

R&S[®] ZND

Vector Network Analyzers

Release Notes for Firmware V3.72

© 2024 Rohde & Schwarz

Muehldorfstr. 15, 81671 Muenchen, Germany

Phone: +49 89 41 29 - 0

Email: info@rohde-schwarz.com

Internet: www.rohde-schwarz.com

Subject to change – Data without tolerance limits is not binding.

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

Trade names are trademarks of the owners.

The software uses several valuable open source software packages. For more information, see the "Open Source Acknowledgment", which is provided with the product.

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



1173961102
Version 68

ROHDE & SCHWARZ
Make ideas real



This document applies to the R&S®ZND (2 ports, 9 kHz to 4.5 GHz, unidirectional, N connectors), order no. 1328.5170.92 and its options.

© 2024 Rohde & Schwarz

Muehldorfstr. 15, 81671 Muenchen, Germany

Phone: +49 89 41 29 - 0

Email: info@rohde-schwarz.com

Internet: www.rohde-schwarz.com

Subject to change – data without tolerance limits is not binding.

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

Trade names are trademarks of the owners.

1173.9611.02 | Version 68 | R&S® ZND

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

1 Current firmware and version history

This document lists the changes introduced in the current and earlier versions of the R&S ZND firmware.

Firmware version

- ▶ To check your R&S ZND firmware version, select "Help" > "About..." from the main menu.

Windows 10

The R&S ZND uses a Windows10 IoT Enterprise LTSC/LTSC operating system, which is the embedded version of Windows 10 with long-term support for security updates and patches. The firmware is tested with the following OS versions:

- Windows 10 IoT Enterprise 2016 LTSC
- Windows 10 IoT Enterprise 2019 LTSC
- Windows 10 IoT Enterprise 2021 LTSC



This firmware cannot be installed on instruments running Windows 7. See the R&S ZND [product page](#) for the Windows 10 upgrade kit R&S ZND-U20.

1.1 Firmware version 3.72

This section lists the changes introduced in firmware version 3.72.



PC installation (R&S ZNXSIM)

On a PC, a manual reboot is required to complete the installation of this firmware.

1.1.1 Improvements

Solved issues

Version	Issue
3.72	SCPI recorder: <ul style="list-style-type: none"> • Incorrect command for "New Channel" • Incorrect command for "All S-Params" in channels with balanced ports
3.72	For segmented sweeps, loading direct fixture compensation data from file was rejected with an "unreasonable number of points" error

Version	Issue
3.72	Measured phases could jump by 180° for some measurement points, if: <ul style="list-style-type: none"> • An UOSM calibration was used • The calibration was performed with a coarse frequency grid and long Unknown Throughs The through paths of a multipoint calibration unit such as R&S ZN-Z154 are typical examples of long Unknown Throughs.
3.72	The "Recovery" tab of the "System Config" dialog was inadvertently hidden
3.72	High CPU and SSD load when Windows explorer was opened from the VNA GUI

1.2 Firmware version 3.71

This section lists the changes introduced in firmware version 3.71.



PC installation (R&S ZNXSIM)

On a PC, a manual reboot is required to complete the installation of this firmware.

1.2.1 Improvements

Solved issues

Version	Issue
3.71	After a firmware update to version 3.70, some global settings were reset.

1.3 Firmware version 3.70

This section lists the changes introduced in firmware version 3.70.



PC installation (R&S ZNXSIM)

On a PC, a manual reboot is required to complete the installation of this firmware.

1.3.1 New functionality

Version	Function
3.70	SCPI Recorder: Automatically generate SCPI command sequences from user instrument operation
3.70	New software option R&S ZND-K100 "SNP assistant": <ul style="list-style-type: none"> • Fast and convenient S-parameter characterization of multiport DUTs • Guided measurement and Touchstone data import • Measured and imported data combined in a common S-matrix • User-defined DUT structure model allows the SNP assistant to fill gaps in the S-matrix with "idealized" data
3.70	Calibration of switch matrix scenarios: Optimized port assignment
3.70	Converted capacitances, inductances, and resistances can be selected as measured quantities

1.3.2 New remote control functionality

Version	Function
3.70	R&S ZNXSIM: New commands <code>MMEMory:SIMulation:...</code> to handle additional simulation data
3.70	New commands <code>[SENSe:]CORRection:CKIT:ADD/[SENSe:]CORRection:CKIT:COPY</code> to add/copy a calibration kit
3.70	New <code><Type></code> constants for trigger out command <code>TRIGger:CHANnel<Ch>:AUXiliary:INTerval <Type></code> : <ul style="list-style-type: none"> • <code>PPOINT</code> (partial point) for "once per partial measurement" Replaces previous implementation of <code>POINT</code> (see modified functionality below) • <code>SEGMENT</code> for "once per segment"
3.70	Additional limit line commands: <ul style="list-style-type: none"> • <code>CALCulate:CLIMits[:STATe]</code> activates or deactivates the combined ("global") limit check • <code>CALCulate<Chn>:LIMit:X:OFFSet/CALCulate<Chn>:LIMit:Y:OFFSet</code> shifts limit lines in horizontal/vertical direction
3.70	New ENA emulation commands: <ul style="list-style-type: none"> • <code>CALCulate:CORRection</code> • <code>DISPlay:ARRange</code> • <code>DISPlay:WINDow{1...4}:SIZE</code>
3.70	New command <code>CALCulate<Ch>:TRANSform:VNETworks:ACTivateall[:STATe]</code> to activate all configured deembeddings.
3.70	User color scheme: New commands <code>DISPlay:CMAp:BWScheme LSScheme LSScheme[:STATe]</code> to add/remove the "Black White Scheme", "Line Styles Scheme", or "Light Scheme" modifier, respectively.
3.70	<code>[SENSe<Ch>:]CORRection:COLlect:CONNectioN<PhyPt> <ConnectorType></code> : New connector type/gender enum constants <ul style="list-style-type: none"> • <code>TYPFemale</code> <code>TYPMale</code> for connector type "Type F (75)" • <code>CON431female</code> <code>CON431male</code> for connector type "4.3-10"

1.3.3 Improvements

Version	Improvement
3.70	The trigger out functionality is now also available at the GUI
3.70	Additional predefined R&S OSP320 matrix definitions (for R&S ZNrun-K4xx)
3.70	When switching from local to remote operation and back, the layout of the application window is preserved: <ul style="list-style-type: none"> • The diagram arrangement is unchanged. In particular, maximized diagrams remain maximized. • The visibility of the on-screen control elements (SYSTEM – [DISPLAY] > "View Bar") is preserved. • If visible, the same softtool is shown.
3.70	A double-tap/click on a diagram now maximizes the diagram area and makes all its traces except the active one invisible
3.70	Bundled "GPIB Explorer" (a.k.a. "IECWIN32") updated to version 1.12.28.6
3.70	Bundled RsVisa updated to version 7.2.2

Solved issues

Version	Issue
3.70	Multiport calibration unit R&S ZN-Z154 <ul style="list-style-type: none"> • Noisy load match measurement at switch matrix port if R&S ZN-Z154 was used for calibration • Firmware crash during user characterization if multiple ports were characterized
3.70	External generator ports in "Cal Power Config" dialog: <ul style="list-style-type: none"> • A modified "Port Power Offset" or "Cal Power Offset" was also applied to P1, and vice versa. • Modifying the "Port Power Offset" or "Cal Power Offset" did not update the power values on the generator port's button.
3.70	TRIGger:CHANnel<Ch>:AUXiliary:INTerval <Type>: Misleading <Type> constant name POINT for "once per partial measurement" (not "once per sweep point") See modified functionality above
3.70	[SENSe<Ch>:]CORRection:COLLect[:ACquire]:SElected: Default value of the optional <DelayTimePhase> parameter was 0 instead of AUTO
3.70	Inline calibration system R&S ZN-Z3x: ICU user characterizations were not applied
3.70	For unidirectional R&S ZND, an S21 trace was displayed during OSM calibration
3.70	"External Matrices" dialog: Width of "Driver" column in "Configured Devices" table too small by default
3.70	Touchstone export of calibration kit standards: The reference resistance in the export file's option line was always set to 50 (Ohms), although the data were normalized to the cal kit's connector resistance.
3.70	Switch matrices R&S ZN-Z86X <ul style="list-style-type: none"> • LAN detection did not work correctly: Model and serial number were not displayed. • Port mode auto-detection did not work: The firmware always assumed 2-port mode and selected the wrong drivers ZN-Z86-22 or ZN-Z86-42 (instead of ZN-Z86-24 or ZN-Z86-44) for 4-port mode.

Version	Issue
3.70	Power meters R&S NRP-Z: Firmware control not possible if an RSVisa 5.12.3-1 or higher was installed on the VNA
3.70	Converted transmission impedances $Z \leftarrow S_{ij}$ ($i \neq j$) with "Shunt Impedance" model: The marker info of "dB Mag" did not show the marker value

1.4 Firmware version 3.60

This section lists the changes introduced in firmware version 3.60.



PC installation (R&S ZNXSIM)

On a PC, a manual reboot is required to complete the installation of this firmware.

1.4.1 New functionality

Version	Function
3.60	Derivative in trace math (formatted traces only)

New remote control functionality

Version	Function
3.60	New command <code>CALCulate<Ch>:PARAMeter:COPIY:CHANnel</code> implementing the "Copy Channel (+ Diagram)" GUI functionality
3.60	New command <code>[SENSE<Ch>:]CORREction:EDELay<PhyPt>:VELocity</code> to set/get the velocity factor for offset correction
3.60	New command <code>SYSTEM:COMMunicate:RDEVICE:AKAL:TEMPerature</code> to query the temperature of the active calibration unit

1.4.2 Modified functionality

Version	Function
3.60	Trace format "Unwrapped Phase": Unstable starting point normalized to upper starting point

1.4.3 Improvements

Version	Issue
3.60	Trace data import: When loading data from Touchstone file, a warning is raised if the configured reference impedances of the involved VNA ports are not identical
3.60	ISD tool (self-installed or with option R&S ZND-K220): Support for ISD version 22.11.23
3.60	SFD tool (self-installed or with option R&S ZND-K230): Support for SFD version 2022.08.17

Solved issues

Version	Issue
3.60	Fixture compensation: For "Auto Length and Loss" correction, measuring "Open and Short" sometimes yielded inferior loss estimations, compared to measuring "Open" or "Short" only.
3.60	Time domain measurements (R&S ZND-K2) in low-pass mode: DC settings did not take effect immediately.
3.60	CalKit definition: When reading a calibration standard's properties from Touchstone file, the firmware did not consider the impedance specified in the file header, and always assumed 50 Ω.
3.60	R&S ZNXSIM: VNA FW 3.50 sporadically hangs while running certain calibration sequences
3.60	Trace data import: When loading data from Touchstone file, the firmware did not consider the port impedances specified in the file header, and always assumed 50 Ω.
3.60	A calibration performed with calibration unit R&S ZN-150 was not applied, if the channel start frequency was below 10 MHz.
3.60	For instruments running Windows 10, version 21H2, the device footprint erroneously reported <code>servicePackMajorVersion="2009"</code> (instead of "21H2")

1.5 Firmware version 3.50

This section lists the changes introduced in firmware version 3.50.



PC installation (R&S ZNXSIM)

On a PC, a manual reboot is required to complete the installation of this firmware.

1.5.1 New functionality

Version	Function
3.50	Firmware support of new EcoCalU calibration units R&S ZN-ZE1xx
3.50	Deembedding assistant (R&S ZND-K220 R&S ZND-K230 R&S ZND-K210): New "Deembedding Quick Setup" dialog that guides you in choosing channel settings that permit accurate modeling with the selected fixture tool

Version	Function
3.50	Time domain measurements (R&S ZND-K2): <ul style="list-style-type: none"> • Time gates can be coupled within the same channel • Effective rise time is displayed and can be set for low pass time domain transformations
3.50	New "Only Active Channel On" function to disable all channels except the active one
3.50	For calibration kit standards defined using snp files, it is now possible to export these files

New remote control functionality

Version	Function
3.50	New command <code>CALCulate<Chn>:PARAMeter:COpy</code> , implementing the "Add Trace" and "Add Trace + Diagram" functions (additionally specifying the trace name)
3.50	Additional commands for cal validation: <ul style="list-style-type: none"> • <code>CALCulate:CALValidate:AVErAge[:STATe]</code> • <code>CALCulate:CALValidate:RESponse:IMAGinary:LOWer UPPer</code> • <code>CALCulate:CALValidate:RESponse:REAL:LOWer UPPer</code> • <code>CALCulate:CALValidate:RUN:RESult</code>
3.50	Deembedding assistant (R&S ZND-K220 R&S ZND-K230 R&S ZND-K210): New command <code>CALCulate:FMODeL:DEASsistant:RUN:RESult</code> to check for successful deembedding tool execution
3.50	Generating default calibration data using <code>[SENSe<Ch>:]CORRection:COLLect:SAVE:SELected:DEFault</code> now also works for frequency-converting channels.

1.5.2 Modified functionality

Version	Function
3.50	Time domain analysis (R&S ZND-K2): "Stimulus" > "Time Domain X-Axis" tab renamed to "Time Domain"
3.50	R&S ZNXSIM PC simulation: the default instrument is now a <i>second generation</i> R&S ZNB8 with 4 ports
3.50	R&S HUMS (R&S ZND-K980) service updated to version 1.44

1.5.3 Improvements

Version	Improvement
3.50	Temperature compensation for inline calibration units R&S ZN-Z3x Outside the temperature range covered by the factory characterization, characterization data are now calculated using extrapolation (instead of taking the data of the nearest factory-characterized temperature)
3.50	Deembedding assistant (R&S ZND-K220, R&S ZND-K230, R&S ZND-K210): DUT + test fixture data can now also be loaded from file

Version	Improvement
3.50	Command <code>DISPlay[:WINDow<Wnd>]:TRACe<WndTr>:EFEed</code> can now move live and memory traces between diagram areas
3.50	Improved wheel positioning of markers on logarithmic sweeps

Solved issues

Version	Issue
3.50	Full n-port calibration with "Reduced Number of Through" connections: Since FW V3.25, an automatic calibration involving switch matrices did not complete, if, apart from the star-shaped Through measurements, additional Through measurements were needed.
3.50	Cal validation was silently rejected, if the "original" calibration unit was not connected to the VNA. Now a warning message is displayed. Note: Currently, the same calibration unit has to be used for calibration and validation.
3.50	Compression point measurements (trace statistics): the compression values were not displayed, if the input power of the compression point was not visible on the selected stimulus axis.
3.50	HP8720 parser emulation: Acquisition of calibration data for calibration type "Trans Norm" was not initialized correctly
3.50	Power meter driver NRPSN: Auto-configuration of R&S NRX power meters did not work
3.50	With coupled markers, marker creation using <code>CALCulate<Chn>:MARKer<Mk> ON</code> behaved erratically, if <code><Mk></code> was higher than the highest existing marker number plus 1.
3.50	Inline calibration: Temperature compensation for the current ICU temperatures was only applied correctly if the corresponding flag was toggled in the calibration wizard. It was neither applied if the calibration was repeated, nor if the wizard was run with "Temperature Compensation" already checked.
3.50	If measurement data was available for some calibration standards, and the related setup was saved under a different name, then "Repeat Calibration" failed in the resulting recall set.
3.50	Changing the smoothing aperture did not take effect immediately
3.50	"Delay" memory traces used the current stimulus axis instead of the stored one
3.50	In swept mode, the validity of a calibration depends on the IF-bandwidth. However, changing the IF-bandwidth did not invalidate the calibration.
3.50	A memory trace with "Math" could not be recalled correctly if the original trace was a wave
3.50	The analyzer GUI became slow if many markers were active
3.50	Self test execution from system "Info" dialog did not work
3.50	In FW versions 3.40 and higher, selecting a trace via <code>CALCulate<Ch>:PARAmeter:SElect<TraceName></code> restarted the sweep
3.50	Drivers for calibration units R&S ZV-Z5x did not work on Windows 7

1.6 Firmware version 3.45

This section lists the changes introduced in firmware version 3.45.



PC installation (R&S ZNXSIM)

On a PC, a manual reboot is required to complete the installation of this firmware.

1.6.1 New functionality

Version	Function
3.45	Deembedding assistant for ISD, SFD, and EZD: New dedicated softtool tab and dock widget simplify common deembedding scenarios Note that the deembedding assistant requires at least one of the related software options R&S ZND-K220, R&S ZND-K230, or R&S ZND-K210.

New remote control functionality

Version	Function
3.45	New commands <code>CALCulate:LIMit:POINTs:LOWer</code> and <code>CALCulate:LIMit:POINTs:UPPer</code> to query the effective limit line data
3.45	New and improved HUMS commands (R&S ZND-K980)
3.45	Various reference marker commands <code>CALCulate<Chn>:MARKer<Mk>:REFerence:...</code> added; same functionality as for regular markers

1.6.2 Modified functionality

Version	Function
3.45	Sound feature (limit line fail beeps, keyboard clicks etc.) no longer available

1.6.3 Improvements

Version	Improvement
3.45	Delta-L 4.0 PCB characterization (R&S ZND-K231): GUI improvements
3.45	ISD (R&S ZND-K220), SFD (R&S ZND-K230), EZD (R&S ZND-K210): New "Reset" buttons in "Advanced Settings" dialogs.
3.45	Maximum number of sweep points increased to 20001
3.45	External switch matrices: Support for R&S OSP added

Solved issues

Version	Issue
3.45	Remote automatic calibration: Visualization not shown
3.45	Help/manual: Wrong syntax description of remote command [SENSe<Ch>:] SEGMENT<Seg>:DEFine
3.45	Automatic calibration: port detection failed for unidirectional R&S ZND
3.45	Power calibration did not work correctly for segmented sweeps whose stimulus values are not monotonically increasing
3.45	R&S ZNXSIM and R&S ZNrun on the same PC: The firmware simulation did not start if the R&S ZNPC driver installed with R&S ZNrun was newer than the driver installed with the R&S ZND firmware. Error message: "No valid Partnumber found!"
3.45	Calibration kit Keysight 85058EP: wrong capacitance value C_0 in Open (f) circuit model
3.45	Time domain analysis R&S ZND-K2: <ul style="list-style-type: none"> • Selecting a different time domain transform ("Type" selection on "Time Domain" tab) did not take effect • Changing the permittivity did not change the distance in TDR distance plots
3.45	R&S ZNXSIM: The enhanced offline data analysis introduced in FW V3.40 was not available in the R&S ZND simulation
3.45	Distance to fault only worked for live traces

1.7 Firmware version 3.40

This section lists the changes introduced in firmware version 3.40.



PC installation (R&S ZNXSIM)

On a PC, a manual reboot is required to complete the installation of this firmware.

1.7.1 New functionality

Version	Function
3.40	Enhanced offline data analysis using R&S ZNXSIM: <ul style="list-style-type: none"> • Channel-specific simulation data • Channel-specific simulation data can be overwritten by port-specific S-parameter data. • Activate/deactivate "Simulation Noise" from the analyzer GUI (deactivated per default)
3.40	Unidirectional R&S ZND now support automatic calibration (OSM at port 1, Trans Norm and One Path Two Ports with source port 1).
3.40	De-/embedding of virtual networks combined with scalar power calibration
3.40	User-definable print color scheme (independent of the user-definable display color scheme)
3.40	New "Operators Check" wizard that allows you to perform selftests and other helpful checks from one central place in the analyzer GUI

New remote control functionality

1.7.2 Modified functionality

Version	Function
3.40	Initially, or after a reset using <code>CONTROL:HANDLER:RESet</code> , the Handler I/O generates active low signals (negative logic).
	"Arbitrary Power" without option R&S ZND-K4: <ul style="list-style-type: none"> • The "Arbitrary Power" tab in the "Port Settings" dialog is always visible • "Arbitrary Power" settings are always possible
3.40	The integrated license server was updated to version 2.0.1.1593.
3.40	Wave quantity measurements: New renormalization (adapted from R&S ZNA) yields different amplitudes and phases compared to previous renormalization

1.7.3 Improvements

Version	Improvement
3.40	Improved warning message in case you attempt to use an uncalibrated reference receiver for source flatness calibration.
3.40	Trace data export: The number of decimal places of stimulus and response values can now be configured.
3.40	Lower minimum "Ref Value" in polar diagrams allows larger scaling.
3.40	In remote mode, a tap/click on the main window restores the "Remote" softtool.
3.40	Distance to Fault measurements (R&S ZND-K3): Cable type attenuations can be defined for frequencies > 6 GHz.
3.40	For better accuracy, the "Compression Point" trace statistic is now calculated using the a-wave (instead of the stimulus axis), if possible.
3.40	New "Arbitrary Power" tab in "Port Settings" dialog gives access to power conversion settings.
3.40	Marker values for wave and ratio traces in complex diagrams (polar coordinates)
3.40	Optional display of X-axis grid labels in cartesian diagrams with linear scale.

Solved issues

Version	Issue
3.40	Handler I/O PASS FAIL signal (pin 33) <ul style="list-style-type: none"> • In immediate pass/fail mode (<code>CONTROL:HANDLER:PASSfail:MODE NOWait</code>), the PASS FAIL signal was only adjusted at the end of the sweep. • The PASS FAIL signal showed the limit check of the current channel instead of the global check result. • In command <code>CONTROL:HANDLER:PASSfail:LOGic</code>, the meaning of <code>POSitive</code> and <code>NEGative</code> was inverted.
3.40	A "Refl Norm Open" (REFL) calibration via remote control caused the firmware to freeze, if the selected cal kit did not contain a Match standard.

Version	Issue
3.40	TRIGger:CHANnel<Ch>:AUXiliary:DURation <TrigOutDuration> did not set the trigger output duration to the specified <TrigOutDuration>.
3.40	Faulty dB conversion for "dB Mag Phase" markers and trace exports that use polar coordinates (e.g. wave quantities or power sensor traces)
3.40	For time domain traces, CALCulate<Chn>:MARKer<Mk>:FUNC:DOMAIN:USER commands did not accept values with units (and returned a misleading error message).
3.40	Markers on traces whose value at the marker position was above or below the visible range were not displayed.
3.40	Option installation via GUI: Empty alert message if unsuccessful
3.40	Bad zip compression performance of "Create R&S Support Information" could lead to GUI freezes and Windows killing the VNA application.
3.40	Automatic calibration: <ul style="list-style-type: none"> • A previously defined calibration unit port assignment <Asg> ≥ 2 was not used in [SENSe<Ch>:]CORRection:COLLect:AUTO:ASSignment<Asg>:ACQuire and hence led to bad calibration results. • Changing the port assignment to non-default or after auto-detection did not work and caused an exception. • When performed via remote control, some automatic calibrations proceeded without displaying calibration diagrams. • If multiple automatic calibrations with port assignments have been prepared, but have not been saved yet, then [SENSe<Ch>:]CORRection:COLLect:AUTO:ASSignment:DELeTe:ALL did not delete all port assignments. Subsequent port assignment definitions failed.
3.40	Communication via VXI-11 did not work after a firmware update from firmware version < 3.0.
3.40	SYSTem:ERRor:DISPlay:STATe OFF did not disable the display of information popups.
3.40	Marker format "dB Mag Phase": Incorrect magnitude calculation for certain trace formats
3.40	Time sweeps <ul style="list-style-type: none"> • Inapplicable error popup "Sweep time exceeds requested time ..." for sweeps with only one point • Inconsistent timing for certain frequencies and IF bandwidths
3.40	[SENSe<Ch>:]CORRection:COLLect:AUTO:ASSignment<Asg>:ACQuire ignored the channel number and used the active channel instead.
3.40	Some memory traces created using "Data & Func to New Mem" (or one of the corresponding parser commands) were not properly loaded from recall set.
3.40	If the current length was zero, "Auto Length and Loss" always calculated a zero loss.
3.40	For some single-ended S-parameter measurements, "Cal Off" was displayed although a calibration was applied.
3.40	If a calibration unit was recharacterized with sexless connectors (e.g. 7 mm), subsequent calibrations using this recharacterization failed with an "invalid cal unit port" warning.
3.40	Switch matrix operation: if multiple matrix switch positions are needed, the external "Channel (Sweep)" trigger required one trigger signal per matrix position instead of one trigger signal per channel
3.40	DISPlay:LAYout HORizontal did the same as DISPlay:LAYout VERTictal.

Version	Issue
3.40	The channel base power P_b could not be increased above the maximum source power PP_{max} of the R&S ZND, even though a port power offset PP_{offset} with $P_b + PP_{offset} \leq PP_{max}$ was set for all ports.
3.40	R&S ZNXSIM with more than one R&S ZNPC smart card attached to the simulation PC: The R&S ZND firmware simulation failed to start if it picked the "wrong" smart card.
3.40	Command <code>CONFigure:CHANnel<Ch>[:STATe] ON</code> did not make channel <Ch> the active one.
3.40	Touchstone file export: data for an export of 2 frequency points were exported in reverse order
3.40	Multiple peak marker search: once no peaks were found, the marker info field was hidden permanently
3.40	<code>[SENSe<Ch>:]CDLL[:STATe] <DllName>, <Boolean></code> did not accept boolean ON.
3.40	$\mu 1$ and $\mu 2$ in "Stability" parameter selection combo-box erroneously prepended with "A"
3.40	<code>CALCulate<Ch>:DATA:CHANnel:ALL</code> failed if, between measurement and data retrieval, a lower-numbered channel was deleted.
3.40	Mouse wheel scrolls in dialogs were propagated to the diagram area – with undesired side effects such as changing the current marker position.
3.40	Stability factor measurements always returned zero
3.40	Opening the "System Config" dialog via the menu bar crashed the firmware.
3.40	A recall set that was saved during an ongoing calibration could not be restored.

1.8 Firmware version 3.30

This section lists the changes introduced in firmware version 3.30.

1.8.1 New functionality

Version	Function
3.30	Cal validation: use a cal unit to check the accuracy of the active channel calibration
3.30	New software option R&S ZND-K980: R&S HUMS (health and utilization monitoring service) <ul style="list-style-type: none"> • Persistent collection of health and utilization data • Configurable access via REST and SNMP interfaces
3.30	Plugin interface and SDK for custom DLLs: extend the VNA firmware by custom SW components
3.30	New "Block Alternated" driving mode
3.30	Source flatness calibration can now use the configured offset de-/embedding (removed in FW V3.50)

Version	Function
3.30	"Web Control": browser-based access to the VNA GUI via the instrument's web interface
3.30	Unidirectional R&S ZND now supports automatic calibration (OSM at port 1, Trans Norm and One Path Two Ports with source port 1)

New remote control functionality

Version	Function
3.30	ENA emulation command alias [SENSE<Ch>]:SWEep:MODE
3.30	Pipelining of measurement data: new command CALCulate:PIPeLining:DATA? that queries the availability of channel results in single-sweep mode

1.8.2 Modified functionality

Version	Function
3.30	"Auto Power Reduction for Cal Unit" global calibration setting renamed to "Auto Power Setting for Cal Unit"
3.30	Delta-L (R&S ZND-K231): GUI <ul style="list-style-type: none"> The "Measurements" setting in the "Delta-L Settings" dialog now restricts the Delta-L measurements to ports of the selected type (single-ended or balanced). Its previous functionality (switch between single-ended and differential mode of the 1-length method) is now provided by the "1L Diff. Mode" checkbox. <p>The remote control interface was changed accordingly.</p> <ul style="list-style-type: none"> Existing command CALCulate:FMODe1:DELT:MEASurement now restricts the Delta-L measurements to balanced or single-ended ports: New command CALCulate:FMODe1:DELT:M1L:DIFFmode to enable/disable the differential mode of the 1-length method:
3.30	The integrated license server was updated to version 1.26.3.1500 Note for R&S ZNXSIM: if you want to use floating licenses, the floating license server must have at least this version

1.8.3 Improvements

Version	Improvement
3.30	The number of decimal places can now also be configured for <i>meter</i> values
3.30	Trace data export: the number of decimal places of stimulus and response values can now be configured
3.30	Eazy De-embedding (R&S ZND-K210): support for impedance correction
3.30	Delta-L (R&S ZND-K231) measurements can now include the TDR impedance traces, if R&S ZND-K2 is installed
3.30	Disable/enable all deembedding functions with a single tap or click

Version	Improvement
3.30	ISD tool (self-installed or with option R&S ZND-K230): support of "Small Fixture" mode
3.30	Distance to Fault measurements (R&S ZND-K3): cable type attenuations can be defined for frequencies > 6 GHz

Solved issues

Version	Issue
3.30	Changing the average factor was ignored while averaging was active
3.30	Limit line check: PASS/FAIL info field disappeared when diagram was maximized
3.30	Printing with user-defined colors did not work as expected
3.30	Command <code>SENSe<Ch>:SWEep:TYPE POINT</code> did not always switch from segmented to CW sweep mode
3.30	LAN power sensors R&S NRP18SN and R&S NRP18AN were not detected correctly
3.30	Switch matrix operation: if multiple matrix switch positions are needed, the external "Channel (Sweep)" trigger required one trigger signal per matrix position instead of one trigger signal per channel
3.30	Formula-defined limit lines were not exported to limit line files (*.limit)
3.30	"Repeat Cal" remained enabled after incompatible changes of the swept frequencies
3.30	Markers on traces whose value at the marker position was above or below the visible range, were not displayed
3.30	Automatic calibration: changing the port assignment to non-default or after auto-detection did not work and caused an exception
3.30	No VXI-11 connectivity after upgrade from FW V2.xx to FW V3.yy

1.9 Firmware version 3.21

This section lists the changes introduced in firmware version 3.21.

1.9.1 Improvements

Solved issues

Version	Issue
3.21	Option R&S ZND-K220 was not displayed in the "Options" tab of the "Info" dialog, even if it was properly installed and activated

1.10 Firmware version 3.20

This section lists the changes introduced in firmware version 3.20.

1.10.1 New functionality

Version	Function
3.20	Touchstone file export conforming to Touchstone® File Format Specification Version 2.0
3.20	Wave-based de-/embedding calculation as an alternative to S parameter-based calculation
3.20	Performance improvement of measurement data processing via pipelining optimization

New remote control functionality

Version	Function
3.20	New command <code>CONFigure:CHANnel:MEASure:OPTimized AUTO MANual,<Ch1>,<Ch2>,...</code> for optimized channel switching times

1.10.2 Modified functionality

Version	Function
3.20	Touchstone file export: option "Symmetric Params" renamed to "Balanced Params"

1.10.3 Improvements

Version	Improvement
3.20	Support of <code>round()</code> function in user-defined mathematical expressions
3.20	Integration of new R&S NRP-Toolkit and USB drivers V4.20 <ul style="list-style-type: none"> Support of new 90 GHz thermal power sensors R&S NRP90T and R&S NRP90TN Support of 67 GHz three-path diode power sensors R&S NRP67S, R&S NRP67SN, and R&S NRP67SN-V (TVAC) New low-level kernel driver V3.35
3.20	VNA firmware simulation R&S ZNXSIM now supports floating licenses

Solved issues

Version	Issue
3.20	Cal unit autodetection did not work for multiple port assignments
3.20	Limit line check: PASS/FAIL info fields disappeared when diagram was maximized
3.20	TRL calibration: improper handling of cal kits with multiple Line standards

Version	Issue
3.20	"DUT Centric Wizard": finishing the wizard with both "Create New Setup" and "Calibrate Newly Created Channels" selected, caused errors
3.20	CALCulate<Chn>;MARKer<Mk>;FUNction:DOMain:USER:SHOW ON did not switch on range limit lines
3.20	Remote command CALCulate<Ch>;PARAmeter:SDEFine <TraceName>, <Result> did accept invalid <Result> parameters
3.20	Wrong L3 parameter for male Short standard of CalKit R&S ZN-Z135 typical

1.11 Firmware version 3.16

This section lists the changes introduced in firmware version 3.16.

1.11.1 New functionality

Version	Function
3.16	Support of new frequency reference board

1.12 Firmware version 3.15

This section lists the changes introduced in firmware version 3.15.

1.12.1 New functionality

Version	Function
3.15	New "Distance to Fault Measurements" software option R&S ZND-K3
3.15	Transmission measurements: "parallel" converted impedance and admittance modeling (in addition to "series" modeling). New measurement results and marker formats
3.15	New software option R&S ZND-K210 "Eazy De-embedding" (EZD) based on IEEE 370
3.15	New software option R&S ZND-K220 "In-situ De-Embedding"
3.15	New software option R&S ZND-K230 "Smart Fixture De-embedding"

Version	Function
3.15	New software option R&S ZND-K231 "Delta-L 4.0 PCB Characterization"
3.15	<p>New "Disable all other Measurements" trace function:</p> <ul style="list-style-type: none"> • Disables all channels, except the active one • Disables all traces in the active channel, except the active one • Hides all diagrams except the active one <p>The previous configuration can be restored using the complementary "Enable all Measurements" function</p>

1.12.2 Modified functionality

Version	Function
3.15	"Save Report" button in system info dialog relabeled to "Create R&S Support Information"

1.12.3 Improvements

Version	Improvement
3.15	Optimized calculation of port set de-/embedding
3.15	<p>Enhanced selftest functionality:</p> <ul style="list-style-type: none"> • Detailed self test report now also available at service level 0 • Selftest execution can be triggered directly from SYSTEM – [SETUP] > "Setup" softtool tab • Test report comprises serial number and firmware version • Overall and individual test results clearly highlighted ("PASS": green, "FAIL": red)
3.15	<p>Auto length and loss functions:</p> <ul style="list-style-type: none"> • Approximate loss can be calculated based on loss values at two positive reference frequencies instead of one • Curve fitting can be restricted to a custom "Evaluation Range"
3.15	Improved handling of long diagram titles during printing
3.15	Configurable system defaults for trace-specific USER PORT "TTL1 Pass" and "TTL2 Pass" settings
3.15	Support of R&S NRQ6 power sensor via LAN

Solved issues

Version	Issue
3.15	<p>Segmented frequency sweeps:</p> <p>If the column "Segm Time" was not displayed in the "Define Segments" dialog, the total sweep time ([Sweep] > "Sweep Params" > "Sweep Time")</p> <ul style="list-style-type: none"> • was not calculated from the segment times • was configurable
3.15	Deleting a trace by dragging it to the recycle bin sometimes did not work
3.15	Calibrations using cal unit R&S ZN-Z150 resulted in an error message
3.15	Formula-defined limit lines: formula was not applied if entered directly in "Response" dialog

Version	Issue
3.15	Logarithmic interpolation of limit lines did not work for linear sweeps
3.15	Missing space between cal label and power cal label in trace info
3.15	Firmware versions 3.x created incompatible *.calkit files (* .calkit files containing snp data could not be used with previous FW versions)
3.15	Error message for missing calibration not informative
3.15	Installation of R&S ZNB/BT/D firmware simulation failed if R&S ZVA/B/T firmware simulation was installed on the same PC
3.15	When storing calibration files using MMEM:STOR:CORR, file names containing dots were truncated
3.15	Segmented sweeps: in FW versions 3.x, markers could not be positioned between sweep segments
3.15	PC firmware simulation failed to run due to missing Microsoft Visual C++ redistributable
3.15	Fixed an issue with handling multiple Line standards in TRL calibration

1.13 Firmware version 3.11

This section lists the changes introduced in firmware version 3.11.

1.13.1 Improvements

Solved issues

Version	Issue
3.11	Problems with fan control
3.11	Impedance normalization failed for some special balanced port configurations
3.11	User characterization of R&S ZN-Z154 did not work
3.11	Firmware simulation: trace noise could not be disabled in Simulation Config tool

1.14 Firmware version 3.10

This section lists the changes introduced in firmware version 3.10.

1.14.1 New functionality

Version	Function
3.10	Switch matrix support for bidirectional R&S ZND

New remote control functionality

Version	Function
3.10	Memory-mapped trace data transfer

1.14.2 Improvements

Version	Improvement
3.10	Limit line enhancements: <ul style="list-style-type: none"> • Formula-defined limit lines • Logarithmic interpolation
3.10	Cal kit data added: <ul style="list-style-type: none"> • N 50 Ω Keysight 85032B, 85032F, 85515A R&S ZN-Z170 typical Spinner BN533843, BN533844, BN533863, BN533864 • 3.5 mm R&S ZN-Z135 typical • 2.92 mm R&S ZN-Z129 typical, R&S ZN-Z129E typical • 7-16 Keysight 85038A Spinner BN533845, BN533846, BN533865, BN533866
3.10	Faster ground loop de-/embedding
3.10	Cal kit standards: loss limit increased to 100,000 GΩ/s
3.10	Menu bar: optimized submenu structure for trace math ("Trace" > "Trace Config" > "Trace Math")
3.10	Remote control: reduced number of ACQUIRE commands in Multiple Calibration Types Mode

Solved issues

Version	Issue
3.10	Marker disappeared in zoom mode
3.10	Incorrect length offset calculation, if a Short was connected when the "Auto Length" or "Auto Length and Loss" function was called
3.10	Discrete markers did not always snap to sweep points
3.10	Trace math on formatted data: for source data traces, an active "Min Hold" or "Max Hold" was ignored
3.10	Loading an unsuitable <code>snp</code> file (e.g. a <code>s3p</code> file on a 2 port instrument), caused a firmware exception and made the VNA stop sweeping

Version	Issue
3.10	Marker values not displayed for Y and Z parameter traces in "dB Mag" format
3.10	Firmware simulation: when switching between simulated instruments, the fixture de-/embedding tool support sometimes got confused about the number of available ports

1.15 Firmware version 3.00

This section lists the changes introduced in firmware version 3.00.

1.15.1 New functionality

Version	Function
3.00	Redesigned graphical user interface, in line with R&S ZNA
3.00	One button automatic calibration
3.00	Export of balanced S-parameter traces
3.00	"Info Window" Marker and bandfilter information can be displayed in a separate, resizeable "Info Window" with: <ul style="list-style-type: none"> • configurable content • automatic font scaling
3.00	Trace math on formatted traces
3.00	"Start in Preset" system configuration option: if selected, the analyzer firmware always starts with the configured preset configuration (factory or user defined)
3.00	XML format for recall set files (*.znxml)

New remote control functionality

Version	Function
3.00	New remote command <code>CALCulate<Chn>;MARKer<Mk>;REFerence:FORMat</code> to set/query the reference marker format
3.00	New query <code>CALCulate:LIMit:FAIL:DATA?</code> returns the sweep points that have failed to pass a limit line, ripple or circle test
3.00	The <code>MMEMory:LOAD:VNETworks</code> commands that specify Touchstonefiles for de-/embedding now have a query form that returns the name of the loaded file

1.15.2 Modified functionality

Version	Function
3.00	Support of R&S ZNC discontinued
3.00	The default host name is now ZND-<serial no.> (instead of RSZND-<serial no.>).
3.00	Index selection combo-boxes for parameters not measured by the active trace now display an empty selection

1.15.3 Improvements

Version	Improvement
3.00	Segmented sweeps <ul style="list-style-type: none"> It is now possible to measure several points on the same frequency in one segment It is now possible to define port-specific source power levels For adjacent segments ($f_{\text{start},n}$, $f_{\text{stop},n}$) and ($f_{\text{start},n+1}$, $f_{\text{stop},n+1}$) the connection line is not shown if $f_{\text{stop},n} > f_{\text{start},n+1}$
3.00	Source power calibration: the source flatness calibration can now also be performed using a power meter (without a preceding reference receiver calibration)
3.00	Markers <ul style="list-style-type: none"> Unlimited number of markers Marker tracking now also works for coupled markers Improved handling of overlapping segments and point based segmented sweeps
3.00	The splash screen now displays the correct VNA model, firmware version, order number, and serial number
3.00	Full support of power meter R&S NRP2
3.00	Context menu actions for trace info and bandfilter search info fields: <ul style="list-style-type: none"> Close the info field or fields (and disable their calculation) Open the related softtool tab
3.00	Marker coupling is now also possible per channel or per diagram
3.00	"Fixture Compensation" calculation now uses the configured "Freq for Loss" instead of a fixed reference frequency of 1 GHz
3.00	Trace labels can be hidden
3.00	Offset parameters: "Loss at Freq" can be set to a value $\neq 0$ even if "Delay" is currently set to 0
3.00	The "IP Address" button in the "Remote Settings" tab of the "Setup" softtool now opens the Windows "Network Connections" system config dialog.

Solved issues

Version	Issue
3.00	"Confirm Password" dialog appeared when "Hide Sensitive Information" was disabled and no password was set
3.00	User color scheme: misleading property name "Horizontal Line / Vertical Range Lines"; changed to "Vertical Range Lines"

Version	Issue
3.00	In polar trace formats, marker values were always calculated before "Smoothing" and "Hold"
3.00	"Trace Manager" dialog: <ul style="list-style-type: none"> Buttons "Delete", "Decouple all Channels", and "Couple all Scales" remained enabled after all but one trace were deleted Misleading popup "Name must be unique" when entering a single illegal character as the new trace name
3.00	Target search with delta markers did not work as expected. This issue is solved if target value format and trace format coincide.
3.00	"System Config" > "Calibration" property "Same Sweep Setup for All Standards" and related command [SENSe<Ch>:]CORREction:COLLect:CSETup erroneously appeared in R&S ZND documentation (R&S ZNA only!)
3.00	Peak search did not find minima below -100 dBm
3.00	Selecting diagram split type "Rows + Cols" made all diagrams disappear ("No Trace")
3.00	In remote commands defining balanced and port pair de-/embedding using Touchstone files, swap gates (SGATes) setting was always applied to the main port (PMAin).
3.00	When markers became coupled due to a change in sweep type, the marker configuration was not aligned immediately
3.00	Bandstop filter search caused the firmware to freeze

1.16 Firmware version 2.95

This section lists the changes introduced in firmware version 2.95.

1.16.1 Improvements

Solved issues

Version	Issue
2.95	Stability issues of hardware driver fixed

1.17 Firmware version 2.94

This section lists the changes introduced in firmware version 2.94.

1.17.1 New functionality

Version	Function
2.94	<p>Windows 10 support</p> <ul style="list-style-type: none"> • New instruments ship with Windows 10 (64bit) • Analyzer firmware V2.94 or higher supports Windows 10 and Windows 7 • Windows edition, version and build are now part of the analyzer's hardware info (SYSTEM – [SETUP] > "Setup" > "Info..." > "Hardware") <p>Upgrade kits Windows 7 → Windows 10 and additional removable system drives with Windows 10 are also available.</p>

1.17.2 Improvements

Version	Improvement
2.94	Up to 100 trace colors in user-defined color schemes
2.94	Ports sets for offset de-/embedding: the "port set number" is now indicated in the "Port Set" selection combo boxes
2.94	"Fixture Compensation" calculation now uses the configured "Freq for Loss" instead of a fixed reference frequency of 1 GHz
2.94	Marker tracking now also works for coupled markers
2.94	Touchstone file export dialog (free configuration): selected ports and port order can be preserved per recall set
2.94	Optimized calculation of time domain traces if balanced ports are configured and distance is used as the x-axis

Version	Issue
2.94	For a unidirectional R&S ZND, the "S-Parameter Wizard" could not be finished without calibration
2.94	"Low Pass Step" time domain representation (R&S ZND-K2): DC extrapolation did only work for S-parameter traces
2.94	Fixture measurement data were not always stored with <code>s1p</code> file name extension
2.94	In presence of single-ended and balanced ports, sometimes the impedance renormalization was not applied
2.94	Marker format "dB Mag" did not work for converted impedance/admittance traces

1.18 Firmware version 2.92

This section lists the changes introduced in firmware version 2.92.

1.18.1 New functionality

Version	Function
2.92	Time Domain S_{VSWR} Measurements
2.92	Offset calculation can be performed after deembedding/embedding calculation

New remote control functionality

Version	Function
2.92	New emulated instrument "E5071" (SYSTEM:LANGUAGE 'E5071') for ENA models E5071 and newer. Previously existing "ENA" mode is for models E5070 and older.
2.92	<p>ENA emulation improvements. Support for commands:</p> <ul style="list-style-type: none"> • CALCulate<Ch>:FSIMulator:SENDED:DEEMBED:PORT<Pt>[:TYPE] {USER NONE} • CALCulate<Ch>:FSIMulator:SENDED:DEEMBED:PORT<Pt>:USER:FILENAME <string> • CALCulate<Ch>:FSIMulator:SENDED:DEEMBED:STATE {ON OFF 1 0} • CALCulate<Ch>:FSIMulator:SENDED:PMCCircuit:PORT<Pt>[:TYPE] {NONE PCSC PCSL PLPC PLSC PLSL SCPC SCPL SLPC SLPL USER} • CALCulate<Ch>:FSIMulator:STATE {ON OFF 1 0} • CALCulate<Ch>[:SELEcted]:LIMit<Tr>:DATA • DISPlay:ANNotation:MESSAge:STATE {ON OFF 1 0} • DISPlay:ARRange {TILE CASCade OVERlay STACK SPLit QUAD} • DISPlay:CClear • DISPlay:ENABLE {ON OFF 1 0} • DISPlay:SPLit • DISPlay:UPDate[:IMMediate] • DISPlay:VISible {ON OFF 1 0} • DISPlay:WINDow<Ch>:TRACe<Tr>:MEMory[:STATE] {ON OFF 1 0} • MMEMory:STORe:SNP:DATA <filename> • MMEMory:STORe:SNP:TYPE:S1P <numeric> • MMEMory:STORe:SNP:TYPE:S2P <numeric1>, <numeric1> • MMEMory:STORe:SNP:TYPE:S3P <numeric2>, <numeric1>, <numeric1> • MMEMory:STORe:SNP:TYPE:S4P <numeric3>, <numeric1>, <numeric1>, <numeric1> • SENSE<ch>:CORRection:COLLect:GUIDed:CKIT:PORT<pt>:CATalog? • SENSE<Ch>:CORRection:EXTension[:STATE] {ON OFF 1 0} • SERvice:CHANnel:COUNT? • SERvice:CHANnel:TRACe:COUNT? • SOURce<ch>:POWer<pt>:CORRection:COLLect:AVERAge[:COUNT] <numeric> • SOURce:POWer<pt>:CORRection:COLLect:AVERAge:NTOLerance <numeric> • SOURce<ch>:POWer<pt>:CORRection:COLLect:SAVE [<RREC>] • SOURce<ch>:POWer<pt>:CORRection[:STATE] {ON OFF 1 0}

1.18.2 Improvements

Version	Improvement
2.92	Extended "Switch Gates" functionality for offset de-/embedding using Touchstone files

Solved issues

Version	Issue
2.92	Missing channel reference in commands MMEMory:LOAD STORE:CORRection:TCoefficient
2.92	Receiver Overload status flag not set
2.92	Backwards-incompatible modification of "Switch Gates" functionality in firmware version 2.90

1.19 Firmware version 2.90

This section lists the changes introduced in firmware version 2.90.

1.19.1 New functionality

Version	Function
2.90	New mode of automatic diagram scaling: equally formatted traces are scaled together
2.90	New "High Output Power" hardware option R&S ZND-B7

New remote control functionality

Version	Function
2.90	<p>ENA emulation improvements. Support for commands:</p> <ul style="list-style-type: none"> • CALCulate{1..4}:FSIMulator:SENDEd:ZCONversion:STATE • CALCulate{1..4}:FSIMulator:SENDEd:ZCONversion:PORT<i>:Z0[:R] • CALCulate{1..4}:FSIMulator:SENDEd:PMCircuit:STAT • CALCulate{1..4}:FSIMulator:SENDEd:PMCircuit:PORT<i>[:TYPE] • CALCulate{1..4}:FSIMulator:SENDEd:PMCircuit:PORT<i>:PARAMeter:{C G L R} • CALCulate<Ch>[:SELEcted]:FORMat • CALCulate{1..4}[:SELEcted]:FUNCTion:TYPE • CALCulate{1..4}[:SELEcted]:FUNCTion:DOMain[:STATE] • CALCulate{1..4}[:SELEcted]:FUNCTion:DOMain:START • CALCulate{1..4}[:SELEcted]:FUNCTion:DOMain:STOP • CALCulate{1..4}[:SELEcted]:FUNCTion:EXECute • CALCulate{1..4}[:SELEcted]:FUNCTion:DATA? • MMEMory:STORE:STYPe • SENSE{1..4}:CORRection:COLLect:CKIT[:SELEct] • SENSE{1..4}:CORRection:COLLect:ECAL:ISOLation[:STATE] • SENSE{1..4}:CORRection:COLLect:ECAL:PATH • SENSE{1..4}:CORRection:COLLect:ECAL:UTHR[:STATE] • SOURce{1..4}:POWer:PORT:COUPle • SYSTem:BEEPer:WARning:STATE

1.19.2 Improvements

Version	Improvement
2.90	Deembedding: streamlined fixture modeling tool support
2.90	Additional license agreements for IVI Shared Components and LucasFonts RSCorpid available via "About Vna" dialog
2.90	R&S NRP2 Power Meter: support for power sensor channel A

Solved issues

Version	Issue
2.90	Portable licenses could not be installed
2.90	HP8720 emulation: some valid queries did not return data
2.90	Source flatness calibration for segmented sweeps: tolerance limit lines were always centered at segment power levels (even if segment-specific power was inactive)
2.90	Recall set file (*.znx) backward compatibility issues with "old" firmware versions
2.90	Segment list file (*.SegList) export did not include segment bits

1.20 Firmware version 2.88

This section lists the changes introduced in firmware version 2.88.

1.20.1 New functionality

Version	Function
2.88	Support of third-party fixture modeling tools for deembedding: <ul style="list-style-type: none"> AtaiTec's <i>In Situ De-Embedding</i> (ISD), see http://ataitec.com/products/isd/ PacketMicro's <i>Smart Fixture De-embedding</i> (SFD) Tool, see https://www.packetmicro.com/Products/sfd-tool.html
2.88	<i>Open/Match</i> and <i>Short/Match</i> reflection normalization calibrations: Manual calibration types "Refl Norm Open" and "Refl Norm Short" now offer a complementary Match standard measurement.
2.88	Configurable number of decimal places for units Farad & Henry

1.20.2 Improvements

Version	Improvement
2.88	The calculated sweep time now also comprises the AGC settling time
2.88	If, when loading a recall set, a user-defined connector type is missing, an error message indicates the name of the missing connector type

Solved issues

Version	Issue
2.88	Portable software options were not displayed correctly
2.88	CalKits 85054D and 85052D: data for Short standards corrected
2.88	Printing to a UNC path via remote commands was not possible (:HCOPY resulted in an execution error if the destination was selected using MME:NAME '<UNC path>'; :HCOP:DEST 'MME';)
2.88	Fixed some problems with HP8720 emulation

1.21 Firmware version 2.86

This section lists the changes introduced in firmware version 2.86.

1.21.1 Improvements

Version	Improvement
2.86	Track the position of the sweep cursor using marker search
2.86	Improved handling of deleted/missing connector types

Solved issues

Version	Issue
2.86	Small inaccuracies and unnecessary port measurements for channels with multiple overlapping calibrations

1.22 Firmware version 2.84

This section lists the changes introduced in firmware version 2.84.

1.22.1 New functionality

Version	Function
2.84	Support of one-port calibration unit R&S ZN-Z103

1.22.2 Improvements

Solved issues

Version	Issue
2.84	"Detect Assignment" did not work for calibration unit R&S ZV-Z59
2.84	GPIB address changes were not properly persisted: a restart of the firmware always restored the default address
2.84	Problem with channel bits for segmented sweeps
2.84	Installation of option keys using xml files did not work
2.84	User characterizations of cal unit R&S ZN-Z154 could not be read
2.84	Reference impedance of logical ports could not be changed from the GUI
2.84	Fixture compensation: wrong calculation of direct compensation for measurement type "Open and Short"
2.84	Default calibration type in "Calibration Unit" wizards was TOSM instead of UOSM
2.84	Remote command <code>SYSTEM:COMMunicate:NET:HOSTname</code> previously undocumented

1.23 Firmware version 2.80

This section lists the changes introduced in firmware version 2.80.

1.23.1 New functionality

Version	Function
2.80	Embedding and deembedding now also available on R&S ZND
2.80	New connector type 4.3-10
2.80	"Arbitrary" marker mode, allowing free placement of markers in the diagram area

New remote control functionality

Version	Function
2.80	New command <code>[SENSe<Ch>:]HARMonic?</code> queries whether or not the current frequency grid is harmonic
2.80	New command <code>SYSTem:COMMunicate:GPIB[:SELf]:DCLear:SUPPress</code> to suppress Device Clear GPIB interface messages (DCL, SDC)

1.23.2 Improvements

Version	Improvement
2.80	Port activation on demand now also supported for measurement of wave quantities and ratios
2.80	On instrument shutdown the states of <i>all</i> loaded recall sets are persisted, not only the active one. These states are automatically recalled on instrument restart.

Solved issues

Version	Issue
2.80	Measurement progress indicator didn't work correctly
2.80	Accuracy of time sweep duration: the configured total sweep time ("Stop Time") is now closely met
2.80	*.csv file export with reference impedances failed if the configuration contained a balanced port
2.80	"Display > Overlay All" sometimes made some traces disappear
2.80	Image suppression is not available (only AUTO mode supported), but setting <code>SENSe<Ch>:FREQuency:SBANd</code> did not generate an error message
2.80	Loading simulation data from *.csv or *.dat format sometimes failed
2.80	Icons in the "External Tools" softtool tab were displayed too large
2.80	"Set to marker" in Numeric Editor: marker stimulus values with unit <i>m</i> were erroneously interpreted as millimeters
2.80	Setting a marker stimulus value via remote control command <code>CALCulate<Chn>:MARKer<Mk>:X</code> did not work in CW mode
2.80	Time domain transformation: <code>CALCulate<Chn>:TRANSform:TIME:STIMulus IMP</code> always activated transformation type "low pass impulse response"
2.80	Bad double-tap behavior

1.24 Firmware version 2.70

This section lists the changes introduced in firmware version 2.70.

1.24.1 Improvements

Version	Improvement
2.70	Protection against data loss in case of improper shutdown (power loss, accidental hard power off etc.)
2.70	"Automatic Harmonic Grid" functionality for "Time Domain Analysis" option R&S ZND-K2

Solved issues

Version	Issue
2.70	For generator levels <i>below</i> the possible range the message "Generator Level out of range. <i>Reduce</i> output power" was displayed

1.25 Firmware version 2.60

This section lists the changes introduced in firmware version 2.60.

1.25.1 New functionality

Version	Function
2.60	Handler I/O option R&S ZN-B14: Support of new hardware variant 05 with 5 V control logic
2.60	Support of Power Sensors R&S NRP8S/18S (requires R&S NRPxxS/SN Firmware Version 15.12.01.01 or newer)
2.60	Limit lines defined in "dB Mag" format can now also be checked in polar diagrams
2.60	Complex traces (Smith, Polar) can be limited to a user-defined "Display Circle"
2.60	New "1 mHz Frequency Resolution" software option R&S ZND-K19
2.60	New "Favorites" softtool tab and menu to manage favorite recall sets
2.60	Complementary isolation measurement for manual transmission normalization calibrations ("Trans Norm" & "Trans Norm Both")

Solved issues

Version	Function
2.60	Remote control of GUI elements <ul style="list-style-type: none"> • <code>DISPlay:MENU:KEY:TOOL:CATalog?</code> lists the available softtool tabs, <code>DISPlay:MENU:KEY:SElect</code> allows to activate them • <code>DISPlay:MENU:KEY:ACTion:CATalog</code> lists the available dialogs, <code>DISPlay:MENU:KEY:EXECute</code> allows to open them • Keysight-compatible command <code>SYSTem:CORRection:WIZard[:IMMediate] MAIN CKIT</code> to open the "Calibration > Start Cal" softtool tab or the "Calibration Kits" dialog.
2.60	Queries <code>CALCulate<Chn>:DATA?</code> and <code>CALCulate:DATA:TRACe?</code> now also support reading uncorrected ratios
2.60	Parallel calibration of multiple channels using channel-specific calibration types. This a remote-only feature, which can be activated using the new command <code>[SENSe:]CORRection:COLLect:CHANnels:MCTypes</code>

1.25.2 Improvements

Version	Improvement
2.60	Commands <code>TRIGger:CHANnel<Ch>:AUXiliary<n></code> no longer require the R&S ZND to be equipped with the Handler I/O interface R&S ZN-B14
2.60	The connector type of a logical port can now also be specified from the GUI
2.60	Improved GUI responsiveness in large multiport configurations
2.60	Enhanced power control at end of sweep

Solved issues

Version	Issue
2.60	Driver file for external generator HP83620A
2.60	Marker format R+jX yields wrong coordinates for special balanced port configurations

1.26 Firmware version 2.54

This section lists the changes introduced in firmware version 2.54.

1.26.1 Improvements

Solved issues

Version	Issue
2.54	Missing documentation for remote command [SENSe<Ch>:]CORRection:OFFSet<PhyPt>:DFComp[:STATe]?
2.54	Missing hint in documentation: commands TRIGger:CHANnel<Ch>:AUXiliary<n> are only available if the R&S ZND is equipped with the Handler I/O interface R&S ZN-B14

1.27 Firmware version 2.52

This section lists the changes introduced in firmware version 2.52.

1.27.1 Improvements

Solved issues

Version	Issue
2.52	Firmware installation problems
2.52	Missing reboot after firmware installation
2.52	"RF Off All Channels" button inoperable
2.52	Power spikes on power sweeps
2.52	Missing documentation for "Power Reduction at Sweep End" feature

1.28 Firmware version 2.50

This section lists the changes introduced in firmware version 2.50.

1.28.1 New functionality

Version	Function
2.50	Support for power meters R&S NRP-Z41/61/71
2.50	Automatic calibration via GUI: "Detect Ports & Start Cal" in one go
2.50	Additional hide/show options for traces (accessible via softtool and context menu of trace list)

Version	Function
2.50	Resizable "Sweep Info" dialog to see the current sweep status at a glance
2.50	New "Multiple Peak" marker search: detection and tracking of multiple local minima/maxima
2.50	Complementary isolation measurement for manual TOSM calibration
2.50	Configurable instrument message display: information popups can be globally disabled or limited to certain message types (Info, Warning, Error, Remote Error)
2.50	Trace specific default marker format
2.50	Optional power reduction at end of sweep

New remote control functionality

Version	Function
2.50	Keyword <code>STATe</code> now optional in command <code>DISPlay[:WINDow<Wnd>][:STATe]</code>

1.28.2 Improvements

Solved issues

Version	Issue
2.50	Remote command <code>MMEMoRY:STORe:CORRection</code> did not automatically append the <code>.cal</code> extension to the specified cal group file name; as a result those cal groups were not added to the cal pool
2.50	Incomplete description of command <code>CALCulate<Chn>:DATA</code>
2.50	False alarm when connecting a power meter R&S NRP-Z61 (error "current firmware version 4.17 < required firmware version !")
2.50	Stability measurements: softpanel buttons " μ 1 21", " μ 2 21" and "K 21" created wrong traces

1.29 Firmware version 2.41

This section lists the changes introduced in firmware version 2.41.

1.29.1 Improvements

Solved issues

Version	Issue
2.41	Remote command <code>MMEemory:STORE:CORRection</code> did not automatically append the <code>.cal</code> extension to the specified cal group file name; as a result those cal groups were not added to the cal pool

1.30 Firmware version 2.40

This section lists the changes introduced in firmware version 2.40.

1.30.1 New functionality

Version	Function
2.40	Firmware installer packages (MSI files) are now signed with R&S certificates
2.40	Touchstone file export: configurable whitespace insertion
2.40	Port activation "on request": disabled ports are automatically activated (as single-ended ports), if a trace requires them
2.40	"Bandfilter Search" for arbitrary scalar traces
2.40	New zoom logic: diagram-specific instead of trace-specific zooming, i.e. all traces of a diagram are displayed with the same zoom factor
2.40	New "Fixture Simulation Input" data access to import/export S-Parameter traces between "Offset" application and "Fixture Simulation" modelling; this allows to apply alternative fixture simulation models to the same measured data. This feature is available via remote control only; see section "New remote control features" below.

New remote control functionality

Version	Function
2.40	Command <code>[SENSe:]CORRection:COLLect:AUTO:CKIT:PORTs:ADD</code> now also allows to modify an existing characterization (i.e. to recharacterize selected ports)
2.40	New parameter for command <code>SYSTEM:SHUTdown</code> to allow for additional shutdown/restart operations: Shutdown FW, Restart FW, Shutdown Windows, Restart Windows
2.40	New <code>FSIData</code> ("Fixture Simulation Input") data access point in <code>CALCulate<Ch>:DATA:CALL</code>
2.40	New data format <code>UCData</code> to read wave quantity traces as "uncalibrated data" in commands <code>CALCulate<Chn>:DATA</code> and <code>CALCulate:DATA:TRACe</code>
2.40	New optional <code><RecallSet></code> parameter in command <code>CALCulate:DATA:ALL</code> to get result data for a particular recall set (not necessarily the active one)

Version	Function
2.40	New remote commands <code>CALCulate:LIMit:FAIL:ALL</code> , <code>CALCulate:LIMit:CIRClE:FAIL:ALL</code> and <code>CALCulate:RIPPlE:FAIL:ALL</code> to query limit violation results for a particular recall set
2.40	New command <code>DIAGnostic:PRODuct:OPTion:INFO</code> to query for installed software options

1.30.2 Modified functionality

Version	Function
2.40	LAN management of calibration units was removed

1.30.3 Improvements

Version	Improvement
2.40	Improved calibration behaviour: after a successful calibration an uncalibrated port is only disabled if it is not used by a measurement, i.e. if it is not required by any trace of the related channel
2.40	Draggable vertical divider in "Calibration Manager" dialog

Solved issues

Version	Issue
2.40	Sometimes no error message was displayed when a save to file operation failed
2.40	Wrong display of limit lines during power calibration if a non-zero "Cal Power Offset" was specified
2.40	Wrong labeling of the origin in polar diagrams
2.40	Some minor problems in marker search
2.40	Manual "adapter removal" calibration wasn't possible if waveguide standards were involved
2.40	Wrong calculation of the quality factor for bandfilter searches with bandwidth \neq 3 dB
2.40	In Time Domain mode delta markers lost their position when switching between Time and Distance scaling

1.31 Firmware version 2.30

Initial firmware release for R&S ZND.

2 Modifications to the documentation

The current documentation is up-to-date.

3 Firmware installation

Upgrade versions of the analyzer firmware are supplied as single executable setup files (*.exe).



64-bit only

For analyzer firmware versions ≥ 3.0 , 32-bit Windows is no longer supported. Only 64-bit firmware is available.

To upgrade your instrument to 64-bit Windows 10, contact Rohde & Schwarz service.



Admin account

You need administrator rights to install a new firmware. Refer to the Getting Started manual for details.

To perform a firmware update:

1. Copy the setup file to any storage medium accessible from the analyzer. This can be either the internal mass storage drive, an external storage medium (USB memory stick, external CD-ROM drive) or a network connection (LAN).
The default name of the internal drive is C:. External storage devices are automatically mapped to the next free drive, i.e. D:, E: etc.
2. Run the setup file from the Windows® Explorer. Follow the instructions of the setup wizard.
Setup files can be reinstalled.



Factory calibration

A firmware update does not affect the factory calibration.



Downgrade to a firmware version < 3.00

To downgrade the firmware from a version ≥ 3.00 to a version < 3.00 , it is required to uninstall the firmware using Windows 10 "Apps & features" before proceeding with the installation.

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