R&S® ZNB/ZNBT
Vector Network Analyzers
Release Notes for Firmware V3.71

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.

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Version 67

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This document applies to the following vector network analyzer models and their options:

- R&S® ZNB4, 9 kHz to 4.5 GHz, 2 test ports, order no. 1311.6010K22
- R&S® ZNB4, 9 kHz to 4.5 GHz, 2 test ports, order no. 1334.3330K22
- R&S® ZNB4, 9 kHz to 4.5 GHz, 4 test ports, order no. 1311.6010K24
- R&S® ZNB4, 9 kHz to 4.5 GHz, 4 test ports, order no. 1334.3330K24
- R&S® ZNB8, 9 kHz to 8.5 GHz, 2 test ports, order no. 1311.6010K42
- R&S® ZNB8, 9 kHz to 8.5 GHz, 2 test ports, order no. 1334.3330K42
- R&S® ZNB8, 9 kHz to 8.5 GHz, 4 test ports, order no. 1311.6010K44
- R&S® ZNB8, 9 kHz to 8.5 GHz, 4 test ports, order no. 1334.3330K44
- R&S® ZNB20, 100 kHz to 20 GHz, 2 test ports, order no. 1311.6010K62
- R&S® ZNB20, 100 kHz to 20 GHz, 2 test ports, order no. 1334.3330K62
- R&S® ZNB20, 100 kHz to 20 GHz, 4 test ports, order no. 1311.6010K64
- R&S® ZNB20, 100 kHz to 20 GHz, 4 test ports, order no. 1334.3330K64
- R&S® ZNB26, 100 kHz to 26.5 GHz, 2 test ports, order no. 1334.3330K63
- R&S® ZNB26, 100 kHz to 26.5 GHz, 4 test ports, order no. 1334.3330K65
- R&S® ZNB40, 10 MHz to 40 GHz, 2 test ports, order no. 1311.6010K72
- R&S® ZNB40, 100 kHz to 40 GHz, 2 test ports, order no. 1311.6010K82
- R&S® ZNB40, 100 kHz to 40 GHz, 4 test ports, order no. 1311.6010K84
- R&S® ZNB43, 100 kHz to 43.5 GHz, 2 test ports 2.92 mm, order no. 1334.3330K92
- R&S® ZNB43, 100 kHz to 43.5 GHz, 2 test ports 2.4 mm, order no. 1334.3330K93
- R&S® ZNB43, 100 kHz to 43.5 GHz, 4 test ports 2.92 mm, order no. 1334.3330K94
- R&S® ZNB43, 100 kHz to 43.5 GHz, 4 test ports 2.4 mm, order no. 1334.3330K95
- R&S® ZNBT8, 9 kHz to 8.5 GHz, 4 test ports (up to 24 ports optional),
  order no. 1318.7006K24
- R&S® ZNBT20, 100 kHz to 20 GHz, 8 test ports (up to 24 ports optional),
  order no. 1332.9002K24
- R&S® ZNBT20, 100 kHz to 20 GHz, 8 test ports (up to 24 ports optional),
  order no. 1332.9002K64
- R&S® ZNBT26, 100 kHz to 26.5 GHz, 8 test ports (up to 24 ports optional),
  order no. 1332.9002K34
- R&S® ZNBT40, 100 kHz to 40 GHz, 8 test ports (up to 24 ports optional),
  order no. 1332.9002K44

1 Current firmware and version history

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

Firmware version

► To check your R&S ZNB/ZNBT firmware version, select "Help" > "About..." from the main menu.

Windows 10

The R&S ZNB/ZNBT uses a Windows10 IoT Enterprise LTSB/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 LTSB
- Windows 10 IoT Enterprise 2019 LTSC
- Windows 10 IoT Enterprise 2021 LTSC

ⓘ This firmware cannot be installed on instruments running Windows 7.

See the product pages of R&S ZNB and R&S ZNBT for the Windows 10 upgrade kits R&S ZNB/ZNBT-U2x.

1.1 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.

1.1.1 Improvements

Solved issues

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

1.2 Firmware version 3.70

This section lists the changes introduced in firmware version 3.70.

(i) PC installation (R&S ZNXSIM)
On a PC, a manual reboot is required to complete the installation of this firmware.

1.2.1 New functionality

Version	Function
3.70	Support of new R&S ZNBT20 variant 64, order no. 1332.9002K64 (replaces 1332.9002K24)
3.70	SCPI Recorder: Automatically generate SCPI command sequences from user instrument operation
3.70	New software option R&S ZNBT-K27: Pulsed sources for R&S ZNBT
3.70	New software option R&S ZNB/ZNBT-K100 "SNP assistant": • 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

1.2.2 New remote control functionality

Version	Function
3.70	R&S ZNXSIM: New commands `MMEMory:SIMulation:...` to handle additional simulation data
3.70	New commands `[SENSe:]CORRection:CKIT:ADD`/`[SENSe:]CORRection:CKIT:COPY` to add/copy a calibration kit
3.70	New `<Type>` constants for trigger out command `TRIGger:CHANnel<Ch>:AUXiliary:INTerval <Type>`: • `PPOint` (partial point) for "once per partial measurement" Replaces previous implementation of `POINt` (see modified functionality below) • `SEGMent` for "once per segment"
3.70	Additional limit line commands: • `CALCulate:CLIMits[:STATe]` activates or deactivates the combined ("global") limit check • `CALCulate<Chn>:LIMit:X:OFFSet`/`CALCulate<Chn>:LIMit:Y:OFFSet` shifts limit lines in horizontal/vertical direction

Version	Function
3.70	New ENA emulation commands: • `CALCulate:CORRection` • `DISPlay:ARRange` • `DISPlay:WINDow{1...4}:SIZE`
3.70	New command `CALCulate<Ch>:TRANsform:VNETworks:ACTivateall[:STATe]` to activate all configured deembeddings.
3.70	User color scheme: New commands `DISPlay:CMAP:BWSCheme|LSCHeme|LSSCheme[:STATe]` to add/remove the "Black White Scheme", "Line Styles Scheme", or "Light Scheme" modifier, respectively.
3.70	Rise time measurements (R&S ZNB/ZNBT-K20): Setting `CALCulate<Chn>:TTIMe:DATA` now defines the content of the rise time info field (basic/extended information).
3.70	Eye diagram measurements (R&S ZNB/ZNBT-K20): New commands • `CALCulate<Chn>:EYE:MEASurement:BASic` and `CALCulate<Chn>:EYE:MEASurement:TIME` selectively showing/hiding "Basic" and "Time" results in the measurement results info field • `DISPlay:CMAP:EYE:TCHigh:RGB` and `DISPlay:CMAP:EYE:TCLow:RGB` defining the color gradient of the eye diagram (as a heat map)
3.70	`[SENSe<Ch>:]CORRection:COLLect:CONNection<PhyPt> <ConnectorType>`: New connector type/gender enum constants • `TYPFemale	TYPMale` for connector type "Type F (75)" • `CON431female	CON431male` for connector type "4.3-10"

1.2.3 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: • 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 • 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: • 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	Intermodulation power calibration (R&S ZNB/ZNBT-K14): If more than one channel was selected for calibration, only the active one was calibrated
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 • 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.
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

1.3 Firmware version 3.61

This section lists the changes introduced in firmware version 3.61.

(i) PC installation (R&S ZNXSIM)
On a PC, a manual reboot is required to complete the installation of this firmware.

1.3.1 Improvements

Solved issues

Version	Issue
3.61	Missing characters on R&S ZNBT mini display

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	R&S ZNBT8: Support of new synthesizer boards with new instruments (serial number >= 200000) or upgrade
3.60	Derivative in trace math (formatted traces only)

New remote control functionality

Version	Function
3.60	New command `CALCulate<Ch>:PARameter:COPY:CHANnel` implementing the "Copy Channel (+ Diagram)" GUI functionality
3.60	New command `[SENSe<Ch>:]CORRection:EDELay<PhyPt>:VELocity` to set/get the velocity factor for offset correction
3.60	New command `SYSTem:COMMunicate:RDEVice:AKAL:TEMPerature` 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 config-ured reference impedances of the involved VNA ports are not identical
3.60	ISD tool (self-installed or with optionR&S ZNB/ZNBT-K220): Support for ISD version 22.11.23
3.60	SFD tool (self-installed or with option R&S ZNB/ZNBT-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	Measurement uncertainty analysis (R&S ZNB-K50/K51): Missing uncertainty models for R&S ZNB43; the default uncertainty models that were used instead, yielded inaccurate results.
3.60	Time domain measurements (R&S ZNB/ZNBT-K2) in low-pass mode: DC settings did not take effect immediately.
3.60	Repeating a SMARTerCal led to duplicate power meter buttons (one of them invalid), if a power meter with a different ID was selected
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	R&S ZNBT with switch matrix R&S ZN-Z84: Firmware freezes for certain logical port configura-tions
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 `servicePackMajorVersion="2009"` (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 ZNB/ZNBT-K220 | R&S ZNB/ZNBT-K230 | R&S ZNB/ZNBT-K210): New "Deembedding Quick Setup" dialog that guides you in choosing channel settings that permit accurate modeling with the selected fixture tool
3.50	Time domain measurements (R&S ZNB/ZNBT-K2): • Time gates can be coupled within the same channel • Effective rise time is displayed and can be set for low pass time domain transformations (Previously only available with R&S ZNB/ZNBT-K20)
3.50	New "Only Active Channel On" function to disable all channels except the active one
3.50	Measurement uncertainty analysis (R&S ZNB/ZNBT-K50): Significance level can now be configured
3.50	For calibration kit standards defined using snp files, it is now possible to export these files
3.50	New calibration procedure "P-Refl OSM" (PFOPort)

New remote control functionality

Version	Function
3.50	New command `CALCulate<Chn>:PARameter:COPY`, implementing the "Add Trace" and "Add Trace + Diagram" functions (additionally specifying the trace name)
3.50	Additional commands for cal validation: • `CALCulate:CALValidate:AVERage[:STATe]` • `CALCulate:CALValidate:RESPonse:IMAGinary:LOWer|UPPer` • `CALCulate:CALValidate:RESPonse:REAL:LOWer|UPPer` • `CALCulate:CALValidate:RUN:RESult`
3.50	Deembedding assistant (R&S ZNB/ZNBT-K220 | R&S ZNB/ZNBT-K230 | R&S ZNB/ZNBT-K210): New command `CALCulate:FMODel:DEASsistant:RUN:RESult` to check for successful deembedding tool execution
3.50	Generating default calibration data using `[SENSe<Ch>:]CORRection:COLLect:SAVE:SELected:DEFault` now also works for frequency-converting channels.

1.5.2 Modified functionality

Version	Function
3.50	Time domain analysis (R&S ZNB/ZNBT-K2): "Stumulus" > "Time Domain X-Axis" tab renamed to "Time Domain"
3.50	R&S ZNXSIM PC simulation: the default instrument is now a *second generation* R&S ZNB8 with 4 ports
3.50	R&S HUMS (R&S ZNB/ZNBT-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 ZNB/ZNBT-K220, R&S ZNB/ZNBT-K230, R&S ZNB/ZNBT-K210): DUT + test fixture data can now also be loaded from file
3.50	Command `DISPlay[:WINDow<Wnd>]:TRACe<WndTr>:EFEed` 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 `CALCulate<Chn>:MARKer<Mk> ON` behaved erratically, if <Mk> 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	Eye diagrams (R&S ZNB/ZNBT-K20): Changing "Advanced Settings" did not take immediate effect
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

Version	Issue
3.50	In FW versions 3.40 and higher, selecting a trace via `CALCulate<Ch>:PARameter:SELect <TraceName>` 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	Firmware support of new 2nd generation R&S ZNB model R&S ZNB43
3.45	Option R&S ZNB40-B73/-U73: Reflector board with ESD limiters for R&S ZNB40
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 ZNB/ZNBT-K220, R&S ZNB/ZNBT-K230, or R&S ZNB/ZNBT-K210.
3.45	LO suppression function, reducing the LO power leaking out of the test ports.

New remote control functionality

Version	Function
3.45	New commands `CALCulate:LIMit:POINts:LOWer` and `CALCulate:LIMit:POINts:UPPer` to query the effective limit line data
3.45	New and improved HUMS commands (R&S ZNB/ZNBT-K980)
3.45	Various reference marker commands `CALCulate<Chn>:MARKer<Mk>:REFerence:...` 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
3.45	Redefined physical ports: An external generator now must be configured before it can be used as source port in remote command `[SENSe:]UDSParams<Pt>:PARam`.

1.6.3   Improvements

Version	Improvement
3.45	Delta-L 4.0 PCB characterization (R&S ZNB/ZNBT-K231): GUI improvements
3.45	ISD (R&S ZNB/ZNBT-K220), SFD (R&S ZNB/ZNBT-K230), EZD (R&S ZNB/ZNBT-K210): New "Reset" buttons in "Advanced Settings" dialogs.
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	Calibration units R&S ZV-Zxx not detected by 2nd generation R&S ZNB
3.45	Help/manual: Wrong syntax description of remote command `[SENSe<Ch>:]SEGMent<Seg>:DEFine`
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 ZNB/ZNBT 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	Precision frequency reference R&S ZNB/ZNBT-B4: No "OCXO Cold" warning if the reference frequency quartz was not on working temperature (Was only displayed with developer service level 3)
3.45	Time domain analysis R&S ZNB/ZNBT-K2: • 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 ZNBT simulation
3.45	Distance to fault only worked for live traces
3.45	If Channel – [Channel Config] > "Channels" > "Fixture Simulator" is enabled on a 2-port R&S ZNB, then the corresponding setup cannot be loaded into a 4-port R&S ZNB

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	Support of new 2nd generation R&S ZNB models: • R&S® ZNB26, 100 kHz to 26.5 GHz, 2 test ports 2.92 mm male, order no. 1334.3330K63 • R&S® ZNB26, 100 kHz to 26.5 GHz, 4 test ports 2.92 mm male, order no. 1334.3330K65
3.40	Enhanced offline data analysis using R&S ZNXSIM: • 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	Measurement uncertainty analysis (R&S ZNB/ZNBT-K50): Support for METAS `scolv` cal kit files.
3.40	Support of new reflectometer board (order no. 1317.8015.03) for R&S ZNB40 • New reflectometers equipped with internal ESD limiters • Displayed as option R&S ZNB40-B73 in system "Info" dialog • Replacement kit available as R&S ZNB40-U73 **Note**: While the old reflectometer board was equipped with bias tees, the new one is not. For R&S ZNB40 equipped with the new board, bias tees are not available.
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 `CONTrol:HANDler:RESet`, the Handler I/O generates active low signals (negative logic).
3.40	"Arbitrary Power" without option R&S ZNB/ZNBT-K4: • 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 ZNB/ZNBT-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	"Power" stimulus axis can be selected without option R&S ZNB/ZNBT-K4.
3.40	Extended time domain analysis R&S ZNB/ZNBT-K20: maximum symbol rate for eye diagrams increased to 120 GSymbols/s
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) • In immediate pass/fail mode (`CONTrol:HANDler:PASSfail:MODE NOWait`), 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 `CONTrol:HANDler:PASSfail:LOGic`, the meaning of `POSitive` and `NEGative` 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.
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.

Version	Issue
3.40	Automatic calibration: • 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 • Inapplicable error popup "Sweep time exceeds requested time ..." for sweeps with only one point • Time sweeps did not work correctly for R&S ZNBxx with xx ≥ 20. • 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	Mixer measurements (R&S ZNB/ZNBT-K4): A channel now remains in mixer mode, if port settings are changed afterwards. Previously, it would have switched to arbitrary mode.
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	`DISPlay:LAYout HORizontal` did the same as `DISPlay:LAYout VERTictal`.
3.40	The channel base power P_b could not be increased above the maximum source power PP_{max} of the R&S ZNB/ZNBT, even though a port power offset PP_{offset} with $P_b + PP_{offset} ≤ PP_{max}$ 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 ZNB/ZNBT firmware simulation failed to start if it picked the "wrong" smart card.
3.40	Command `CONFigure:CHANnel<Ch>[:STATe] ON` 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	`[SENSe<Ch>:]CDLL[:STATe] <DllName>, <Boolean>` did not accept boolean `ON`.
3.40	µ1 and µ2 in "Stability" parameter selection combo-box erroneously prepended with "Å"
3.40	`CALCulate<Ch>:DATA:CHANnel:ALL` failed if, between measurement and data retrieval, a lower-numbered channel was deleted.

Version	Issue
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 3.32

This section lists the changes introduced in firmware version 3.32.

1.8.1 Improvements

Solved issues

Version	Issue
3.32	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
3.32	For some "older" R&S ZNBT20, the firmware did not boot after updating to firmware version 3.30
3.32	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

1.9 Firmware version 3.30

This section lists the changes introduced in firmware version 3.30.

1.9.1 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 ZNB/ZNBT-K980: R&S HUMS (health and utilization monitoring service) • 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

Version	Function
3.30	Source flatness calibration can now use the configured offset de-/embedding (removed in FW V3.50)
3.30	"Web Control": browser-based access to the VNA GUI via the instrument's web interface

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

1.9.2 Modified functionality

Version	Function
3.30	For R&S ZNB variants 1334.3330.xx, GUI sounds are now disabled and the "Sounds" check-box in the "User Interface" tab of the "System Config" dialog is hidden
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 ZNB/ZNBT-K231): GUI • 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. The remote control interface was changed accordingly. • Existing command `CALCulate:FMODel:DELT:MEASurement` now restricts the Delta-L measurements to balanced or single-ended ports: • New command `CALCulate:FMODel: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

1.9.3 Improvements

Version	Improvement
3.30	The number of decimal places can now also be configured for *meter* 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 ZNB/ZNBT-K210): support for impedance correction
3.30	Delta-L (R&S ZNB/ZNBT-K231) measurements can now include the TDR impedance traces, if R&S ZNB/ZNBT-K2 is installed

Version	Improvement
3.30	Disable/enable all deembedding functions with a single tap or click
3.30	ISD tool (self-installed or with option R&S ZNB/ZNBT-K230): support of "Small Fixture" mode
3.30	Distance to Fault measurements (R&S ZNB/ZNBT-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 `SENSe<Ch>:SWEep:TYPE POINt` did not always switch from segmented to CW sweep mode
3.30	Parallel measurement of multiple DUTs, with frequency offset: • Calibration of balanced ports failed with error message "Initialization of calibration failed - inconsistent data." • Calibration of single-ended ports measured at logical instead of physical ports
3.30	R&S ZNBT: slow sweeps due to missing sweep time recalculations
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	Source flatness calibration of mixer ports: during RF and IF port calibrations, the LO port was not driving for certain mixer configurations
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

1.10 Firmware version 3.21

This section lists the changes introduced in firmware version 3.21.

1.10.1 Improvements

Solved issues

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

1.11 Firmware version 3.20

This section lists the changes introduced in firmware version 3.20.

1.11.1 New functionality

Version	Function
3.20	Support of new R&S ZNB instrument variants: • R&S® ZNB4, 9 kHz to 4.5 GHz, 2 test ports, order no. 1334.3330.22 • R&S® ZNB4, 9 kHz to 4.5 GHz, 4 test ports, order no. 1334.3330.24 • R&S® ZNB8, 9 kHz to 8.5 GHz, 2 test ports, order no. 1334.3330.42 • R&S® ZNB8, 9 kHz to 8.5 GHz, 4 test ports, order no. 1334.3330.44 • R&S® ZNB20, 100 kHz to 20 GHz, 2 test ports, order no. 1334.3330.62 • R&S® ZNB20, 100 kHz to 20 GHz, 4 test ports, order no. 1334.3330.64
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 `CONFigure:CHANnel:MEASure:OPTimized AUTO	MANual,<Ch1>,<Ch2>,...` for optimized channel switching times

1.11.2 Modified functionality

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

1.11.3   Improvements

Version	Improvement
3.20	R&S ZNBT: reduced sweep time for certain measurements
3.20	Support of *round()* function in user-defined mathematical expressions
3.20	Integration of new R&S NRP-Toolkit and USB drivers V4.20 • 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
3.20	The "TDR Wizard" now also works for more than 4 ports (on the VNA and connected switch matrices)

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
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

1.12   Firmware version 3.17

This section lists the changes introduced in firmware version 3.17.

1.12.1   Improvements

Solved issues

Version	Issue
3.17	R&S ZNBT: production-related issues

1.13 Firmware version 3.16

This section lists the changes introduced in firmware version 3.16.

1.13.1 New functionality

Version	Function
3.16	Support of new frequency reference board

1.14 Firmware version 3.15

This section lists the changes introduced in firmware version 3.15.

1.14.1 New functionality

Version	Function
3.15	Measurement uncertainty analysis using METAS VNA Tools (option R&S ZNB-K50/K50P) for all R&S ZNB models: • "METAS Calibration" using calibration kits with uncertainties • Real-time visualization of measurement uncertainty • Verification using verification kits with uncertainties • Real-time visualization of verification results • Export to METAS VNA Tools for offline analysis For the R&S ZNBT, this option is **not** available.
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 ZNB-K210/R&S ZNBT-K210 "Eazy De-embedding" (EZD) based on IEEE 370
3.15	New software option R&S ZNB-K220/R&S ZNBT-K220 "In-situ De-Embedding"
3.15	New software option R&S ZNB-K230/R&S ZNBT-K230 "Smart Fixture De-embedding"
3.15	New software option R&S ZNB-K231/R&S ZNBT-K231 "Delta-L 4.0 PCB Characterization"
3.15	New "Disable all other Measurements" trace function: • 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 The previous configuration can be restored using the complementary "Enable all Measurements" function
3.15	New automatic gain control algorithm (**R&S ZNB only!**) **Note** that the new "Memory AGC" algorithm has become the factory default for the R&S ZNB. You can reactivate the legacy "Point AGC" algorithm in the "System Config" dialog ("Power" tab > "Global AGC" setting).

1.14.2   Modified functionality

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

1.14.3   Improvements

Version	Improvement
3.15	"Distance to Fault" measurements (R&S ZNB-K3/R&S ZNBT-K3): • Import dialog for cable types • Now available on all ports • Now also available in "Applic" softtool
3.15	Optimized calculation of port set de-/embedding
3.15	Extended time domain analysis (option R&S ZNB/ZNBT-K20): new "TDR Wizard" to set up and calibrate a TDR measurement quickly (**R&S ZNB only!**)
3.15	Enhanced selftest functionality: • 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	Auto length and loss functions: • 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	Segmented frequency sweeps: If the column "Segm Time" was not displayed in the "Define Segments" dialog, the total sweep time ([Sweep] > "Sweep Params" > "Sweep Time" • 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	Configured "Reference Receiver Cal Power" value not used for SMARTerCal
3.15	R&S ZNBT segmented sweeps: AGC "Auto" mode in one segment activated the AGC pre-measurement for measurements in all segments
3.15	Multiple DUT configurations: for segmented sweeps with segment-specific power, the AGC learn sweep did not work
3.15	Calibrations using cal unit R&S ZN-Z150 resulted in an error message

Version	Issue
3.15	Formula-defined limit lines: formula was not applied if entered directly in "Response" dialog
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	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 incorrect environment detection
3.15	Fixed an issue with handling multiple Line standards in TRL calibration

1.15 Firmware version 3.13

This section lists the changes introduced in firmware version 3.13.

1.15.1 Improvements

Solved issues

Version	Issue
3.13	`SYST:SHUT RESTART` did not restart the firmware

1.16 Firmware version 3.12

This section lists the changes introduced in firmware version 3.12.

1.16.1 Improvements

Solved issues

Version	Issue
3.12	Firmware versions 3.x created incompatible `*.calkit` files (`*.calkit` files containing snp data could not be used with previous FW versions)
3.12	R&S ZNBT8 with CPU board "LPW10" and image version "1.0 (64-bit)": update to firmware versions 3.x failed CPU board and image version can be found in the "Info" dialog ("Setup" tab > "Image Information" section)
3.12	PC firmware simulation failed to run due to missing Microsoft Visual C++ redistributable

1.17 Firmware version 3.11

This section lists the changes introduced in firmware version 3.11.

1.17.1 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

1.18 Firmware version 3.10

This section lists the changes introduced in firmware version 3.10.

1.18.1 New functionality

Version	Function
3.10	Ground loop de-/embedding per port group (i.e. per DUT)
3.10	New "Distance to Fault Measurements" software option R&S ZNB-K3/R&S ZNBT-K3

New remote control functionality

Version	Function
3.10	Memory-mapped trace data transfer

1.18.2 Improvements

Version	Improvement
3.10	Limit line enhancements: • Formula-defined limit lines • Logarithmic interpolation
3.10	Cal kit data added: • **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	Measurement uncertainty analysis (option R&S ZNB-K50) • Additional consistency checks for METAS calibration configuration • Cable movement and reconnection events: the name of the measurement file that is generated with the event report, can be configured
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	Calibrated imbalance and CMRR traces did not show "Cal" label
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 `snp` file (e.g. a `s3p` file on a 2 port instrument), caused a firmware exception and made the VNA stop sweeping
3.10	"Load Simulation Data" from snp files with $n > 9$ did not work reliably

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

1.19 Firmware version 3.00

This section lists the changes introduced in firmware version 3.00.

1.19.1 New functionality

Version	Function
3.00	Redesigned graphical user interface, in line with R&S ZNA
3.00	Guided, "DUT Centric" measurement and calibration
3.00	One button automatic calibration
3.00	Uncertainty analysis using METAS VNA Tools II (option R&S ZNB-K50) • "METAS Calibration" using calibration kits with uncertainties • Real-time visualization of measurement uncertainty • Verification using verification kits with uncertainties • Real-time visualization of verification results • Export to METAS VNA Tools II for offline analysis **This option is only available for certain R&S ZNB model variants.**
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: • 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`)
3.00	External generators: "Minimum Settling Delay" system setting See the "Power" tab in the "System Config" dialog.

New remote control functionality

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

1.19.2 Modified functionality

Version	Function
3.00	Support of 32-bit Windows discontinued
3.00	The default host name has changed: • ZNB-<serial no.> (instead of RSZNB-<serial no.>) for R&S ZNB • ZNBT-<serial no.> (instead of RSZNBT-<serial no.>) for R&S ZNBT
3.00	Predefined port configuration "3 x Single" (4-port R&S ZNB): changed the assignments of logical to physical ports
3.00	Index selection combo-boxes for parameters not measured by the active trace now display an empty selection
3.00	The "All S-Params" function is now always active. However, if it would result in more than 100 diagrams being created, the operation can be canceled.
3.00	In "Swept" mode, the "Sweep Time" field is cleared and disabled

1.19.3 Improvements

Version	Improvement
3.00	Segmented sweeps • 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 $(f_{start,n}, f_{stop,n})$ and $(f_{start,n+1}, f_{stop,n+1})$ the connection line is not shown if $f_{stop,n} > f_{start,n+1}$
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 • 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	Automatic calibration: Through measurements can be limited to a "star", centered at a configurable port

Version	Improvement
3.00	Full support of power meter R&S NRP2
3.00	Context menu actions for trace info and bandfilter search info fields: • 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	The "External Generators" dialog allows you to limit the list of known external devices to supported generators
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 ≠ 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"
3.00	In polar trace formats, marker values were always calculated before "Smoothing" and "Hold"
3.00	"Trace Manager" dialog: • 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	"Imbalance Differential" dialog: the displayed "Imbalance Result" formula for "Imbalance 1" was not correct (although the calculation was)
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 ZNB/ZNBT documentation (R&S ZNA only!)
3.00	Peak search did not find minima below -100 dBm
3.00	`SYSTem:COMMunicate:RDEVice:SMATrix:DELete` did not delete the configured switch matrices
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-/embeding using Touchstone files, swap gates (`SGATes`) setting was always applied to the main port (`PMAin`).
3.00	R&S ZNB/ZNBT-K4: balanced ports with different arbitrary frequency formula

Version	Issue
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

1.19.4 Known issues

Version	Issue
3.00	For an external generator R&S SMB100A, power sweeps don't work if the generator is in list mode. Temporary workaround: disable "Fast Sweep" for these generators.

1.20 Firmware version 2.95

This section lists the changes introduced in firmware version 2.95.

1.20.1 Improvements

Solved issues

Version	Issue
2.95	Stability issues of hardware driver fixed

1.21 Firmware version 2.94

This section lists the changes introduced in firmware version 2.94.

1.21.1 New functionality

Version	Function
2.94	Support of new multiport analyzers R&S ZNBT26 and R&S ZNBT40
2.94	Windows 10 support • 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") Upgrade kits Windows 7 → Windows 10 and additional removable system drives with Windows 10 are also available
2.94	R&S ZNBT with option R&S ZNBT-K4: the generator flag can be set for multiple VNA ports driven by the same internal source (source 1 drives ports 1 to 8, source 2 drives ports 9 to 24). Requires identical arbitrary frequency and power settings for all generator ports driven by the same internal source.

New remote control functionality

Version	Function
2.94	New query `SYSTem:COMMunicate:RDEVice:SMATrix<Matr>:SERial` returns the serial number of an active switch matrix

1.21.2 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	A R&S ZNBT8 with options R&S ZNBT8-B504, R&S ZNBT8-B508, and R&S ZNBT8-B112 reported an "invalid option key combination"
2.94	"Low Pass Step" time domain representation (R&S ZNB/ZNBT-K2): DC extrapolation did only work for S-parameter traces
2.94	Fixture measurement data were not always stored with `s1p` file name extension

Version	Issue
2.94	Switch matrix configuration: in the "Logical Port Config" tab of the "Balanced Ports" dialog, the logical port numbers were limited to the number of VNA ports
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

1.22 Firmware version 2.92

This section lists the changes introduced in firmware version 2.92.

1.22.1 New functionality

Version	Function
2.92	Time Domain S_{VSWR} Measurements in accordance with ANSI C63.25
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	ENA emulation improvements. Support for commands: • `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:PMCircuit: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}`

1.22.2 Improvements

Version	Improvement
2.92	Port sets for deembedding and embedding can now have any number of ports
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

Version	Issue
2.92	Parallel measurement of multiple DUTs • Traces got mixed up if reference impedances other than the default 50 Ω were used. • Port pair embedding did not work.
2.92	Backwards-incompatible modification of "Switch Gates" functionality in firmware version 2.90

1.23 Firmware version 2.90

This section lists the changes introduced in firmware version 2.90.

1.23.1 New functionality

Version	Function
2.90	New mode of automatic diagram scaling: equally formatted traces are scaled together

New remote control functionality

Version	Function
2.90	ENA emulation improvements. Support for commands: • `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`

1.23.2 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	One point calibration with switch matrix did not work
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

1.24 Firmware version 2.88

This section lists the changes introduced in firmware version 2.88.

1.24.1 New functionality

Version	Function
2.88	Support of third-party fixture modeling tools for deembedding: • AtaiTec's *In Situ De-Embedding* (ISD), see http://ataitec.com/products/isd/ • PacketMicro's *Smart Fixture De-embedding* (SFD) Tool, see https://www.packetmicro.com/Products/sfd-tool.html
2.88	*Open/Match* and *Short/Match* reflection normalization calibrations: Manual calibration types "Refl Norm Open" and "Refl Norm Short" now offer a complementary Match standard measurement.
2.88	High impedance setting for voltage/current measurement on GPIO pins 9 and 10 (requires RFFE/GPIO interface R&S ZN-B15/Z15 Var. 03 with FPGA version 6.1.0 or higher)
2.88	Configurable number of decimal places for units Farad & Henry

1.24.2 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	Extended power range options for R&S ZNBT: ports 5 to 24 : for all ports the generator level check was based on the option availability for ports 1 to 4 (option B21)
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 `MMEM:NAME '<UNC path>'; :HCOP:DEST 'MMEM';`)
2.88	Multiple DUTs: single-ended S-parameters of balanced ports could not be measured
2.88	Fixed some problems with HP8720 emulation

1.25 Firmware version 2.86

This section lists the changes introduced in firmware version 2.86.

1.25.1 New functionality

Version	Function
2.86	Support of additional test ports 17 to 24 for R&S ZNBT20 (options R&S ZNBT20-B120 and -B124)

1.25.2 Improvements

Version	Improvement
2.86	Support of chopped driving mode with arbitrary frequencies (option R&S ZNB/ZNBT-K4)
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
2.86	Reverse order of shunt resistances in description of remote command `CONTrol<Ch>:GPIO<Port>:SHUNt`

1.26 Firmware version 2.84

This section lists the changes introduced in firmware version 2.84.

1.26.1 Improvements

Version	Improvement
2.84	Extended Time Domain Analysis (option R&S ZNB/ZNBT-K20): • Configurable modulation type for eye diagram generator signal (NRZ, PAM-4, PAM-8, PAM-16) • "TDR XY" softtool split into "Y Axis" and "X Axis" softtools with additional configuration options

Solved issues

Version	Issue
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 `SYSTem:COMMunicate:NET:HOSTname` previously undocumented

1.27 Firmware version 2.82

This section lists the changes introduced in firmware version 2.82.

1.27.1 New functionality

Version	Function
2.82	Support of redesigned vector network analyzers R&S ZNB40 with extended frequency range 100 kHz to 40 GHz: • 2 port variant (order no. 1311.6010.82) • 4 port variant (order no. 1311.6010.84)
2.82	Support of Extended Dynamic Range hardware options for R&S ZNBT8
2.82	Support of one-port calibration unit R&S ZN-Z103

1.27.2 Improvements

Version	Improvement
2.82	Redesigned "Applic" softtool: select an application to display the related softtool tabs

Solved issues

Version	Issue
2.82	"Detect Assignment" did not work for calibration unit R&S ZV-Z59
2.82	GPIB address changes were not properly persisted: a restart of the firmware always restored the default address
2.82	Problem with channel bits for segmented sweeps
2.82	Calibration problems with R&S ZNB20 and cal unit R&S ZV-Z52 for higher frequencies
2.82	Installation of option keys using xml files did not work
2.82	User characterizations of cal unit R&S ZN-Z154 could not be read
2.82	External Handler I/O option R&S ZNBT-Z14 erroneously displayed as R&S ZNBT-B14
2.82	Reference impedance of logical ports could not be changed from the GUI

1.28 Firmware version 2.80

This section lists the changes introduced in firmware version 2.80.

1.28.1 New functionality

Version	Function
2.80	Support of new external RFFE GPIO interface R&S ZN-Z15 for R&S ZNBT (and R&S ZNB)
2.80	New connector type 4.3-10

Version	Function
2.80	"Arbitrary" marker mode, allowing free placement of markers in the diagram area
2.80	Extended Time Domain Analysis (option R&S ZNB/ZNBT-K20) New time domain measurements: • Rise time measurement • Skew measurement, including limit test

New remote control functionality

Version	Function
2.80	New command `[SENSe<Ch>:]HARMonic?` queries whether or not the current frequency grid is harmonic
2.80	New command `CALCulate<Chn>:EYE:MASK AUTO` to perform an automatic eye mask calculation via remote control (requires option R&S ZNB/ZNBT-K20)
2.80	New command `SYSTem:COMMunicate:GPIB[:SELF]:DCLear:SUPPress` to suppress Device Clear GPIB interface messages (DCL, SDC)

1.28.2 Improvements

Version	Improvement
2.80	Manual Automatic Gain Control (AGC) configuration: new convenience functions to apply the same AGC mode to all a and b wave receivers
2.80	R&S ZNBT: mini display now indicates "Shutdown or Restart in Progress" during instrument shutdown or restart
2.80	Port activation on demand now also supported for measurement of wave quantities and ratios
2.80	On instrument shutdown the states of *all* loaded recall sets are persisted, not only the active one. These states are automatically recalled on instrument restart.
2.80	For frequency conversion measurements always the "Flatten Noise" averaging mode is used; the "Reduce Noise" mode is unsuitable in this case.
2.80	Faster sweep segment creation via remote control
2.80	R&S ZNBT: faster loading of "complex" recall sets

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	Loading simulation data from `*.csv` or `*.dat` format sometimes failed

Version	Issue
2.80	Icons in the "External Tools" softtool tab were displayed too large
2.80	S-parameter wizard: if a test setup with more than two ports was selected and a 4-port calibration unit was used, the port preselection in the calibration step was wrong
2.80	"Set to marker" in Numeric Editor: marker stimulus values with unit *m* were erroneously interpreted as millimeters
2.80	Setting a marker stimulus value via remote control command `CALCulate<Chn>:MARKer<Mk>:X` did not work in CW mode
2.80	Frequency converting measurements: recall sets comprising a reverse sweep could not be loaded
2.80	Time domain transformation: `CALCulate<Chn>:TRANsform:TIME:STIMulus IMP` always activated transformation type "low pass impulse response"
2.80	Bad double-tap behavior
2.80	R&S ZNB20 with switch matrix: timeout eror messages during calibration

1.29 Firmware version 2.75 (R&S ZNBT20 Only)

This section lists the changes introduced in firmware version 2.75.

1.29.1 New functionality

Version	Function
2.75	Support of new vector network analyzer R&S ZNBT20: frequency range 100 kHz to 20 GHz, 8 test ports (up to 16 ports optional)

1.29.2 Improvements

Version	Improvement
2.75	Manual Automatic Gain Control (AGC) configuration: new convenience functions to apply the same AGC mode to all a and b wave receivers

Solved issues

Version	Issue
2.75	Measurement progress indicator didn't work correctly

1.30 Firmware version 2.70

This section lists the changes introduced in firmware version 2.70.

1.30.1 New functionality

Version	Function
2.70	New "Extended Time Domain Analysis" option R&S ZNB-K20 / R&S ZNBT-K20

1.30.2 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 ZNB-K2 / R&S ZNBT-K2

Solved issues

Version	Issue
2.70	Coupled markers in Time Domain moved unexpectedly
2.70	For generator levels *below* the possible range the message "Generator Level out of range. *Reduce* output power" was displayed

1.31 Firmware version 2.60

This section lists the changes introduced in firmware version 2.60.

1.31.1 New functionality

Version	Function
2.60	Parallel measurements with R&S ZNBT: arbitrary drive port order
2.60	Handler I/O options R&S ZN-B14 and R&S ZNBT-Z14: support of new hardware variants **05** with 5 V control logic
2.60	Support of 3rd generation RFFE board R&S ZN-B15 Var. 03 with current and voltage measurement
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

Version	Function
2.60	Complex traces (Smith, Polar) can be limited to a user-defined "Display Circle"
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")
2.60	"Cal Off" analysis in "Calibration Manager" dialog: the "Channel Properties" now indicate mismatches between current channel settings and the settings that were used during calibration. Currently the analysis is limited to settings related to Parallel Measurements with Frequency Offset and Frequency Sweep Mode.

Solved issues

Version	Function
2.60	Remote control of GUI elements • `DISPlay:MENU:KEY:TOOL:CATalog?` lists the available softtool tabs, `DISPlay:MENU:KEY:SELect` allows to activate them • `DISPlay:MENU:KEY:ACTion:CATalog` lists the available dialogs, `DISPlay:MENU:KEY:EXECute` allows to open them • Keysight-compatible command `SYSTem:CORRection:WIZard[:IMMediate] MAIN | CKIT` to open the "Calibration > Start Cal" softtool tab or the "Calibration Kits" dialog.
2.60	Queries `CALCulate<Chn>:DATA?` and `CALCulate:DATA:TRACe?` now also support reading uncorrected ratios
2.60	Remote command `SYSTem:COMMunicate:RDEVice:SMATrix:SCAN` for auto detection of switch matrixes, corresponding to "Scan Instruments" function of "External Matrices" GUI dialog
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 `[SENSe:]CORRection:COLLect:CHANnels:MCTYpes`

1.31.2 Improvements

Version	Improvement
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
2.60	Parallel Measurements with Frequency Offset: improved AGC Mode "Auto"

Solved issues

Version	Issue
2.60	Driver file for external generator HP83620A
2.60	Parallel measurement with frequency offset: CAL flag
2.60	Switch matrix routing optimization: "Precision" mode didn't work correctly

Version	Issue
2.60	External switch matrix R&S ZN-Z85: • No warning was displayed in case the USB connection was lost • False warning message "Current sweep range is not covered by available data of matrix" for frequencies between 8.5 GHz and 20 GHz
2.60	Marker format R+jX yields wrong coordinates for special balanced port configurations
2.60	Mixer Meas Wizard didn't set generator flag for external LO generator
2.60	Error in calibration unit wizard for calibrations with multiple port assignments and multiple channels
2.60	Wrong calculation of transmission coeffecents when invoked from "Power Meter Transmission Coefficients" dialog

1.32 Firmware version 2.56

This section lists the changes introduced in firmware version 2.56.

1.32.1 New functionality

Version	Function
2.56	Swept mode for linear frequency sweeps (both non-segmented and segmented)

1.32.2 Improvements

Version	Improvement
2.56	Commands `TRIGger:CHANnel<Ch>:AUXiliary<n>` no longer require the R&S ZNB/ZNBT to be equipped with the Handler I/O interface R&S ZN-B14/R&S ZNBT-Z14

1.33 Firmware version 2.54

This section lists the changes introduced in firmware version 2.54.

1.33.1 New functionality

Version	Function
2.54	Parallel measurements on multiple DUTs (with or without frequency offset) for R&S ZNB
2.54	Parallel measurements on multiple DUTs with frequency offset for R&S ZNBT

1.33.2   Improvements

Version	Improvement
2.54	Improved AGC mode "Auto"

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 ZNB/ZNBT is equipped with the Handler I/O interface R&S ZN-B14/R&S ZNBT-Z14

1.34   Firmware version 2.52

This section lists the changes introduced in firmware version 2.52.

1.34.1   Improvements

Solved issues

Version	Issue
2.52	Firmware installation problems
2.52	Missing reboot after firmware installation
2.52	Mixer Meas Wizard didn't set generator flag for internal LO ports
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

1.35   Firmware version 2.50

This section lists the changes introduced in firmware version 2.50.

1.35.1 New functionality

Version	Function
2.50	Support for power meters R&S NRP-Z41/61/71
2.50	Support for external switch matrix R&S ZN-Z85
2.50	Automatic calibration via GUI: "Detect Ports & Start Cal" in one go
2.50	Additional hide/show options for traces (acessible via softtool and context menu of trace list)
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 `STATe` now optional in command `DISPlay[:WINDow<Wnd>][:STATe]`

1.35.2 Improvements

Version	Improvement
2.50	Improved power supply fan control for R&S ZNBT
2.50	Improved masking of stimulus info at the GUI

Solved issues

Version	Issue
2.50	Remote command `MMEMory:STORe:CORRection` did not automatically append the `.cal` 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 `CALCulate<Chn>:DATA`
2.50	In multiport scenarios (more than 4 test ports) the measured S parameter could not be selected by mouse click (in the related "Numeric Editor")
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 "µ1 21", "µ2 21" and "K 21" created wrong traces

Version	Issue
2.50	R&S ZNB20: Global properties were not saved on shutdown via standby key
2.50	R&S ZNBT: When multiple DUTs were measured in parallel, "export snp" was only available for DUT 1

1.36 Firmware version 2.41

This section lists the changes introduced in firmware version 2.41.

1.36.1 Improvements

Solved issues

Version	Issue
2.41	Remote command `MMEMory:STORe:CORRection` did not automatically append the `.cal` extension to the specified cal group file name; as a result those cal groups were not added to the cal pool

1.37 Firmware version 2.40

This section lists the changes introduced in firmware version 2.40.

1.37.1 New functionality

Version	Function
2.40	New balanced measurement parameter: Common Mode Rejection Ratio
2.40	Firmware installer packages (MSI files) are now signed with R&S certificates
2.40	Touchstone file export: configurable whitespace insertion
2.40	R&S ZNBT mini display now indicates status levels OK, INFO (general errors), WARNING (setting errors) and ERROR<id> (boot errors, HW errors)
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	R&S ZNBT: support for new Handler I/O option R&S ZNBT-Z14

Version	Function
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 "Off-set" 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 `[SENSe:]CORRection:COLLect:AUTO:CKIT:PORTs:ADD` now also allows to modify an existing characterization (i.e. to recharacterize selected ports)
2.40	New parameter for command `SYSTem:SHUTdown` to allow for additional shutdown/restart operations: Shutdown FW, Restart FW, Shutdown Windows, Restart Windows
2.40	New `FSIData` ("Fixture Simulation Input") data access point in `CALCulate<Ch>:DATA:CALL`
2.40	New data format `UCData` to read wave quantity traces as "uncalibrated data" in commands `CALCulate<Chn>:DATA` and `CALCulate:DATA:TRACe`
2.40	New optional `<RecallSet>` parameter in command `CALCulate:DATA:ALL` to get result data for a particular recall set (not necessarily the active one)
2.40	New remote commands `CALCulate:LIMit:FAIL:ALL`, `CALCulate:LIMit:CIRCle:FAIL:ALL` and `CALCulate:RIPPle:FAIL:ALL` to query limit violation results for a particular recall set
2.40	New command `DIAGnostic:PRODuct:OPTion:INFO` to query for installed software options

1.37.2 Modified functionality

Version	Function
2.40	LAN management of calibration units was removed

1.37.3 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
2.40	Speed and memory optimization for multiport measurements

Solved issues

Version	Issue
2.40	Sometimes no error message was displayed when a save to file operation failed
2.40	R&S ZNBT: Parallel measurement of multiple DUT's was disabled at the GUI if option R&S ZNBT-K4 was not installed
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 bandwith ≠ 3 dB
2.40	In Time Domain mode delta markers lost their position when switching between Time and Distance scaling

1.38 Firmware version 2.30

This section lists the changes introduced in firmware version 2.30.

1.38.1 New functionality

Version	Function
2.30	Support of RFFE/GPIO board (R&S ZN-B15) on R&S ZNB, including RFFE read operations
2.30	New averaging mode "Moving Average" using simple moving averages of the real and imaginary parts
2.30	New "Fixture Simulator" switch to disable and (re-)enable the configured deembedding, embedding, balanced ports, and port impedance settings for a particular channel
2.30	Support for new multiport calibration unit R&S ZN-Z154
2.30	Bandfilter search: a new system setting defines how the center frequency is calculated (geometric or arithmetic mean of the band edge frequencies)
2.30	New GUI font

New remote control functionality

Version	Function
2.30	New remote command `CALCulate:RIPPle:DISPlay:RESult:ALL[:STATe]` to configure the display of ripple check info fields ("Show Results All Traces" GUI function)
2.30	New remote commands `CALCulate<Ch>:DATA:CHANnel:ALL` and `CALCulate<Ch>:DATA:CHANnel:DALL` to read all traces or data traces of a particular channel, respectively

1.38.2 Improvements

Version	Improvement
2.30	LAN settings of a switch matrix can be read and modified from the analyzer GUI
2.30	Calibration metadata • Cal Kit: For each port the name of the used calibration kit is stored with the calibration. If available, this information is displayed by the "Calibration Manager" and can be queried remotely. • Time of calibration: The calibration manager now displays this timestamp in local time instead of UTC. At the remote interface both UTC and local time can be queried.
2.30	Performance optimizations for multiport measurements
2.30	Performance optimizations for multichannel measurements
2.30	Manual calibration with cal kits R&S ZV-Z1xx: as characteristic data are not available for these cal kits, the calibration wizard no longer diplays the corresponding information message

Solved issues

Version	Issue
2.30	With more than 4 ports, double-clicking the "TRACE > Meas > S-Params > S-Parameter" text field didn't open the on-screen keyboard
2.30	Occasionally logical ports were not correctly assigned
2.30	Wrong display of power during calibration with segmented sweep
2.30	Temporary GUI freeze when moving the marker towards the boundary of the sweep range using a fast turn of the rotary knob

1.39 Firmware version 2.20

This section lists the changes introduced in firmware version 2.20.

1.39.1 New functionality

Version	Function
2.20	64 bit software for R&S ZNB/ZNBT • More that 2 GB RAM supported New R&S ZNB/ZNBT are shipped with 8 GB RAM, an Upgrade Kit for older instruments will be available soon • No more sweep point limitations in multiport scenarios with full n-port calibration
2.20	Port set de-/embedding: deembedding and embedding of *2m*-port networks (m=2,3,4) via Touchstone files
2.20	New print option: hardcopy of diagram area, preserving layout and colors ("real screenshot")
2.20	For complex traces (Smith, Polar), trace statistics can be calculated for resistances and conductances (in addition to voltages)

New remote control functionality

Version	Function
2.20	New remote commands to handle cal kit data in Keysight format: • `[SENSe:]CORRection:CKIT:DMODe` allows to toggle between ZVR compatible (el. length) and Keysight (delay) modelling • `[SENSe:]CORRection:CKIT:<StandardType>`, `[SENSe:]CORRection:CKIT:<StandardType>:WLABel` and `[SENSe:]CORRection:CKIT:<ConnType>:<StandardType>` interpret/return the delay parameter according to the selected modelling • `[SENSe:]CORRection:CKIT:STANdard:DATA` returns the parameters of a calibration standard in either of the two modellings
2.20	New remote command `SYSTem:DISPlay:CONDuctances` to set the "Conductance in Embedding Networks" flag

1.39.2 Improvements

Version	Improvement
2.20	All de-/embedding networks created via SCPI can be displayed and edited at the GUI
2.20	R&S ZNBT virtual hardkey panel is now ON by default
2.20	Remote limit check: automatic recalculation of violation state (queried using `CALCulate<Chn>:LIMit:FAIL?` or `CALCulate:CLIMits:FAIL`) whenever a relevant setting is changed; same logic as the GUI

Solved issues

Version	Issue
2.20	Sweep time could not be changed using rotary knob
2.20	Default cal kits could be modified via remote interface

Version	Issue
2.20	Limit line violations were indicated although they occurred outside the sweep range
2.20	Hardcopies created using `HCOPy[:IMMediate]` exhibit truncated grids and blackened areas

1.40 Firmware version 2.10

This section lists the changes introduced in firmware version 2.10.

Changed calibration behavior in firmware version 2.10

In contrast to previous releases, after a successful calibration (system error correction or power calibration) uncalibrated ports are now disabled in the related channels.

If only one of the physical ports forming a balanced port is uncalibrated, the balanced port is dissolved and only the uncalibrated (single-ended) port is disabled.

A port is *uncalibrated*, if it neither has a valid system error correction, nor a valid power calibration.

1.40.1 New functionality

Version	Function
2.10	New faceless multiport analyzer R&S ZNBT • Support of R&S ZNBT8 with all available hardware and software options • Parallel measurement of multiple DUTs • New remote command `SYSTem:INFO:CONTrast` to set the contrast level of the mini display
2.10	Support for new "Device Control" interface card (hardware option R&S ZNB-B12 / R&S ZNBT-B12), providing a PCIe and a Direct Control interface

New remote control functionality

Version	Function
2.10	New command `MEMory:CATalog:COUNt` returns the number of loaded recall sets

1.40.2 Solved issues

Version	Issue
2.10	"File name" input field was missing in "Save" dialog
2.10	For multi-channel setups, SMARTer Cal could not be selected in "Mixer Meas Wizard"

1.41 Firmware version 2.00

This section lists the changes introduced in firmware version 2.00.

1.41.1 New functionality

Version	Function
2.00	RFFE and GPIO interfaces (new option R&S ZN-B15)
2.00	Out of the box support for new calibration kit R&S ZV-Z129

New remote control functionality

Version	Function
2.00	New command `MMEMory:LOAD:CKIT:SDATa:WLABel` to load cal kit characterization data from Touchstone files; similar to existing command `MMEMory:LOAD:CKIT:SDATa` but supports cal kit addressing **by label**
2.00	New commands `[SENSe:]CORRection:CKIT:<OnePortStandardType>:WLABel:SDATa` and `[SENSe:]CORRection:CKIT:<TwoPortStandardType>:WLABel:SDATa` to read back the cal kit S-parameter data previously loaded using `MMEMory:LOAD:CKIT:SDATa:WLABel` or `MMEMory:LOAD:CKIT:SDATa`
2.00	New command `DIAGnostic:DUMP:SIZE` to set the level of detail of the dump files created in case of firmware exceptions

1.41.2 Improvements

Version	Improvement
2.00	Improved error logging: if a channel was removed from a loaded recall set because its applied calibration is not available in the cal pool, a corresponding message is written to the error log
2.00	Support for connector type SMA

Solved issues

Version	Issue
2.00	Wrong DC port numbers in menu "Trace > Meas > DC" (with option R&S ZNB-B81)
2.00	UNDO sometimes didn't restore a valid calibration
2.00	Missing display updates for certain power meter traces

1.42 Firmware version 1.95

This section lists the changes introduced in firmware version 1.95.

1.42.1 Improvements

Version	Improvement
1.95	Support of Shift JIS character encoding at remote interface
1.95	Faster AGC filters

Solved issues

Version	Issue
1.95	When measuring multiple Y- and Z-parameters in parallel, sometimes the traces got messed up
1.95	In presence of memory traces and markers, switching between regular and segmented sweep could crash the VNA application

1.43 Firmware version 1.94

This section lists the changes introduced in firmware version 1.94.

1.43.1 New functionality

Version	Function
1.94	New options R&S ZNB4/8-B52/B54 extend the dynamic range of a R&S ZNB4 or R&S ZNB8 to 140 dB (typically 150 dB) for full 2-port calibrated measurements; B52 applies to 2-port, B54 to 4-port models.

New remote control functionality

Version	Function
1.94	New commands to delete memory traces: • `CALCulate<Ch>:PARameter:DELete:CMEMory` deletes all memory traces in the selected channel • `CALCulate:PARameter:DELete:MEMory` deletes all memory traces in all channels (same functionality as "Delete all Mem" function in manual control)

1.43.2 Improvements

Version	Improvement
1.94	Support of new calibration unit R&S ZN-Z51; in particular, characterization data can be stored to and read from a microSD card inserted at the R&S ZN-Z51
1.94	Support of new switch matrix unit R&S ZN-Z84
1.94	Remote control: optimized selection of active trace, resulting in much faster reselection

Solved issues

Version	Issue
1.94	Sporadic spikes on S-parameter traces
1.94	Manual calibration: cal kits with multiple Throughs weren't properly handled
1.94	Manual TOSM calibration: silent fallback to UOSM (due to missing Through characterization or missing gender of Through standard) produced inaccurate calibration results
1.94	Time domain traces (R&S ZNB-K2): display of stimulus values was truncated when R&S ZNB-K19 (Frequency Resolution 1 mHz) was active
1.94	Balanced ports: incorrect measurement of single-ended S-parameters for constituent physical ports
1.94	GUI language selection wasn't possible
1.94	Automatic calibration: cal unit state after calibration was undefined (not preserving the last measured calibration standard, as it was the case until firmware V1.91)

1.44 Firmware version 1.93

This section lists the changes introduced in firmware version 1.93.

1.44.1 New functionality

Version	Function
1.93	Support for R&S ZNB20 with 4 test ports (order no. 1311.6010.64)
1.93	Calculation of differential mode imbalance of a DUT with balanced input and output ports, connected to a balanced test port and two single-ended test ports
1.93	Touchstone file export with renormalization according to port-specific impedances
1.93	Additional information (comments) in exported Touchstone Files: • port-specific renormalization information (if applied) • VNA identification • timestamp • headings for included data tables
1.93	UTF-8 support at remote interface

1.44.2 Improvements

Version	Improvement
1.93	Firmware exception handling: automatic creation of dump files with configurable level of detail
1.93	Alternative GUI presentation of "capacitor in parallel with resistor" circuit blocks in lumped de-/embedding networks: resistances can be displayed and specified as conductances
1.93	Measurement of imbalance parameters on 2-port VNAs with connected switch matrices
1.93	Error bit for connected external switch matrices in the `STATus:QUEStionable:INTegrity:HARDware` register

Solved issues

Version	Issue
1.93	A single "Undo"/"Redo" sometimes executed multiple actions
1.93	Inverse ON/OFF logic in remote command `SENSe:SEGMent:POWer:GAINcontrol:CONTrol`
1.93	Excessive measurement time when both single-ended and balanced S-parameters are displayed

1.45 Firmware version 1.91

This section lists the changes introduced in firmware version 1.91.

1.45.1 New functionality

Version	Function
1.91	New 2-port calibration type: Adapter Removal
1.91	Redefined S-Parameters due to freely definable physical ports (reference receiver, measurement receiver, generator)
1.91	Balanced ports: display single-ended S-parameters for the constituent physical ports within the same channel
1.91	Support of CalUnit ZN-Z151
1.91	Embedding/Deembedding: • 4-port de-/embedding networks for arbitrary port pairs • Ground Loop De-/Embedding • Differential Match Embedding • GUI redesign

New remote control functionality

Version	Function

1.91	New commands
	`CALCulate<Ch>:TRANsform:VNETworks:BALanced:DEEMbedding<LogPt>:PARameters:DATA<Cmp>`
	
	`CALCulate<Ch>:TRANsform:VNETworks:BALanced:EMBedding<LogPt>:PARameters:DATA<Cmp>`
	
	`CALCulate<Ch>:TRANsform:VNETworks:SENDed:DEEMbedding<PhyPt>:PARameters:DATA`
	
	`CALCulate<Ch>:TRANsform:VNETworks:SENDed:EMBedding<PhyPt>:PARameters:DATA`
	
	to define an embedding/deembeding network from S-Parameter traces provided in IEEE 488.2 block data format (as opposed to existing `MMEM:LOAD:VNETworks:BALanced|SENDed:EMBedding|DEEMbedding` commands that load these traces from Touchstone files located at the R&S ZNB's file system).

1.91	New command `MMEMory:CKIT:INFO` to query basic information about a cal kit defined in a cal kit file
1.91	New commands to load cal kit data • by name, label and gender from the pool: `[SENSe<Ch>:]CORRection:COLLect:CKIT:LOAD` • by gender from file: `[SENSe<Ch>:]CORRection:COLLect:CKIT:INSTall` plus complementary command `[SENSe<Ch>:]CORRection:COLLect:CKIT:PORT<PhyPt>` to verify the loaded data
1.91	New command `SYSTem:PRESet:REMote[:STATe]` to "Align *Rst to User Defined Preset"
1.91	Parameter <ConnectorType> is now optional in • `[SENSe:]CORRection:CKIT:CATalog` • `[SENSe:]CORRection:CKIT:LCATalog`
1.91	Logical Port numbers in DC and Power Added Efficiency measurements (`CALCulate<Ch>:PARameter:MEASure`, `CALCulate<Ch>:PARameter:SDEFine`)
1.91	Additional system error correction properties `ACAL`, `SPORt`, `TSTamp`, `TVNA`, `MVNA` and `MTESt` can be queried in `[SENSe<Ch>:]CORRection:DATA:PARameter<Sfk>` and `[SENSe<Ch>:]CORRection:DATA:PARameter<Sfk>:PORT<PhyPt>`
1.91	Additional power calibration properties `TSTamp`, `TVNA`, `MVNA` and `MTESt` can be queried in `SOURce<Ch>:POWer:CORRection:DATA:PARameter<Wv>`

1.45.2 Improvements

Version	Improvement
1.91	Logical ports: • free assignment of logical port numbers to balanced or unbalanced ports • "Use Default" flag to toggle between default and renormalized port impedance(s)
1.91	Revised time gating mathematics for step response calculation
1.91	Fixture Compensation (length/loss): • "Direct Compensation" data can be saved to and loaded from file • Compensation can be toggled ON/OFF (per port)

Version	Improvement
1.91	Switch Matrices: • Calibration using 6- or 8-port cal units now arranges physical ports in ascending order • Info dialog now also covers configured switch matrices. In particular, for mechanical matrices the current relay switch counts are reported (if supported by the matrix) • "Used" switch matrices can be deleted (with automatic test port renumbering) • Memory management: after completing a full n-port calibration for a large number of ports, the number of sweep points is automatically decreased to prevent out of memory errors
1.91	On creation of a new setup, if the current memory consumption is too high (> 800 MB), existing setups are automatically closed (with confirmation dialog)
1.91	Trace data import: S-parameter traces can be "auto distributed" to related diagrams
1.91	New flags to control the execution behavior of certain remote commands
1.91	Various GUI enhancements: • "Trace Statistics": a restricted "Evaluation Range"" is indicated in the "Trace Statistics" info field • Streamlined trace data import/export • Calibration unit selection (GUI): model variant displayed in GUI labels (new label "<model>-<variant>::<serial #>")
1.91	Frequencies can be displayed with a fixed unit (Hz, kHz, MHz, GHz, THz) instead of an automatically selected one (default)
1.91	Reference Impedances: when switching from single-ended to balanced mode, the reference impedances of the balanced port (differential/common mode) are calculated from the reference impedances of its constituent physical ports
1.91	Sliding Match standards: improved GUI handling
1.91	Limit lines: limit violations in dB are checked and visualized also for traces other than "dB Mag"

Solved issues

Version	Issue
1.91	Switch matrix calibration: excessive port checks (and resulting matrix switches) during auto-detection of port connections eliminated
1.91	DC measurements: source port (driving port) can now also be set from the GUI
1.91	Limit lines: display for 1-point sweeps
1.91	Memory traces: progress bar no longer displayed
1.91	Trace data export in Touchstone (*.s<n>p) file format now also works with de-/embedding enabled
1.91	Moving a marker with the rotary knob no longer suspends trace updates
1.91	User preset file: output power control during [Preset]
1.91	Define limit line from trace: offset granularity was too coarse
1.91	Trace data export involving multiple channels (via "Export snp Free Configuration") didn't work as expected
1.91	For external generators, an "RF Off" in the "Port Settings" dialog didn't always switch the RF power off (instead the configured "Sweep End" action was performed)

Version	Issue
1.91	For power meter traces, trace math with "Result is Wave Quantity" was disabled
1.91	For frequency sweeps, the step size couldn't be set to a value below 9kHz

1.46 Firmware version 1.81

This section lists the changes introduced in firmware version 1.81.

1.46.1 Improvements

Solved issues

Version	Issue
1.81	Missing channel bits in segmented sweeps

1.47 Firmware version 1.80

This section lists the changes introduced in firmware version 1.80.

1.47.1 New functionality

Version	Function
1.80	Support for R&S ZNB40
1.80	IF gain control: the optimum settings in "AGC Mode: Manual" can be determined in a "Learn Sweep" preceding the actual measurement
1.80	"Mixer Meas Wizard" for streamlined mixer measurement setup, complementing the existing mixer definition by an intuitive measurement parameter selection and customized SMARTerCal assistance
1.80	Selectable target format (magnitude, phase, ...) in marker target search
1.80	Shift limit lines in x and y direction without having to redefine the constituent line segments
1.80	MultiCal support now also for automatic calibrations (Cal Unit): • Multiple automatic system error corrections on the same channel • Wizard-guided setup and simultaneous data acquisition for multiple automatic system error corrections • Multiple automatic SMARTerCals
1.80	Embedding and Deembedding: new "Shunt L, Shunt C" circuit model for 2-port networks

New remote control functionality

Version	Function
1.80	New command `[SENSe:]CORRection:COLLect:AUTO:ASSignment:DEFine:TPORt:DEFault` to create the default port assignments for an automatic calibration, relying on auto-detection of port connections
1.80	New command `[SENSe:]CORRection:COLLect:AUTO:ASSignment:ALL:COUNt` to get the total number of port assignments of *all* calibrations in MultiCal scenarios
1.80	New command `[SENSe:]CORRection:COLLect:AUTO:CKIT:PORts:ADD` to extend an existing calibration unit characterization
1.80	New remote commands `CALCulate<Ch>:TRANsform:VNETworks:SENDed:EMBedding<PhyPt>:PARameters:G<Cmp>` and `CALCulate<Ch>:TRANsform:VNETworks:SENDed:DEEMbedding<PhyPt>:PARameters:G<Cmp>` to handle conductances in single-ended embedding/deembedding circuit models

1.47.2 Improvements

Version	Improvement
1.80	Marker/Target Search: a search range can now also be assigned to the reference marker
1.80	Channel Manager: sweep mode and measurement state of a channel can now also be set in the Channel Manager dialog
1.80	Info fields in diagrams: the font size of an info field (e.g. for marker position or limit line pass/fail display) is adjusted according to the available display space
1.80	Optional Auto Averaging of calibration sweeps

Solved issues

Version	Issue
1.80	Intermodulation measurements: "Fit Frequency Range" did not work correctly for intermodulation products of order > 3
1.80	Better performance of file dialogs when accessing network drives

1.48 Firmware version 1.70

This section lists the changes introduced in firmware version 1.70.

1.48.1 New functionality

Version	Function
1.70	Support for external switch matrices R&S ZV-Z81 and R&S ZV-Z82: • Auto-detection, registration and remote operation of matrices connected via USB or LAN • Guided RF connection setup • Multiple path handling during calibration and measurement • Configuration of matrix port properties just as easy as configuration of native VNA port properties • Redesign of various GUI widgets to support the increased number of ports
1.70	Full n-Port Calibration with reduced number of through connections
1.70	Automatic calibration with multiple port assignments
1.70	Characterization of CalUnits with more than 4 ports (R&S ZV-Z58 and R&S ZV-Z59)
1.70	MultiCal support: • Multiple manual system error corrections on the same channel • Wizard-guided setup and simultaneous data acquisition for multiple manual system error corrections
1.70	SMARTerCal with complementary power flatness calibration
1.70	"Save sweep data" for system error corrections can be activated via system setup
1.70	"Showroom Mode": load a user-defined recall set whenever the instrument is (re-)started or the [Preset] key is pressed
1.70	"Clear Test" function for limit tests (line, circle, ripple)

New remote control functionality

Version	Function
1.70	Existing command `SOURce<Ch>:LPORt<LogPt>` now allows to assign logical port numbers to single-ended ports
1.70	`SENSe:CORRection:COLLect:AUTO:CKIT:PORTs` creates CalUnit characterizations with manual port assignment
1.70	Existing command `SENSe<Ch>:CORRection:DATA:PARameter<Sfk>` can now query individual settings
1.70	`SOURce<Ch>:POWer<PhyPt>:CORRection:DATA:PARameter<Wv>:COUNt` queries the number of available power calibrations, `SOURce<Ch>:POWer<PhyPt>:CORRection:DATA:PARameter<Wv>:COUNt` queries the respective settings
1.70	`SYSTem:COMMunicate:RDEVice:PMETer<Pmtr>:SPCorrection[:STATe]` enables/disables the built-in S-parameter correction on certain R&S®NRP-Z power sensors

1.48.2 Improvements

Version	Improvement
1.70	Improved user assistance for automatic calibrations (Cal Unit)
1.70	"Preset User Cal": load a user-defined calibration whenever the [Preset] key is pressed

Solved issues

Version	Issue
1.70	For certain polar diagrams the "Draw Circle" softtool did not display the correct unit
1.70	Limit lines disappeared during minimization/maximization of diagrams
1.70	Sorting behavior in tables after cell editing
1.70	Better performance when moving the zoom rectangle in "Overview Select" mode
1.70	"Print to File..." rendered some markers invisible
1.70	Marker couldn't be moved with the rotary knob when its current position was out of the frequency range
1.70	TRM calibration with sexless cal kits didn't work

1.49 Firmware version 1.63

This section lists the changes introduced in firmware version 1.63.

1.49.1 Improvements

Solved issues

Version	Issue
1.63	Due to a timing conflict in accessing the internal instrument specific information, this information might possibly get corrupted. It is strongly recommended to install the firmware version 1.63 in order to fix this issue. In case the firmware shows the message "Error reading instrument serial number. " it needs recovery in a R&S service center.

1.50 Firmware version 1.62

This section lists the changes introduced in firmware version 1.62.

1.50.1 Improvements

Solved issues

Version	Issue
1.62	Mixer measurement with sweeping LO and interpolation did not work.
1.62	Command `CALCulate<Ch>:PARameter:DEFine:SGRoup` could not be used repeatedly with the same port numbers.
1.62	`MMEMory:LOAD:LIMit` (ENA parser command) did not work.
1.62	Problems with measurement and cal unit calibration for a very large number of sweep points (100000).
1.62	Problems with new (2nd) calibration with a different start or stop frequency setting.

1.51 Firmware version 1.61

This section lists the changes introduced in firmware version 1.61.

1.51.1 New functionality

Version	Function
1.61	"Adjust Time Gate" function, moves the time gate in the opposite direction when the offset parameters are changed. This allows measurements at variable offset but fixed time gate position.

1.51.2 Improvements

Solved issues

Version	Issue
1.61	Measurement with more than one power meter did not work.
1.61	Marker info fields on printed hardcopies were misplaced or invisible.
1.61	Some error messages contained wrong characters and were hard to read.
1.61	Calibration unit characterization with different connector types did not work.
1.61	Calibration unit characterization required consecutive ports starting with port 1.
1.61	Calibration for frequency conversion measurements (option R&S ZNB-K4) at frequencies < 100 kHz was incorrect.
1.61	Missing GUI for receiver attenuator settings (options R&S ZNB<n>-B31/32/33/34).

1.52 Firmware version 1.60

This section lists the changes introduced in firmware version 1.60.

1.52.1 New functionality

Version	Function
1.60	New hardware option R&S ZN-B14, "Handler IO".
1.60	New software option R&S ZNB-K19, "1 mHz Frequency Resolution". This option enhances the frequency resolution to 1 mHz. In order to utilize the higher frequency resolution set "Decimal Places" for unit "Hz" to "12" in the "Setup/System Config/User Interface" dialog.
1.60	Direct access to the function "Repeat previous cal" in calibration soft tool (softkey added).
1.60	Calculation of filter quality factor based on selectable bandwidth different to 3 dB.
1.60	Overview window for zoomed traces.
1.60	Support for R&S SGMA signal generator.

New remote control functionality

Version	Function
1.60	Definition of diagram and their positions including nested layouts: `DISPlay:LAYout:APPLy, DISPlay:LAYout:DEFine, DISPlay:LAYout:EXECute, DISPlay:LAYout:JOIN`.
1.60	Circle test for limit checks in Smith and Polar diagrams: `CALCulate<Chn>:LIMit:CIRCle...` etc.
1.60	New command `[SENSe<Ch>:]SWEep:DWELl:POint ALL	FIRSt`, defines whether a delay time is inserted before all partial measurements or before the first partial measurement only.
1.60	New command `SOURce<Ch>:POWer:CORRection:IMODulation:PORT`, selects the source port for the receiver power calibration with intermodulation measurement.

1.52.2 Improvements

Version	Improvement
1.60	Frequency axis (RF, IF, LO) selectable in mixer mode.

Solved issues

Version	Issue
1.60	The bandwidth setting of segmented sweep did not work in firmware V1.50.
1.60	The settings "Channel / Mode / LO< RF" and "Channel / Mode / LO > RF" were interchanged, also the SCPI command settings `SENSe:FREQuency:SBANd POSitive` and `NEGative`. This is fixed now. However, if you use the command in your programs and it works correctly you have to change the setting to the correct values now.

1.53 Firmware version 1.50

This section lists the changes introduced in firmware version 1.50.

1.53.1 New functionality

Version	Function
1.50	New software option R&S ZNB-K14, "Intermodulation Measurements"
1.50	Circle test for limit checks in Smith and Polar diagrams.
1.50	Fixture Compensation to correct the measurement result for effects of a test fixture.
1.50	Support of separate AGC (Automatic Gain Control) settings per drive port, receiver port and segment.
1.50	Support of ENA parser emulation.
1.50	Wizard for scalar mixer measurements.

New remote control functionality

Version	Function
1.50	SCPI commands for split display: `DISPlay:LAYout <mode>` and `DISPlay LAYout:GRID <rows>, <cols>`.

1.53.2 Improvements

Version	Improvement
1.50	Correct sorting of numerical values in tables.
1.50	Drag&Drop for table lines and rows if applicable. An arrow in the upper left corner indicates the feature.
1.50	Drag&Drop for markers from the soft tool into the diagram
1.50	Additional marker symbols
1.50	Creation of CalKits with the same name, e.g. for CalKits with various serial numbers.

Version	Improvement
1.50	"SCal" instead of "Cal" is indicated with "SMARTerCal"
1.50	Characterization of the CalU: Support of any combination of CalU-port.
1.50	Reference lines is moved using the triangle.
1.50	Fixed output format for SNP export.
1.50	Context sensitive help for tabs and dialogs with QTabWidgets.
1.50	Restrictions for Remote desktop removed, e.g. no administrator mode necessary.
1.50	New command for "Averaging Mode"
1.50	Support of generator Hittite HMC-T2240.
1.50	Trace progress bar in remote control

1.54 Firmware version 1.40

This section lists the changes introduced in firmware version 1.40.

1.54.1 New functionality

Version	Function
1.40	New software option R&S ZNB-K4, "Frequency Conversion Measurements"
1.40	New hardware option R&S ZNB-B2, "Internal Second Source"
1.40	New hardware option R&S ZNB-B4, "OCXO Frequency Reference"
1.40	New hardware option R&S ZNB-B81, "DC Inputs", provides DC voltage and power added efficiency (PAE) measurements.
1.40	Scalar power calibration (including reference receiver calibration, flatness calibration, measurement receiver calibration)
1.40	Characterization wizard for R&S calibration units
1.40	Smarter Calibration (combination of system error correction and power calibration at one port). Smarter calibration is also supported on calibration units R&S ZV-Zxx.
1.40	Automatic adjustment of calibration sweep ranges in frequency conversion measurements
1.40	Multi-chanel system error correction (manual control and cal unit)
1.40	Touchscreen lock in order to prevent inadvertent entries
1.40	"External Tools" softtool panels, gives access to pre-installed applications.
1.40	Trace – [Trace Config] > "Trace Data" > "s1p Active Trace..." stores the active trace to a Touchstone (`*.s1p`) file.
1.40	User-defined softkeys in the remote screen
1.40	Sweep symbols on the trace indicate the progress of the sweep.

Version	Function
1.40	Averaging modes "Reduce Noise" and "Flatten Noise"
1.40	Hardkeys may open the first tab of a softtool panel or the last used tab.

New remote control functionality

Version	Function
1.40	Support for HiSLIP protocol for TCP-based remote control
1.40	Queries `CALCulate<Chn>:DATA:NSWeep:FIRSt?` and `CALCulate<Chn>:DATA:NSWeep[:LAST]?` extended to retrieve one of several consecutive sweep results.
1.40	New queries `CALCulate<Chn>:DATA:CALL?` and `CALCulate<Chn>:DATA:CALL:CATalog?` return all S-parameter traces in the active channel or in the active system error correction, respectively.
1.40	Commands `[SENSe<Ch>:]CORRection:CDATa:PORT<PhyPt>`, `[SENSe<Ch>:]CORRection:DATa:PARameterPORT<PhyPt>`, `[SENSe<Ch>:]CORRection:POWer:DATA:PORT<PhyPt>`, `[SENSe<Ch>:]CORRection:STIMulus:PORT<PhyPt>`, `SOURce<Ch>:POWer:CORRection:DATA:PORT<PhyPt>`, designed to handle calibration data for frequency conversion measurements.

1.54.2 Improvements

Version	Improvement
1.40	If a front panel key or a key in the hardkey bar is pressed repeatedly, the analyzer switches between the different softtool tabs.
1.40	The source port for wave quantities and ratios is always indicated in the trace list.
1.40	Tapping a trace in a diagram activates the trace (equivalent to tapping the trace line).

1.55 Firmware version 1.31

This section lists the changes introduced in firmware version 1.31.

1.55.1 Improvements

Solved issues

Version	Issue
1.31	Inadvertent switchover of measurement results
1.31	Incorrect external generator control via the "Modify Cal Power" dialog

1.56 Firmware version 1.30

This section lists the changes introduced in firmware version 1.30.

1.56.1 New functionality

Version	Function
1.30	Support for external power meters and generators

New remote control functionality

Version	Function
1.30	Status registers for external power meters and generators (bits no. 10 and 11 of the `STATus:QUEStionable:INTegrity:HARDware` register).
1.30	New command `SYSTem:COMMunicate:RDEVice:AKAL:PREDuction[:STATe]`, enables power reduction during an automatic calibration.
1.30	New commands `CALCulate<Ch>:PARameter:DELete:CALL` and `CALCulate<Ch>:PARameter:DELete:ALL`, delete several traces.

1.56.2 Improvements

Version	Improvement
1.30	"Search" tab in the Help system, allows you to search for a character string (full text search).
1.30	Segmented frequency sweep with point-based x-axis
1.30	New user color setting "Colorize Trace when Failed"
1.30	Windows Explorer is accessible from all file dialogs.

1.57 Firmware version 1.20

This section lists the changes introduced in firmware version 1.20.

1.57.1 New functionality

Version	Function
1.20	Ripple limits and ripple test (e.g. for checking whether the passband ripple of a filter is within acceptable limits)
1.20	Embedding/deembedding of virtual networks (single-ended or balanced)
1.20	S-Parameter Wizard; facilitates the configuration of a standard S-parameter measurement
1.20	Additional settings for user color schemes in the "Define User Color Scheme" dialog, e.g. "Use Trc Color for Limit Lines"
1.20	New toolbar icon "New Ch + Tr", adds a new trace with new channel settings
1.20	Show/hide the toolbar

New remote control functionality

Version	Function
1.20	Commands `INITiate:CONTinuous:ALL` and `INITiate[IMMEdiate]:ALL`, start a single sweep (sequence) in all channels.
1.20	The remote language setting "ZBABT" ensures compatibility with network analyzers of the R&S ZVA/B/T family.
1.20	New command `[SENSe:]SWEep:COUnt:ALL`, defines the number of sweeps in single sweep mode for all channels.
1.20	Commands `CONFigure:CHANnel<Ch>:MEASure[:STATe]` and `CONFigure:CHANnel<Ch>:MEASure:ALL[:STATe]`, deactivate the sweep in a particular channel (speed gain for the remaining channels)
1.20	New commands `CALCulate...STATe:AREA`, move various info fields to nine predefined positions within the diagrams.
1.20	New commands `SYSTem:DISPlay:BAR:...`, display or hide control bars and panels.
1.20	New commands `SYSTem:IDENtify...` and `SYSTem:OPTions...`, customize or reset the identity and option strings of the instrument.
1.20	New `SYSTem:COMMunicate:RDEVice:AKAL:...?` queries, return the characterizations stored on a calibration unit and their properties.
1.20	New command `SYSTem:COMMunicate:RDEVice:AKAL:SDATa?`, returns the complex characterization data for a particular standard from a cal unit characterization.
1.20	New command `CALCulate:DATA:TRACe? '<Trace name>', FDATa | SDATA | MDATa | NCData`, returns the trace data of an arbitrary (not necessarily the active) trace.
1.20	New command `CONFigure:CHANnel<Ch>:TRACe:CATalog?`, queries the traces in a particular channel <Ch>.

Version	Function
1.20	New commands `CONFigure:TRACe:WINDow? <'Trace name>'` and `CONFigure:TRACe:WINDow:TRACe? <'Trace name>'`, query the window and trace number of a particular displayed trace.
1.20	New command `[SENSe:]CORRection:COLLect:LOAD:SELected`, loads calibration data from a cal group file.

1.57.2 Improvements

Version	Improvement
1.20	Nine different positions for info fields (instead of 6)
1.20	Re-numbering of diagrams when a diagram is deleted
1.20	Progress monitor for automatic calibration with calibration unit R&S ZV-Z5x
1.20	The title bars of closed softtool panels keep being displayed and can be used to re-open the softtools any time.
1.20	Improved drag and drop functionality for markers; single markers can be deleted.

1.58 Firmware version 1.14

This section lists the changes introduced in firmware version 1.14.

1.58.1 Improvements

Version	Improvement
1.14	Firmware support for a new type series of the internal flash memory.

1.59 Firmware version 1.13

This section lists the changes introduced in firmware version 1.13.

1.59.1 Improvements

Version	Improvement
1.13	Measurements below 25 MHz have been improved. To achieve full performance below 25 MHz without user calibration, the instrument needs to be serviced if it was delivered with firmware V1.12 or earlier.

1.60　Firmware version 1.12

This section lists the changes introduced in firmware version 1.12.

1.60.1　Improvements

Solved issues

Version	Issue
1.12	Some issues have been solved.

1.61　Firmware version 1.10

This section lists the changes introduced in firmware version 1.10.

1.61.1　New functionality

Version	Function
1.10	Calibration kit management (load, modify, and store calibration kit data).
1.10	"Calibration Manager" dialog, stores system error correction data to the cal pool and assigns stored correction data to channels.
1.10	Graphic zoom; see chapter "Operating the Instrument > Using the Graphic Zoom" in the Getting Started manual or in the Help system of your R&S ZNB. This feature is also available in remote control.
1.10	Various drag and drop features for efficient manual control; see chapter "Operating the Instrument" in the Getting Started manual or in the Help system.

1.62　Firmware version 1.0

Initial firmware release for R&S ZNB.

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