

R&S[®]ZNrun

Vector Network Analyzer Automation Suite V2.92

Release Notes

© 2024 Rohde & Schwarz

Muehldorfstr. 15, 81671 Muenchen, Germany

Phone: +49 89 41 29 - 0

Email: info@rohde-schwarz.com

Internet: www.rohde-schwarz.com

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Throughout this document, R&S[®] is abbreviated as R&S.



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Version 21

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1 Current version and version history

This chapter lists the changes introduced in the current and earlier versions of the R&S ZRun software.

1.1 Version 2.92

1.1.1 Improvements

Solved issues

Version	Issue
2.92	After 9 January 2024, an expired certificate prevented the ZRun Workbench from switching to execution state. The certificate was renewed.

1.2 Version 2.90

1.2.1 New functionality

Version	Function
2.90	<p>ZNrun Cable Test Client</p> <ul style="list-style-type: none"> • New option R&S ZNrun-K440 "Compliance test automation for PCIe 5.0 and 6.0 cable assemblies" <ul style="list-style-type: none"> – Support for x4 and x8 cables – Calculation of cclCN and IRL according to "Internal Cable Specification for PCI Express 5.0 and 6.0, Version 0.7, December 22, 2022" – Calculation of EPPS and EIPS according to "Intel PCI Express Internal Cable Measurement Procedure Specification, Revision 1.1, February 2023, Reference Number 573135" – Calculation of psXT • New command-line interface: Separation of test preparation and measurement reduces the overall measurement time for repeated cable tests
2.90	<p>Tuning (R&S ZNRUN-K6)</p> <ul style="list-style-type: none"> • Asynchronous, string-based communication: <ul style="list-style-type: none"> – To connected VNAs via the ZNrun Server's standard SCPI channel – To other external devices via custom "Communication Channel" plugins (interface IClientCommChannel) • ZNrun Workbench in execution phase, tuning active: Additional "DUT Center" view for convenient selection of traces and custom curves to be displayed

1.2.2 Modified functionality

Version	Function
2.90	ZNrun Calibration Client: The calibration reporting functionality was replaced by the "Calibration Summary" of the ZNrun Workbench and ZNrun Cable Test Client.
2.90	ZNrun Workbench: The "DUT Center" views now display custom curve nodes with the "Display Name" specified in the related custom device action or post-processor action. Up to V2.80, the custom curve's "Identifier" was used.
2.90	The integrated license server was updated to version 2.15
2.90	<p>Predefined R&S ZNRUN-K4xx projects (ZNrun Cable Test Client):</p> <ul style="list-style-type: none"> • Now read-only • Now automatically installed with the ZNrun Cable Test Client • For simplified access, the installation directory <code>C:\ProgramData\Rohde-Schwarz\ZNrun\<version>\Resources\MOI</code> was rearranged to a clearly laid out tree.

1.2.3 Improvements

Version	Improvement
2.90	ZRun Cable Test Client: Extended configuration possibilities for R&S ZRun-K4xx scenarios <ul style="list-style-type: none"> • De-/selection of individual tests, postprocessing (evaluation), data export, and reporting steps • De-/selection of TX ports for NEXT and FEXT measurement test steps • Enhanced logical port configuration <ul style="list-style-type: none"> – Fixture deembedding via <code>s4p</code> Touchstone files (balanced port deembedding) – Configurable reference impedances for common and differential mode • Modification of measurement parameters (stimuli, limit lines) via direct access to related ZRun Workbench views
2.90	Support of new default <code>*IDN?</code> result format, returned by future VNA models
2.90	ZRun Workbench: Start and stop time of time domain measurements can be specified
2.90	ZRun Settings client: The calibration selection logic can be configured to limit its matches to calibrations with identical stimulus power and/or IF bandwidth settings.

Solved issues

Version	Issue
2.90	Time domain: The ZRun Server merged measurement paths of the same stimulus portgroup measurement and only generated a single trace, although their referenced time domain measurements or time gates were different.

1.3 Version 2.80

1.3.1 New functionality

Version	Function
2.80	Support for new switch matrices R&S ZN-Z86(X)
2.80	ZRun Cable Test Client: <ul style="list-style-type: none"> • Extended configuration possibilities for logical ports (single-ended or balanced de-/embedding, individual port impedances) • For the high-speed Ethernet compliance and precompliance tests of R&S ZRun-K41x, you can now configure the IEEE COM tool and configuration <code>*.xs1x</code> to be used for post-processing. The specified paths are persisted with the cable test project.

1.3.2 Modified functionality

Version	Function
2.80	The integrated license server was updated to version 2.10
2.80	A calibration from the calibration result database is no longer considered an INTERPOLATED_FREQUENCY_GRID_MATCH, if its other stimulus attributes do not match

1.3.3 Improvements

Version	Improvement
2.80	R&S ZNRUN-K4xx: When executing one of the predefined compliance test projects, the ZNrun Server now configures the required R&S OSP paths automatically (via custom device plugin). The test projects were adjusted accordingly.
2.80	ZNrun Visualization (ZNrun Workbench and standalone client): <ul style="list-style-type: none"> Improved usability of marker placement, drag & drop, and chart resizing Improved stability and logging
2.80	R&S ZNrun API: Custom curve data generated by a custom device or post processor can now be read by subsequently executed custom devices or post processors (interface <code>IMeasurementCustomCurveDataQuery</code>)

Solved issues

Version	Issue
2.80	ZNrun Visualization (ZNrun Workbench and standalone client): <ul style="list-style-type: none"> Limit lines not displayed during measurement Sometimes adding a new chart failed with the misleading exception "The defined memory limit of 2GB was reached." Sometimes a trace or custom curve was not displayed or updated
2.80	Although it is not allowed to have multiple <code>StimulusPortgroupMeasurement</code> elements with the same name (attribute) in a <code>DutMeasurementPlan</code> , schema validation using <code>DutMeasurementPlan.xsd</code> did not fail in this case.

1.4 Version 2.72

1.4.1 Improvements

Solved issues

Version	Issue
2.72	The R&S License Server system service did not start automatically at Windows startup in some cases

1.5 Version 2.70

1.5.1 New functionality

Version	Function
2.70	Support of frequency conversion measurements (e.g. harmonics) on R&S ZNA/ZNB/ZNBT with option K4.

1.5.2 Modified functionality

Version	Function
2.70	The functionality of the ZNRun Calibration Client is now fully integrated into the ZNRun Workbench. The workbench no longer launches the standalone application.
2.70	R&S ZNRUN-K4xx: The OSP path config files were moved to the directory %PROGRAMDATA%\Rohde-Schwarz\ZNRun\<version>\Resources\DeviceConfig\ matrix_routes

1.5.3 Improvements

Version	Improvement
2.70	<p>R&S ZNRUN-K4xx:</p> <ul style="list-style-type: none"> Protected compliance test projects can be opened, edited, executed, debugged, tuned, visualized, and saved in the ZNRrun Workbench. <p>Note that protected compliance test projects remain protected when edited and saved. They can be executed on a ZNRrun Server with suitable K4xx option, but cannot be rolled out.</p> <ul style="list-style-type: none"> Plug-in architecture for cable tests Updated IEEE 802.3 MatLab script and config files for COM and ERL calculation (version 03/22)
2.70	<p>ZNRrun Workbench:</p> <ul style="list-style-type: none"> R&S ZNRrun projects can now also be handled in zipped form (*.znrrun files). The application supports unencrypted zip archives, and the encrypted R&S ZNRUN-K4xx compliance test projects. File and folder dialogs in ZNRrun Workbench show hidden folders. The functionality of the ZNRrun Visualization Client and ZNRrun Calibration Client was integrated into the workbench application. When browsing for a Touchstone file, the file filter is narrowed to the applicable number of ports for the current context. E.g., for balanced port de-/embedding only s4p files are displayed. Improved "Browse..." logic for grid view cells with file selection functionality
2.70	If multiple license dongles are connected to one PC, their licenses are pooled.
2.70	Support of plugins compiled for x86
2.70	Port group de-/embedding using Touchstone files: configurable assignment between physical ports and port data ("Interchange" parameter of related VNA remote control commands).

Solved issues

Version	Issue
2.70	R&S ZNRUN-K6: If, during tuning, an s4p file was selected for balanced port de-/embedding, its content was not transferred to the ZNRrun Server.
2.70	Touchstone export: For some measurements, the S-parameters in the export file were not ordered according to the logical port numbers of the DUT measurement plan.
2.70	If a custom device action was used in a measurement step, the name of the custom device action was also displayed as the name of the measurement step.
2.70	<p>ZNRrun Workbench</p> <ul style="list-style-type: none"> Selecting a file using the "Browse ..." item of a grid view cell's dropdown menu did not update the cell content Setting a de-/embedding file to "None" did not disable the corresponding de-/embedding functionality, but led to an invalid ZNRrun project.

1.6 Version 2.62

1.6.1 Modified functionality

Version	Function
2.62	R&S ZNrun-K41x: "OSP320-4-8NC" matrix definition aligned with R&S ZNA FW V2.70 and R&S ZNB/ZNBT/ZND FW V3.45

1.6.2 Improvements

Version	Improvement
2.62	R&S ZNrun-K41x: <ul style="list-style-type: none"> • The required OSP path config files are now part of the R&S ZNrun installer (*.path files in directory: %PROGRAMDATA%\Rohde-Schwarz\ZNrun\2.6x\Resources\DeviceConfig) • Improved speed of condensed calibration with R&S ZNA

Solved issues

Version	Issue
2.62	ZNrun Server raised an exception if no power meter was configured
2.62	R&S ZNrun-K410: The file name of the ZNrun project for IEEE 802.3bj-2014 clause 92 with 200 GBASE-CR8 contained the substring <code>_100GBASE_</code> .

1.7 Version 2.60

1.7.1 New functionality

Version	Function
2.60	<p>ZNrun Cable Test Client:</p> <ul style="list-style-type: none"> • Reduced number of Through measurements during calibration • New option R&S ZNrun-K410: Compliance test automation for IEEE 802.3 by, bj, cd cable assemblies • New option R&S ZNrun-K411: Compliance test automation for IEEE 802.3 ck cable assemblies <p>Note that options R&S ZNrun-K41x require a R&S ZNA with firmware version 2.60 or higher, or R&S ZNB/ZNBT/ZND with firmware version 3.45 or higher. R&S ZVA and R&S ZVT are not supported.</p>
2.60	<p>ZNrunProjectConverter.exe: new console application to convert pre-V2.0 projects to the current project format</p> <p>(Installed with the ZNrun Workbench and located in <ZNrun installdir>\Workbench)</p>

1.7.2 Modified functionality

Version	Function
2.60	32-bit support discontinued
2.60	Legacy smart cards with CardOS operating system (shipped before March 2018) are no longer supported and must be replaced

1.7.3 Improvements

Version	Improvement
2.60	ZNrun Workbench: Possibility to assign a particular calibration file to an SPM (during configuration and tuning)
2.60	ZNrun Cable Test Client: Enhancements in evaluation and reporting functionality
2.60	Enhanced re-use of compatible calibration files: aggregation of compatible calibration steps (same stimulus, port group, etc.), differing only in extended SPM attributes (averaging parameters etc.)

Solved issues

Version	Issue
2.60	Exceptions during user defined or full calibration, if no DUT-related calibration has been performed before
2.60	Device configuration was not possible for R&S ZNA network analyzers (device configuration files were missing)

1.8 Version 2.50**1.8.1 New functionality**

Version	Function
2.50	Server-side calibration results database <ul style="list-style-type: none"> • Calibrations created for a particular VNA can be reused across MEUs • Configurable selection logic via ZNrun Settings app

1.8.2 Modified functionality

Version	Function
2.50	The integrated license server was updated to version 2.2.2

1.8.3 Improvements

Version	Improvement
2.50	ZNrun Workbench: <ul style="list-style-type: none"> • The number of aperture points for delay measurements can now be configured • Support of pipelining on R&S ZNB/R&S ZNBT with firmware version 3.30 or higher • Support of "Detector" setting for wave quantity measurements
2.50	Support of power meter deembedding on R&S ZNA with firmware version 2.50 or higher, and R&S ZNB/R&S ZNBT with firmware version 3.40 or higher
2.50	Measuring a- and b-waves is now also possible on the driving VNA port
2.50	ZNrun Server <ul style="list-style-type: none"> • Plugin API: If R&S ZNrun-controlled switch matrixes are used, it is now possible to query the VNA port involved in a particular measurement • Server-side custom devices can provide configuration data to instrument-side custom DLLs (R&S ZNA with firmware version 2.10 or higher, R&S ZNB/R&S ZNBT with firmware version 3.30 or higher) • Fetch limit line points from R&S ZNA with firmware version 2.60 and R&S ZNB/R&S ZNBT with firmware version 3.50 or higher (can be activated via "ZNrun settings" app)

Solved issues

Version	Improvement
2.50	The ZNRUN Visualization Client did not use logarithmic x-axis scaling for logarithmic frequency sweeps
2.50	If tuning was enabled and the number of points of a stimulus was changed during execution, it was no longer possible to create charts in the visualization workspace
2.50	Incompatibilities with R&S ZVA
2.50	If the ZNRUN Server lost the connection to the license server, then even after the connection was reestablished, it was not possible to pause or abort running measurements from the ZNRUN Workbench
2.50	ZNRUN Visualization Client: maximizing a chart sometimes crashed the application
2.50	ZNRUN Calibration Client: calibration problem in CW mode
2.50	Limit checks did not work if "Use VNA channels instead of setups" was activated in the ZNRUN Server settings

1.9 Version 2.40

1.9.1 New functionality

Version	Function
2.40	New "ZNRUN Cable Test Client"
2.40	Pipelining <ul style="list-style-type: none"> • Support of "full" and "setup-based" pipelining on VNAs supporting the respective mode (via XML configuration editing; n.a. in ZNRUN Workbench yet) • "Hybrid" mode to support synchronous execution of custom code (custom DLLs) at the beginning and/or end of a pipelined sequential context
	Support for virtual VNAs, which combine several "real" VNAs to one large one Task 834709: Add multi vna support to combine several VNAs to one virtual VNA

1.9.2 Improvements

Version	Improvement
2.40	Support of high-end coaxial cal kit series R&S ZV-Z2xx
2.40	R&S ZNRUN now allows white-spaces in matrix ROUTE command

Solved issues

Version	Issue
2.40	The R&S ZNRUN API provided two ways to access the Stimulus Portgroup Measurement name. The API function <code>SpmName</code> was marked deprecated, replace its occurrences by <code>StimulusPortgroupMeasurementName</code> .
2.40	Calibration using calibration units: if multiple connection steps were required, sometimes the resulting calibration was not assigned to the related VNA channel
2.40	ZNRUN Calibration Client: full calibration (<code>--coverage=FULL_CALIBRATION</code>) reported missing stimulus and could not be used
2.40	ZNRUN Calibration Client crashed in expert mode with active R&S ZNRUN-K5
2.40	Projects comprising custom curves without limit lines generated errors when entering the measurement phase.
2.40	The ZNRUN Visualization Client ran out of memory when displaying multiple Stimulus Portgroup Measurements

1.10 Version 2.30**1.10.1 New functionality**

Version	Function
2.30	New rollout phase in ZNRUN Workbench workflow: roll out a valid measurement execution unit to multiple test stations, controlled by one or multiple ZNRUN Server(s).

1.10.2 Improvements

Version	Improvement
2.30	Support of floating licenses
2.30	Possibility to represent Stimulus Portgroup Measurements as channels rather than setups (new setting Windows Start menu > "R&S ZNRUN 2.9x" > "ZNRUN Settings" > ZNRUN Server > "Use VNA channels instead of setups")

1.11 Version 2.20

1.11.1 New functionality

Version	Function
2.20	History and authentication of R&S ZRun projects <ul style="list-style-type: none"> History A <code>ProjectHistory.xml</code> file, which is saved in the R&S ZRun project root folder, tracks the changes of the R&S ZRun project. Authentication (optional): Only projects last modified by certain users are allowed to run on the ZRun Server.
2.20	Support of R&S ZNA
2.20	Support of ANSI C63.25 time domain site voltage standing wave ratio measurements (requires FW V2.92 or higher on a R&S ZNB or R&S ZNBT)
2.20	Support of memory-mapped trace data transfer for R&S ZNB and R&S ZNBT (requires FW V3.10 or higher)

1.11.2 Improvements

Version	Improvement
2.20	The connection plan is now available in the ZRun Measurement Client

Solved issues

Version	Issue
2.20	Calibration with calibration kit failed on R&S ZNB

1.12 Version 2.10

1.12.1 New functionality

Version	Function
2.10	New calibration API for plugins
2.10	Human-readable version of API documentation

1.12.2 Improvements

Version	Improvement
2.10	Improved logical port de-/embedding

Solved issues

Version	Issue
2.10	Touchstone file for 6 ports had incorrect format

1.13 Version 2.01

1.13.1 Improvements

Version	Improvement
2.01	Documentation update

1.14 Version 2.00

1.14.1 New functionality

Version	Function
2.00	ZNRrun Workbench: New client application to develop, test and tune a Measurement Execution Unit (MEU) before it is used in the production field. The ZNRrun Workbench supports the core features of the R&S ZNRrun V2.00 release: DUT multiplicity, VNA multiplicity, and MEU Tuning (see below).
2.00	New option R&S ZNRrun-K5 "ZNRrun Multiplicity" <ul style="list-style-type: none"> • DUT multiplicity: parallel measurement of multiple identical DUTs on a single VNA • VNA multiplicity: parallel measurements on a single DUT using multiple VNAs
2.00	New option R&S ZNRrun-K6 "ZNRrun Tuning" The ZNRrun Server now offers a tuning API that allows client applications to modify a MEU at runtime, without reinitializing it. The ZNRrun Workbench uses this API for MEU tuning.
2.00	Python scripting of <code>CustomDevices</code> and <code>PostProcessor</code> plug-ins
2.00	Support of time domain measurements for R&S ZNB/ZNBT with time domain option K2
2.00	Support of ground loop embedding for R&S ZNB/ZNBT

Version	Function
2.00	Support of formula-defined limit lines for R&S ZNB/ZNBT with firmware V3.00 or higher
2.00	Support of star topology also for automatic calibrations with R&S ZNB/ZNBT (firmware V3.00 or higher)
2.00	Touchstone file export of balanced S-parameter traces
2.00	Support of wave quantity measurements

1.14.2 Modified functionality

Version	Function
2.00	Windows XP and Windows 7 support discontinued; R&S ZRun components updated to .NET framework 4.7.2

1.14.3 Improvements

Version	Improvement
2.00	Added an interface for retrieving information about the post processor queue
2.00	Updated R&S ZRun plug-in templates
2.00	Detailed information about plug-ins and postprocessors used by a particular MEU
2.00	A <code>MeasurementEventStepStarted</code> event is raised at the start of each measurement step

1.15 Version 1.71

1.15.1 Modified functionality

Version	Function
1.71	If only non-fatal errors/warnings occur during configuration, the R&S ZRun server now proceeds to the measurement phase ("resultOK == true")

1.15.2 Improvements

Version	Improvement
1.71	R&S ZRun now supports calibration unit R&S ZN-Z154 with 6, 12 and 18 ports (in addition to the full 24-port unit)

Solved issues

Version	Issue
1.71	The R&S ZNRun server failed in some cases when calibrating with specific device combinations (e.g. R&S ZVT8 + R&S ZN-Z84, and R&S ZN-Z154)
1.71	If more than one VNA-controlled switch matrix was used, the calibration client failed in some cases

1.16 Version 1.70**1.16.1 New functionality**

Version	Function
1.70	Logging of measurement times at R&S ZNRun measurement client
1.70	Support for manual AGC mode
1.70	Support of R&S ZNB/ZNBT's "swept" sweep mode
1.70	The <code>DevicePlanInfo</code> interface of the R&S ZNRun server now also exposes the following device properties: <ul style="list-style-type: none"> • Manufacturer • Identifier • Serial number • FW version
1.70	Server-side export of measurement data in Touchstone file format

1.16.2 Modified functionality

Version	Function
1.70	R&S ZNRun licensing based on maintenance contracts

1.16.3 Improvements**Solved issues**

Version	Issue
1.70	Init method of custom device plug-ins was not called during calibration

1.17 Version 1.60

1.17.1 New functionality

Version	Function
1.60	Support of custom calibration plugins
1.60	Execute external tools (*.exe files) from within the measurement client; the current MEU's VNA IP is passed to the tool as first command-line parameter
1.60	Support of power sensors R&S NRP33S and R&S NRP-Z85
1.60	Impedance/admittance measurements with Match/Open/Short circuits

1.17.2 Improvements

Version	Improvement
1.60	Minimized number of <code>UserConnectingSteps</code> during calibration
1.60	R&S ZRun now supports different calibration types in a single calibration file

Solved issues

Version	Issue
1.60	De-/embedding files assigned to the same VNA port in different DUT states overwrite each other
1.60	Timeout in Calibration Client during lengthy multipoint calibration
1.60	Error "access with invalid index" when uploading a R&S ZRun project file containing a power stimulus
1.60	False error message "The VNA device could not be found" in calibration client
1.60	After a calibration, the related analyzer's error queue was not checked properly
1.60	The XML schema for <code>DutMeasurementPlan</code> elements did not enforce a positive number of segments in segmented sweeps
1.60	Calibration client asserts 'object null reference' for reflection S-Parameter measurements
1.60	Sometimes error -114 was raised, if the number of calibration unit ports was smaller than the number of ports to be calibrated
1.60	Calibration steps comprising multiple power sweeps that only differ in center frequency, show a wrong number of user connection steps

1.18 Version 1.55

1.18.1 New functionality

Version	Function
1.55	Support of R&S OSP
1.55	Support of pulsed measurements in <code>DutMeasurementPlan</code>
1.55	Support of switch matrix R&S ZV-Z81 and calibration unit R&S ZN-Z154
1.55	Full support of de-/embedding data
1.55	Post-processing plug-in for ZNrun Server
1.55	Support of channel bits, trigger bits and busy bits
1.55	Support of power calibrations (as "User-defined Calibration Tasks" in ZNrun Calibration Client)

1.18.2 Modified functionality

Version	Function
1.55	License server added to R&S ZNrun setup
1.55	Calibration results are now stored in a database

1.18.3 Improvements

Version	Improvement
1.55	Improved system visualization in calibration client: a picture displays the connections required for the current calibration step
1.55	Stability and performance improvements
1.55	API improvements
1.55	Improved MWA support
1.55	Improved R&S ZNrun workflow model: "Priority" attribute to define relative execution order within PRE/MAIN/POST phases
1.55	Support balanced measurements for K11 importer
1.55	Custom names for matrix ports
1.55	Extended support of time sweeps

1.19 Version 1.42

1.19.1 Improvements

Version	Improvement
1.42	Improved configuration utility
1.42	Improved MWA import

1.20 Version 1.40

1.20.1 New functionality

Version	Function
1.40	Added an improved configuration utility

1.21 Version 1.30

1.21.1 New functionality

Version	Function
1.30	Added R&S ZNrun-K2 multiclient capability for R&S ZNrun-K1

1.22 Version 1.00

Initial release of R&S ZNrun for automated VNA tests. The installation package includes the R&S ZNrun server and GUI clients for configuration, calibration and measurement execution.

2 Modifications to the documentation

The current documentation is up to date.

3 Software installation

Installation packages of the R&S ZRun SW are supplied as a single executable file `Setup_ZRun_<version>.exe`. Please execute this file and follow the on-screen instructions.



Administrator account

You need administrator rights to install a new software version.

4 Contacting customer support

Technical support – where and when you need it

For quick, expert help with any Rohde & Schwarz product, contact our customer support center. A team of highly qualified engineers provides support and works with you to find a solution to your query on any aspect of the operation, programming or applications of Rohde & Schwarz products.

Contact information

Contact our customer support center at www.rohde-schwarz.com/support, or follow this QR code:



Figure 4-1: QR code to the Rohde & Schwarz support page