

R&S® ZNC/ZND

Vector Network Analyzers

Release Notes for Firmware V2.94



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

1 Release Notes for Firmware V2.94

Version 2.94 of the R&S ZNC/ZND firmware provides the following changes:

New Functionality

- Windows 10 support
 - New R&S ZND ship with Windows 10 (64bit)
 - Analyzer firmware V2.94 or higher supports Windows 10 and Windows 7
 - Windows edition, version and build are now part of the analyzer's hardware info (SYSTEM – [SETUP] > "Setup" > "Info..." > "Hardware")

For the R&S ZND, upgrade kits Windows 7 → Windows 10 and additional removable system drives with Windows 10 are also available

Improvements

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

Solved Issues

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



Downgrade to a firmware version < 2.40

In order to downgrade the firmware from a version ≥ 2.40 to a version < 2.40 , it is required to uninstall the "R&S ZNBC Compass Webserver" using the Windows "Programs and Features" control panel before proceeding with the installation.

Firmware version

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

1.1 V2.92 (Compared to V2.90)

New Functionality

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

New remote control features

- New emulated instrument "E5071" (SYSTEM:LANGUage 'E5071') for ENA models E5071 and newer.
Previously existing "ENA" mode is for models E5070 and older.
- ENA emulation improvements. Support for commands:
 - CALCulate<Ch>:FSIMulator:SENDED:DEEMbed:PORT<Pt>[:TYPE] {USER|NONE}
 - CALCulate<Ch>:FSIMulator:SENDED:DEEMbed:PORT<Pt>:USER:FILENAME <string>
 - CALCulate<Ch>:FSIMulator:SENDED:DEEMbed:STATE {ON|OFF|1|0}
 - CALCulate<Ch>:FSIMulator:SENDED:PMCircuit:PORT<Pt>[:TYPE] {NONE|PCSC|PCSL|PLPC|PLSC|PLSL|SCPC|SCPL|SLPC|SLPL|USER}
 - CALCulate<Ch>:FSIMulator:STATE {ON|OFF|1|0}
 - CALCulate<Ch>[:SElected]:LIMIT<Tr>:DATA
 - DISPLAY:ANNOtation:MESSAge:STATE {ON|OFF|1|0}
 - DISPLAY:ARRange {TILE|CASCade|OVERlay|STACk|SPLit|QUAD}
 - DISPLAY:CClear
 - DISPLAY:ENABLE {ON|OFF|1|0}
 - DISPLAY:SPLit
 - DISPLAY:UPDate[:IMMediate]
 - DISPLAY:VISible {ON|OFF|1|0}
 - DISPLAY:WINDow<Ch>:TRACe<Tr>:MEMory[:STATE] {ON|OFF|1|0}
 - MMEMory:STORe:SNP:DATA <filename>
 - MMEMory:STORe:SNP:TYPE:S1P <numeric>
 - MMEMory:STORe:SNP:TYPE:S2P <numeric1>, <numeric1>
 - MMEMory:STORe:SNP:TYPE:S3P <numeric2>, <numeric1>, <numeric1>
 - MMEMory:STORe:SNP:TYPE:S4P <numeric3>, <numeric1>, <numeric1>, <numeric1>
 - SENSE<ch>:CORRection:COLLect:GUIDEd:CKIT:PORT<pt>:CATalog?
 - SENSE<Ch>:CORRection:EXTension[:STATE] {ON|OFF|1|0}
 - SERVICE:CHANnel:COUNT?
 - SERVICE:CHANnel:TRACe:COUNT?
 - SOURce<ch>:POWer<pt>:CORRection:COLLect:AVERAge[:COUNT] <numeric>

- SOURce:POWer<pt>:CORRection:COLLect:AVERAge:NTOLerance <numeric>
- SOURce<ch>:POWer<pt>:CORRection:COLLect:SAVE [<RREC>]
- SOURce<ch>:POWer<pt>:CORRection[:STATe] {ON|OFF|1|0}

Improvements

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

Solved Issues

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

1.2 V2.90 (Compared to V2.88)

New Functionality

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

New remote control features

- ENA emulation improvements. Support for commands:
 - CALCulate{1..4}:FSIMulator:SENDEd:ZCONversion:STATe
 - CALCulate{1..4}:FSIMulator:SENDEd:ZCONversion:PORT<i>:Z0[:R]
 - CALCulate{1..4}:FSIMulator:SENDEd:PMCircuit:STAT
 - CALCulate{1..4}:FSIMulator:SENDEd:PMCircuit:PORT<i>[:TYPE]
 - CALCulate{1..4}:FSIMulator:SENDEd:PMCircuit:PORT<i>:PARAMeter:{C|G|L|R}
 - CALCulate<Ch>[:SELEcted]:FORMat
 - CALCulate{1..4}[:SELEcted]:FUNctioN:TYPE
 - CALCulate{1..4}[:SELEcted]:FUNctioN:DOMain[:STATe]
 - CALCulate{1..4}[:SELEcted]:FUNctioN:DOMain:START
 - CALCulate{1..4}[:SELEcted]:FUNctioN:DOMain:STOP
 - CALCulate{1..4}[:SELEcted]:FUNctioN:EXECute
 - CALCulate{1..4}[:SELEcted]:FUNctioN:DATA?
 - MMEMoRY:STORE:STYPe
 - SENSE{1..4}:CORRection:COLLect:CKIT[:SELEct]
 - SENSE{1..4}:CORRection:COLLect:ECAL:ISOLation[:STATe]
 - SENSE{1..4}:CORRection:COLLect:ECAL:PATH

- SENSE{1...4}:CORRection:COLLect:ECAL:UTHR[:STATe]
- SOURce{1...4}:POWer:PORT:COUPLe
- SYSTem:BEEPer:WARNIing:STATe

Improvements

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

Solved Issues

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

1.3 V2.88 (Compared to V2.86)

New features

- Support of third-party fixture modeling tools for deembedding:
 - AtaiTec's *In Situ De-Embedding* (ISD), see <http://ataitec.com/products/isd/>
 - PacketMicro's *Smart Fixture De-embedding* (SFD) Tool, see <https://www.packetmicro.com/Products/sfd-tool.html>
- *Open/Match* and *Short/Match* reflection normalization calibrations: Manual calibration types "Refl Norm Open" and "Refl Norm Short" now offer a complementary Match standard measurement.
- Configurable number of decimal places for units Farad & Henry

Product improvements

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

Bug fixes

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

1.4 V2.86 (Compared to V2.84)

Product improvements

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

Bug fixes

- Small inaccuracies and unnecessary port measurements for channels with multiple overlapping calibrations

1.5 V2.84 (Compared to V2.80)

New features

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

Bug fixes

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

1.6 V2.80 (Compared to V2.70)

New features

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

New remote control features

- New command `[SENSe<Ch>:]HARMonic?` queries whether or not the current frequency grid is harmonic
- New command `SYSTem:COMMunicate:GPIB[:SELF]:DCLear:SUPPpress` to suppress Device Clear GPIB interface messages (DCL, SDC)

Product improvements

- Manual Automatic Gain Control (AGC) configuration: new convenience functions to apply the same AGC mode to all a and b wave receivers (R&S ZNC only)
- Port activation on demand now also supported for measurement of wave quantities and ratios
- On instrument shutdown the states of *all* loaded recall sets are persisted, not only the active one. These states are automatically recalled on instrument restart.

Bug fixes

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

1.7 V2.70 (Compared to V2.60)

Product improvements

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

Bug fixes

- For generator levels *below* the possible range the message "Generator Level out of range. Reduce output power" was displayed

1.8 V2.60 (Compared to V2.54)

New features

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

New remote control features

- Remote control of GUI elements
 - `DISPlay:MENU:KEY:TOOL:CATaLog?` lists the available softtool tabs, `DISPlay:MENU:KEY:SElect` allows to activate them
 - `DISPlay:MENU:KEY:ACTion:CATaLog` lists the available dialogs, `DISPlay:MENU:KEY:EXECute` allows to open them
 - Keysight-compatible command
`SYSTem:CORREction:WIZard[:IMMediate] MAIN | CKIT` to open the "Calibration > Start Cal" softtool tab or the "Calibration Kits" dialog.
- Queries `CALCulate<Chn>:DATA?` and `CALCulate:DATA:TRACe?` now also support reading uncorrected ratios
- Parallel calibration of multiple channels using channel-specific calibration types. This a remote-only feature, which can be activated using the new command `[SENSe:]CORREction:COLLEct:CHANnels:MCTypes`

Product improvements

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

Bug fixes

- Driver file for external generator HP83620A
- Marker format `R+jX` yields wrong coordinates for special balanced port configurations

1.9 V2.54 (Compared to V2.52)

Product improvements

- Improved AGC mode "Auto"

Bug fixes

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

1.10 V2.52 (Compared to V2.50)

Bug fixes

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

1.11 V2.50 (Compared to V2.40)

New features

- Support for power meters R&S NRP-Z41/61/71
- Automatic calibration via GUI: "Detect Ports & Start Cal" in one go
- Additional hide/show options for traces (accessible via softtool and context menu of trace list)
- Resizable "Sweep Info" dialog to see the current sweep status at a glance
- New "Multiple Peak" marker search: detection and tracking of multiple local minima/maxima
- Complementary isolation measurement for manual TOSM calibration
- Configurable instrument message display: information popups can be globally disabled or limited to certain message types (Info, Warning, Error, Remote Error)
- Trace specific default marker format
- Optional power reduction at end of sweep

New remote control features

- Keyword `STATe` now optional in command `DISPlay[:WINDow<Wnd>][:STATe]`

Bug fixes

- Remote command `MMEmory:STORe:CORRection` did not automatically append the `.cal` extension to the specified cal group file name; as a result those cal groups were not added to the cal pool
- Incomplete description of command `CALCulate<Chn>:DATA`
- False alarm when connecting a power meter R&S NRP-Z61 (error "current firmware version 4.17 < required firmware version !")
- Stability measurements: softpanel buttons "µ1 21", "µ2 21" and "K 21" created wrong traces

1.12 V2.40 (Compared to V2.30)**New features**

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

New remote control features

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

Product improvements

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

Bug fixes

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

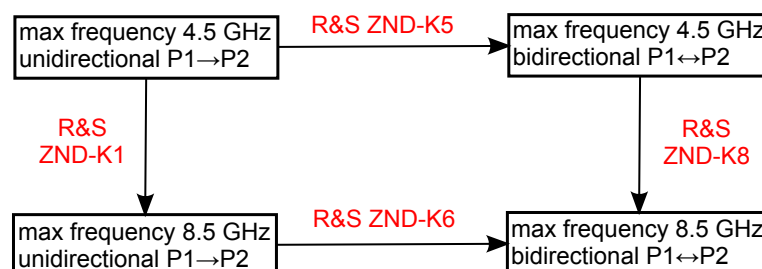
Removed Features

- LAN management of calibration units was removed

1.13 V2.30 (Compared to V2.21)

New features

- Support for the new [Value Instruments](#) vector network analyzer R&S ZND:
 - two-port VNA
 - basic version with maximum frequency 4.5 GHz and unidirectional mode (Port 1 \rightarrow Port 2)
 - upgrade paths to maximum frequency 8.5 GHz and/or bidirectional mode (Port 1 \leftrightarrow Port 2)



- New averaging mode "Moving Average" using simple moving averages of the real and imaginary parts
- New "Fixture Simulator" switch to disable and (re-)enable the configured balanced ports and port impedance settings for a particular channel
- Support for new multiport calibration unit R&S ZN-Z154

- Bandfilter search: a new system setting defines how the center frequency is calculated (geometric or arithmetic mean of the band edge frequencies)
- New GUI font

New remote control features

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

Product improvements

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

Bug fixes

- Wrong display of power during calibration with segmented sweep
- Temporary GUI freeze when moving the marker towards the boundary of the sweep range using a fast turn of the rotary knob

1.14 V2.20 (Compared to V2.10)

New features

- New print option: hardcopy of diagram area, preserving layout and colors ("real screenshot")
- For complex traces (Smith, Polar), trace statistics can be calculated for resistances and conductances (in addition to voltages)

New remote control features

- New remote commands to handle cal kit data in Agilent format:
 - `[SENSe:]CORRection:CKIT:DMODE` allows to toggle between ZVR compatible (el. length) and Agilent (delay) modelling
 - `[SENSe:]CORRection:CKIT:<StandardType>`,
`[SENSe:]CORRection:CKIT:<StandardType>:WLAbel` and

[SENSe:]CORRection:CKIT:<ConnType>:<StandardType> interpret/
return the delay parameter according to the selected modelling

- [SENSe:]CORRection:CKIT:STANdard:DATA returns the parameters of a calibration standard in either of the two modellings

Product improvements

- Remote limit check: automatic recalculation of violation state (queried using CALCulate<Chn>:LIMit:FAIL? or CALCulate:CLIMits:FAIL) whenever a relevant setting is changed; same logic as the GUI

Bug fixes

- Sweep time could not be changed using rotary knob
- Default cal kits could be modified via remote interface
- Limit line violations were indicated although they occurred outside the sweep range
- Hardcopies created using HCOpy[:IMMediate] exhibit truncated grids and blackened areas

1.15 V2.10 (Compared to V2.00)

New remote control features

- New command MEMory:CATalog:COUNT returns the number of loaded recall sets

Bug fixes

- "File name" input field was missing in "Save" dialog



Changed Calibration Behavior in FW Version 2.10

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

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

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

1.16 V2.00 (Compared to V1.95)

New features

- Out of the box support for new calibration kit R&S ZV-Z129

New remote control features

- New command MMEMory:LOAD:CKIT:SDATa:WLABel to load cal kit characterization data from Touchstone files; similar to existing command MMEMory:LOAD:CKIT:SDATa but supports cal kit addressing **by label**

- **New commands**
`[SENSe:]CORRection:CKIT:<OnePortStandardType>:WLAbel:SDATa` and
`[SENSe:]CORRection:CKIT:<TwoPortStandardType>:WLAbel:SDATa` to
read back the cal kit S-parameter data previously loaded using
`MMEMoRY:LOAD:CKIT:SDATa:WLAbel` or `MMEMoRY:LOAD:CKIT:SDATa`
- **New command** `DIAGNostic:DUMP:SIZE` to set the level of detail of the dump files created in case of firmware exceptions

Product improvements

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

Bug fixes

- UNDO sometimes didn't restore a valid calibration
- Missing display updates for certain power meter traces

1.17 V1.95 (Compared to V1.94)

Product improvements

- Support of Shift JIS character encoding at remote interface
- Faster AGC filters

Bug fixes

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

1.18 V1.94 (Compared to V1.93)

New remote control features

- **New commands to delete memory traces:**
 - `CALCulate<Ch>:PARAmeter:DELeTe:CMEMoRY` deletes all memory traces in the selected channel
 - `CALCulate:PARAmeter:DELeTe:MEMoRY` deletes all memory traces in all channels (same functionality as "Delete all Mem" function in manual control)

Product improvements

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

Bug fixes

- Sporadic spikes on S-parameter traces
- Manual calibration: cal kits with multiple Throughs weren't properly handled
- Manual TOSM calibration: silent fallback to UOSM (due to missing Through characterization or missing gender of Through standard) produced inaccurate calibration results
- Balanced ports: incorrect measurement of single-ended S-parameters for constituent physical ports
- GUI language selection wasn't possible
- Automatic calibration: cal unit state after calibration was undefined (not preserving the last measured calibration standard, as it was the case until firmware V1.91)

1.19 V1.93 (Compared to V1.91)

New features

- Touchstone file export with renormalization according to port-specific impedances
- Additional information (comments) in exported Touchstone Files:
 - port-specific renormalization information (if applied)
 - VNA identification
 - timestamp
 - headings for included data tables
- UTF-8 support at remote interface

Product improvements

- Firmware exception handling: automatic creation of dump files with configurable level of detail

Bug fixes

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

1.20 V1.91 (Compared to V1.81)

New features

- New 2-port calibration type: Adapter Removal
- Balanced ports: display single-ended S-parameters for the constituent physical ports within the same channel
- Support of CalUnit ZN-Z151

New remote control features

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

Product improvements

- Logical ports:
 - free assignment of logical port numbers to balanced or unbalanced ports
 - "Use Default" flag to toggle between default and renormalized port impedance(s)
- Revised time gating mathematics for step response calculation
- Fixture Compensation (length/loss):
 - "Direct Compensation" data can be saved to and loaded from file
 - Compensation can be toggled ON/OFF (per port)
- On creation of a new setup, if the current memory consumption is too high (> 800 MB), existing setups are automatically closed (with confirmation dialog)
- Trace data import: S-parameter traces can be "auto distributed" to related diagrams
- New flags to control the execution behavior of certain remote commands
- Various GUI enhancements:
 - "Trace Statistics": a restricted "Evaluation Range" is indicated in the "Trace Statistics" info field
 - Streamlined trace data import/export

- Calibration unit selection (GUI): model variant displayed in GUI labels (new label "<model>-<variant>::<serial #>")
- Frequencies can be displayed with a fixed unit (Hz, kHz, MHz, GHz, THz) instead of an automatically selected one (default)
- Reference Impedances: when switching from single-ended to balanced mode, the reference impedances of the balanced port (differential/common mode) are calculated from the reference impedances of its constituent physical ports
- Sliding Match standards: improved GUI handling
- Limit lines: limit violations in dB are checked and visualized also for traces other than "dB Mag"

Bug fixes

- Limit lines: display for 1-point sweeps
- Memory traces: progress bar no longer displayed
- Trace data export in Touchstone (*.s<n>p) file format now also works with de-/embedding enabled
- Moving a marker with the rotary knob no longer suspends trace updates
- User preset file: output power control during [Preset]
- Define limit line from trace: offset granularity was too coarse
- Trace data export involving multiple channels (via "Export snp Free Configuration") didn't work as expected
- For power meter traces, trace math with "Result is Wave Quantity" was disabled
- For frequency sweeps, the step size couldn't be set to a value below 9kHz

1.21 V1.81 (Compared to V1.80)

Bug fix

Missing channel bits in segmented sweeps

1.22 V1.80 (Compared to V1.70)

New features

- IF gain control: the optimum settings in "AGC Mode: Manual" can be determined in a "Learn Sweep" preceding the actual measurement
- Selectable target format (magnitude, phase, ...) in marker target search
- Shift limit lines in x and y direction without having to redefine the constituent line segments

New remote control features

- New command [SENSe:]CORRection:COLLect:AUTO:CKIT:PORTs:ADD to extend an existing calibration unit characterization

Product improvements

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

Bug fixes

- Better performance of file dialogs when accessing network drives

1.23 V1.70 (Compared to V1.63)

New features

- "Save sweep data" for system error corrections can be activated via system setup
- "Showroom Mode": load a user-defined recall set whenever the instrument is (re-)started or the [Preset] key is pressed
- "Clear Test" function for limit tests (line, circle, ripple)

New remote control features

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

Product improvements

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

Bug fixes

- For certain polar diagrams the "Draw Circle" softtool did not display the correct unit
- Limit lines disappeared during minimization/maximization of diagrams
- Sorting behavior in tables after cell editing
- Better performance when moving the zoom rectangle in "Overview Select" mode

- "Print to File..." rendered some markers invisible
- Marker couldn't be moved with the rotary knob when its current position was out of the frequency range
- TRM calibration with sexless cal kits didn't work

1.24 V1.63 (Compared to V1.62)

Bug fixes

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

1.25 V1.62 (Compared to V1.61)

Bug fixes

- Command `CALCulate<Ch>:PARAmeter:DEFine:SGRoup` could not be used repeatedly with the same port numbers.
- `MMEMoRY:LOAD:LIMit` (ENA parser command) did not work.
- Problems with new (2nd) calibration with a different start or stop frequency setting.
- Mouse pointer was not displayed when the mouse was USB-connected for the first time.

1.26 V1.61 (Compared to V1.60)

New features

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

Bug fixes

- Measurement with more than one power meter did not work.
- Marker info fields on printed hardcopies were misplaced or invisible.
- Some error messages contained wrong characters and were hard to read.
- Calibration unit characterization with different connector types did not work.
- Calibration unit characterization required consecutive ports starting with port 1.

1.27 V1.60 (Compared to V1.50)

New features

- Direct access to the function "Repeat previous cal" in calibration soft tool (softkey added).
- Calculation of filter quality factor based on selectable bandwidth different to 3 dB.
- Overview window for zoomed traces.
- Support for R&S SGMA signal generator.

New remote control features

- Definition of diagram and their positions including nested layouts:
`DISPlay:LAYout:APPLY`, `DISPlay:LAYout:DEFine`,
`DISPlay:LAYout:EXECute`, `DISPlay:LAYout:JOIN`.
- Circle test for limit checks in Smith and Polar diagrams:
`CALCulate<Chn>:LIMit:CIRCle...`
etc.
- New command `[SENSE<Ch>:]SWEp:DWELL:POINT ALL | FIRSt`, defines whether a delay time is inserted before all partial measurements or before the first partial measurement only.

New options

- R&S ZN-B14, "Handler IO".

Product improvements

- Frequency axis (RF, IF, LO) selectable in mixer mode.

Bug fixes

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

1.28 V1.50 (Compared to V1.40)

New features

- Circle test for limit checks in Smith and Polar diagrams.
- Fixture Compensation to correct the measurement result for effects of a test fixture.
- Support of separate AGC (Automatic Gain Control) settings per drive port, receiver port and segment.
- Support of ENA parser emulation.

New remote control features

- Scpi commands for split display:
`DISPlay:LAYout <mode>` and `DISPlay LAYout:GRID <rows>, <cols>`.

Product improvements

- Correct sorting of numerical values in tables.
- Drag&Drop for table lines and rows if applicable. An arrow in the upper left corner indicates the feature.
- Drag&Drop for markers from the soft tool into the diagram
- Additional marker symbols
- Creation of CalKits with the same name, e.g. for CalKits with various serial numbers.
- "SCal" instead of "Cal" is indicated with "SMARTerCal"
- Characterization of the CalU: Support of any combination of CalU-port.
- Reference lines is moved using the triangle.
- Fixed output format for SNP export.
- Context sensitive help for tabs and dialogs with QTabWidgets.
- Restrictions for Remote desktop removed, e.g. no administrator mode necessary.
- New command for "Averaging Mode"
- Support of generator Hittite HMC-T2240.
- Trace progress bar in remote control

1.29 V1.40 (Compared to V1.31)**New features**

- Scalar power calibration (including reference receiver calibration, flatness calibration, measurement receiver calibration)
- Characterization wizard for R&S calibration units
- Multi-channel system error correction (manual control and cal unit)
- Touchscreen lock in order to prevent inadvertent entries
- "External Tools" softtool panels, gives access to pre-installed applications.
- TRACE – [TRACE CONFIG] > "Trace Data" > "s1p Active Trace..." stores the active trace to a Touchstone (*.s1p) file.
- User-defined softkeys in the remote screen
- Averaging modes "Reduce Noise" and "Flatten Noise"
- Sweep symbols on the trace indicate the progress of the sweep.
- Hardkeys may open the first tab of a softtool panel or the last used tab.

New remote control features

- Support for HiSLIP protocol for TCP-based remote control
- Command `CALCulate<Chn>:DATA:NSweep` extended to retrieve several consecutive sweep results.
- Commands `CALCulate<Chn>:DATA:CALL?` and `CALCulate<Chn>:DATA:CALL:CATalog?`; return all S-parameter traces in the active channel or in the active system error correction.

Product improvements

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

1.30 V1.31 (Compared to V1.30)

Issues fixed

- Inadvertent switchover of measurement results

1.31 V1.30 (Compared to V1.20)

New features

- Support for external power meters

New remote control features

- Status registers for external power meters (bit no. 11 of the `STATUS:QUESTIONABLE:INTEGRITY:HARDWARE` register).
- New command `SYSTEM:COMMUNICATE:RDEVICE:AKAL:REDUCTION[:STATE]`, enables power reduction during an automatic calibration.
- New commands `CALCULATE<Ch>:PARAMETER:DELETE:CALL` and `CALCULATE<Ch>:PARAMETER:DELETE:ALL`, delete several traces.

Product improvements

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

1.32 V1.20 (Compared to V1.14)

New features

- Ripple limits and ripple test (e.g. for checking whether the passband ripple of a filter is within acceptable limits)
- S-Parameter Wizard; facilitates the configuration of a standard S-parameter measurement

- Additional settings for user color schemes in the "Define User Color Scheme" dialog, e.g. "Use Trc Color for Limit Lines"
- New toolbar icon "New Ch + Tr", adds a new trace with new channel settings
- Show/hide the toolbar

New remote control features

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

Product improvements

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

1.33 V1.14 (Compared to V1.13)

The new firmware provides support for a new type series of the internal flash memory.

2 Firmware Update

Upgrade versions of the analyzer firmware are supplied as single Windows® installer files (*.msi).



Administrator account

You need administrator rights to install a new firmware version. 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).
2. Run the setup file from the Windows® Explorer. Follow the instructions of the setup wizard.

Setup files can be reinstalled. 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.



Factory calibration

A firmware update does not affect the factory calibration.

NOTICE

External accessories

Calibration units must be disconnected during a firmware update.
