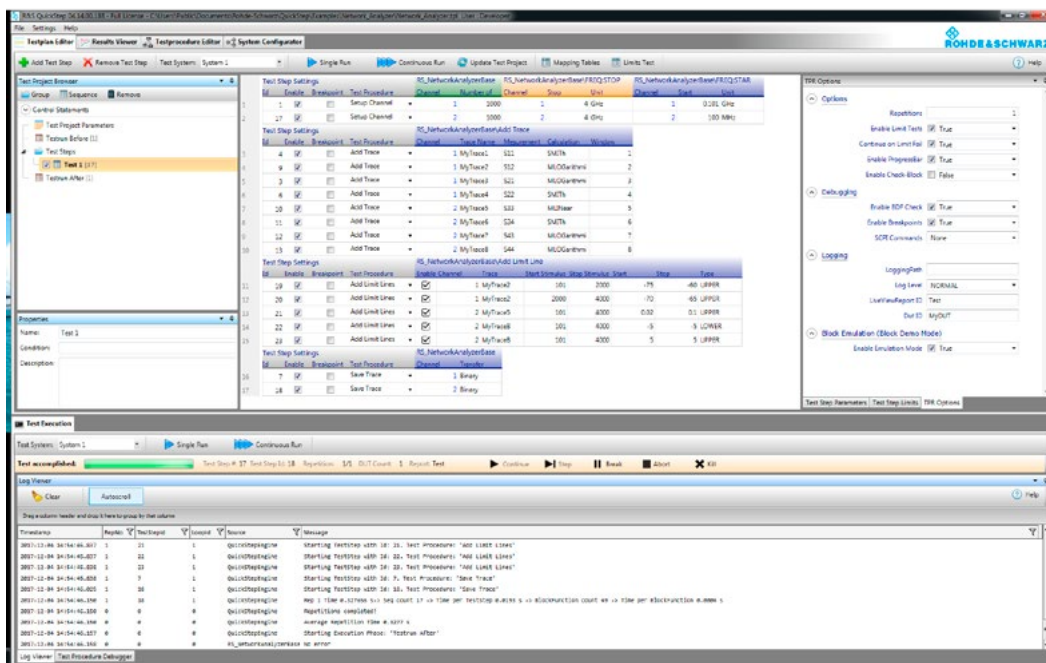
Users with different needs and profiles – including R&D engineers, application experts, test engineers, test technicians right up to the operator on the production floor – are involved in the development and execution of tests. R&S®QuickStep takes this into account by providing role-specific graphical user interfaces and intrinsic workflows. Special software development skills and intensive education are not prerequisite, not even for the development of new test functionalities.

The use of one common test executive in all domains increases the efficiency of test development and shortens the time to market due to significantly reduced effort for test transfer and correlation.

R&S®QuickStep provides a comprehensive test platform that allows users to focus on the core tasks of a test team: the development and execution of tests.

Key facts

- Performance-optimized design for low overhead test execution
- Intrinsic parallelism for efficient use of test system resources
- Role-specific graphical user interfaces with excellent usability
- Graphical editor for simple development of new test procedures
- Efficient and simple extension of available test functions
- Development of new functions in C++ or C# with Microsoft Visual Studio® based on source code templates
- Development of new functions in Python in combination with R&S®Forum
- Development of new functions in MATLAB®
- Graphical test procedure editor



Test execution with
R&S®QuickStep.

R&S®QuickStep Test Executive Software

Benefits and key features

Efficient development of new tests

- Graphical test procedure definition
- Automatic generation of source code templates for new test functions
- Microsoft Visual Studio® based test function development with C++ (32 bit and 64 bit) or C#
- Test function development in Python with R&S®Forum
- Test function development in MATLAB®
- Support of multiple technologies in one test procedure
- Visualization library
- Customizable report generation

▷ [page 4](#)

Minimized test time for improved productivity

- Performance-optimized design for low overhead test execution
- Intrinsic parallelism for efficient use of test system resources

▷ [page 6](#)

Simple system configuration management

- Graphical system configurator
- Editor for user-specific device symbols
- Management of VISA instruments

▷ [page 7](#)

Powerful test plan generation

- Table-based test plan editor
- Column view of test steps
- Powerful sweep and set functions
- Control Statements
- Parameter and path mapping
- Test limit assignment
- Test execution parameterization

▷ [page 8](#)

Test execution under control

- Test execution control
- Test execution log viewer
- User access control
- Test procedure debugger
- Runtime option

▷ [page 9](#)

Test results at a glance

- Result file browser
- Test result viewer
- Diagram for result plots
- Histogram and statistical analysis
- Test execution protocol viewer

▷ [page 10](#)

Efficient development of new tests

Graphical test procedure definition

Test procedures are defined as flowcharts in a graphical editor, based on a library of functions provided by Rohde&Schwarz or user-developed functions. Each node in the flowchart represents a function or a script file with input and output parameters for parametrization and data exchange. Decision elements allow the definition of dynamic procedures with loops. “Fork” and “join” elements are available to create and synchronize parallel execution branches. Conditions can be defined to conditionally execute test functions. All test function parameters can be made available for test parameterization within the test plan editor.

For each test step, a test procedure typically first sets parameters of all involved instruments and the device under test (DUT). One or more measurements are carried out after parameterization is complete. Parallel execution branches for parameterization and measurements can be defined in the test procedure editor in order to optimize the usage of the test system resources and minimize test time.

The graphical definition of a test procedure based on a function library significantly reduces coding and debugging effort. The R&S®QS-DEV option is required to use the graphical test procedure editor.

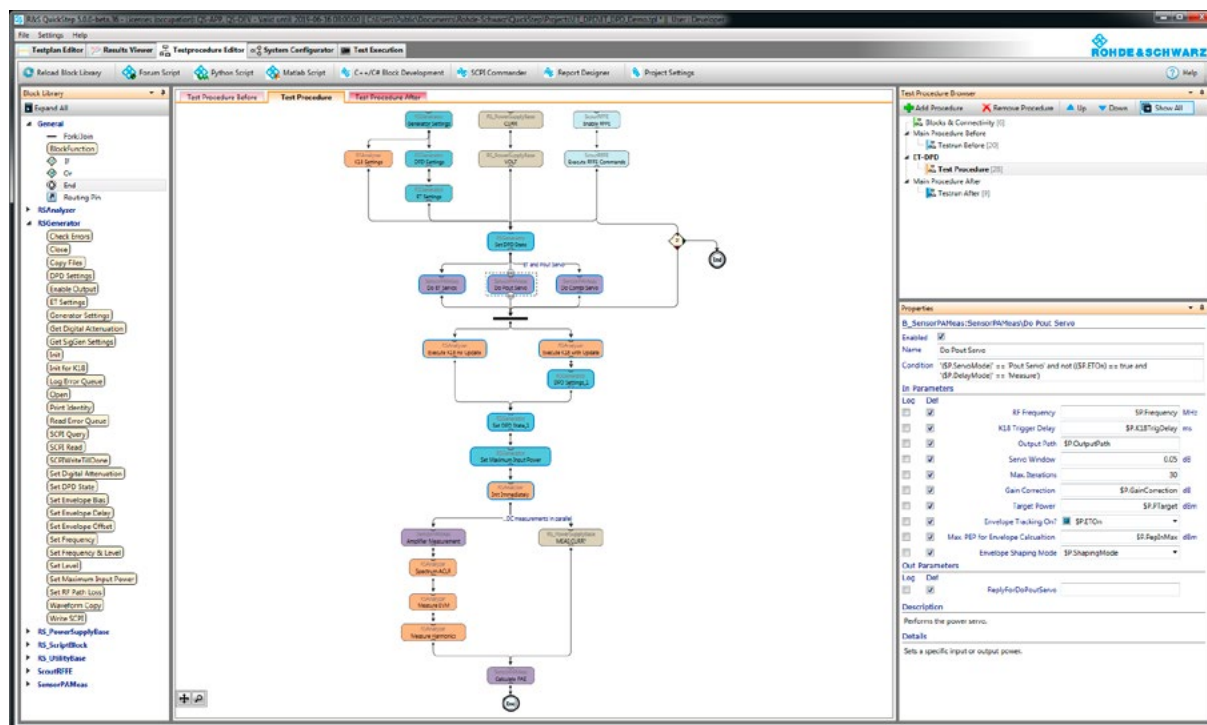
A set of the most common remote control functions for Rohde&Schwarz instruments and several utility functions are provided. The user can easily add additional functions such as remote control of Rohde&Schwarz or third party instruments.

Unlike conventional coded test procedures, the graphical representation of a test procedure as a flowchart provides an excellent overview. The function library allows modularization in atomic functions and ensures simple reuse of developed functions. Existing test procedures can easily be duplicated and modified without increasing the code base.

Automatic generation of source code templates for new test functions

The block development tool is used to define new test functions and the associated function parameters. Based on these definitions, Microsoft Visual Studio® C++ or C# projects with source code templates are automatically generated. The templates just need to be extended with user code in order to create user-specific test functions. Templates can be generated for Visual Studio 2012, 2013, 2015 and 2017. For legacy equipment, C++ test functions also support 32-bit besides the default 64-bit project setting. This allows a direct support of such equipment within R&S®QuickStep test procedures without any additional effort. The R&S®QS-DEV option is required to use the block development tool.

Graphical test procedure editor.



Microsoft Visual Studio® based test function development with C++ (32 bit and 64 bit) or C#

The predefined source code templates can be extended with user-specific code. The R&S®QuickStep application programming interface (API) offers a set of functions for data exchange with other functions and logging of results. Even users with limited software development experience can implement new test functions with just a few lines of code. Development experts can make use of all capabilities of Microsoft Visual Studio® to develop complex test functions. After compilation, the newly developed test functions are available in the test procedure editor.

Test function development in Python with R&S®Forum

New test functions can be developed in Python. Script templates with parameter definitions are automatically generated. Python scripts are developed and debugged with R&S® Forum. An import wizard supports the integration of existing Python scripts. R&S®Forum currently supports Python 2.7.1. The R&S®QS-DEV option is required to develop new test functions with Python.

Test function development in MATLAB®

New test functions can be developed in MATLAB®. Script templates with parameter definitions are automatically generated. MATLAB scripts are developed, debugged and executed in the MATLAB® environment. An import wizard supports the integration of existing MATLAB® scripts. The R&S®QS-DEV option is required to develop new test functions with MATLAB®.

Support of multiple technologies in one test procedure

Each test procedure node can be based on an individual technology. This allows a mixture of functions developed in C#/C++ and Python/MATLAB® scripts within a single test procedure. The technology is selected based on technical requirements or the developer's personal preferences.

Visualization library

A set of functions for realtime visualization of data is provided. Different window elements are available for visualization of results and charts as 2D/3D plots and histograms. This allows graphical definition of visualization GUIs without programming.

Customizable report generation

A set of functions for the generation of test reports is provided. Different reporting elements are available for text, tables and graphs. This allows graphical definition of test reports without programming. Additionally, a report generator is provided for defining a customized report template. Unicode character tables are supported to allow the generation of localized reports.

Test procedure with visualization and report.



Minimized test time for improved productivity

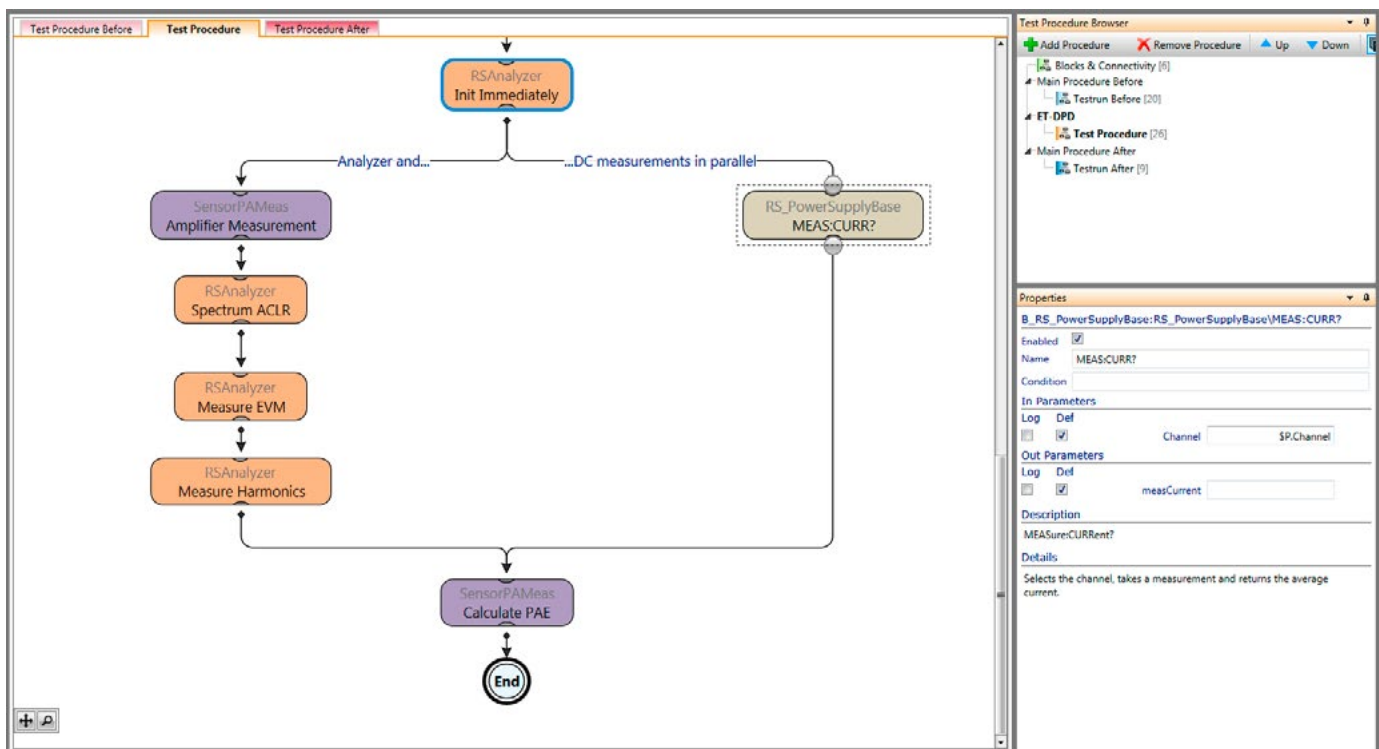
Performance-optimized design for low overhead test execution

The R&S®QuickStep test sequencer is designed for the most demanding test applications, such as production test of components. The test execution speed is comparable to native C++ code. Best performance is achieved if test cases are also implemented in C++.

Intrinsic parallelism for efficient use of test system resources

Independent test functions of a test procedure can be executed in parallel. Parallelism is achieved by assigning the test functions to parallel branches in the flowchart within the test procedure editor. A subsequent test function within one branch is executed when the previous test function in the flowchart is finished. Conditions can be additionally defined in order to achieve a conditional execution of test functions.

Test procedure editor detail.



Simple system configuration management

Graphical system configurator

Based on the library of instruments and system components, the system configuration and a corresponding block diagram can be generated. The RF path loss data can be defined for each component of the system. One or more connections and system components can be assigned to an RF path in order to automatically calculate the RF path loss during test execution based on the losses of the individual components. If several test benches are available, a system configuration for each can be generated. System-dependent test setup parameters such as connection IDs can be managed within the system configurator.

Editor for user-specific device symbols

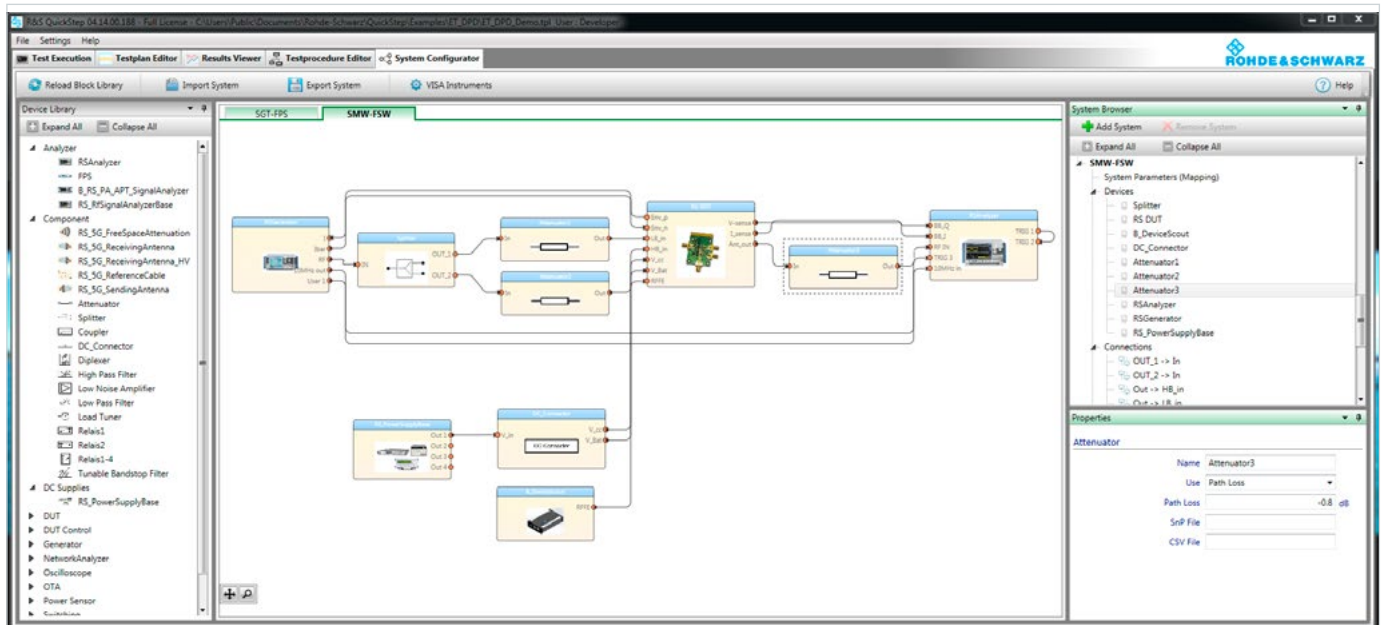
The device symbol library of the system configurator can be extended by the user. New user-specific symbols with connectors, parameters and a picture can be defined.

The symbol editor is part of the block development tool and requires the R&S®QS-DEV option.

Management of VISA instruments

Measurement instruments supporting the virtual instrument software architecture (VISA) standard can be managed in a user-configurable list. Available VISA instruments can automatically be found and added to the list.

Graphical system configurator.



Powerful test plan generation

Table-based test plan editor

The R&S®QuickStep test plan editor provides a table-based definition of test parameters and measurements. Each test step is represented by a row within the table. The parameter set of each test step is dynamically adapted according to the user-selected test procedure. In case of a change of the test procedure parameters within the test procedure editor, the parameter set within the test plan editor is automatically updated. Multiple test step parameter tables can be organized in a tree view for keeping an overview of large tests.

Column view of test steps

The parameters of a test step can also be displayed in a column in order to give a better overview and provide a more convenient way to edit parameters without scrolling over several screens.

Powerful sweep and set functions

The test plan editor provides powerful sweep and set functions for automatic generation of parameter sweeps or efficient setting of parameters for multiple test steps. Multi-parameter sweeps can be defined within a single test step. Prioritization can be used to keep control of the order of the parameter sweeps within nested loops.

Control Statements

Control statements for conditions and loops can be used to adapt and control the execution sequence of tests. Test steps can be executed multiple times within a loop and conditions can be defined for each test step or groups of test steps.

Parameter and path mapping

Parameter and path mapping allows test parameters and RF path settings from the test procedures to be assigned to the physical instruments and predefined RF paths of different test systems. Consequently, test-system-specific parameters such as path losses and connection IDs can be centrally defined and managed. The test system to be used for the test execution can be selected from among the predefined systems within the test plan editor. This makes it possible to flexibly and dynamically map a test plan to different test system instances without modifying system-specific parameters within the test plan.

Test limit assignment

The assignment of test limits to certain test steps is an optional step that can be skipped if the limit test is not required. The limits are imported from a Microsoft Excel file with a predefined format. Multiple limits can be defined with individual actions for each test result.

Test execution parameterization

The test execution offers various settings for logging and debugging. Breakpoints for debugging and single-step execution can be enabled for specific test steps. The hardware emulation can be activated in order to emulate instruments which are not available in the current test system.

Table-based test plan editor.

The screenshot displays the R&S QuickStep test plan editor interface. The main window is titled "R&S QuickStep 04.14.00.188 - Full License - C:\Users\Public\Documents\Roland.Schwarz\QuickStep\Examples\Network_Analyzer\Network_Analyzer.tpl - User: Developer". The interface includes a menu bar (File, Settings, Help) and a toolbar with icons for adding/removing test steps, running tests, and updating projects. The main workspace is divided into several panes:

- Test Project Browser:** Shows a tree view of the test plan structure, including "Test Project Parameters", "Testrun Before [1]", "Test Steps", and "Testrun After [1]".
- Test Step Settings:** A table listing test steps with columns for Id, Enable, Breakpoint, Test Procedure, Channel, Number of, Stop, Unit, Start, and Unit. The table contains multiple rows for different test steps, including "Setup Channel", "Add Trace", and "Add Limit Lines".
- Test Step Parameters:** A pane on the right showing parameters for the selected test step, including "Step No 12", "Step Enabled", "Step Id 20", "Breakpoint", "Test Procedure", "Add Limit Lines", "Test Step Parameters", "RS_NetworkAnalyzerBase\Add Limit Line", "Enable", "Channel", "Trace", "Start Stimulus", "Stop Stimulus", "Start Response", "Stop Response", and "Type".

The "Test Step Settings" table is detailed as follows:

Id	Enable	Breakpoint	Test Procedure	Channel	Number of	Stop	Unit	Start	Unit
1	<input checked="" type="checkbox"/>	<input type="checkbox"/>	Setup Channel	1	1000	1	4 GHz	0.101 GHz	
17	<input checked="" type="checkbox"/>	<input type="checkbox"/>	Setup Channel	2	1000	2	4 GHz	100 MHz	
4	<input checked="" type="checkbox"/>	<input type="checkbox"/>	Add Trace	1	MyTrace1	S11	SMITH	1	
9	<input checked="" type="checkbox"/>	<input type="checkbox"/>	Add Trace	1	MyTrace2	S12	MLOGarithmi	2	
3	<input checked="" type="checkbox"/>	<input type="checkbox"/>	Add Trace	1	MyTrace3	S21	MLOGarithmi	3	
6	<input checked="" type="checkbox"/>	<input type="checkbox"/>	Add Trace	1	MyTrace4	S22	SMITH	4	
10	<input checked="" type="checkbox"/>	<input type="checkbox"/>	Add Trace	2	MyTrace5	S33	MLinear	5	
11	<input checked="" type="checkbox"/>	<input type="checkbox"/>	Add Trace	2	MyTrace6	S34	SMITH	6	
12	<input checked="" type="checkbox"/>	<input type="checkbox"/>	Add Trace	2	MyTrace7	S43	MLOGarithmi	7	
13	<input checked="" type="checkbox"/>	<input type="checkbox"/>	Add Trace	2	MyTrace8	S44	MLOGarithmi	8	
19	<input checked="" type="checkbox"/>	<input type="checkbox"/>	Add Limit Lines	1	MyTrace2	101	2000	-75	-60 UPPER
20	<input checked="" type="checkbox"/>	<input type="checkbox"/>	Add Limit Lines	1	MyTrace2	2000	4000	-70	-65 UPPER
21	<input checked="" type="checkbox"/>	<input type="checkbox"/>	Add Limit Lines	2	MyTrace5	101	4000	0.02	0.1 UPPER
22	<input checked="" type="checkbox"/>	<input type="checkbox"/>	Add Limit Lines	2	MyTrace6	101	4000	-5	-5 LOWER
23	<input checked="" type="checkbox"/>	<input type="checkbox"/>	Add Limit Lines	2	MyTrace8	101	4000	5	5 UPPER
7	<input checked="" type="checkbox"/>	<input type="checkbox"/>	Save Trace	1	Binary				
18	<input checked="" type="checkbox"/>	<input type="checkbox"/>	Save Trace	2	Binary				

Test execution under control

Test execution control

During test execution, a progress bar and log viewer window is shown. The progress bar additionally offers test execution control elements, and the log viewer window displays color-coded log and debug messages. A test can be executed once or continuously for testing multiple DUTs. A DUT loop allows manual or automatic DUT handling.

User access control

For each test project, different user roles with individual visibility of QuickStep GUI elements can be defined. User-specific role configurations help to reduce complexity and prevent unintentional modifications.

Test procedure debugger

The test procedure debugger allows the setting of break points and individual execution of each function in a test procedure. Function parameters can be modified prior to execution. For each executed function, the execution time is shown.

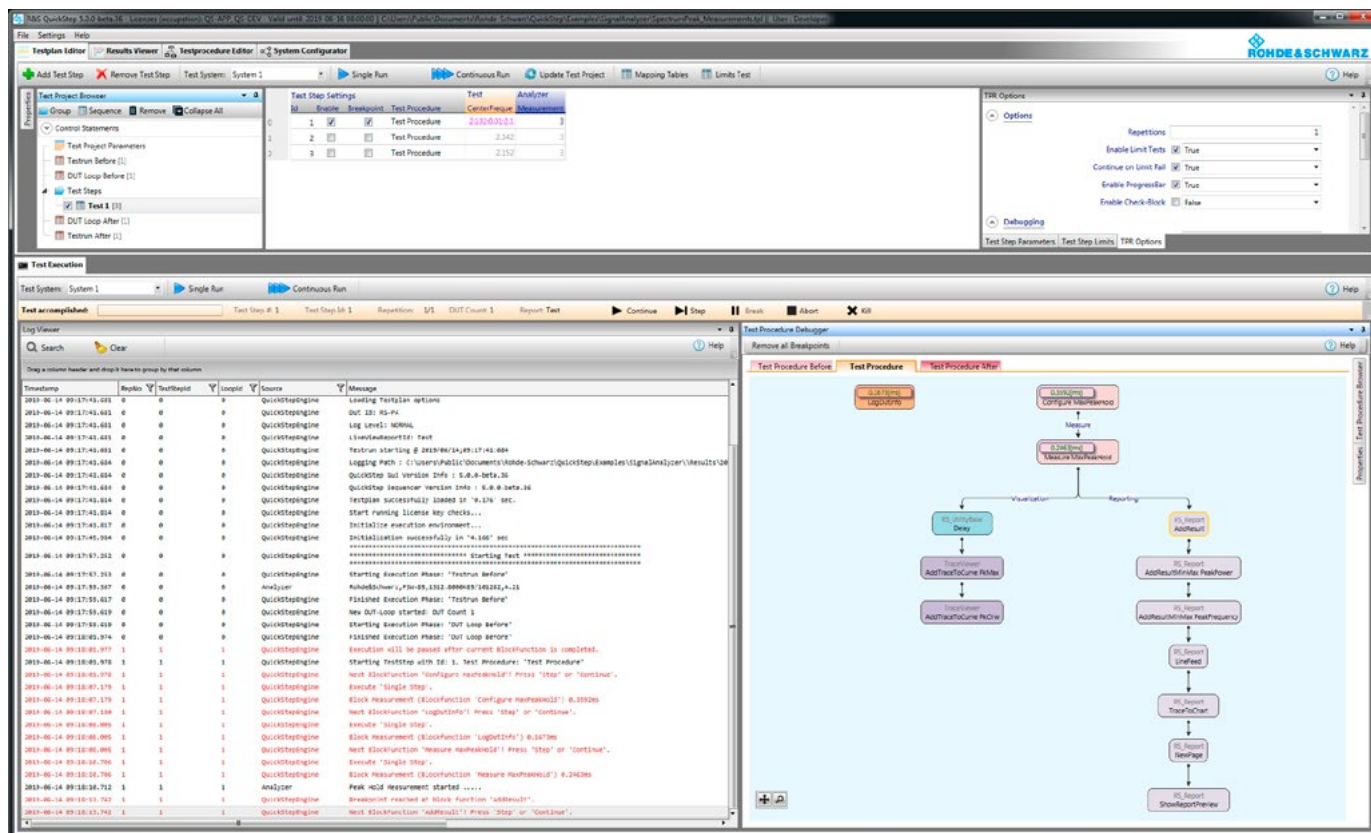
Test execution log viewer

The test execution log viewer displays all status, warning and error messages during test execution. Powerful search, sort and filter functions support efficient analysis of the test execution log.

Runtime option

Test projects with built-in GUIs for test execution control and result visualization can be executed without the R&S®QuickStep GUI. Only a dongle with the R&S®QS-SEQ runtime option is required.

Test execution with R&S®QuickStep.



Test results at a glance

Result file browser

The result file browser helps to keep an overview of large sets of result data. Each test run generates a new time-stamped folder with a complete set of result files with measurement and timing results as MS Excel compatible text files. Additionally, a copy of the test plan and the execution log is stored as a reference. A result folder can be selected within the result file browser for analysis with the test result viewer.

Test result viewer

The test result viewer displays the content of data and timings result files as tables. Each column of the table offers powerful sort and filter functions. An export filter makes it possible to export a subset of the result log as a CSV or XLS file.

Diagram for result plots

The diagram window plots the data of a single or multiple columns or traces that are selected within the test result viewer. Scatter plots are possible, since any result parameter can be selected for the x-axis of the plot. Results can be assigned to color-coded groups by selecting an additional grouping parameter. Delta markers are available for measurements.

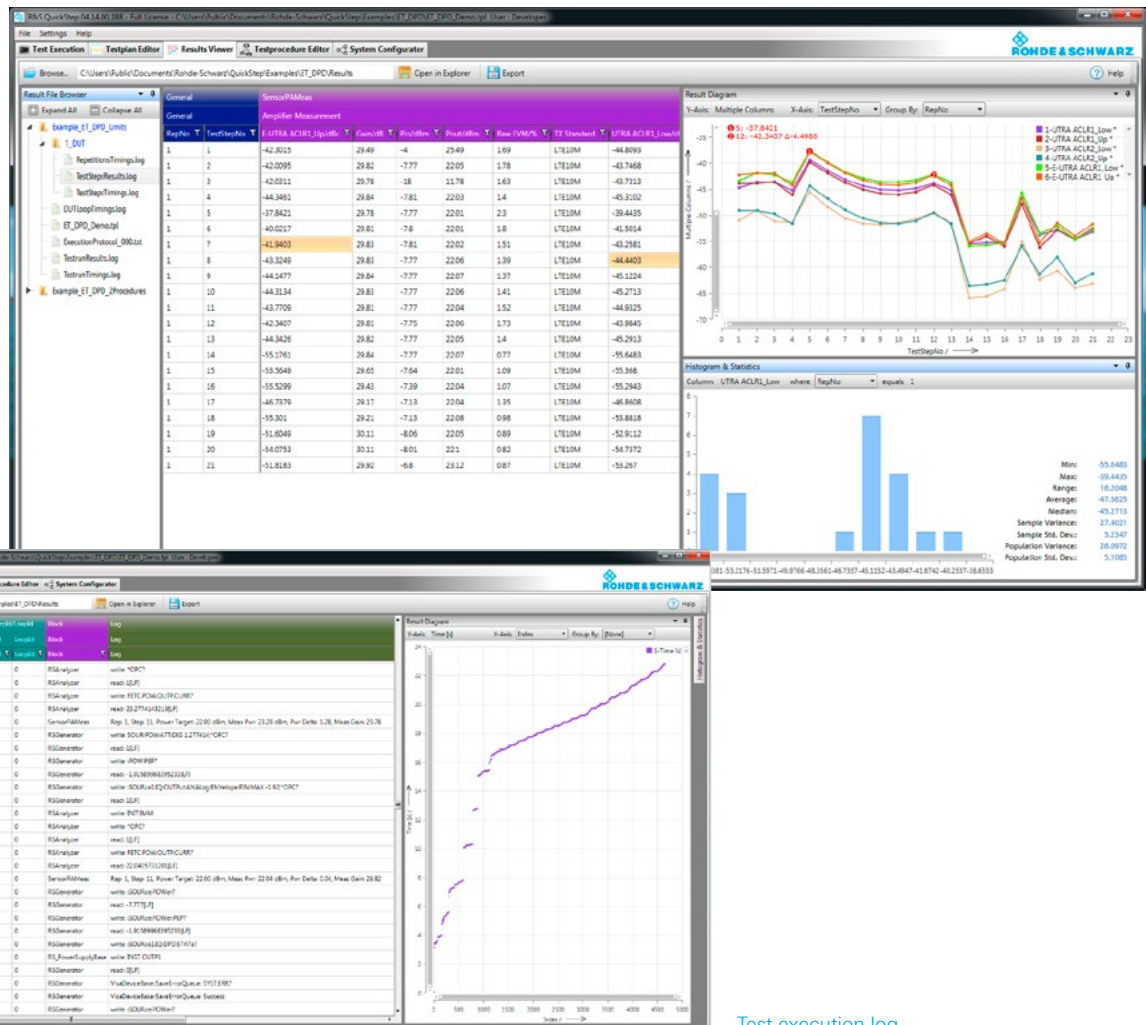
Histogram and statistical analysis

The statistics window provides a histogram view and statistical analysis of the result data that is selected within the test result viewer.

Test execution protocol viewer

The execution protocol viewer lists all logged messages with timestamp and origin. Powerful search, sort and filter functions support detailed analysis of the test execution. An export filter allows the export of a subset of the execution log. This makes it possible, for example, to export and reuse SCPI sequences within other test environments.

R&S®QuickStep test result viewer.



Test execution log.

Specifications in brief

Recommended system configuration	
Operating system	Windows 7 SP1 (64 bit), Windows 10 (64 bit)
Free hard disk space	1 Gbyte
Min. free RAM	4 Gbyte

Ordering information

Designation	Type	Order No.
R&S®QuickStep test executive software ¹⁾	R&S®QS-APP	1528.9010.02
Development option for R&S®QuickStep test executive software ²⁾	R&S®QS-DEV	1528.9026.02
R&S®QuickStep test sequencer software	R&S®QS-SEQ	1528.9049.02
Automatic calibration of R&S®ATS1000 and positioner driver ³⁾	R&S®QS-ATSCAL	1528.9078.02
Mandatory developer training for R&S®QS-ATSCAL	R&S®QS-ATSTRN	1528.9061.02
Driver package for R&S®ATS anechoic chamber positioner	R&S®ATSDRV	1528.9084.02
License dongle and key card for software options	R&S®QS-DGL	1528.9003K02
Floating licenses		
R&S®QuickStep test executive software ⁴⁾	R&S®QS-APP	1528.9010.51
Development option for R&S®QuickStep test executive software ⁵⁾	R&S®QS-DEV	1528.9026.51
R&S®QuickStep test sequencer software	R&S®QS-SEQ	1528.9049.51
License dongle and key card for software options	R&S®QS-DGL	1528.9003K03

¹⁾ Requires R&S®QS-DGL license dongle.

²⁾ Requires R&S®QS-APP.

³⁾ Please refer to separate product brochure for more details.

⁴⁾ Requires R&S®QS-DGL license dongle.

⁵⁾ Requires R&S®QS-APP.

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

www.rohde-schwarz.com

Rohde & Schwarz training

www.training.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

R&S® is a registered trademark of Rohde & Schwarz GmbH & Co. KG

Trade names are trademarks of the owners

PD 3607.2249.12 | Version 06.00 | June 2019 (GK)

R&S®QuickStep Test Executive Software

Data without tolerance limits is not binding | Subject to change

© 2016 - 2019 Rohde & Schwarz GmbH & Co. KG | 81671 Munich, Germany



3607224912