R&S® ZNA
Vector Network Analyzers
Release Notes for Firmware V2.96

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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 36

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This document describes the following R&S®ZNA vector network analyzers:

- R&S®ZNA26, 10 MHz to 26.5 GHz, 2 test ports, 3.5 mm, order no. 1332.4500K22
- R&S®ZNA26, 10 MHz to 26.5 GHz, 4 test ports, 3.5 mm, order no. 1332.4500K24
- R&S®ZNA43, 10 MHz to 43.5 GHz, 2 test ports 2.92 mm, order no. 1332.4500K42
- R&S®ZNA43, 10 MHz to 43.5 GHz, 4 test ports 2.92 mm, order no. 1332.4500K44
- R&S®ZNA43, 10 MHz to 43.5 GHz, 2 test ports 2.4 mm, order no. 1332.4500K43
- R&S®ZNA43, 10 MHz to 43.5 GHz, 4 test ports 2.4 mm, order no. 1332.4500K45
- R&S®ZNA50, 10 MHz to 50 GHz, 2 test ports 2.4 mm, order no. 1332.4500K52
- R&S®ZNA50, 10 MHz to 50 GHz, 4 test ports 2.4 mm, order no. 1332.4500K54
- R&S®ZNA67, 10 MHz to 67 GHz, 2 test ports 1.85 mm, order no. 1332.4500K62
- R&S®ZNA67, 10 MHz to 67 GHz, 4 test ports 1.85 mm, order no. 1332.4500K64

R&S®ZNA67EXT vector network analyzer systems:

- 2-port R&S®ZNA67, 2 standard power test sets, order nos. 1352.1888K02/K12
- 4-port R&S®ZNA67, 2 standard power test sets, order nos. 1352.1888K03/K13
- 4-port R&S®ZNA67, 4 standard power test sets, order nos. 1352.1888K04/K14
- 2-port R&S®ZNA67, 2 high-power test sets, order nos. 1352.1888K05/K15
- 4-port R&S®ZNA67, 2 high-power test sets, order nos. 1352.1888K06/K16
- 4-port R&S®ZNA67, 4 high-power test sets, order nos. 1352.1888K07/K17

Contents

1 Current firmware and version history

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

Firmware version

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

1.1 Firmware version 2.96

This section lists the changes introduced in firmware version 2.96.

1.1.1 Improvements

Solved issues

Version	Issue
2.96	Delta Cal deembedding of one-port DUTs did not work
2.96	Two-tone group delay measurements (R&S ZNA-K9): In the measurement setup dialog, the port and attenuation visualization were not adjusted according to the current configuration
2.96	Drag & drop of the "More Ratios" button did not work and left the target diagram in an illegal state

1.2 Firmware version 2.95

This section lists the changes introduced in firmware version 2.95.

1.2.1 New functionality

Version	Function
2.95	Support of new R&S ZNA67EXT variants 1352.1888K12–1352.1888K17
2.95	Group delay measurements (R&S ZNA-K9): New trace and marker format "delay derivation"
2.95	New "Delta Cal" fixture tool for single-ended deembedding, based on two calibrations (coaxial and on-fixture)
2.95	SCPI-based presets ("Standards") • Predefined scripts prepare your instrument for measuring DUTs of various industry standards • Special commands enable conditional script execution (frequency range, number of ports, available options, ...)
2.95	New software option R&S ZNA-K121 "RF OFF Boot Up", ensuring: • Power OFF for all RF ports at instrument boot up • Firmware starts in "Preset" • "Preset" always enforces RF OFF for all ports

1.2.2 New remote control functionality

Version	Function
2.95	Automatic calibration: New command `[SENSe<Ch>:]CORRection:COLLect:AUTO:POWer:DEFault` adding default power meter data to a receiver power calibration instead of measuring with a power meter
2.95	New command `INITiate<Ch>:STOP` to stop a sweep (GUI: Channel – [Sweep] > "Sweep Control" > "Stop Sweep")

1.2.3 Modified functionality

Version	Function
2.95	Redesigned measurement setup dialog • Modified controls for switching between channels and measurement types • Modified graphics pane: better graphics, more information, port selection only • Tabbed content pane for improved usability: Settings are now always distributed to tabs "Sweep", "Mixer" (with R&S ZNA-K4), "Test Set"and "Frequency". Depending on the measurement type, some tabs are disabled. • For scalar mixer measurements (R&S ZNA-K5), vector mixer measurements (R&S ZNA-K5), and two-tone group delay measurements (R&S ZNA-K9), some settings were moved between the corresponding softtool tab and setup dialog.
2.95	Time sweeps: The measurement of the last sweep point now *begins* at the configured stop time. Before, it *ended* at the configured stop time, which sometimes led to (display) inconsistencies.

Version	Function
2.95	The SCPI command `DISPlay:ANNotation:FREQuency:STATe ON/OFF` (show/hide sensitive information) was removed. This feature can now only be toggled at the VNA GUI.
2.95	Redefined physical ports are automatically resolved when a switch matrix is configured.
2.95	Two-tone setups (R&S ZNA-K4/K9): If available, the internal combiner (R&S ZNAxx-B212/B213) is used per default.
2.95	Switch matrix setup, calibration of two-tone measurements (R&S ZNA-K4/K9): If the two tones are combined on a single VNA port, you can now select the source port by its **test port number** *t* and perform a single "P-One Path Two Ports" calibration with test port *t* as source port. With an external combiner, the calibration setup still uses the **VNA port number** for each source. Calibrate the two sources separately: • "P-One Path Two Ports" with the lower tone VNA port as source • "P-Refl OSM" for the upper tone VNA port The destination port is always selected by its test port number.
2.95	Internal preamplifiers (R&S ZNAxx-B302, R&S ZNAxx-B501, ...) cannot be used in switch matrix setups. The corresponding GUI elements are now hidden if a switch matrix is configured.
2.95	"Quick Start Calibrate All" now automatically selects all channels and immediately enters the calibration phase.
2.95	Default driving mode changed from "Alternated" to "Auto".

1.2.4 Improvements

Version	Improvement
2.95	Noise figure measurements (R&S ZNA-K30) • Improved description of noise figure calibration properties in "Calibration Manager" dialog • In a 50 Ω environment, the noise figure calculation now considers "One Way Loss" deembedding settings. • Support of 2 x POSM calibration (for RF and IF port) • "Quick Setup" is now also possible for switch matrix setups.
2.95	Time domain measurements (R&S ZNA-K2): New frequency domain windows "Blackman", "Kaiser", "Gaussian","Exponential"
2.95	Eazy Deembedding (EZD; R&S ZNA-K210): Update to enhanced version 2.0

Solved issues

Version	Issue
2.95	Time gates (R&S ZNA-K2): Time gate linking was retained when the "linked to" trace was deleted
2.95	S-parameter measurements with CW sweep type • For some configuration sequences, the number of sweep points could not be changed • For some configuration sequences, the "Start Frequency" control displayed the number of sweep points
2.95	Spectrum measurements (R&S ZNA-K1): Error message "Check for SPA90.dll failed!!" for R&S ZNA67EXT variants 01 to 04

Version	Issue
2.95	Intermodulation measurements (R&S ZNA-K4): In a switch matrix setup, IMD CW mode did not work
2.95	Two-tone measurements (R&S ZNA-K4/K9): Incorrect values in "Frequency Overview" dialog

1.3 Firmware version 2.92

This section lists the changes introduced in firmware version 2.92.

1.3.1 Improvements

Solved issues

Version	Issue
2.92	Second internal LO (R&S ZNA-B5): Some measurements yielded incorrect results if the second internal LO was used
2.92	VNA systems R&S ZNA67EXT, variants 02–04: Error message "Invalid HW configuration detected ZNA67EXT. Please contact R&S" although the VNA system works as expected.

1.3.2 Known issues

Version	Function
2.91	"Acquisition Meas."/"Acquisition ALC+Meas." trigger out in pulsed mode: Unpredictable behavior if the configured "Width" exceeds the measurement acquisition time.

1.4 Firmware version 2.91

This section lists the changes introduced in firmware version 2.91.

1.4.1 New functionality

Version	Function
2.91	Intermodulation measurements (R&S ZNA-K4): It is now possible to set up a CW mode spectrum channel from the "Intermod." setup dialog. (New sweep type "IMD CW Mode" in "Intermod." setup dialog)
2.91	Converted capacitances, inductances, and resistances can be selected as measured quantities

Version	Function
2.91	New software option R&S ZNA-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
2.91	Support of forthcoming R&S ZNA67EXT variants 1352.1888K12–1352.1888K17

1.4.2 Modified functionality

Version	Function
2.91	Intermodulation calibration (R&S ZNA-K4): If a switch matrix is in the two-tone signal path, then the channel's status bar now displays the "DUT In" matrix port instead of the "PComb" port.

1.4.3 New remote control functionality

Version	Function
2.91	New commands `[SENSe:]CORRection:CKIT:ADD`/`[SENSe:]CORRection:CKIT:COPY` to add/copy a calibration kit
2.91	New command `SYSTem:DISPlay:SINGle ON|OFF` to enable/disable the "Single Window Mode"

1.4.4 Improvements

Version	Improvement
2.91	Improved error detection if the selected fixture deembedding tool generates invalid output or no output at all
2.91	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.
2.91	Fixture deembedding with ISD tool (R&S ZNA-K220): • Support of smoothing parameter `smooth_dut` • New deembedding model "Symmetrical" for balanced DUT ports
2.91	Delta-L (R&S ZNA-K231): Support of AITT-DL resonance removal
2.91	Leveling (R&S ZNA-K8): It is now possible to export loaded leveling data in human-readable format.
2.91	The "External Power Meter Config" dialog is now available for all R&S NRP.

Version	Improvement
2.91	Measurement setup dialog: Improved layout, in particular for frequency-converting measurements (R&S ZNA-K4).
2.91	Calibration setup dialog: Support of "mixed" calibrations using cal units and cal kits
2.91	Trigger out signals (R&S ZNA-B91): Separate acquisition triggers for measurement (as before), ALC, and ALC+measurement
2.91	Support of predefined R&S OSP320 setups for IEEE P802.3ck cable compliance tests based on R&S ZNrun with option R&S ZNrun-K411

Solved issues

Version	Issue
2.91	Fixture deembedding with SFD tool (R&S ZNA-K230): The deembedding assistant's file selection dialog used incorrect file filters when loading coupon files.
2.91	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 are normalized to the cal kit's connector resistance.
2.91	Spectrum measurements (R&S ZNA-K1): • Measuring a reference receiver yielded invalid results in some cases. • Measuring more than one receiver failed in some cases.
2.91	Trigger out signals with pulsed measurements and ALC (R&S ZNA-B91, R&S ZNA-K7): The acquisition trigger ignored the ALC acquisition times
2.91	Independent generator mode: Remote activation using `SOURce:INDependent<Pt>[:STATe] ON` did not work in some cases
2.91	Calibration setup dialog: It was not possible to run a "P-One Path Two Ports" or "P-Trans Norm" calibration (Warning message "... SMARTerCal requires a Powermeter! Please configure and select one." although a power meter was present)
2.91	Channel setup dialog for two-tone signals (R&S ZNA-K4, R&S ZNA-K9) with configured switch matrices: If an internal combiner was used, the matrix test port selection combo-boxes were missing or displayed incorrect port names
2.91	Switch matrices: In the channel setup dialog, the combiner and matrix test port blocks were shown also for 1-tone setups
2.91	Noise figure measurement (R&S ZNA-K30): Opening the non-converting NF setup dialog crashed the firmware if an R&S OSP320 switch matrix was configured

1.4.5 Known issues

Version	Function
2.91	"Acquisition Meas."/"Acquisition ALC+Meas." trigger out in pulsed mode: Unpredictable behavior if the configured "Width" exceeds the measurement acquisition time.

1.5 Firmware version 2.90

This section lists the changes introduced in firmware version 2.90.

1.5.1 New functionality

Version	Function
2.90	Spectrum analysis (R&S ZNA-K1) • Spectrum measurements can now be triggered like other measurements • Spectrum data acquisitions can be synchronized to internal pulse modulators (options R&S ZNAxx-B4y)

1.5.2 New remote control functionality

Version	Function
2.90	`SYSTem:COMMunicate:AKAL:CONNection <CalStandard>, <Port>[, ...]`: Added possibility to switch calibration unit ports to "non-calibrating" state explicitly (`<CalStandard>=NONE`)
2.90	New ENA emulation commands: • `CALCulate:CORRection` • `DISPlay:ARRange` • `DISPlay:WINDow{1...4}:SIZE`

1.5.3 Improvements

Version	Improvement
2.90	Extended time domain analysis (R&S ZNA-K20): Additional PRBS bit streams with lengths 2^{17}-1, 2^{19}-1, ..., 2^{31}-1 for eye diagram simulation

Solved issues

Version	Issue
2.90	HP8720 parser emulation: Acquisition of calibration data for calibration type "Trans Norm" was not initialized correctly
2.90	Drivers for calibration units R&S ZV-Z5x did not work on Windows 7
2.90	R&S ZNA67EXT: Inapplicable "Ref. receiver uncalibrated" warning during calibrations with multiple frequency axes
2.90	Support for multicast DNS (mDNS)
2.90	In a calibrated vector mixer channel, the phase of a b2/a1 ratio trace differed from the phase of the corresponding S_{21} trace

1.6 Firmware version 2.85

This section lists the changes introduced in firmware version 2.85.

1.6.1 New functionality

Version	Function
2.85	Additional predefined R&S OSP320 matrix definitions (for R&S ZNrun-K4xx)

1.6.2 Improvements

Version	Improvement
2.85	Support for NF measurements with pulsed RF signals (pulse width > 2 µs) Requires R&S ZNA-K30 and R&S ZNA-K7
2.85	Two-tone group delay measurements (R&S ZNA-K9): • One-stop calibration configuration in calibration setup dialog • Separate LO configuration for calibration mixer (in addition to DUT mixer). Optional flatness calibration of the related source added to calibration workflow.
2.85	If pulse generation is switched on, the "FreeRun" button in the "Trigger" softtool tab is labeled "FreeRun (Pulsed)", to indicate that the measurement is (possibly) synchronized to the generated pulses
2.85	ISD tool (self-installed or with optionR&S ZNA-K220): Support for ISD version 22.11.23
2.85	SFD tool (self-installed or with option R&S ZNA-K230): Support for SFD version 2022.08.17

Solved issues

Version	Issue
2.85	Intermodulation measurements (R&S ZNA-K4): • If an internal combiner (R&S ZNAxx-B12y) was used, the calibration wizard with "Source Leveling" did not cover the source flatness step for the upper tone generator • For some port configurations involving switch matrices, calibration did not work • For some configurations, activating CW mode spectrum measurements via remote control sometimes caused the firmware to freeze or crash, if ALC was used • On a channel with two mixer stages, 2nd order intermodulation products and intercept points could not be selected as measured quantities at the GUI
2.85	ALC not working correctly if some ports are configured as permanent ports ("Source Gen" active in "Port Settings" dialog)
2.85	Time domain measurements (R&S ZNA-K2) in low-pass mode: DC settings did not take effect immediately.
2.85	For "Remote Language: ZVABT", the trigger handling for single sweep channels deviated from R&S ZVA behavior

Version	Issue
2.85	Two-tone group delay measurements (R&S ZNA-K9): • For some configurations, "Track LO" did not work, if ALC was used • Setups with converters as upper and lower tone, and with fixed IF frequency could not be calibrated ("... data not plausible") • For LO signals with frequency ≠ "Fixed", the multiplication factor at the LO port was ignored during calibration
2.85	R&S ZNA67EXT: • Spike in high frequency mode, if ALC was used • Calibration issue
2.85	Pulse profile sweeps (R&S ZNA-K7) across sweep matrices: Continuous sweeping halted after first sweep
2.85	Power correction from pre-measurement did not work, if "Track LO" was active
2.85	Using leveling data loaded from file caused exceptions
2.85	Vector mixer measurements (R&S ZNA-K5): Phase deviations
2.85	Noise figure measurements (R&S ZNA-K30): • Averaging did not work for "Gain" and NF traces • Activating NF measurements on a channel with two mixer stages (R&S ZNA-K4) caused the firmware to freeze and crash, if "Conv. LO" was used as LO source for one of the mixers.
2.85	A calibration performed with calibration unit R&S ZN-150 was not applied, if the channel start frequency was below 10 MHz.
2.85	Pulse generation: "Auto Set" did not set the correct bandwidth if a fixed duty cycle was used

1.6.3 Known issues

Version	Function
2.85	Vector mixer measurements (R&S ZNA-K5): If using a calibration recorded with FW version < 2.85, the measured phases exhibit a constant shift in FW versions ≥ 2.85. Recalibration with a FW version ≥ 2.85 solves this issue.

1.7 Firmware version 2.80

This section lists the changes introduced in firmware version 2.80.

1.7.1 New functionality

Version	Function
2.80	Pulsed measurements (R&S ZNA-K7): Configurable measurement acquisition offset for every a- and b-wave receiver (Revised version of a feature introduced in FW V2.50, and removed in FW V2.51)
2.80	Intermodulation measurements (R&S ZNA-K4): FW support for measuring intermodulation products and intercept points of order 2
2.80	Measurements on pulsed signals (R&S ZNA-K7): Point averaging
2.80	New option to keep the channel bit states at sweep end

1.7.2 New remote control functionality

Version	Function
2.80	Deembedding assistant (R&S ZNA-K220 | R&S ZNA-K230 | R&S ZNA-K210): New command `CALCulate:FMODel:DEASsistant:RUN:RESult` to check for successful deembedding tool execution
2.80	Intermodulation measurements (R&S ZNA-K4), two-tone group delay measurements (R&S ZNA-K9): Two-tone measurements are now also possible if switch matrices are configured
2.80	Generating default calibration data using `[SENSe<Ch>:]CORRection:COLLect:SAVE:SELected:DEFault` now also works for: • Frequency-converting channels • One-port system error corrections with combined receiver power calibration (PREFl, PRSHort, ...)

1.7.3 Improvements

Version	Improvement
2.80	The functionality of the "Trigger Out Manager" dialog is now directly available in the "Pulse Modulation" dialog
2.80	Deembedding assistant (R&S ZNA-K220, R&S ZNA-K230, R&S ZNA-K210): DUT + test fixture data can now also be loaded from file
2.80	Inline calibration system (ICS) R&S ZN-Z3x: A firmware update of the inline calibration controller (ICC, R&S ZN-Z3x) and the inline calibration units (ICUs, R&S ZN-Z32/Z33) can be performed from the "Inline Calibration Systems" dialog. The R&S ZNA firmware now includes the latest ICS firmware binaries, located in the directory `C:\Program Files\Rohde-Schwarz\Vector Network Analyzer\ZNA\Resources\ICS`.
2.80	New global "RF Off on Rec. Overload" setting to enable an automatic "RF Off All Channels" if a receiver overload is detected
2.80	Pulse modulation: Relevant ALC settings can now be configured directly in the "Pulse Modulation" dialog

Solved issues

Version	Issue
2.80	Extensions and accessories R&S ZN-Zx: Communication issues over LAN
2.80	Possible firmware crash in "Independent Generator Settings" dialog
2.80	Intermodulation measurements (R&S ZNA-K4): • Activating "CW Mode Spectrum" crashed the firmware, if ALC was active • "IMD Sweep Type: Power" could not be selected • When "IMD Sweep Type: Delta F" was selected, the "Define Segments" dialog occurred by mistake
2.80	Calibration pool data • Repeating a calibration loaded from the cal pool corrupted the existing calibration, if "Overwrite Current File" was selected and the calibration was canceled • When repeating a calibration loaded from the cal pool, some existing data were deleted instead of reused • Storing a scalar vector mixer calibration in the calibration pool only partly saved the error terms and created invalid cal files
2.80	The analyzer GUI became slow if many markers were active
2.80	Millimeter-wave converter support (R&S ZNA-K8): • Increasing the "Cable & Splitter Loss" decreased (instead of increased) the output power at the respective VNA port • In a mixed setup with "ZNA67EXT-TS" and other converter types, the frequency axes were inverted
2.80	+28 V Noise Source Control (R&S ZNA-B91): Documentation of remote command `CONTrol:NOISe:SOURce[:STATe]` was missing
2.80	For some manual multi-channel calibrations, the required calibration standard buttons appeared twice
2.80	Source step attenuators (R&S ZNAxx-B2y): The selected source attenuation was applied twice to the power range of a source flatness calibration
2.80	For channels with math traces, adding certain waves to the set of measured quantities made sweep preparation hang
2.80	Two-tone group delay measurements (R&S ZNA-K9): Adding a mixer delay calibration to an existing UOSM using "Repeat Cal" failed with error message "SMARTerCal requires a Power-meter!"
2.80	Frequency-converting measurements (R&S ZNA-K4): Misleading "Ref. Receiver not calibrated" warning during measurement receiver calibrations of remaining ports, if their required reference receiver calibration was performed with "Calibrate Only Port Frequency"
2.80	Noise figure measurements (R&S ZNA-K30): • Documentation of remote command `[SENSe<Chn>:]CORRection:NSTate` was missing • If the "Quick Setup" was opened from the frequency-converting noise figure channel setup, the firmware crashed when modified settings were applied
2.80	Leveling datasets: • Misleading "requested power not available in leveling data" warning, if the frequency range of the dataset differs strongly from the current port frequency ranges • In the "Leveling Datasets" dialog (and using `SOURce<Ch>:POWer<PhyPt>:CORRection:SLEVeling:STATe`), it was possible to enable "Power Control" even though no leveling dataset was available

Version	Issue
2.80	If drag&drop was used to add "More S-Params", "More Wave Quantities", or "More Harmonics", then modifying the "Detector Meas Time" in the corresponding selection dialog did not take effect
2.80	Internal pulse modulators (options R&S ZNAxx-B4y): Commands `[SENSe<Ch>:]PULSe:PORT<Pt>:WIDTh` and `[SENSe<Ch>:]PULSe:PORT<Pt>:DELay` did not work as expected, if option R&S ZNA-B91 was not available
2.80	Repeating a "P-"cal (a.k.a SMARTerCal) led to duplicate power meter buttons (one of them invalid), if a power meter with a different ID was selected
2.80	Mixer delay measurements (R&S ZNA-K9): The "Const Cal Delay" calibration mixer setting in the "Mixer/IMD/Harmonics" tab of the calibration setup dialog did not take effect
2.80	R&S ZNA67EXT: For some configurations, adding + deleting a channel made sweep preparation hang

1.8 Firmware version 2.74

This section lists the changes introduced in firmware version 2.74.

1.8.1 New functionality

Version	Function
2.74	Firmware support of new 110 GHz VNA systems R&S ZNA67EXT

1.9 Firmware version 2.73

This section lists the changes introduced in firmware version 2.73.

1.9.1 Improvements

Solved issues

Version	Function
2.73	Since version 2.70, the firmware created and maintained log files `C:\ProgramData\Rohde-Schwarz\ZNA\Log\Ch<Ch>InitTimes.log` that grew with every initialization of channel <Ch>. The creation of these files has been deactivated. You can safely delete them.

1.10 Firmware version 2.72

This section lists the changes introduced in firmware version 2.72.

1.10.1 Modified functionality

Version	Function
2.72	Fan test removed from self test

1.11 Firmware version 2.71

This section lists the changes introduced in firmware version 2.71.

1.11.1 Modified functionality

Version	Function
2.71	Power correction from pre-measurement: To prevent generators from oscillating, convergence factors > 1 are no longer allowed

1.12 Firmware version 2.70

This section lists the changes introduced in firmware version 2.70.

1.12.1 New functionality

Version	Function
2.70	Power correction from pre-measurement
2.70	Time domain measurements (R&S ZNA-K2/K20): Time gates can be coupled within the same channel
2.70	New "Only Active Channel On" function to disable all channels except the active one
2.70	Measurement uncertainty analysis (R&S ZNA-K50): Significance level can now be configured

New remote control functionality

Version	Function
2.70	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`

1.12.2 Modified functionality

Version	Function
2.70	1.0 mm cal kit "Demo Kit 1 mm" renamed to "General alternative kit" **Note**: To remove the "Demo Kit 1 mm" (leftover from previous firmware versions), perform a factory preset.
2.70	Spectrum analysis (R&S ZNA-K1): For spectrum channels, "IF Filter (analog)" is fixed to "Wideband", also when created using "Spectrum = Marker".
2.70	Two-tone group delay measurements (R&S ZNA-K9): Mixer delay calibration integrated into standard calibration framework • New calibration types "Mixer Delay" and "UOSM Mixer Delay" in calibration GUI • New calibration types `MDELay | UMDelay | PUMDelay` for remote calibration • New remote command `[SENSe<Ch>:]CORRection:COLLect:AUTO:MDELay` for delay mixer calibration • Calibration-related controls removed from "Meas" > "Two Tone Group Dly" softtool tab
2.70	R&S HUMS (R&S ZNA-K980) service updated to version 1.44
2.70	"OSP320-4-8NC" matrix definition aligned with R&S ZNrun V2.62

1.12.3 Improvements

Version	Improvement
2.70	"Simulation Noise" can be toggled from the menu bar
2.70	Eye diagrams (R&S ZNA-K20: "Transfer Rate" can now be configured directly
2.70	Cal validation: The format of the validation diagrams can now be configured

Solved issues

Version	Issue
2.70	Cal kits containing weights could not be exported
2.70	Time domain analysis (R&S ZNA-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 • Distance to fault only worked for live traces

Version	Issue
2.70	HP8720 parser emulation: Acquisition of calibration data for calibration type "Trans Norm" was not initialized correctly
2.70	If measurement data is available for a calibration, and the related setup was saved under a different name, then "Repeat Calibration" failed in the resulting recall set
2.70	If measurement data is available for a calibration of channel no. x and this calibration was stored to the cal pool, then "Repeat Calibration" failed if the related cal pool calibration was applied to a channel no. y≠x
2.70	Eye diagrams (R&S ZNA-K20): changing "Advanced Settings" did not take immediate effect
2.70	"Delay" memory traces used the current stimulus axis instead of the stored one
2.70	Internal combiner (R&S ZNAxx-B212/B213) in "Combiner Configuration" dialog: It was possible to select different receiver inputs for lower and upper tone
2.70	A memory trace with "Math" could not be recalled correctly if the original trace was a wave
2.70	`*RST` always triggered a factory preset before loading a user preset file

1.13 Firmware version 2.61

This section lists the changes introduced in firmware version 2.61.

1.13.1 New functionality

Version	Function
2.61	Internal combiner now also available for R&S ZNA50 and R&S ZNA67: • R&S ZNAxx-B212 "Internal combiner P1-P2 for **2-port** R&S ZNAxx" (xx = 50, 67). Requires a second internal source (R&S ZNAxx-B52) and a source step attenuator at port 1 (R&S ZNAxx-B21). • R&S ZNAxx-B213 "Internal combiner P1-P3 for **4-port** R&S ZNAxx" (xx = 50, 67). Requires source step attenuators at ports 1 and 3 (R&S ZNAxx-B21+B23).
2.61	Internal low noise preamplifier at receive port 2 now also available for R&S ZNA50 and R&S ZNA67: • HW options R&S ZNA50-B302 and R&S ZNA67-B302 are subject to **export control restrictions**. • HW options R&S ZNA50-B312 and R&S ZNA67-B312 are **not** subject to export control restrictions, but if installed, the spectrum analysis software option R&S ZNA-K1 is blocked. Requires hardware option R&S ZNAxx-B32 (receiver step attenuator at port 2).

Version	Function
2.61	Internal low power spur reduction amplifier at receive port 1 now also available for R&S ZNA50 and R&S ZNA67: • Options R&S ZNA50-B501 and R&S ZNA67-B501 are subject to **export control restrictions**. • R&S ZNA50-B511 and R&S ZNA67-B511 are **not** subject to export control restrictions, but if one of these HW options is installed, the spectrum analysis software option R&S ZNA-K1 is blocked. Requires hardware option R&S ZNAxx-B31 (receiver step attenuator at port 1).
2.61	Support of new economy calibration units R&S ZN-ZE1xx (EcoCalU)

1.13.2 Improvements

Version	Improvement
2.61	ALC jitter: It is now possible to disable "Clamp" and keep on with ALC while the analyzer acquires measurement data. Previously, ALC was always suspended during measurements ("Clamp" = enabled), which is still the default behavior.
2.61	Performance optimizations for large numbers of setups and/or channels
2.61	Reduced memory consumption, in particular for multi-port setups

Solved issues

Version	Issue
2.61	Incorrect naming of matrix test ports for switch matrix type "OSP320-4-8NC"

1.14 Firmware version 2.60

This section lists the changes introduced in firmware version 2.60.

1.14.1 New functionality

Version	Function
2.60	Enhanced control of HW settling wait times: • Select one of the available wait time control algorithms or let the firmware decide • Specify or limit wait times manually Can reduce sweep times at reasonable loss of measurement precision, or increase precision at acceptable sweep times.
2.60	Switch matrix support (including R&S OSP) **Note** that the following features/measurements are not supported, if switch matrices are used: • Noise figure quick setup (R&S ZNA-K30) • Intermodulation measurements (part of R&S ZNA-K4) • Two-tone group delay measurements (R&S ZNA-K9) • Measurement uncertainty analysis (R&S ZNA-K50)

Version	Function
2.60	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 ZNA-K220, R&S ZNA-K230, or R&S ZNA-K210.
2.60	User-definable print color scheme (independent of the user-definable display color scheme)
2.60	Millimeter-wave converters (R&S ZNA-K8): Support of intermodulation measurements (with R&S ZNA-K4) and two-tone group delay measurements (with R&S ZNA-K9)
2.60	Independent generator mode: Allows you to set up one or more of the internal sources as permanent, channel-independent CW signals.

New remote control functionality

Version	Function
2.60	Noise figure measurements (R&S ZNA-K30): • Query version of `[SENSe<Ch>:]NFIGure:DEFine` added • New `[SENSe<Ch>:]NFIGure:QSET...` commands for deembedding assistant functions
2.60	New and improved HUMS commands (R&S ZNA-K980)
2.60	Millimeter-wave converter support (R&S ZNA-K8): New command `SOURce<Ch>:POWer<PhyPt>:CONVerter:OFFSet` to set the power or power offset of a converter port.
2.60	Various reference marker commands `CALCulate<Chn>:MARKer<Mk>:REFerence:...` added; same functionality as for regular markers

1.14.2 Modified functionality

Version	Function
2.60	Redefined physical ports: An external generator now must be configured before it can be used it as source port in remote command `[SENSe:]UDSParams<Pt>:PARam`.

1.14.3 Improvements

Version	Improvement
2.60	Averaging now also available for noise figure and gain compression measurements
2.60	Y-axis grid labels now show values with units instead of unit-less values
2.60	Delta-L 4.0 PCB characterization (R&S ZNA-K231): GUI improvements
2.60	Enhanced offline data analysis using R&S ZNXSIM: • Channel-specific simulation data • Activate/deactivate "Simulation Noise" from the analyzer GUI (now deactivated per default)

Version	Improvement
2.60	ISD (R&S ZNA-K220), SFD (R&S ZNA-K230), EZD (R&S ZNA-K210): New "Reset" buttons in "Advanced Settings" dialogs.
2.60	Measurement uncertainty analysis (R&S ZNA-K50): Support of sliding match (= sliding load) standards

Solved issues

Version	Issue
2.60	Readout of data from two traces via remote control: Sometimes one data trace was zero
2.60	Remote calibration: If system error correction data was loaded from file, an additional source flatness calibration could not be performed with power meter only (`SOURce:POWer:CORRection:COLLect:METHod PMONly`)
2.60	IMD measurements with coupler as combiner: In the scalar power cal wizard, ref. and meas. receiver cals were offered for the upper tone port, although not possible with this coupler configuration
2.60	If the current length was zero, "Auto Length and Loss" always calculated a zero loss.
2.60	Incorrect calculation of "Lin Mag" marker values for power meter traces
2.60	Ambiguous Y-axis labeling: no visible indication if the unit of the reference value was different from the unit of the other Y-values (displayed unit-less)
2.60	If multiple automatic calibrations with port assignments have been prepared but not saved yet, then `[SENSe<Ch>:]CORRection:COLLect:AUTO:ASSignment:DELete:ALL` did not delete all port assignments. Subsequent port assignment definitions failed.
2.60	"Calibrate All" took too long, if a noise figure channel and a standard S-parameter channel were calibrated at the same time, and "Auto Averaging" was active.
2.60	A recall set that was saved during an ongoing calibration could not be restored.
2.60	Automatic calibrations with multiple port assignments: The calibration wizard sometimes got confused if port auto-detection was used
2.60	Mixer measurements (R&S ZNA-K4): If the Converter LO (R&S ZNA-B8) was used as LO source, its power was not correctly set from the measurement setup dialog
2.60	Automatic calibration: the last measurement involving the calibration did not complete successfully
2.60	Remote operation with `SYSTem:DISPlay:UPDate OFF`: In single sweep mode, modified settings were applied immediately, instead of before the next sweep start.
2.60	Help/manual: Wrong syntax description of remote command `[SENSe<Ch>:]SEGMent<Seg>:DEFine`
2.60	Trace data queries `CALCulate<Chn>:DATA? NCData` and `CALCulate:DATA:TRACe? <TraceName>,NCData` did not always return factory-calibrated trace data.
2.60	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 ZNA firmware. Error message: "No valid Partnumber found!"
2.60	Calibration kit Keysight 85058EP: wrong capacitance value C_0 in Open (f) circuit model

Version	Issue
2.60	Millimeter-wave converter support (R&S ZNA-K8): The firmware limited the maximum output power to 20 dBm *minus "Cable & Splitter Loss"* , although the "Cable & Splitter Loss" does not reduce the output power, but the input power.
2.60	Noise figure measurements (R&S ZNA-K30): • Remote commands `CALCulate<Chn>:LIMit:LOWer[:DATA]`, `DISPlay[:WINDow<Wnd>]:TRACe<WndTr>:Y[:SCALe]:RLEVel` and `DISPlay[:WINDow<Wnd>]:TRACe<WndTr>:Y[:SCALe]:PDIV` did not work for noise density traces • Noise figure calibration failed if "Same Sweep Setup for all Standards" was active.
2.60	Gain and phase compression calculations were affected by the selected power stimulus axis for power
2.60	Sporadic firmware freezes during mixer delay calibrations
2.60	IMD did not work if Channel – [Channel Config] > "Port Config" > "Port Settings..." > "Arb. Frequency" > "Receiver Freq." was set to "only b"
2.60	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.
2.60	Amplifier/converter compression: The visualization in the upper part of the setup dialog showed the driving port together with the channel base power instead of the configured power range
2.60	The "Timing Diagram" in the "Pulse Modulation" dialog showed a single dot for the ALC length, if no "Port" or "PuMo Out" was configured for pulse modulation output
2.60	Distance to fault only worked for live traces

1.15 Firmware version 2.51

This section lists the changes introduced in firmware version 2.51.

1.15.1 Modified functionality

Version	Function
2.51	Pulsed measurements (R&S ZNA-K7): the possibility to configure a measurement acquisition offset for every a- and b-wave receiver has been removed.

1.16 Firmware version 2.50

This section lists the changes introduced in firmware version 2.50.

This firmware version only works on instruments with motherboard product index 8 or higher.

For the motherboard product index of your R&S ZNA, see System – [Setup] > "Setup" tab > "Info" dialog > "Hardware" tab > "Assemblies" table > "MB_MPM" row > "Product Index" column.

1.16.1 New functionality

Version	Function
2.50	Support of new hardware options: • R&S ZNAxx-B212 "Internal combiner P1-P2 for **2-port** R&S ZNAxx", xx = 26, 43 Requires a second internal source (R&S ZNAxx-B52) and source step attenuators at both ports (R&S ZNAxx-B21+B22). • R&S ZNAxx-B52 "2nd internal RF and LO sources for **2-port** R&S ZNAxx", now also available for R&S ZNA50 and R&S ZNA67
2.50	Noise figure measurements (R&S ZNA-K30): • Virtual image rejection for precise measurements of steep filter edges and narrow spikes. Can be enabled per channel or segment. • Support of (P)TRL calibration • Noise power density measurements
2.50	Harmonics (R&S ZNA-K4): Single-ended total harmonic distortion measurements (THD_F and THD_R)
2.50	De-/embedding of virtual networks combined with scalar power calibration

New remote control functionality

Version	Function
2.50	New commands `CALCulate:FMODel:ISD:IMPedance` and `CALCulate:FMODel:SFD:IMPedance` to set/get the global "Use Impedance Correction" parameter of the respective deembedding tool

1.16.2 Modified functionality

Version	Function
2.50	Noise figure calibration (R&S ZNA-K30): If different power levels are configured for the cal standard and/or power meter steps, the power level is now reduced to the respective minimum before every step.
2.50	Scalar mixer measurements (option R&S ZNA-K4): The default manual calibration type "without Through" is now "(P)OSM Scalar Mixer" (instead of "Refl OSM").
2.50	The integrated license server was updated to version 2.0.1.1593.
2.50	The "RF off|on" button is now pinned to the right edge of the toolbar, so that it is always visible.

1.16.3 Improvements

Version	Improvement
2.50	Pulsed measurements (R&S ZNA-K7): • Configurable ALC acquisition delay • A measurement acquisition offset can be configured for every a and b wave receiver.
2.50	2-dimensional compression point measurements: To increase measurement speed, the linear part of the power sweeps can be skipped.
2.50	Marker values for wave and ratio traces in complex diagrams (polar coordinates)
2.50	Optional display of X-axis grid labels in cartesian diagrams with linear scale.
2.50	Noise figure measurements (R&S ZNA-K30): • Improved detector time calculation for calibration of frequency-converting NF measurements • Better prediction of overall calibration and measurement times
2.50	Firmware installer: New display configuration routines for improved "repair installation" behavior
2.50	External generators: Improved "Fast Sweep" mode
2.50	When the R&S ZNA loads a recall set file with non-standard extension (e.g. `*.cst`), it now tries to open it as XML (`*.znxml`) *and* binary (`*.znx`) file.
2.50	DUT wizard: In the amplifier configuration sequence, "Gain" replaces "Conversion Gain".

Solved issues

Version	Issue
2.50	Automatic vector mixer calibration (R&S ZNA-K5): Depending on the order in which the calibration steps were performed, the calibration mixer step did not always finish.
2.50	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.
2.50	Old versions of the direct access and receiver step attenuator hardware were not properly detected by the firmware.
2.50	Scalar mixer mode (option R&S ZNA-K4): • An automatic PUOSM calibration could not be performed unless option R&S ZNA-K5 was also installed. • Misleading icon for "OSM Scalar Mixer" calibration
2.50	R&S ZNXSIM with more than one R&S ZNPC smart card attached to the simulation PC: The R&S ZNA firmware simulation failed to start if picked the "wrong" smart card
2.50	Command `CONFigure:CHANnel<Ch>[:STATe] ON` did not make channel `<Ch>` the active one.
2.50	Touchstone file export: data for an export of 2 frequency points were exported in reverse order
2.50	Improper handling of invalid "Harmonic" values in "More Harmonics" dialog
2.50	`[SENSe<Ch>:]CDLL[:STATe] <DllName>, <Boolean>` did not accept boolean `ON`.
2.50	`CALCulate<Ch>:DATA:CHANnel:ALL` failed if, between measurement and data retrieval, a lower-numbered channel was deleted.

Version	Issue
2.50	External generators were not switched off if not required in a partial measurement.
2.50	Commands `CALCulate:FMODel:EZD:PRESet`, `CALCulate:FMODel:ISD:PRESet`, and `CALCulate:FMODel:SFD:PRESet` did not restore all channel-independent default settings of the respective deembedding tool.
2.50	Mouse wheel scrolls in a dialog were propagated to the diagram area – with undesired side effects such as changing the current marker position.
2.50	Stability factor measurements always returned zero
2.50	An external generator could not be used as the source port of a redefined physical port.
2.50	Spectrum measurements on frequency-converting devices, involving mm-wave converters (R&S ZNA-K1, R&S ZNA-K4, R&S ZNA-K8): If converters were used as RF and LO ports, the RF frequency was limited to the frequency range of the R&S ZNA in use.
2.50	Noise figure measurements (R&S ZNA-K30) could not be performed in CW mode.
2.50	Opening the "System Config" dialog via the menu bar crashed the firmware.
2.50	Command `SOURce<Ch>:POWer<PhyPt>[:LEVel][:IMMediate]:LLIMit:VALue` did not set the port power limits.
2.50	Vector mixer measurements (R&S ZNA-K5): Opening the vector mixer setup dialog, changed the "Phase Mode" setting from "Coherence On Low Ph. Noise" to "Coherence On"
2.50	Mixer measurements with "Conv. LO" as LO port (R&S ZNA-K4 etc., R&S ZNA-B8): • In the mixer channel setup dialogs, the LO power was not always set correctly. • Changing the LO power in the "Port Settings" dialog, did not change the value in the mixer channel setup dialogs.
2.50	It was not possible to set the "Driving Mode" from the GUI.
2.50	Whenever a channel's set of configured traces changed, all its traces were recalculated.
2.50	Stability factor measurements K_{ij} used too many ports
2.50	Calibration setup dialog > "Cal Power" tab: • Some labels were not clear. • Some (default) values originating from the channel setup were not displayed correctly.

1.17 Firmware version 2.41

This section lists the changes introduced in firmware version 2.41.

1.17.1 New functionality

Version	Function
2.41	Leveling datasets can be saved to and loaded from file
2.41	Eazy de-embedding (R&S ZNA-K210): new "Port Order" setting

New remote control functionality

Version	Function
2.40	New command `[SENSe<Ch>:]CORRection:COLLect:AUTO:REPeat` to repeat an automatic calibration
2.41	New remote commands `DISPlay:LAYout:OVERlay` and `DISPlay:LAYout:SPLit` for diagram functions "Overlay All" and "Split All", respectively

1.17.2 Improvements

Version	Improvement
2.41	"Power" stimulus axis can be selected without option R&S ZNA-K4.

Solved issues

Version	Issue
2.40	`[SENSe<Ch>:]CORRection:COLLect:AUTO:ASSignment<Asg>:ACQuire` ignored the channel number and used the active channel instead
2.40	Touchstone file export: data for 2 frequencies were exported in reverse order
2.41	Leveling datasets lost when a power calibration was started
2.41	True differential mode (R&S ZNA-K61): with two balanced ports, export of balanced S-parameters raised an error
2.41	mm-wave converters: ALC produced wrong levels above a setup-dependent frequency
2.41	A [Preset] during an automatic calibration sometimes made the firmware freeze and crash
2.41	µ1 and µ2 in "Stability" parameter selection combo-box erroneously prepended with "Å"

1.18 Firmware version 2.40

This section lists the changes introduced in firmware version 2.40.

1.18.1 New functionality

Version	Function
2.40	Firmware support of VDI - Erickson power meters PM4 and PM5
2.40	Option R&S ZNA-K8: The functionality of the R&S Converter Leveling Tool is now built into the firmware Note that the leveling functionality is enabled with optionR&S ZNA-K8, but can also be used for regular VNA ports.
2.40	Firmware support of Inline Calibration System R&S ZN-Z3x

Version	Function
2.40	Joining of existing calibrations
2.40	Noise figure measurements (R&S ZNA-K30): • Support for R&S ZNA50 and R&S ZNA67 • Quickset now also available für mixer measurements (R&S ZNA-K4)
2.40	Spectrum measurements (R&S ZNA-K1): • Noise power ratio trace statistic • "Increased Level Accuracy" (zero padding) measurement option
2.40	Measurement uncertainty analysis (R&S ZNA-K50): Support for METAS `scolv` cal kit files

New remote control functionality

Version	Function
2.40	Source coherence (R&S ZNA-K6): New command `SOURce<Ch>:CMODe:PORT<Pt>:PHASe:SPAN` to set the phase span
2.40	"Remote Language" PNA: Command `SOURCE:POWER1:ATT:AUTO` is now accepted Note that the related functionality is not available on the R&S ZNA and hence the query always returns 0.
2.40	Command `[SENSe<Ch>:]SWEep:GENeration STEPped` is now accepted Note that the swept (`ANALog`) mode is not available on the R&S ZNA and hence the corresponding set command generates an error.
2.40	New "Ready for Trigger" remote commands: • `TRIGger:STATus:READy` queries the current "Ready for Trigger" state • `TRIGger<unused>:WAIT:READy [<Timeout>]` returns 1 when the R&S ZNA is "Ready for Trigger", or 0 after the specified `<Timeout>`

1.18.2 Modified functionality

Version	Function
2.40	Deleting a device in the "External Generic Devices" dialog now also removes its configuration from the current setup. Defining the device again does not restore its configuration.
2.40	"Remote Language" ZVABT: Command `[SENSe<Ch>:]FREQuency<Pt>:CONVersion:ARBitrary` now ignores the `<Pt>` suffix and defines the receiver frequency for **all** ports (like in R&S ZVA/ZVB/ZVT)
2.40	Mixer measurements (R&S ZNA-K4): A channel now remains in mixer mode, if port settings are changed afterwards. Previously, it would have switched to arbitrary mode.
2.40	Intermodulation measurements (R&S ZNA-K4): If a cal unit is available, then by default an automatic PUOSM calibration is performed between lower tone and receiving port (instead of a manual "P-One Path Two Port")

1.18.3 Improvements

Version	Improvement
2.40	Improved warning message in case you attempt to use an uncalibrated reference receiver for source flatness calibration
2.40	Intermodulation measurements (R&S ZNA-K4), additional port match calibration types: • "P-One Path Two Ports" and "PUOSM" if one receiver pair is used for both IMD tones at the source side • "P-Refl OSM" if two receiver pairs are used
2.40	Trace data export: The number of decimal places of stimulus and response values can now be configured
2.40	Two-tone group delay measurements (R&S ZNA-K9): Support of PUOSM calibration
2.40	Spectrum measurements (R&S ZNA-K1): With motherboard product index 8 or higher, up to four receivers can be measured in parallel (no parallel measurements for firmware versions < 2.40 or with motherboard product index < 8)
2.40	Noise figure "Quickset" dialog (R&S ZNA-K30): • De-/activate the receiver isolation amplifier (R&S ZNAxx-B501) from within the dialog • Additional external attenuation parameters
2.40	Lower minimum "Ref Value" in polar diagrams allows larger scaling
2.40	Source coherence (R&S ZNA-K6): • "Phase Span" setting and "Phase Imbalance" sweep type are no longer limited to true differential mode (R&S ZNA-K61) • "Phase Start" and "Phase Stop" setting no longer limited to ±180°
2.40	In remote mode, a tap/click on the main window restores the "Remote" softtool
2.40	Distance to Fault measurements (R&S ZNA-K2): Cable type attenuations can be defined for frequencies > 6 GHz
2.40	The integrated license server was updated to version 1.31.0.1568
2.40	Delta-L PCB characterization (R&S ZNA-K231): Configurable output directory for deembedding files
2.40	New "Generic Device Setting for Calibration Mixer"
2.40	Automatic level control (ALC): New 7 MHz filter in wideband signal path improves ALC convergence speed and allows shorter pulses with ALC.
2.40	A flatness cal performed for a frequency sweep can now be reused for power sweeps
2.40	For better accuracy, the "Compression Point" trace statistic is now calculated using the a-wave (instead of the stimulus axis), if possible
2.40	"Freq Step Size" setting added to all measurement setup dialogs

Solved issues

Version	Issue
2.40	True differential mode (R&S ZNA-K61): Failed UOSM calibration of CW and power sweeps
2.40	Mixer phase measurements (R&S ZNA-K5): Measurement results varied with VUOSM calibration sequence

Version	Issue
2.40	The visibility of the "Track LO" popup was not setup-specific
2.40	Pulse profile measurements (R&S ZNA-K7): • Popup hint "Measurement not fast enough. Increase bandwidth." was shown even though the maximum bandwidth was already selected • Excessive preparation time if the number of sweep points is large
2.40	Mixer measurements (R&S ZNA-K4): Inapplicable warning "... power of Port x should be calibrated before" during guided calibration
2.40	Noise figure measurements (R&S ZNA-K30): • The "Quickset" logic did not take the state of the internal low power spur reduction amplifier (R&S ZNAxx-B501) into account • The "Source Attenuator" field in the noise figure setup dialog displayed the receiver attenuator value • Receiver noise figure traces could not be configured via remote control (commands `CALCulate<Ch>:PARameter:MEASure` and `CALCulate<Ch>:PARameter:SDEFine` dropped the `R` in `'NF1R' | 'NF2R' | ...`) • Automatic channel calibration with the auto-detect command `[SENSe<Ch>:]CORRection:COLLect:AUTO:TYPE` did not work • "Quick Setup Noise Figure" did not add the "NF21" trace to the channel • In noise figure channels, a completed flatness calibration was no longer applied, after a reference receiver calibration was performed for a third port
2.40	For time domain traces, `CALCulate<Chn>:MARKer<Mk>:FUNC:DOMAIN:USER` commands did not accept values with units (and returned a misleading error message)
2.40	For some multichannel configurations, calibration data could not be applied
2.40	Markers on traces whose value at the marker position was above or below the visible range, were not displayed
2.40	Frequency converting measurements (R&S ZNA-K4): • Setting the stimulus axis to a converted receiver frequency did not adjust the frequency range displayed in the channel info • Disabling LO tracking generated an error
2.40	Option installation via GUI: Empty alert message if unsuccessful
2.40	Calibration setup dialog: "Start Cal" was disabled but no error message was displayed, if a combination of cal units and cal kits was configured in a channel (not supported)
2.40	"Calibrate All": If some channels were configured for manual and others for automatic calibration, only the manual calibrations were performed
2.40	R&S ZNA firmware PC simulation (R&S ZNXSIM-K2): Non-existing R&S ZNA software options displayed in "Info" dialog
2.40	Vector mixer measurements (R&S ZNA-K5): Command `[SENSe<Ch>:]CORRection:COLLect:AUTO:TYPE` did not work for cal types `VUOSm` and `CPUosm`
2.40	Bad zip compression performance of "Create R&S Support Information" could lead to GUI freezes and Windows killing the VNA application
2.40	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
2.40	`SYSTem:ERRor:DISPlay:STATe OFF` did not disable the display of information popups

Version	Issue
2.40	"More Ratios" dialog did not work with external generators S
2.40	Formula-based limit lines were not properly restored from recall sets
2.40	With "Same Sweep Setup for All Standards", a combined receiver power calibration was not performed
2.40	Marker format "dB Mag Phase": Incorrect magnitude calculation for certain trace formats
2.40	Frequency converting two-tone group delay measurements (R&S ZNA-K9): Wrong source frequencies if a source port is not running at channel base frequency
2.40	Inapplicable error popup "Sweep time exceeds requested time ..." for time sweeps with only one point
2.40	Calibration kit Keysight 85052C (predefined): Both Reflect standards were defined as Open instead of Short
2.40	Some memory traces created using "Data & Func to New Mem" (or one of the corresponding parser commands) were not properly loaded from recall set
2.40	Controlled timing (R&S ZNA-K28): • It was possible to activate ALC, although ALC is not supported if controlled timing is active • Access to ring buffer was blocked for continuous sweeps
2.40	For some single-ended S-parameter measurements, "Cal Off" was displayed although a calibration was applied

1.19 Firmware version 2.31

This section lists the changes introduced in firmware version 2.31.

1.19.1 Improvements

Solved issues

Version	Issue
2.31	Firmware crashes if ALC is used for coherent source signals
2.31	ALC instability for intermodulation measurements on 2-port R&S ZNA with option R&S ZNA-B52
2.31	Various issues with AM/PM measurements
2.31	Noise figure measurements (option R&S ZNA-K30) did not work correctly without option R&S ZNA-K4
2.31	Command `[SENSe<Ch>:]SWEep:GENeration STEPped` was not accepted
2.31	PNA remote language: command `SOURCE:POWER1:ATT:AUTO` was not accepted

1.20 Firmware version 2.30

This section lists the changes introduced in firmware version 2.30.

1.20.1 New functionality

Version	Function
2.30	Automatic level control (ALC) • ALC now supported for intermodulation, group delay, mixer, and pulse modulation measurements • ALC can use the configured offset or single-ended deembedding network • Configurable optimization
2.30	Vector mixer measurements (R&S ZNA-K5): additional calibration types: • "POSM Vector Mixer" • "UOSM Scalar Vector Mixer"
2.30	New software option R&S ZNA-K980: R&S HUMS (health and utilization monitoring service) • Persistent collection of health and utilization data • Configurable access via REST and SNMP interfaces
2.30	New software option R&S ZNA-K28 "Continuous data recording": data of periodically executed sweeps are recorded with equidistant time grid, using a circular buffer
2.30	Support for new hardware options: • R&S ZNAxx-B52 "2nd internal RF and LO sources for **2-port** R&S ZNAxx" • R&S ZNAxx-B212 "Internal combiner P1-P2 for **2-port** R&S ZNAxx" Requires a second internal source (R&S ZNAxx-B52) and source step attenuators at both ports (R&S ZNAxx-B21+B22). Currently these hardware options are only available for 2-port R&S ZNA26 and R&S ZNA43.
2.30	"Web Control": browser-based access to the VNA GUI via the instrument's web interface
2.30	Disable/enable all deembedding functions with a single tap or click
2.30	ISD tool (self-installed or with option R&S ZNA-K230): support of "Small Fixture" mode

1.20.2 New remote control functionality

Version	Function
2.30	Frequency converters (R&S ZNA-K8): SCPI commands for default cable and splitter losses at LO IN ports: • "Cable & Splitter Loss": `[SENSe:]CONVerter<Port>:CSLoss` • "Slope": `[SENSe:]CONVerter<Port>:CSSLope`
2.30	New remote command `SYSTem:ERRor:COUNt` to get the current number of error entries in the SCPI error queue.
2.30	ENA emulation command alias `[SENSe<Ch>]:SWEep:MODE`

1.20.3 Modified functionality

Version	Function
2.30	Confirmed settings in "ALC Config" dialog

2.30	Delta-L (R&S ZNA-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 now restricts the Delta-L measurements to balanced or single-ended ports:
	`CALCulate:FMODel:DELT:MEASurement`
	• New command to enable/disable the differential mode of the 1-length method:
	`CALCulate:FMODel:DELT:M1L:DIFFmode`

2.30	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

1.20.4 Improvements

Version	Improvement
2.30	Source flatness calibration can now use the configured offset de-/embedding
2.30	Support for external generator R&S SMW200A
2.30	Configurable number of decimal places for stimulus and result values in Touchstone export files
2.30	The number of decimal places can now also be configured for *meter* values
2.30	Phase coherence and true differential mode with mm-wave converters: improved stability if RF ports are used as LO sources
2.30	Eazy De-embedding (R&S ZNA-K210): support for impedance correction
2.30	"ZVABT" remote language: better consistency with R&S ZVABT behavior for ARB frequency commands
2.30	On a 4-port R&S ZNA with four sources (i.e. equipped with R&S ZNAxx-B3), four 1-port DUTs can be measured in parallel
2.30	Delta-L (R&S ZNA-K231) measurements can now include the TDR impedance traces, if R&S ZNA-K2 is installed
2.30	Pulsed measurements: the acquisition delay can now be set without option R&S ZNA-K7
2.30	Phase Coherent Source Control (R&S ZNA-K6): • "Phase Span" setting no longer requires R&S ZNA-K61 • "Phase Span" value no longer limited to +/- 180°

Solved issues

Version	Issue
2.30	Changing the average factor was ignored while averaging was active
2.30	Calibrated traces showed "Cal Off" label after deembedding
2.30	UOSM vector mixer calibration (R&S ZNA-K5): "Repeat Calibration" did not make use of existing calibration data
2.30	Limit line check: PASS/FAIL info field disappeared when diagram was maximized
2.30	Printing with user-defined colors
2.30	Frequency converters with IF connections via R&S ZNAxx-B16: degraded spectrum analysis (R&S ZNA-K1) performance for some IF frequencies
2.30	Formula-defined limit lines were not exported to limit line files (`*.limit`)
2.30	Source flatness calibration of mixer ports: during RF and IF port calibrations, the LO port was not driving for certain mixer configurations
2.30	"Repeat Cal" remained enabled after incompatible changes of the swept frequencies
2.30	For R&S ZNAxx equipped with HW options R&S ZNAxx-B302 and/or -B501, a wrong pre-correction was applied to spectrum analysis measurements (R&S ZNA-K1)
2.30	Improper Trigger Out signal generation for sweep points in alternated driving mode
2.30	External DLLs: • interrupts were delayed • PAE measurement was skipped in some setups with multiple driving ports
2.30	ALC configuration was enabled for spectrum analysis channels (even though it is not available for those channels)
2.30	A restart using `SYSTem:SHUTdown RESTart` sometimes caused a crash of the firmware
2.30	Live pulse analysis with R&S VSE (R&S ZNA-K7): firmware crash when switching from "VSE Mode": "ZNA and VSE" to "ZNA Only"
2.30	In several measurement configuration dialogs, the Converter LO could not be selected as LO port, if the internal combiner was used
2.30	Setting `[SENSe:]CONVerter:SPLitter<Port>:LOPort` sometimes caused the firmware to crash

1.21 Firmware version 2.21

This section lists the changes introduced in firmware version 2.21.

1.21.1 Improvements

Version	Improvement
2.21	LO Out (HW option R&S ZNA-B8): firmware support for improved factory calibration procedure

1.22 Firmware version 2.20

This section lists the changes introduced in firmware version 2.20.

1.22.1 New functionality

Version	Function
2.20	Support for new instrument models: • R&S ZNA50, 10 MHz to 50 GHz, 2 test ports 2.4 mm, order no. 1332.4500K52 • R&S ZNA50, 10 MHz to 50 GHz, 4 test ports 2.4 mm, order no. 1332.4500K54 • R&S ZNA67, 10 MHz to 67 GHz, 2 test ports 1.85 mm, order no. 1332.4500K62 • R&S ZNA67, 10 MHz to 67 GHz, 4 test ports 1.85 mm, order no. 1332.4500K64
2.20	New hardware option R&S ZNAxx-B302: Low noise preamplifier for port 2 of a R&S ZNAxx, up to 30 dB power gain at receiver side. Only available for R&S ZNA26 and R&S ZNA43. Requires hardware option R&S ZNAxx-B32 (receiver step attenuator at port 2).
2.20	New hardware option R&S ZNAxx-B501: spur magnitude reduction for enhanced spectral purity at port 1 of a R&S ZNAxx Only available for R&S ZNA26 and R&S ZNA43. Requires hardware option R&S ZNAxx-B31 (receiver step attenuator at port 1).
2.20	New software option R&S ZNA-K30 "Noise figure measurement on 2 port devices" With option R&S®ZNA-K4, also frequency converting NF measurements are possible. Only available for R&S ZNA26 and R&S ZNA43.
2.20	Distance-to-fault measurements with time domain option R&S ZNA-K2
2.20	Touchstone file export conforming to Touchstone® File Format Specification Version 2.0
2.20	Extended time domain analysis (option R&S ZNA-K20): new "TDR Wizard" to set up and calibrate a TDR measurement quickly
2.20	Touchstone file export of balanced S-parameter traces
2.20	Support of R&S VSE software with option R&S ZNA-K7 "Pulsed Measurements" • GUI for VSE connection configuration • Export of I/Q data during "Pulse Profile" sweeps Note that for R&S VSE a separate license and option R&S VSE-K6 "Pulse measurements application" is required.
2.20	Channel-specific "Same Sweep Setup for All Standards" calibration setting

New remote control features

Version	Function
2.20	New query `SOURce<Ch>:LOTRack:DFRequency` that gets the frequency difference between expected and measured LO frequency when LO tracking is active

1.22.2 Modified functionality

Version	Function
2.20	"Save Report" button in system info dialog relabeled to "Create R&S Support Information"
2.20	"Ratio" and "Harmonics" softtool tabs joined
2.20	"Auto Power Reduction for Cal Unit" global calibration setting renamed to "Auto Power Setting for Cal Unit"

1.22.3 Improvements

Version	Improvement
2.20	Support of spectrum analysis measurements (R&S ZNA-K1) with frequency converters (R&S ZNA-K8)
2.20	Support of source monitor access (R&S ZNA-B161/-B163) for two-tone signal generation
2.20	Phase mode "Coherence On, Low Ph. Noise": several limitations removed; now supported with mixer phase measurements (R&S ZNA-K5)
2.20	Improved handling of long diagram titles during printing
2.20	Configurable system defaults for trace-specific User Port "TTL1 Pass" and "TTL2 Pass" settings
2.20	Support of *round()* function in user-defined mathematical expressions
2.20	Support of R&S NRQ6 power sensor via LAN
2.20	Combiner selection now also possible via "Channel Config" > "Port Config" tab
2.20	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
2.20	Gain compression measurements: • New measured quantity "Compression Point S-Param" • Load match correction of "Compression Point Power Out"
2.20	R&S ZNA-K50(P): GUI terms adjusted to METAS VNA tools
2.20	VNA firmware simulation R&S ZNXSIM now supports floating licenses
2.20	Improved detector usage for S-parameters with AVG detector
2.20	For harmonics traces, marker labels display a "H<order>" below the x-axis frequency
2.15	Updated driver signatures for Windows 10 compatibility
2.20	Improved speed for remote "True Differential" measurements
2.20	Improved "RF ON/OFF" toolbar button design

Solved issues

Version	Issue
2.20	MATLAB® failed to import trace data files that were exported by the R&S ZNA firmware, if, during Matlab export, a field separator other than "Comma" was used.
2.20	User characterization of R&S ZN-Z154 did not work
2.20	Logarithmic interpolation of limit lines did not work for linear sweeps
2.20	Missing space between cal label and power cal label in trace info
2.15	Firmware versions < 2.15 created incompatible `*.calkit` files (`*.calkit` files containing snp data could not be used with other Rohde&Schwarz VNAs)
2.20	Installation of R&S ZNA firmware simulation failed if R&S ZVA/B/T firmware simulation was installed on the same PC
2.20	Limit line check: PASS/FAIL info field disappeared when diagram was maximized
2.20	Fixed an issue with handling multiple Line standards in TRL calibration
2.20	For segmented sweeps, markers could not be positioned between sweep segments
2.20	Frequency-converting IMD measurements: for certain frequency setups, the firmware erroneously displayed an error message during power calibration with a power meter
2.20	"DUT Centric Wizard": finishing the wizard with both "Create New Setup" and "Calibrate Newly Created Channels" selected, caused errors
2.20	R&S ZNA-B26: hardware pre-correction for spectrum analysis mode
2.20	True differential mode with a combination of balanced and single ended ports: sporadic timing problems
2.20	Internal pulse generator: under certain conditions, the master pulse period was not set correctly
2.20	`CALCulate<Chn>:MARKer<Mk>:FUNCtion:DOMain:USER:SHOW ON` did not switch on range limit lines
2.20	Remote command `CALCulate<Ch>:PARameter:SDEFine <TraceName>, <Result>` did accept invalid `<Result>` parameters
2.20	Entering the "Power Cal Settings" softtool changed the "Power Cal Method" to "Ref. Receiver Only"
2.20	"More Wave Quantities" dialog: if an external generator was selected as "External Source", also the "Source Port" had to be set to "None"
2.20	Command `SENSe<Ch>:SWEep:TYPE POINt` did not always switch from segmented to CW sweep mode
2.20	Fixed an issue with reusing reference receiver calibrations in subsequent calibrations
2.20	A positive/negative ALC offset ("Start Value: Offset") decreased/increased the start power **Note that the offset direction has been reversed.**
2.20	The "Pulse Modulation" dialog did not always preserve settings
2.20	"Mixer Params" > "More Relfection & Feedthru" did not create correct feedthrough measurements

Version	Issue
2.20	Advanced power cal commands: • Misspelled keyword `ATTenautor` in `[SENSe<Ch>:]CORRection:ADVanced:SOURce<PhyPt>:ATTenuator` commands • Settings `SENSe<Ch>:]CORRection:ADVanced:SOURce<PhyPt>:ATTenuator:STATe` and `[SENSe<Ch>:]CORRection:ADVanced:POWer<PhyPt>:STATe` did not work
2.20	External (custom) DLLs: • the firmware crashed if more than one task was set to "Permanent" • missing channel interrupts for tasks with drive port > 1
2.20	mm-wave converters • no warning was raised if converters with different LO sources were used in a measurement • sweep stopped if ALC or source coherence was used
2.20	`STATus:QUEStionable:INTegrity:HARDware:CONDition` did not reflect "overload" condition (status register bit 3 was not set correctly)
2.20	After firmware startup, the internal combiner configuration was not set immediately
2.20	Wrong L3 parameter for male Short standard of CalKit R&S ZN-Z135 typical

1.23 Firmware version 2.15

This section lists the changes introduced in firmware version 2.15.

1.23.1 New functionality

Version	Function
2.15	Support of optional RFFE/GPIO boards R&S ZNA-B15 • Var. 03 (order no. 1332.4575.03) with voltage/current measurement • Var. 02 (order no. 1332.4575.02) without voltage/current measurement
2.15	New software option R&S ZNA-K210 "Eazy De-embedding" (EZD) based on IEEE 370
2.15	New software option R&S ZNA-K220 "In-situ De-embedding"
2.15	New software option R&S ZNA-K230 "Smart Fixture De-embedding"
2.15	New software option R&S ZNA-K231 "Delta-L 4.0 PCB Characterization"
2.15	Power-added efficiency measurements with R&S®HMP2030 power supply
2.10	Wave-based de-/embedding calculation as an alternative to S parameter-based calculation

New remote control functionality

Version	Function
2.10	New commands `[SENSe:]CONVerter<Port>:RFLoss` and `[SENSe:]CONVerter<Port>:LOLoss`, to define the cable loss at port <Port> if used as RF port or LO port (without splitter), respectively

1.23.2 Improvements

Version	Improvement
2.15	Improved start-up behavior for instruments with memory extension R&S ZNA-B7

1.24 Firmware version 2.10

This section lists the changes introduced in firmware version 2.10.

1.24.1 New functionality

Version	Function
2.10	New software option R&S ZNA-K61 "True differential measurements" for 4-port instruments: • True differential operation mode (stimulation and measurement) • Phase imbalance and amplitude imbalance sweep types (Requires R&S ZNA-K6 "Phase-coherent source control")
2.10	ALC for frequency converter ports
2.10	Harmonics measurements (with option R&S ZNA-K4)
2.10	Plugin interface and SDK for custom DLLs: extend the VNA firmware by custom SW components
2.10	Frequency converter power control (R&S ZNA-K8): new "Generic" power control type allows you to reuse leveling data from other converter ports and configurations
2.10	New software option R&S ZNA-K50P: same functionality as R&S ZNA-K50 "Measurement Uncertainty Analysis", but with preinstalled METAS VNA Tools

New remote control functionality

Version	Function
2.10	`SENSe:CORRection:ADVanced` commands for advanced calibration settings

1.24.2 Improvements

Version	Improvement
2.10	Consistent default settings in "Pulse Modulation" dialog (after [Preset])
2.10	Mixer setup dialog leaves frequency settings of unaffected ports unchanged
2.10	Support of calibration setups with manual and automatic calibration
2.10	IMD measurements • Simplified default calibration • Aligned behavior of "CW Mode Spectrum" functions "CW Mode" and "Spectrum = Marker"
2.10	Vector mixer measurements: more measured quantities directly accessible via "Vector Mixer Meas" softtool tab (appearance aligned to "Vector Mixer Meas" tab)
2.10	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)
2.10	Measurement uncertainty analysis (R&S ZNA-K50): zip archives created using "Export Data to METAS VNA Tools" can now be directly unpacked to the user data folder of a METAS VNA Tools installation for further offline analysis
2.10	Source coherence mode (R&S ZNA-K6): direct phase control, without applying port match and calibration
2.10	If compatible with the overall converter setup, the source providing the LO IN signal to a frequency converter is automatically configured as permanent ("Source Gen")
2.10	Segmented sweeps: changes take effect faster (less "prepare sweep" phases)
2.10	Improved access to extended [Preset] functionality via menu bar
2.10	Manual ALC control loop configuration: new parameters "Control Time" and "Auto Settling"

Solved issues

Version	Issue
2.10	Factory correction for Direct Access (B16) inputs was not applied in SA mode
2.10	Frequency-converting measurements with Converter LO used as LO provider: the "Power Result" displayed in the "Port Settings" dialog was not correct
2.10	Frequency-converting measurements with external generator used as LO provider: excessive retrace time
2.10	Some timing/synchronization problems with external generator R&S SGS100A
2.10	Misleading calibration instructions on "DUT Centric Wizard" start page
2.10	Calibration setup dialog: • Redundant warning messages • Sometimes a warning message did not disappear even if it was no longer applicable
2.10	IMD measurements: • Inconsistent warning messages during default calibration • Misspelled measured quantity for Through measurement during calibration (now labeled LTO for "Lower Tone at DUT Out")

Version	Issue
2.10	Deleting a trace by dragging it to the recycle bin sometimes did not work
2.10	Configured "Reference Receiver Cal Power" value not used in SMARTerCal
2.10	Formula-defined limit lines: formula was not applied if entered directly in "Response" dialog
2.10	Impedance normalization failed for some special balanced port configurations
2.10	`*.calkit` files created with R&S ZNA and containing snp data were not compatible with R&S ZNB/BT/C/D firmware versions < 3.0 and R&S ZNL/LE firmware versions < 1.30

1.25 Firmware version 2.00

This section lists the changes introduced in firmware version 2.00.

1.25.1 New functionality

Version	Function
2.00	Uncertainty analysis using METAS VNA Tools (option R&S ZNA-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 for offline analysis
2.00	Basic non-linear measurements ("Gain Compression") • For non frequency-converting and frequency converting DUTs • Configurable compression value • Sweep method: power sweeps over a linear frequency grid, with break at the compression point • Result traces: compression point power in/out vs. frequency
2.00	New software option R&S ZNA-K6 "Phase-coherent source control" for 4-port instruments: enables the generation of signals with defined phase and amplitude.
2.00	Guided calibration

1.25.2 Improvements

Version	Improvement
2.00	The firmware installer can now update all FPGAs of the R&S ZNA
2.00	Two-tone group delay measurements (R&S ZNA-K9) • The upper tone can now also be provided by an external generator • Improved calibration
2.00	Fixture modeling: support of the ISD tool's new DC extrapolation function
2.00	Frequency converter support (R&S ZNA-K8) • If source flatness calibrations at the RF IN and at the CONV port of a converter are available, then only one of them can be active at a time. If both of them are performed during a single run of the "Power Cal Wizard", the wizard automatically activates the CONV calibration and deactivates the RF IN. (Resolves a known issue of FW V1.95) • Source flatness calibrations at converter input ports (RF IN, LO IN) now also appear in the "Active Power Cals" dialog. • The input power limits at the RF IN and LO IN ports are now also enforced during source flatness calibration.
2.00	Enhanced preset functionality: new "Preset" softtool allows you to switch between different preset modes
2.00	Improved "reduced through" calibration results for full n-port calibrations on more than two ports
2.00	Improved cal kit import from cal kit print files (`*.prn`) generated by Keysight Cal Kit Editor
2.00	Load match correction can be disabled for non frequency-converting measurements
2.00	Improved dynamic range at frequencies around 2 GHz. **Note** that the improvement is achieved by using an alternative signal path. For a R&S ZNA that was factory calibrated with a firmware version < 2.0, this change can cause an offset of approximately 0.3 dB for uncalibrated wave measurements. Calibrated measurements are not affected. The offset can be eliminated by a new factory calibration at Rohde&Schwarz service.
2.00	Ground loop de-/embedding per port group (i.e. per DUT)
2.00	Menu bar: optimized submenu structure for trace math ("Trace" > "Trace Config" > "Trace Math")

Solved issues

Version	Issue
2.00	IMD measurements using an external generator and a combiner: incorrect power calibration of the two-tone stimulus signal using a power meter, if the generator's "Sweep End" state was not set to "Switch Power Off" (Resolves a known issue of FW V1.95)
2.00	After a configuration change, some queries (e.g. for markers) returned outdated results
2.00	Receiver overload not indicated during spectrum and certain pulse profile measurements
2.00	Frequency converter support (R&S ZNA-K8): custom frequency conversion formulae for converter ports could result in inconsistent settings and miscalculated frequency results
2.00	LO Out port (R&S ZNA-B8): flatness cal of LO Out port did not appear in "Active Power Cals" dialog

Version	Issue
2.00	Some timing/synchronization problems with external generator R&S SGS100A
2.00	Some power cal properties, when set via remote commands, could not be changed from the GUI
2.00	Marker disappeared in zoom mode
2.00	Discrete markers did not always snap to sweep points
2.00	Trace math on formatted data: for source data traces, an active "Min Hold" or "Max Hold" was ignored
2.00	Incomplete import of waveguide cal kits from `*.prn` files
2.00	Intermodulation measurements • If an external generator or LO Out (R&S ZNA-B8) provides the upper tone, the "Upper Tone at DUT In" (UTI) cannot be measured, but could be selected in the "Intermodulation Measurements" dialog • If LO Out provides the upper tone, the calculated frequencies were not correct
2.00	Focus problem in "Save" dialog when entering file names
2.00	Lost trigger counter • Erroneous lost trigger events if optional trigger board R&S ZNA-B91 is not equipped • Erroneous lost trigger events after firmware start with user-defined preset file
2.00	In FW V1.95 the "Export Cal Kit" function generated `*.calkit` files that could not be read by other instruments or previous firmware versions

1.26 Firmware version 1.95

This section lists the changes introduced in firmware version 1.95.

1.26.1 New functionality

Version	Function
1.95	New, streamlined user interface for calibration setup and execution: • Restructured "Start Cal" softtool tab • New multi-channel setup dialog for calibration. Covers manual and automatic, standard and SMARTer calibration. Separates calibration setup from execution. • New "Quick Start" buttons for starting the calibration of one or multiple channels using the configured/default calibration directly
1.95	Formula-defined limit lines

1.26.2 Modified functionality

Version	Function
1.95	Minor changes in "Pulse Modulation" dialog
1.95	Port configuration user interface: • "Port Settings" dialog enhanced • "Advanced Port Settings" dialog discarded
1.95	Self test query `*TST` now returns 0 (instead of 1) if the self test yields "no error"
1.95	Modified calculation of UOSM mixer phase calibration (R&S ZNA-K5). New calculation method can result in a phase shift of 180 degrees if the sweep direction is changed.

1.26.3 Improvements

Version	Improvement
1.95	Tracking of lost trigger events via GUI and remote control
1.95	Time domain (R&S ZNA-K2): If the "Low Pass Step" transformation is selected, a dialog prompts you to activate "Dynamic Bw at Low Frequencies"
1.95	IMD calibration (R&S ZNA-K4): configurable option to increase the number of sweep points to avoid interpolation
1.95	IMD measurements (R&S ZNA-K4): optimized automatic image suppression
1.95	Channel info line: • The active calibration is shown in a dedicated label • A double-tap/click on the calibration label opens the calibration manager
1.95	Spectrum mode (option R&S ZNA-K1): improved behavior of "Reduce Power at Sweep End"
1.95	Vector mixer measurements (R&S ZNA-K5): improved calculation of phases and delays for lower side band measurements

Solved issues

Version	Issue
1.95	Spikes in mixer phase measurements after switching the analog IF filter from "Wideband" to "Normal"
1.95	Spectrum analysis did not work for VNA ports serving as generator ports
1.95	Improvements in "More Wave Quantities" dialog: • Possibility to select "None" as source port • Improved user interface
1.95	"More Ratios" dialog: possibility to select "None" as source port
1.95	Activating converters did not remove the corresponding ports from other assignments
1.95	At firmware start, the license server was not ready (error "Failed to connect to R&S License Server")
1.95	Minor window layout problems in conjunction with remote desktop access

Version	Issue
1.95	When LO tracking was enabled, the delay times for power sweeps were negative
1.95	Frequency converting UOSM calibration used wrong frequency settings if the number of sweep points was below 20
1.95	Group delay calibration: when repeated, the updated calibration was not applied immediately
1.95	Frequency converters: inapplicable warning message for unused ports during source flatness calibration
1.95	Two-tone group delay measurements (with R&S ZNA-K9): a change of the "Delta Frequency" changed the absolute phase result. (The group delay result was not affected though!)
1.95	When "Min Hold" or "Max Hold" was activated, the trace was not updated until the next sweep was completed
1.95	Some marker commands did not work in pulse profile mode
1.95	Segmented sweeps could not be defined for higher bandwidths
1.95	Calibration wizards: dock widget for SMARTerCal "P-Trans Norm Both" did not open
1.95	Frequency converting measurements (R&S ZNA-K4): the scalar vector mixer calibration sometimes crashed after recording the data
1.95	Frequency converting measurements (R&S ZNA-K4): system error correction failed, if a frequency axis other than f_b (channel base frequency) was used during calibration
1.95	Security Write Protection (option R&S ZNA-K51) • Insufficient documentation • Password dialogs were covered by analyzer GUI during first "SecureUser" start
1.95	Frequency converting measurements (R&S ZNA-K4): mixer calibration failed if frequency converters were involved
1.95	Frequency converting measurements (R&S ZNA-K4): multi-channel calibration for mixer measurements did not start
1.95	Problems with fixture modeling tool (ISD, SFD) integration
1.95	Direct IF Access (option R&S ZNA-B26): the firmware accepted rear out frequencies that were not feasible
1.95	Value display in pulse modulation timing diagram partly incorrect
1.95	An a-wave measurement was not indicated via Rx LED, if driving and receiving ports were different
1.95	Help mentioned invalid commands `[SENSe<Ch>:]SPECtrum:PORT` and `[SENSe<Ch>:]SPECtrum:ENABle` for creating spectrum traces.

1.26.4 Known issues

Version	Issue
1.95	Frequency converter measurements (R&S ZNA-K8): source flatness power calibration for RF IN and at the converter port must not be used at the same time. Before initiating a flatness calibration, it must be decided to perform either an RF IN power calibration, or a converter port power calibration.
1.95	IMD measurements (R&S ZNA-K4), using an external source and a combiner: to obtain a correct power calibration of the two-tone stimulus signal using a power meter, the external generator's "Sweep End" state must be set to "Switch Power Off".

1.27 Firmware version 1.92

This section lists the changes introduced in firmware version 1.92.

1.27.1 New functionality

Version	Function
1.92	New hardware option R&S ZNA-B7 "Memory Extension for Data Streaming"
1.92	New hardware options R&S ZNAxx-B161/163 "Direct source monitor access, Port 1/Port 3"
1.92	New hardware option R&S ZNAxx-B213 "Internal Combiner P1–P3"

1.27.2 Improvements

Solved issues

Version	Issue
1.92	Incorrect information in documentation: hardware option R&S ZNA-B8 is in fact available for 4-port *and* 2-port models

1.28 Firmware version 1.91

This section lists the changes introduced in firmware version 1.91.

1.28.1 New functionality

Version	Function
1.91	Display assignment support for new display units

1.29 Firmware version 1.90

This section lists the changes introduced in firmware version 1.90.

1.29.1 New functionality

Version	Function
1.90	Support of millimeter-wave converters with new software option R&S ZNA-K8 • Simple and versatile converter configuration • Integration of the leveling tool (if installed on the R&S ZNA)
1.90	LO out with new hardware option R&S ZNA-B8 (e.g. for millimeter-wave converters)
1.90	New software option R&S ZNA-K51 "Security Write Protection of Solid State Drive"
1.90	Automatic level control (ALC)
1.90	"Calibrate All": specify the calibration configuration for all channels and calibrate all channels with a minimized number of connections of cal standards/cal devices
1.90	Guided calibration for amplifier, mixer, and intermodulation measurements
1.90	New dedicated mixer calibration types: • "PUOSM Scalar Mixer" for scalar mixer measurements (R&S ZNA-K4) • "PUOSM Scalar Vector Mixer" for vector mixer measurements(R&S ZNA-K5)
1.90	Vector mixer measurements with sweeping LO
1.90	Converted transmission impedances/admittances: calculation of parallel transmission impedances/admittances in addition to series impedances/admittances (default)
1.90	Status LEDs • The Remote LED now indicates whether a remote control connection is established • The Cal LED now indicates the calibration state of the active setup
1.90	New "Start in Preset" system configuration option: if selected, the analyzer firmware always starts with the configured preset configuration (factory or user defined)
1.90	New "Calibrate Only Port Frequency" switch that limits calibrated frequencies to those frequencies that are relevant for the related reference receiver
1.90	Logarithmic interpolation of limit line segments

New remote control functionality

Version	Function
1.90	New remote command `OUTPut:ULED:STATe OFF | GREEn | RED | FGREen | FRED` to control the user defined LED
1.90	New remote command `SOURce<Ch>:POWer<PhyPt>:OFFSet <Offset>, ONLY | CPADd` defines a port-specific source power or a power offset relative to the channel power

1.29.2 Modified functionality

Version	Function
1.90	"Meas" menu • Selection of DUT type ("Non-Frequency Converting"/"Frequency Converting" changed to selection of measurement type ("S-Params" vs. "Mixer Params") • "Converter Gain", "Reflection Feedthru", and "Converter Wave" tabs consolidated on a single "Scalar Mixer Meas" tab plus a complementary "Frequency Converting Measurements" dialog • "Single Tone Group Delay" tab renamed to "Vector Mixer Meas"
1.90	Spectrum channel markers (R&S ZNA-K1): peak searches now use an excursion of 6 dBm per default
1.90	R&S ZNA-K30: rise time calculation
1.90	"Input/Output" settings moved from dedicated dialog to a tab in the "Port Settings" dialog
1.90	Receiver step attenuators are no longer switched off automatically during calibration unit port detection

1.29.3 Improvements

Version	Improvement
1.90	Full color scheme support in print options
1.90	New "System" group in main (textual) menu
1.90	Spectrum analysis (R&S ZNA-K1): improved peak criteria for multipeak search
1.90	"Time Gate" softtool now also available in "Meas" menu
1.90	Support of "Fast Sweep" mode (list mode) for external R&S signal generators
1.90	Power calibration of external generators
1.90	Independent formulas for source and receiver frequencies (with option R&S ZNA-K4)
1.90	Visual combiner selection in "Port Setup" tab
1.90	Prepare time of segmented sweep significantly improved

Solved issues

Version	Issue
1.90	Wrong step attenuator configuration in case of single sweep and multiple channels
1.90	Typo in impulse response filter selection ("Bohmann" instead of "Bohman")
1.90	R&S ZNA-K1: sometimes "Min Hold" spectrum traces were not updated if the number of sweep points was changed
1.90	After a full n-port calibration, the exported `snp` Touchstone file for the related ports did not contain the full set of S-parameters: only displayed S-parameter traces were included in the export.
1.90	SMARTerCal visualization: when executed via remote control, a calibration unit was shown instead of a power meter.
1.90	Spectrum analysis (option R&S ZNA-K1): "Max Hold" data was reset unexpectedly
1.90	Pulse train generation (option R&S ZNA-K7): Off state was about 25 ns too long
1.90	Issues with disabled auto-configuration of power meters solved
1.90	"Resolve Pool Link" action in cal pool "Overwrite Warning" dialog did not work
1.90	Automatic calibration did not work for setups comprising eye diagrams (R&S ZNA-K20)
1.90	Pulse profile sweep (option R&S ZNA-K7): Acquisition time too short for detector length > 1
1.90	SMARterCal power calibration was not applied if frequency range was reduced during measurement
1.90	`CALCulate<Ch>:PARameter:CATalog` and related queries returned incorrect string identifiers for measurement quantities involving primed waves
1.90	With "Track LO" enabled, the measurement frequency at the driving port was shifted
1.90	Two tone group delay measurements (R&S ZNA-K9) did not work if "Track LO" was enabled
1.90	In mixer configurations, the LO frequencies were limited to the instrument's frequency range although the LO port was set to "None"
1.90	The pulse modulator was disabled if only one internal pulse modulator R&S ZNAxx-B4y was installed
1.90	"Spectrum = Marker" did not work for mixer intermodulation measurements
1.90	External applications were not found because wrong folder was parsed
1.90	False warning messages when LO tracking was switched off using `SOUR<Ch>:LOTR OFF`
1.90	In single sweep mode, the sweep duration increased with every "Restart Sweep"
1.90	When creating a cal kit by copying a system-defined one, the new cal kit remained read-only
1.90	The algorithm to calculate the ratios between primed and unprimed waves was revised
1.90	Communication issues with some external devices connected via USB solved
1.90	Communication issues with some external devices connected via USB-to-serial adapter solved
1.90	In some info messages, the displayed frequency ranges did not match the actual settings

1.30 Firmware version 1.80

This section lists the changes introduced in firmware version 1.80.

1.30.1 New functionality

Version	Function
1.80	Trigger out signals for data acquisition and pulse generator pulses (with R&S ZNA-B91)
1.80	Pulse train generation (with R&S ZNA-K7)
1.80	Compression point calculation • Support of phase formatted traces ("phase compression") in addition to dB formatted traces • Flexible definition/calculation of the reference value
1.80	The R&S ZNA firmware can now be run as PC Simulation; requires license dongle R&S ZNPC with software option R&S ZNPC-K2
1.80	Multi-channel "S-Params" setup dialog for standard non-frequency converting measurements (S-parameters, waves, ratios)

1.30.2 Modified functionality

Version	Function
1.80	Renamed "GC Mode" to "Wideband IF Gain Mode"
1.80	The Channel – [Channel Config] > "Port Config" tab is now visible even if option R&S ZNA-K4 is not available
1.80	Default "Phase Mode" changed from "Coherence On" to "Coherence Off"

1.30.3 Improvements

Version	Improvement
1.80	Pulse Modulation • Improved user interface • Reworked "Pulse Profile" sweep type
1.80	Marker coupling is now also possible per channel or per diagram
1.80	The LO tracking functionality is now implemented within the original channel
1.80	Added description of power calibration label suffixes "S" and "R"
1.80	Time Domain Analysis (R&S ZNA-K2): improved step response implementation
1.80	Shorter sweep times in single sweep mode
1.80	The combiner type can now also be selected in the System – [Setup] > "Port Setup" tab

Solved issues

Version	Issue
1.80	Selecting diagram split type "Rows + Cols" made all diagrams disappear ("No Trace")
1.80	In pulse profile sweep mode mode, trigger out for channel and segment did not work
1.80	Possible deadlock when calibrating multiple channels
1.80	Wrong description of remote command `[SENSe<Ch>:]POWer:GAINcontrol:GLOBal` in manual and help

1.31 Firmware version 1.71

This section lists the changes introduced in firmware version 1.71.

1.31.1 Improvements

Version	Improvement
1.71	The analyzer GUI alerts the user that Pulse Mode is switched off during calibration

1.32 Firmware version 1.70

This section lists the changes introduced in firmware version 1.70.

1.32.1 New functionality

Version	Function
1.70	Pulse modulator and pulse analysis support
1.70	"RF On/Off" toolbar icon

1.32.2 Modified functionality

Version	Function
1.70	DUT wizard redesigned

1.32.3 Improvements

Version	Improvement
1.70	Enhanced drag & drop support
1.70	Spectrum measurements (R&S ZNA-K1): • Measurement speed • Multiple spectrum channels (1 measured port per channel)
1.70	General stability improvements

1.33 Firmware version 1.65

This section lists the changes introduced in firmware version 1.65.

1.33.1 Modified functionality

Version	Function
1.65	IF filter bandwidth selection

1.34 Firmware version 1.64

This section lists the changes introduced in firmware version 1.64.

1.34.1 Improvements

Solved issues

Version	Issue
1.64	False alarm in self-test procedure

1.35 Firmware version 1.60

Version 1.60 was the initial firmware release.

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`).

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.

However, for a R&S ZNA that was factory calibrated with a firmware version < 2.0, an upgrade to a firmware version ≥ 2.0 makes the factory calibration slightly less accurate. A changed signal path in firmware versions ≥ 2.0 can result in an offset of approximately 0.3 dB for uncalibrated wave measurements. Calibrated measurements are not affected. The offset can be eliminated by a new factory calibration at Rohde&Schwarz service.

Downgrade to a firmware version < 1.90

Instruments shipped with a REFBOARD version > 001_000_000 cannot be downgraded to a firmware version < 1.90 simply by executing the related firmware setup file. Please contact R&S service if you plan such a downgrade.

See System – [SETUP] > "Setup" > "Info..." > "Hardware" for the REFBOARD version of your instrument.

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