

What's New in this Revision

This help describes version V2.51 of the R&S ZVT firmware. This firmware provides the following new features.

- The network analyzer application can be started with a minimized window; see Startup Procedure .
- `CALCulate<Chn>:DATA` can be used to write memory traces.
- **Bandstop Search ref to Marker** searches the absolute minimum in the active search range. The response value for the lower and upper band edges is calculated as the response value at the active marker position plus / minus x dB, where x is equal to the `<x dB Bandwidth>` value.

Product improvements:

- Corrections to the help system:
`[SENSe<Ch>:]CORREction:LOSS<port_no>:OFFSet <DC_loss>`
defines the
frequency-independent part (DC value) of the offset loss. R&S ZVR-compatible
command `[SENSe<Ch>:]CORREction:OFFSet<port_no>:MAGNitude <DC_loss>`
defines the frequency-independent part (DC value) of the offset loss.
`[SENSe<Ch>:]CORREction:LOSS<port_no> <ref_loss>`
defines the offset loss at the
reference frequency.



To check your R&S ZVT firmware version, click *Help – About Nwa...*



Contents of this help and of your documentation CD-ROM

This help system represents an up-to-date version of the ZVT documentation including all new features of the current firmware version. An updated printable (.pdf) file and CD-ROM is provided for each major (2-digit) firmware version.

New Features in Firmware V2.50 (Compared to V2.47)

- Wizard for **intermodulation** distortion measurement and detailed intermodulation distortion **results** (with option R&S ZVA-K4)
- New "Defined Coherence Mode " (with option R&S ZVA-K6)
- Export of full sets of single-ended S-parameters to **Touchstone** files, irrespective of the balanced port configuration and the measured quantities.
- New LXI browser interface
- Extended functionality of DATA ENTRY keys (entry of characters).
- Absolute bandpass search (bandpass/bandstop **absolute level**)
- **Fast power calibration** mode
- Adjustable **Font Size** in diagrams
- **Channel Info** , shows or hides the channel list below the diagrams
- **New remote control features**

The new features are also available via remote control; the SCPI commands are

reported in the relevant reference sections. Besides the following remote-control features have been added:

- New command `SOURce:POWER:CORRection:COLLect[:ACQuire]:DEFault ON | OFF` , enables the analyzer to generate a default source power calibration with no need of using a power meter.
- New command `CALCulate<Chn>:GDAPerture:SCOUNT` , defines the aperture steps for the group delay calculation.
- New command `CALCulate<Ch>:DATA:ALL?` , return the response values of all traces in the active setup.
- *Align *RST to User Defined Preset* switch in the *System Config – Preset* tab causes `*RST` and `SYSTEM:PRESet` restore the user-defined settings.
- New command `[SENSe<Ch>:]CORRection:CKIT:LABel` , assigns a label to a user-defined or imported calibration kit.
- New command `CALCulate<Chn>:DATA:NSweep:FIRSt?` , reads the sweep results in single sweep mode in ascending order.
`CALCulate<Chn>:DATA:NSweep:COUNT?` returns the number of completed sweeps.
- New command `SOURce<Ch>:GROup<group_no>:PORTs` defines a port group with an arbitrary, not necessarily continuous port range.
`SOURce<Ch>:GROup<group_no>:COUNT` queries the number of port groups.

Product improvements:

- A system error calibration during a power sweep can be started using the `[SENSe<Ch>:]CORRection:COLLect[:ACQuire]:SELEcted`. Restrictions in earlier firmware versions do not apply any longer.
- Improved automatic full n-port calibration with automatic adjustment of frequency step size during the calibration.
- Equidistant time sweep for the full set of 60001 sweep points.
- The version of the data sheet that corresponds to the current firmware version is displayed in the Info dialog.

New Features in Firmware V2.47 (Compared to V2.46)

- Support for frequency converter model R&S ZVA-Z75 (for analyzers with a maximum frequency of at least 20 GHz)

Fixed issues:

- In a **mixer power calibration** , the external power meter is controlled correctly.
-

New Features in Firmware V2.46 (Compared to V2.45)

- Added emergency power off in single sweep mode by means of command

OUTPut<Ch>[:STATE] .

New Features in Firmware V2.45 (Compared to V2.40)

- Support for frequency converter model R&S ZVA-Z325 (for analyzers with a maximum frequency of at least 20 GHz)
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New Features in Firmware V2.40 (Compared to V2.31)

- Extension to the TRL calibration: Calibration with **three lines** .
- **Renormalization** of port impedances can be based on two alternative waveguide circuit theories.
- The sweep segments for **Segmented Frequency** sweep type can overlap.
- Selectable field separators (semicolon, comma, tabulator, space) for trace export files (**Export Complex Data** , **Export Formatted Data**).

- **New remote control features**

The new features are also available via remote control; the SCPI commands are reported in the relevant reference sections. Besides the following remote-control features have been added:

- A default directory 'C:\C:\Rohde&Schwarz\Nwa' can be set using `MMEMory:CDIRECTory DEFault` .
- New command `[SENSE<Ch>:]CORREction:CKIT:DELeTe 'ckit_name'` , deletes a user-defined or imported cal kit.
- New command `SYSTEM:LANGUage` selects the remote language for the analyzer.

Product improvements:

- In the *Port Configuration* dialog the source *Power Result* is always displayed.
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New Features in Firmware V2.31 (Compared to V2.30)

- Two-Tone combiner for R&S ZVT20 network analyzers equipped with option R&S ZVT20-B11.
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New Features in Firmware V2.30 (Compared to V2.21)

- **Ripple limit** test
- **Characterization** of R&S calibration units
- Support of **One Path Two Port** calibration by R&S calibration units
- Directory for *Additionally Available Cal Kits and Conn Types*: Cal kit files will be (re-) loaded automatically every time the NWA application is started (*System Config. - General*).

- Possibility to raise the priority of the running NWA application (*System Config. – General*).
- Transparent info fields for markers and trace statistics (*System Config. –General*).
- The analyzer supports sweeps with a single sweep point. The maximum **Number of Points** is 60001.
- The NWA application is available for restricted users without administrator rights. Firmware update still requires administrator rights.

- **New remote control features**

The new features are also available via remote control; the SCPI commands are reported in the relevant reference sections. Besides the following remote-control features have been added:

- New command `CALCulate<Ch>:PARAMeter:DELeTe:SGRoup` , deletes an S-parameter group
- New command `SYSTem:COMMunicate:RDEvice:PMETer<pmeter_no>:AZERo` , starts auto zeroing of an external power meter.
- New parameter `SENSE:CORRection:COLLect:DELeTe ALL` , deletes all system error correction data.
- New command `MMEMory:STORe:TRACe:CHANnel` , stores the trace data of all data traces in the specified channel to a trace file.
- New command `SYSTem:COMMunicate:RDEvice:PMETer<pmeter_no>:CONFigure:AUTO[:STATe]` , enables or disables Auto Config NRP-Zxx.
- New command `CALCulate<Ch>:LIMit:SEGMENT:COUNT?` , queries the number of limit line segments.
- New command `SYSTem:LOGGing:REMote[:STATe]` , enables logging of all remote control commands transferred to the analyzer.
- New commands `[SENSE<Ch>:]CORRection:COLLect:AUTO:PORTs:TYPE` and `[SENSE<Ch>:]CORRection:COLLect:AUTO:PORTs:TYPE` , start an automatic calibration with a specific calibration type.

New Features in Firmware V2.21 (Compared to V2.20)

- New remote control commands, define diagram names (`DISPlay:WINDow<Wnd>:NAME '<Name>'`) return diagram numbers and names (`DISPlay:WINDow<Wnd>:CATalog?`) and traces in diagrams (`DISPlay:WINDow<Wnd>:TRACe<WndTr>:CATalog?`).

New Features in Firmware V2.20 (Compared to V2.13)

- Support for frequency converters (for analyzers with a maximum frequency of at least 20 GHz)
- Selectable **source power settings** in true differential mode

- Alternative use of compensated a-waves in **amplitude and phase imbalance** sweeps
- New source power **calibration parameters** : *Includes Flatness Cal, Includes Reference Receiver Cal*
- Extended **harmonic power calibration** dialog
- New **Resolution Enhancement Factor** for time domain measurements
- **Automatic calibration** of $n > 2$ ports with full one-port, separate full two-port and full n-port calibrations possible
- **New remote control features**

The new features are also available via remote control; the SCPI commands are reported in the relevant reference sections. Besides the following remote-control features have been added:

- New queries for the channel names and number of a particular trace:
CONFigure:TRACE:CHANnel:NAME? , CONFigure:TRACE:CHANnel:NAME:ID?
- Extended preset: SYSTem:FPReset .
- New statistical parameter GAIN is command
CALCulate<Chn>:STATistics:RESult?
- New command DISPLAY[:WINDow<Wnd>]:TRACe:EFEd displays a trace in a diagram area without numbering it.
- New command DISPLAY:CMAP<Element>:TRACe:RGB for trace color definition.
- New commands for **harmonic power calibration**

New Features in Firmware V2.13 (Compared to V2.11)

- Support for new front module controller FMR7

New Features in Firmware V2.12 (Compared to V2.11)

- Support for R&S ZVT20 vector network analyzers

Fixed issues:

- Corrected function of the *Measure "a" Waves at* radio buttons in the *Port Configuration* dialog.
- Corrected **marker formats** for complex reference impedance settings

New Features in Firmware V2.11 (Compared to V2.10)

This firmware version has been released for compatibility with a firmware version for R&S ZVA network analyzers.

New Features in Firmware V2.10 (Compared to V2.02)

- **True differential mode** (option R&S ZVA-K6)

- **Automatic calibration** for arbitrary combinations of ports in manual control
- Extended trace statistics: **Gain/Slope/Flatness**
- New commands for trace names and numbers (`CONFigure:TRACe<Trc>:CATalog?` , `CONFigure:TRACe<Trc>:NAME` , `CONFigure:TRACe<Trc>:NAME:ID?`)
- New command `OUTPut[:STATe]` switches internal and external power sources on or off.
- New command for verification of a source power calibration `SOURce<Ch>:POWER<Pt>:CORRection[:ACQuire]:VERification:RESult?`

New Features in Firmware V2.02 (Compared to V2.01)

- New commands to change trace names: `CONFigure:CHANnel<Ch>:TRACe:REName` , `CONFigure:TRACe<Trc>:REName` .

New Features in Firmware V2.01 (Compared to V2.00)

- Keyboard control of *Eval. Range* and *Define Limit Line* dialogs improved.
- Ready for Trigger signal switched off for pulsed measurements.
- Preset performance improved (delay time eliminated).
- Mixer measurements extended to the frequency range <50 MHz.
- Dialog performance improved compared to firmware version V2.00.

Extended Functionality

- The `C:\Program Files\Rohde&Schwarz\Network Analyser\Rsib` directory contains the files needed for remote control via **RSIB protocol** (for programming in C/C++ and Visual Basic).

New Features in Firmware V2.00 (Compared to V1.92)

- **Pulsed measurements** (with option R&S ZVA-K7)
- Extension of the **Offset** menu: compensation of a frequency-dependent, port-specific loss.
- Selectable reference for stimulus value definitions in the *Port Configuration* dialog (*Stimulus* dialog).
- Selectable reference for **power** and **frequency** definitions for mixer measurements.
- Low-frequency extension for **TRL calibration** with an additional match or sliding match.
- Optional display of **time gate limits** in the diagram area.
- Import of **cal kit files** (*.prn) generated with the PNA Cal Kit Editor.
- Improved display of hardware error messages .
- **New remote control features**

The new features are also available via remote control; the SCPI commands are reported in the relevant reference sections. Besides the following remote-control features have been added:

- New status registers **STATUS:QUESTIONABLE:INTEGRITY...** monitor hardware failures.
- Extended command **MMEMORY:LOAD:LIMIT** , can load limit lines from Touchstone files, assigning a response and stimulus offset.
- Extended command **MMEMORY:STORE:TRACE** , can store traces with various data formats.
- New command **CALCULATE<Chn>:PARAMETER:DEFINE:SGROUP** creates the traces for all S-parameters associated with a group of logical ports. **CALCULATE<Chn>:DATA:SGROUP?** returns the results.
- New command **[SENSE<Ch>:]BANDWIDTH|BWIDTh[:RESOLUTION]:SELECT** defines the selectivity of the IF filters for unsegmented sweeps.
- New command **CALCULATE<Chn>:MARKER<Mk>SEARCH:BFILTER:RESULT[:STATE]** to display or hide the results of a bandfilter search.
- New commands **CALCULATE<Chn>:STATISTICS:MMPTPEAK[:STATE]** , **CALCULATE<Chn>:STATISTICS:MSTDEV[:STATE]** , **CALCULATE<Chn>:STATISTICS:RMS[:STATE]** , **CALCULATE<Chn>:STATISTICS:EPDELAY[:STATE]** to display or hide statistical information about traces.
- New command **FORMAT:EXPORT:SOURCE** , defines the format for traces retrieved with the ZVR-compatible command **TRACE[:DATA] [:RESPONSE] [:ALL]?**
- New command **SOURCE<Ch>:POWER<Pt>:CORRECTION:GENERATOR<Gen>:LEVEL:OFFSET** defines an attenuation or gain in the signal path between an external generator and the calibrated reference plane.

New Features in Firmware V1.92 (Compared to V1.91)

- Support of configurable generator step attenuators (analyzer types R&S ZVB and R&S ZVA).

Fixed Issues

- Interchanged remote control parameter names for **FORMAT:BORDER NORMAL | SWAPPED** .

New Features in Firmware V1.91 (Compared to V1.90)

- Support of ZVA40 vector network analyzers.
- Extended frequency range of **TRL calibration** due to a second line standard.
- A tooltip for remote command errors, to be activated in the *GPIB Settings* tab of the *System Configuration* dialog, is available. The tooltip is to provide information that can be useful for program development and optimization; it does not necessarily indicate that a remote control script is faulty or non-executable.
- Extended *GPIB Language* selection in the *GPIB Settings* tab of the *System Configuration* dialog.

- **New remote control features**

The new features are also available via remote control; the SCPI commands are

reported in the relevant reference sections. Besides the following remote-control features have been added:

- Optional trace name parameter (replaces numeric trace suffix) in the `DISPlay:WINDow:SCALE...` commands.

Fixed Issues

- In time domain representation the exported formatted **trace files** contain the actual stimulus (time) values.
- Memory traces can be handled in remote control (e.g. `CALCulate:PARAmeter...`) without limitation.

New Features in Firmware V1.90 (Compared to V1.86)

- Extensions to the **TOSM calibration** type: unknown through.
- New **Imbalance** parameter for balanced port configurations.
- Automatic identification of the port assignment between the analyzer and the **calibration unit** . The numbers of the connected ports must no longer match.
- Several calibration units may be USB-connected simultaneously. See also remote control commands `SYSTem:COMMunicate:RDEvice:AKAL:ADDRess...`
- Extended diagram scaling functions: **Max and Min** .
- **Max Hold** function for the active trace.
- **Global Limit Check** returns the result of a composite limit check (on several traces).
- In the *Presets* tab of the *System Configuration* dialog, it is possible to specify a user-defined preset configuration.
- In the **remote screen** , it is possible to define user-defined softkeys and assign the functionality of function softkeys to them.
- A single menu command **All S-Params** displays all S-parameters.
- Improved **calibration wizard** for calibrations using a sliding match.
- Port frequencies for ports with a common synthesizer are no longer coupled unless the ports are used as permanent signal sources .
- **New remote control features**

The new features are also available via remote control; the SCPI commands are reported in the relevant reference sections. Besides the following remote-control features have been added:

- Export of marker values to an ASCII file (`MMEMory:MARKer<Mk>:STORE`)
- Optional port restriction parameters in the `[SENSE<Ch>:]CORRection:CKIT:<std_type>` command
- New parameter `MDATa` for `CALCulate:DATA` to read unformatted data after evaluation of the trace mathematics
- A trace generated with `CALCulate<Ch>:PARAmeter:SDEFine` automatically becomes the active trace
- The new command `[SENSE<Ch>:]CORRection:COLLect:AUTO:PORTs:CONNECTION?` queries the port assignment between the analyzer and a calibration unit.
- `SYSTem:KLOCK` locks or unlocks the local controls of the analyzer.

- New command `[SENSE<Ch>:]CORREction:COLLect:SCONnection<port_no>` selects the connector type of the ports using a string variable.
- New command `[SENSE<Ch>:]CORREction:FACTory[:STATE]` enables or disables the factory calibration
- New command `CONFigure:CHANnel<Ch>:NAME:ID? '<Ch_name>'` returns the channel number for a named channel.
- New command `SYSTEM:USER:DISPlay:TITLe` changes the title of the remote display.
- Refined calibration unit settings: `SYSTEM:COMMunicate:AKAL:CONNECTION` , `SYSTEM:COMMunicate:AKAL:MMEMory[:STATE]` , `MMEMory:AKAL:FACTory:CONVersion` , `[SENSE<Ch>:]CORREction:COLLect:AUTO:CKIT`
- New commands for calibration: `[SENSE<Ch>:]CORREction:DATE?` , `[SENSE<Ch>:]CORREction:DATA:PARAMeter?` , `[SENSE<Ch>:]CORREction:SSTATE?`
- New commands `DISPlay:MENU:KEY:EXECute` and `DISPlay:MENU:KEY:SElect` combine remote and manual control.
- New command `[SENSE<Ch>:]CORREction:CKIT:SElect '<conn_type>'` , `'<ckit_name>'` selects a calibration kit for a connector type with arbitrary name.

New Features in Firmware V1.86 (Compared to V1.84 and V1.85)

- Systematic protection of the analyzer's RF amplifiers against excess input levels. An update to firmware version V1.86 is highly recommended to eliminate any possibility of damaging the instrument hardware.

Improvements in Firmware V1.84 (Compared to V1.83)

- The system error correction data is acquired at a constant IF gain. During the calibration sweep, the *IF Gain b* in the *Receiver* section of the *Port Configuration* menu is set to *Low Distortion*. A possible AGC (*Auto*) setting is suspended.

New Features in Firmware V1.83 (Compared to V1.80/V1.82)

- Support of calibration unit **R&S ZV-Z52** (models 72 and 30 for frequencies up to 18 GHz and 24 GHz, respectively).
 - Improvement of the power calibration process with active Automatic Level Control (ALC).
 - Power calibration data acquired in *Power* sweep mode can be re-used for *Time* and *CW Mode* sweeps (for frequency sweeps this feature was already implemented in firmware V1.80).
 - The sweep average (*Average On*, *Average Factor*) and the *Trigger* settings are also valid for calibration sweeps.
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New Features in Firmware V1.80 (Compared to V1.78)

- **New measurement mode:** Frequency Conversion (option R&S ZVA-K4, including **Harmonic Distortion** measurements and **Mixer Mode**)
- **New calibration type: Power calibration**
- **Support for external test devices:** External generators and power meters can be controlled via USB, LAN, GPIB bus, or other interface types
- Adaptive Gain Control (AGC) of the receiver
- **Automatic Level Control (ALC)** of the source
- **Low Phase Noise mode**
- Extended bandfilter search mode: **Bandpass Search Ref to Marker**
- Improved access to the time domain and frequency domain stimulus values in the *Transform –Time Domain Stimulus Axis* menu.
- **Frequency Step Size** is a setting parameter for frequency sweeps
- **Marker values** can be exported to an ASCII file.
- New remote control command [SENSE<Ch>:]CORREction:COLLect:METHOD? returns a list of all calibration types for channel <Ch>.
- New remote control commands [SENSE<Ch>:]CORREction:CONNECTION and [SENSE<Ch>:]CORREction:CONNECTION:DELEte configure and delete user-defined connector types.
- New remote control command [SENSE<Ch>:]CORREction:CKIT:<std_type> defines the parameters of arbitrary connector types.
- New remote control commands SYSTem:SOUND:ALARm[:STATe] and SYSTem:SOUND:ALARm[:STATe] switch alarm and status sounds on or off.

Fixed Issues

- Trace mathematics can distinguish between voltages and dimensionless quantities (**Result is Wave Quantity**).
- **Zero Delay at Marker** can now be used for all ports, the arithmetic problems have been solved.

Improvements in Firmware V1.78 (Compared to V1.77)

- Performance improvements for very large numbers of simultaneous channels/traces

New Features in Firmware V1.77 (Compared to V1.75)

- New calibration standard: **Sliding match** .
 - The 7-term **calibration types** *TOM*, *TRM*, *TRL*, and *TNA* can be used for an arbitrary number of ports.
 - Two new **calibration types** : *TSM Enhanced* and *TOM Enhanced*.
 - Sweep segment-specific **IF gain** for received waves including Automatic Gain Control (AGC).
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New Features in Firmware V1.75 (Compared to V1.70)

- The **channel bits** are switched over without intermediate reset when the measuring channel is changed. The bits always correspond to the current measuring channel.
 - During a calibration sweep the channel bits of the calibrated channel are activated (instead of the reset values).
 - When a new channel is created, the channel bits automatically take on the values of the previous channel.
 - Calibration via remote control works for all channels without restriction.
 - Touchstone files for more than 4 (and up to 8) ports are supported.
 - A measurement wizard for up to 4 ports is available for ZVT analyzers.
 - Automatic calibration works correctly after a balanced port configuration is configured in the measurement wizard.
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New Features in Firmware V1.70 (Compared to V1.62)

- **New measurement: Virtual Transform** (Embedding/deembedding)
- Sweep range can be defined by **Sweep Step Size**
- Alternative conversion of wave quantities in **trace mathematics**
- **Data to Memory** function can be applied to all data traces at once
- New softkey **Recall Last Cal Set**
- Export of **formatted trace** data
- Renormalization of **reference impedances** for the test ports with complex values
- Automatic power reduction for Calibration Unit in the initial tab of the *System Config* dialog
- **New remote control features**

The new features are also available via remote control; the SCPI commands are reported in the relevant reference sections. Besides the following remote-control features have been added:

- User defined color scheme settings (`DISPlay:CMAP...`).
 - Cal standard data can be loaded from a Touchstone file (`MMEmory:LOAD:CKIT:SDATa...`).
 - New command `SYSTem:ERRor:ALL` reads complete error queue.
 - New command `FORMat:BORDer` controls whether binary data is transferred in normal or swapped byte order.
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