Release Notes for R&S ZVA Firmware Version V3.00

New Features:

- Frequency converting noise figure measurement (option R&S ZVA-K31)
- Possibility to use higher order interpolation of calibration data for special measurement scenarios.
- Measurement of image gain for scalar mixer measurement.
- Renormalization of scattering parameters during import and export can be freely configured; see Import/Export Data.
- Restart Hold All menu command.
- Support to simultaneously define calibration kits with the same name but different label; see `[SENSe<Ch>:]CORRection:CKIT...` with Labels.
- Extensions of power meter configuration file, like modification of measurement result by a general mathematical formula, to support special external power meters.
- Reworking of power calibration wizards; see e.g. Mixer Power Cal....
- Checkbox *Narrowband DUT* in Define Noise Figure dialog.

Product Improvements:

- Mixer power cal wizards now propose two source power calibrations for enhanced accuracy when enhanced wave correction is activated.
- Relaxed restriction on calibration unit port assignment list. Now more special cases are allowed.
- Diagram windows shown in calibration dialogs now use the same color scheme as the main diagram area.
- Improved display color of title bar in color scheme *Light Background*.
- Reflect calibration standards in ideal kits changed to Short.
- Improved error messages in *Import Complex Data* dialog.
- Export of unconventional cases like S_{21} or S_{dd11} to an `*.s1p` file improved.
  Reference impedance written to Touchstone file is adjusted appropriately, if possible.
- For multiport calibrations with reduced number of Through connections, the measured Through connections are listed in the calibration manager and setup info.
- Improved frequency range check of calibration standards and warning messages.
- Setting of power stimulus axis to input port of device under test when adding traces from within noise figure setup guide.
- New version of *GPIB Explorer* tool.
- Calibration unit characterization info shows a message if Through characterization is missing.
- Improved handling of low memory situations.
- Improved handling of power correction data in segmented sweep mode.
- Improved calibration in power sweep type.
- Dialog *Define Scalar Mixer Measurement:* display of frequency and power settings from the sub-dialogs in the mixer diagram.
- *Add External Generator* dialog in *System Configuration: Identify Type* button now always enabled.
- Suppressed warning *Problem concerning external generator ...* when generator is not used in setup.

- Explicit display of preparation sweep for calibrations with certain frequency converters.
- Improved display of detected USB switch matrices in *System Configuration*.
- Improved error messages for frequency converter mode.
- When performing a power calibration out of the noise figure setup guide, a warning is shown when the IF bandwidth is too high or the generator power too low.
- Remote error messages are deleted when returning to local mode.
- For frequency converters without electronic attenuator, flatness calibration is deactivated by default.
- *RF Off* state is checked when performing a calibration.
- New driver files for R&S NRP power sensors.
- *Load Match Corr* menu command is now only enabled for frequency converting configurations.
- ***New remote commands:***
  - To read out calibration properties:
    - `SOURce<Ch>:POWer<Pt>:CORRection:DATA:PARameter<wave>`
    - `SOURce<Ch>:POWer<Pt>:CORRection:DATA:PARameter:COUNt?`
    - `[SENSe<Ch>:]CORRection:DATA:PARameter:COUNt?`
    - `[SENSe<Ch>:]CORRection:DATA:PARameter` (extended)
  - For dynamic bandwidth reduction:
    - `[SENSe<Ch>:]BANDwidth[:RESolution]:DREDuction`
  - For querying the noise calibration state:
    - `SENSe<Ch>:CORRection:NSTate`
  - For renormalization of scattering parameters during import and export:
    - `MMEMory:SETTings:RENOrm:MODE`
    - `MMEMory:SETTings:RENOrm:RIMPedance`
    - `MMEMory:SETTings:RENOrm:STATe`
  - For narrowband DUT:
    - `SENSe<Ch>:NFIGure:NDUT`
  - To change segment name and spurious avoidance in segmented sweep mode:
    - `[SENSe<Ch>:]SEGMent<Seg>:NAME`
    - `[SENSe<Ch>:]SEGMent<Seg>:SBANd`
    - `[SENSe<Ch>:]SEGMent<Seg>:SBANd:CONTrol`
  - New (modified) commands to support calibration kits with the same name but different label:
    - `MMEMory:STORe:CKIT:WLABel`
    - `[SENSe<Ch>:]CORRection:CKIT:<connector_type>:LSELect`
    - `[SENSe<Ch>:]CORRection:CKIT:LCATalog?`
    - `[SENSe<Ch>:]CORRection:CKIT:LDELete`
    - `[SENSe<Ch>:]CORRection:CKIT:LLABel`
    - `[SENSe<Ch>:]CORRection:CKIT:LSELect`
    - `[SENSe<Ch>:]CORRection:CKIT:<standard_type>:WLABel`
  - To query and modify the system time and date
    - `SYSTem:TIME`
    - `SYSTem:DATE`.
  - To change the computer name
    - `SYSTem:COMMunicate:NETwork:HOSTname`

Resolved issues for the following measurements / operating modes:

- Improved handling of automatic gain control during calibration for models R&S ZVA40

and R&S ZVA50

- Channel not sweeping after remote command `DISPlay:WINDow:STATe`.
- Hiding of displayed columns in *Port Configuration* table, when deselecting a whole display group.
- Small correction in the calculation of the optimum number of points in the *Define Pulse Profile* dialog.
- Step size of sweep time property not handled correctly when using the rotary knob.
- Resolved several issues with fast sweep mode of external generators:
  - error messages when having multiple channels with different number of points;
  - sporadic missing of first trigger pulse after firmware start;
  - multiple channels with CW sweep type;
  - setting of measurement delay in certain cases;
  - unnecessary learning of list after *Restart* menu;
  - timeout during learning of lists;
  - sporadic crashes when opening error log several times;
  - clear error message when maximum number of points is exceeded;
  - detection of extra trigger impulse in very rare cases.
- Issues with *Fit Frequency Range* for intermodulation distortion measurements with higher order intermodulation products.
- Port power could be set to *0 dBm + ...* (independent of Pb) although the stimulus axis was set to this port.
- Overlapping properties in channel info line.
- Usage of external generator during defined coherence mode under certain conditions.
- Exceptions during *Refresh Tables* when defining external generators under certain conditions.
- Power calibration in segmented sweep mode for certain constellations.
- Improved frequency range check for calibration with calibration unit for frequency converting configurations.
- Measurement of relative intermodulation products.
- Unnecessary display of *Unknown Through Characteristics* dialog in very special cases.
- Detection of external generator via VXI-11 interface.
- Calibration in frequency converting configurations in sweeps with fixed frequencies.
- External generator not sweeping in certain frequency converting setups with true differential mode.
- Commands following a device clear in HP emulation mode.
- One Path Two Port calibrations with calibration unit out of noise figure setup guide.
- Several fixes regarding the `ROUTe:PORTs` command:
  - functionality when only one channel was present;
  - channel not sweeping after command.
- Displaying LTI in intermodulation distortion measurement when the port with highest port number was used as upper tone.
- Display of calibration frequency for remote power calibration in frequency converting mode.
- *Bandwidth Fine Adjust* dialog elements disabled in certain cases.
- Step size for port power offset in *Noise Figure Setup Guide* dialog.
- `SENSe:CORR:SSTate?` also returned the noise calibration state.
- Improved width of *Stimulus* column in printout of marker table.
- Source noise figure not displayed correctly during source noise calibration.
- Remote calibration for vector mixer measurement.

- Frequency setting for external generator when intermodulation distortion measurement is active in special cases.
- Update of sweep settings after power calibration in combination with enhanced wave correction.
- Corrections in product help:
  - timing of output signals;
  - description of *Split All* menu command;
  - description of `SENS:CORR:SST?`, `SENS:CORR:PST?` and `SENS:POW:ATT`.
- Option R&S ZVA-K10 when using slave ZVA as LO source.
- LO power calibration in mixer mode when using cal power offset.
- Importing a load standard with offset length from a `*.prn` file. Automatic detection of gender during import of calibration kit from`*.csv` format. Import of offset loss of a match from `*.csv` format.
- Application crash when opening *Define Vector Mixer Meas* Dialog for very large setups.
- Automatic changing of traces with external generator as drive port when making changes in port configuration.
- Misleading display of frequency transformation equation under special conditions.
- Unnecessary reset of stop time in time sweep when performing certain setup changes.
- *Remote Display Active* screen when no setup is loaded.
- Correction in queries of `SENSe1:CORRection:COLLect:METHod` for calibration types `OPTport` and `ROPTport`.
- No automatic display update after remote command `MMEMory:LOAD:TRACe`.
- Sweep preparation phase of `SENSe2:CORRection:POWer2:ACQuire` could not be canceled by device clear command.
- Free disk space returned by `MMEMory:CATalog?` .
- Power calibration quality label for special cases, like interpolation in segmented sweep mode.

Resolved issues in Firmware V2.92

- Output power stability for R&S ZVA67 under certain conditions

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Product Improvements in Firmware V2.91 (Compared to v2.90)

New Features:

- Dynamic reduction of measurement bandwidth at low frequencies; see Bandwidth Fine Adjust.

Product improvements:

- Improvements in HP compatibility parsers
- Option R&S ZVAB-B14, Universal Interface:
  – Improved timing of pass/fail strobe signal
  – Support of port E and F
- Display of calibration frequency instead of base frequency during remote mixer power

calibration

- Added default calibration kit for R&S ZV-Z135
- Definition of additional through standards in default calibration kits 85052D and 85054D for TOSM calibration method
- Single step power calibration over whole frequency range for R&S ZVA80 and R&S ZVA110 systems
- New remote commands:
  `CONTrol:HANDler:E[:DATA]`
  `CONTrol:HANDler:F[:DATA]`

Resolved issues for the following measurements / operating modes:

- Sporadic hanging sweeps and error dialogs for setups with high number of points on devices with new FMR9 computer board
- Transmission coefficient settings were not considered for remote power calibration sweep diagram.
- Noise figure setup guide update of displayed attenuator settings when returning from a sub dialog
- New remote commands for calibration with calibration unit and multiple port assignments did not consider channel number
- Rounding issues when entering mechanical offset values
- Display issues in mixer measurement wizard for segmented sweeps or when setting the stimulus axis to *All Receivers*.
- Base power could not be changed in mixer measurement wizard for specific configurations.
- Unnecessary calibration sweeps during remote mixer power calibration for specific setups
- Default port assignment for calibration with calibration unit if only one port is selected
- *RF Off* in single sweep mode taking effect only after restart of sweep
- Configuration of upper tone frequency for mixer delay measurement with fixed RF frequency
- Calibration with calibration unit in segmented sweep mode when one or more segments were switched off
- Saving a characterization of calibration unit in rare cases
- Check for cutoff frequency for calibration with waveguide connectors in segmented sweep mode

To check your R&S ZVA firmware version, click *Help – About Nwa...* in the network analyzer's main application window. Refer to section Firmware Update for information about an upgrade of your network analyzer firmware.

New Features in Firmware V2.90 (Compared to V2.86)

- Mixer measurement wizard now supports up to two mixer stages and internal frequency multiplication factors.
- Support for multiple port assignments for calibration unit. For example it is now possible to perform a four port calibration with a two port calibration unit.
- Support for multiport calibrations with reduced number of Through connections

- Calibration sweep diagram for remote power calibration
- Display update during execution of remote commands; see Switchover to Remote Control.
- The switchover frequencies for a multi-line TRL calibration can now be influenced; see TRL Extensions.
- Support for ELVA power meter 4806
- Support for socket based Ethernet communication for external devices

Product improvements:

- Documentation of file format for external generator and power meter configuration files incorporated into online help; see section Configuration Files.
- Support of second GPIB1 bus to configure external generators with two GPIB adapters
- New softkey Max Unambiguous Range for time domain transform
- New power meter driver version and support of new models like NRP-Z211 or NRP-Z221
- Small improvements on noise figure setup guide
- New version of GPIB explorer tool
- Device clear softkey in remote mode; see Switchover to Remote Control.
- New keywords for device driver configuration files to better support non SCPI compliant devices.
- Cal and Corr at Base Freq now also considers power calibration.
- Improved firmware stability in low memory situations
- Improvements in HP compatibility parsers
- Driver file for Hittite generator HMC-T2240
- Possibility to replace not measured S-parameters during export with zero; see Select Ports.
- **New remote commands**
  - `SYSTem:PRESet:REMOte[:STATe] ON | OFF`
  - Extension to `CALCulate:DATA:NSWeep:FIRSt?` to read several sweeps at once.
  - `CALCulate:PARameter:DELete:ALL`
  - `CALCulate<Ch>:PARameter:DELete:CALL`
  - `MMEMory:STORe:TRACe:PORTs:INCOmplete`
  - `[SENSe<Ch>:]CORRection:COLLect:AUTO:ASSignment<Asg>:DEFine`
  - `[SENSe<Ch>:]CORRection:COLLect:AUTO:ASSignment<Asg>:ACQuire`
  - `[SENSe<Ch>:]CORRection:COLLect:AUTO:ASSignment<ASg>:DELete:ALL`
  - `[SENSe<Ch>:]CORRection:COLLect:AUTO:CONFigure`
  - `[SENSe<Ch>:]CORRection:COLLect:AUTO:SAVE`
  - `[SENSe<Ch>:]FREQuency:CONVersion:MIXer:FIXEd` extended
  - `[SENSe<Ch>:]FREQuency:CONVersion:MIXer:FUNDamental` extended
  - `[SENSe<Ch>:]FREQuency:CONVersion:MIXer:TFREquency` extended
  - `SOURce<Ch>:FREQuency:CONVersion:MIXer:FUNDamental` extended
  - `SOURce<Ch>:FREQuency:CONVersion:MIXer:PFIXed` extended
  - `SOURce<Ch>:FREQuency:CONVersion:MIXer:PMODe`
  - `SOURce<Ch>:POWer:CORRection:MIXer:LO[:ACQUire]` extended

- [SENSe<Ch>:]FREQuency:CONVersion:MIXer:IFPort
- [SENSe<Ch>:]FREQuency:CONVersion:MIXer:LOMultiplier
- **[SENSe<Ch>:]FREQuency:CONVersion:MIXer:LOPort**
- [SENSe<Ch>:]FREQuency:CONVersion:MIXer:MFFixed
- [SENSe<Ch>:]FREQuency:CONVersion:MIXer:RFMultiplier
- [SENSe<Ch>:]FREQuency:CONVersion:MIXer:RFPort
- [SENSe<Ch>:]FREQuency:CONVersion:MIXer:STAGes

Resolved issues for the following measurements / operating modes:

- Improved import of .csv files.
- Refinement of frequency grid during calibration with calibration unit will not be saved in correction data.
- Side effects for remote operation when switching back from frequency converter mode.
- Remaining *Port Power Unleveled* warning when using ALC with several channels.
- *Port Power Unleveled* warning was only reset at end of sweep even when settings were changed.
- Small power peaks when switching between certain frequency points.
- Wrong unit of scaling displayed under certain conditions.
- SYSTem:PRESet:USER:NAME did not use default path and did not show an error if file did not exist.
- Entering sweep time when defining sweep segments.
- Open sub menus when switching to remote control.
- Wrong default format when changing a trace from admittance to scattering parameters.
- Wrong display of channel info line for segmented frequency sweep under certain conditions.
- Application crash in port configuration dialog under special condition.
- Application crash in frequency converter tab in system configuration under special condition.
- Behaviour of limit line between two measurement points under certain conditions.
- [SENSe<Ch>:]CORRection:COLLect:METHod:DEFine with empty calibration name.
- Setting up a scalar mixer measurement in CW mode under certain conditions.
- Using frequency converter ZVA-Z325 on a ZVA80-BU device.
- Wrong estimation of sweep time for frequency converting modes.
- Display of sweep time for segmented frequency sweep under certain conditions.
- SYSTem:WAIT could not be interrupted by device clear.
- Pressing *Preset* was possible during remote operations which could cause undefined instrument states.
- Error dialog box when deleting external generator while in use.
- Display of *Cal* quality label for bidirectional transmission normalization.
- Checkmark for softkeys *Couple all Traces.*
- Global meas delay for segmented sweep.
- Noise figure setup guide *Add* and *Replace* button if more than one channel present.
- Power calibration for vector mixer meas under certain conditions.

- Correction in NRVD power meter configuration file (no service request for zeroing).
- Application chrash in *More Harmonics* dialog under special conditions.
- Slowly responding firmware with large setups under certain conditions.
- Active trace changes after remote power calibration.
- Mixer power cal verification sweep was available when flatness cal was turned off.
- Corrected error in SML generator configuration file.
- `DISPay:MENU:KEY:SELect` caused user interface to be unconditionally active during remote operation which can lead to undefined instrument states and application crashes.

Product Improvements in Firmware V2.86 (Compared to v2.85)

- New menu command Cal and Corr at Base Freq to force calibration and system error correction to be performed at base frequency for setups with external frequency conversion.
- Re-enabled Anritsu parser; see Remote Settings. A basic command set is supported.

Resolved issues for the following measurements / operating modes:

- S-parameter correction for ports at channel base frequency in arbitrary mode
- Correction at base frequency for ZVR emulation mode
- UOSM dialog showing up when selecting *Repeat Previous Cal* after TOSM calibration.
- Source power calibration for external generator
- Configuration of external generators under certain conditions
- Source power calibration with setting *Reference Receiver Only* and interpolation
- Power normalization for true differential mode with frequency converters
- Display of *Cal Off* label under certain frequency converting configurations
- Mixer mode S-Parameter correction now independent of setting *Enhanced Wave Correction*. Correction can be switched off by *Correction Off*.

New Features in Firmware V2.85 (Compared to V2.81)

- Load match correction for scalar mixer measurement
- Receiver power calibration allows selection of reference power value.
- User characterization info message for calibration units can be turned off; see Characterize Cal Unit.

Product improvements:

- Improved user interface responsiveness for setups with large number of points
- Mixer power calibration: IF range sweep display update
- Display of source port in trace names for wave quantities and ratios
- Display of active trace properties in status bar
- Reference for power and frequency stimulus axis indicated more clearly
- Several improvements in calibration unit dialogs

- Power meter correction accessible from *Trace – Measure – Power Sensor* dialog
- Changed default setting for *Frequency Information for Power Meter* (see Power Meter Correction)
- New menu command *Trace – Scale – Couple All* to easily couple the scaling of all traces
- Support for calibration units with different connector types
- New version of GPIB Explorer tool
- New version of rsib32.dll for RSIB communication channel
- Generator configuration file for HP83620A
- Extended frequency grid for UOSM calibration
- New remote commands
  `SOURce<Ch>:POWer:CORRection:CONVerter:LEVel:OFFSet`
  `SOURce<Ch>:TDIF:CRFRequency`

Resolved issues for the following measurements / operating modes:

- Averaging for intermodulation measurement quantities
- Keep trigger settings for output power calibration
- Deactivate automatic IF bandwidth reduction for output power calibration
- Remote command `[SENSe]:PAE:EXPRession` (C10 and C1 were interchanged)
- Application crash for coupled markers in very special cases
- Shift response value for noise figure traces
- Export of S-matrix if folder name contains a period
- Long Distance Mixer Delay (R&S ZVA-K10) calibration with remote commands under certain conditions
- *Frequency out of Range* warning when disconnecting power meter
- Loading of setup files from other instruments under special conditions
- *Undo* function under certain conditions
- Calibration in CW mode with calibration unit
- `AVERAGE:COUNT:CURRENT?` when no averaging active
- Display order of LAN 1 and 2 connections in LXI configuration dialog
- *Define Mixer Delay Measurement* dialog allowed incompatible port selection
- Gender setting missing when loading calibration kit on R&S ZVA110
- Display of *Source power reduced to limit* for defined coherence mode
- Switching between setup with different internal/external reference settings
- Trace info table not formatted correctly when maximizing diagram area
- Resizing main window with maximized diagram area
- Multiple through calibration standards for overlapping UOSM calibrations
- Missing tooltip in *Compile Calibrations* dialog if sweep start is below waveguide cutoff frequency
- Cal label for wave quantities

New Features in Firmware V2.81 (Compared to V2.80)

Product improvements:

- Two alternative calibration methods for optimum accuracy or calibration speed. See Same Sweep Setup for All Standards.

Resolved issues for the following measurements / operating modes:

- Increased calibration time in specific configurations (see *Product improvements* above).
- Definition of Offset Short 2 and 3 calibration standard via remote control
- Calibration via remote command when receiver step attenuator is set.
- Power reduction for unknown mixer standard for vector mixer measurement calibration (option R&S ZVA-K5) with calibration unit
- Calibration with AVG detector in combination with isolation term
- Possible error messages in combination with new CPU board (under very rare conditions)
- Calibration in combination with sweep averaging

New Features in Firmware V2.80 (Compared to V2.79)

- Enhanced mixer measurement
- Gain-corrected noise figure measurement
- Noise figure setup guide
- Calibration unit support for vector mixer measurement calibration (option R&S ZVA-K5)
- Enhanced wave correction
- Configurable *RF Off* behavior; see *System Configuration* – Power
- Defined coherence mode support for certain frequency-converting configurations
- Support for data set-based advanced power transfer model for frequency converters. Calibration data can be acquired by means of the *R&S ZVA Frequency Converter Leveling Tool;* see Power Transfer Models.

Product improvements:

- Improved stability under low memory conditions
- Additional correction of non driving port wave quantities in defined coherence mode
- Improved calibration speed for setups with a large number of points (for devices with maximum frequency above 8 GHz)
- Existence of error log entries is signaled by status bar icon
- Support for new revision of CPU boards
- Support for option R&S ZVAX-B203, Low-Noise Preamplifier. Refer to sections ZVAX Path Configuration and Noise Figure Measurement.
- Support for Windows XP Embedded Service Pack 3
- New version of the GPIB Explorer tool
- `SYSTem:USER:DISPlay:TITle` supports multiple text lines lines.
- New menu entry for easy access of two port UOSM calibration
- Support for demo option keys with longer duration
- Reference for power stimulus axis is indicated in channel info line
- Global system configuration is retained in case of firmware crash

- Improvements of true differential and defined coherence mode in frequency converting configurations
- Safely remove USB stick now possible when storing setup on USB stick
- Option R&S-ZVAB-B14: New commands `CONTrol:AUXiliary:A`, `CONTrol:AUXiliary:B`, write the active channel number to the handler ports A and B.
- New remote commands `CALCulate<Ch>:DATA:CALL:CATalog?` and `CALCulate<Ch>:DATA:CALL?`, return all S-parameter traces in the active channel or in the active system error correction.
- Support of DC measurements in true differential mode
- Support for S-parameter measurements with average detector; see More S-Parameters
- Possibility to set the channel power stimulus axis out of the power calibration dialog

Resolved issues for the following measurements / operating modes:

- Combo box problems during bandfilter search for certain dialogs
- Minor corrections for extended power transfer mode for converters
- Defined coherence mode when port 1 is not involved
- Reference marker default value in special cases
- Bandfilter marker tracking in delta mode
- Moving delta marker with mouse freezes trace under special conditions.
- Delta markers in discrete marker mode
- No error code was returned for ZVAX extension unit remote commands if no unit was present.
- Reset values of Handler-IO board R&S ZVAB-B14
- Port power limit not considered for defined coherence mode
- `CALCulate:PARameter:SELect` did not change the active trace in diagram area for memory traces.
- Misleading display of *Calint* calibration label in true differential and defined coherence mode
- Several calibration unit dialog issues
- HCOPy remote command image artifacts under certain conditions
- Pulse profile mode in frequency converting configurations
- R&S SMF signal generator driver file frequency limits extended
- Scalar mixer power cal dialog issues when no LO port is selected
- Firmware crash when creating new channel when a mixer delay trace is active
- Improved convergence of true differential and defined coherence mode
- R&S ZVA67 output power issues under rare conditions
- Corrected documentation for remote command `[SENSe<Ch>:]EUNit:PGENerator:ASSignment`
- Corrected unit of "Detector Meas Time has been limited" warning
- Issues with "Offset / Mechanical Length" softkey
- Display update after remote command `DISPlay:WINDow1:TRACe1:Y:SCALe:AUTO ONCE`
- Missing 1 mm, 1.85 mm and 2.4 mm connector definitions for `[SENSe]:CORRection:COLLect:CONNection`

- Calibration issues in certain frequency-converting configurations

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New Features in Firmware V2.79 (Compared to V2.78)

- Arbitrary (one or two-port) S-parameters may be exported to a *.s1p Touchstone file. Use Export S-Matrix to export a full set of S-parameters.
- New command `[SENSe<Ch>:]CORRection:PSTate?`, queries the power calibration label.

Product improvements:

- Improved compatibility of `SYSTem:ERRor?` and `SYSTem:ERROR:ALL?` response for PNA emulation
- Measurement info (extended header) for Touchstone export; see Touchstone Files.

Resolved issues for the following measurements / operating modes:

- Power Calibration dialog when pressing "Take Cal Sweep" several times
- Scalar mixer power calibration IF range
- Display of *PCao* and *PCal Off* attributes
- Scroll bars in *Fixture Compensation* and *Step Attenuators* dialogs
- Sporadic measurement delays with external generators over GPIB under special conditions
- Calibration Unit: automatic port assignment detection for Defined Coherence mode
- Sweep progress marker, special cases
- Defined Coherence and True Differential mode amplitude accuracy for special cases

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New Features in Firmware V2.78 (Compared to V2.76)

- Power meter correction list
- Extended power transfer mode for converters with and without electronic attenuators
- True differential mode in combination with frequency converters; see True Diff Mode
- True differential mode in combination with frequency-converting mode; see True Differential Mode on Frequency-Converting DUTs
- Possibility to generate a system report; see Obtaining Technical Support
- Isolation term can be considered for one path two port and TOSM calibrations
- Customization of BUSY signal
- Password protection for calibration unit characterizations
- Set all traces to zero on sweep restart; see System Configuration – General
- Password protection for frequency info; see System Configuration – General
- Sweep progress marker; see Marker Tracking
- Short form of bandfilter search info for small displays; see System Configuration – General
- Phase preview in *Calibration* – Measure Standards dialog is optional
- Center frequency calculation for bandfilter search is configurable; see System

Configuration – General

- **New remote control commands**
  - `HCOPy:MITem...` and `HCOPy:MPAGe:WINDow`, configure the output to a printer file
  - `MMEMory:LOAD:CORRection:MERGe`, supports merging of power calibrations
  - `[SENSe<Ch>:]CORRection:STIMulus?`, queries the current stimulus value
  - `SYSTem:COMMunicate:RDEVice:AKAL:PREDuction[:STATe]`, enables or disables automatic power reduction during an automatic calibration
  - `SOURce<Ch>:POWer:CORRection:CONVerter<Converter_Number>:STATe`, enables or disables the source power calibration for a frequency converter with electronic attenuators
  - `CALCulate<Chn>:FORMat:WQUType POWer | VOLTage`, selects voltage or power units for wave quantities.
  - `MMEMory:AKAL:USER:CONVersion`, copies an arbitrary (e.g. user-defined) set of calibration data for the active calibration unit to a directory.
  - New command group `[SENSe<Ch>]:UDSParams<Pt>...`, defines user-defined (virtual) analyzer ports

Product improvements:

- New checkbox in the mixer delay calibration dialog to divide the calibration data by two
- Improved support of device clear (remote command `*DCL`) for cancelling long operations
- Better signaling if time grid is too close in time sweep mode
- Added default .calkit files for several Anritsu/Wiltron calibration kits
- Frequency converter default .calkit files are loaded as read-only files to prevent issues when changing the connector settings.
- New GPIB driver
- New version of the GPIB Explorer tool
- Improvements of TOM calibration procedure (consideration of non-ideal Match and Through)
- The setting of the sync generator type is preserved when temporarily setting the pulse type to constant high or low
- Changed handling of the up/down arrows when navigating trace lists

Resolved issues for the following measurements / operating modes:

- Combination of S-parameter measurements with frequency conversion in one channel
- Power correction of b_1 wave in special conditions with active scalar mixer mode
- ZVAB-K9 calibration under special conditions
- Hanging power meters in rare cases
- Connector gender issue with sexless connectors
- Intermodulation measurement at fixed intermediate frequency
- Saving of setups via remote command under certain conditions
- Calculation of the sideband filter ranges for vector mixer measurements
- Stopped power cal verification sweep with high number of points
- Irregularities with PCal attribute under certain conditions

- Problems with `CALC:DATA:ALL?` when deleting traces
- Display problems in intermodulation distortion power calibration dialog
- Global ALC settings with more than one open setup
- Distributed LXI configuration setup in certain cases
- Calibration unit characterization with sexless connectors
- Output power stability for R&S ZVA67 under certain conditions at high IF bandwidths
- Reduced power stability
- TRL with multiple lines, when through standard is longer than the line standards
- Loading .calkit files with special characters in the connector name

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New Features in Firmware V2.76 (Compared to V2.75)

- Support for vector network analyzers R&S ZVA80
- Support for timed and unregistered option keys
- Support for frequency converter R&S ZVA-500 (with calibration kit R&S ZV-WR02)
- New remote command `[SENSe<Ch>:]CORRection:COLLect:CONNection:GENDers`, qualifies whether the genders of the connectors at the analyzer ports (but not their types) are equal or independent.

New Features in Firmware V2.75 (Compared to V2.70)

- Support for frequency converter R&S ZVA-Z220 (with calibration kit R&S ZV-WR05)
- Extensions to the mixer delay measurement: external receiver with LXI connection.
- Extensions to *Virtual Transform:* port pair (de-)embedding
- Configurable ALC settings
- Port-specific trigger delay
- Extensions to source power calibration: auto zero and sensitivity correction for power meter
- Extensions to the vector mixer measurement (option R&S ZVA-K5): Independent power setting and remote control commands for auxiliary LO signal (Aux LO).
- Extended LXI pages: Utilities for event and status logging and for connection tests
- New calibration types for calibration units R&S ZV-Z51 ... -Z59: Bidirectional, forward or reverse transmission normalization. Selection of node port for one path two port calibration.
- *IF Gain a* setting in the Port Configuration table; defines the IF gain in the reference receiver path.
- New remote control features
  - New command `MMEMory:LOAD:CORRection:MERGe`, merges several cal group files for a channel.
  - New command `SYSTem:SHUTdown`, switches the analyzer to standby mode.
  - New command `[SENSe<Ch>:]AVERage:COUNt:CURRent?`, returns currently measured sweep (progress of sweep average).

New Features in Firmware V2.71 (Compared to V2.70)

- Support for network analyzer R&S ZVA67 with 4 ports
- Support for frequency converters R&S ZVA-Z140 and R&S ZVA-Z170 (with calibration kits R&S ZV-WR08 and R&S ZV-WR06)
- Primed wave quantities for two-tone measurements with a port-specific frequency offset.
- New source power calibration modes: Use Reference Receiver only, Use Reference Receiver after n Power Meter Readings. See Modify Source Power Cal Settings.
- New remote control features
  - New parameter `CALCulats<Chn>:DATA? TSData`, used to retrieve the raw measurement data in pulse profile mode.
  - New command `SOURce<Ch>:POWer<Pt>[:LEVel][:IMMediate] LLIMit:DGRaccess`, optimizes the automatic level control (ALC) for test setups where the additional connectors of option R&S ZVA-B16 are used.
  - New parameter IPORts for `MMEMory:LOAD:VNETworks:SENDed:DEEMbedding` etc., interchanges port numbers in imported *.s2p files.
  - New parameter ALL for `MMEMory:LOAD:CORRection` and `MMEMory:LOAD:CORRection:RESolve`, used to apply a calibration to all channels or resolve the pool link for all channels.
  - New commands `CALCulate<Chn>:STATistics:DOMain:USER:SHOW`, `CALCulate<Chn>:MARKer<Mk>:FUNCtion:DOMain:USER:SHOW`, display or hide range limit lines.
  - New commands `PROGram[:SELected]:INIParameter`, `PROGram [:SELected]:INIMessage`, configure the preferences file (*.ini) for external applications.
  - New command `SYSTem:FREQuency?`, queries the frequency range of the analyzer.
  - New command `SYSTem:PRIority`, selects the priority of the running NWA application.

New Features in Firmware V2.70 (Compared to V2.62)

- Support for network analyzer R&S ZVA67
- Support for frequency converter R&S ZVA-Z90E (with calibration kit R&S ZV-WR12)
- Noise figure measurement (option R&S ZVAB-K30)
- *Average* detector, calculates the arithmetic mean value of the complex results over a selectable measurement time
- Ground loop (de-)embedding, adds (compensates) the effect of a non-ideal ground connection of the DUT.
- Support of Universal Interface (option R&S ZVAB-B14)
- New trace functions, calculate the linearity deviation of the active trace
- Extended parameter lists for the commands `MMEMory:LOAD:CKIT:SDATa`, `[SENSe<Ch>:]CORRection:COLLect[:ACQuire]`, `[SENSe<Ch>:]CORRection:COLLect [:ACQuire]:SELected`, select multiple offset short standards
- New commands to query connector types, calibration kits, and standards: `[SENSe<Ch>:]CORRection:CONNection:CATalog?`

```
[SENSe<Ch>:]CORRection:CKIT:CATalog?
[SENSe<Ch>:]CORRection:CKIT:STANdard:CATalog?
```

Product improvements:

- Simplified menu for limit check and ripple limit check; common fail beep
- *Frequency Conversion Off* softkeys for various frequency-converting measurements renamed: *Reset Frequency Conversion*

New Features in Firmware V2.62 (Compared to V2.61)

- Performance improvements for ZVB20 and ZVT20

New Features in Firmware V2.61 (Compared to V2.60)

- Port-specific source power limits
- New commands `CALCulate<Chn>:MARKer<Mk>:NAME`, `CALCulate<Chn>:MARKer<Mk>:REFerence:NAME`, define marker names.
- Automatic configuration for all USB-connected NRP-Zxx power meters
- *Frequency Conversion Off* softkeys, disable an active Intermodulation or Mixer Delay measurement
- Export of system error corrected but incomplete S-parameter sets to Touchstone (*.snp) files is possible.

Product improvements:

- Remote control of frequency converters with electronic attenuators R&S ZVA-Z110E improved.

New Features in Firmware V2.60 (Compared to V2.53)

- Support for extension unit R&S ZVAX24
- Support for frequency converter with electronic attenuator R&S ZVA-Z110E
- Internal pulse generator (option R&S ZVA-K27)

The pulse generator option R&S ZVA-K27 requires network analyzers equipped with motherboards part no. 1305.6470.02 (see *Info Hardware Info)*. Please contact your Rohde & Schwarz service representative should you experience any problems on older network analyzers.

- Mixer delay measurement without LO control (option R&S ZVA-K9) with support of primed wave quantities and ratios

To ensure accurate mixer delay results, network analyzers R&S ZVA40 and R&S

ZVA50 must be equipped with reflectometer (RM) control boards part no. 1305.3042.40 or newer (see *Info Hardware Info,* e.g. *Rm 1 Generator RM44 CONTROL 1305.3042.40)*. Please contact your Rohde & Schwarz service representative should you experience any problems.

- Vector mixer measurement (option R&S ZVA-K5)
- Min Hold mode for traces
- Faster algorithm for the correction of measurement results based on the system error correction data *(*Fast Multiport Correction*)*
- New calibration types: *Forward transmission normalization, reverse transmission normalization*
- Convergence Factor for source power calibration
- *New remote control features*
  - New command `DISPlay[:WINDow<Wnd>]:TRACe<WndTr>:SHOW`, display or hides all data or memory traces
  - New commands for external generators and power meters:
    `SYSTem:COMMunicate:RDEVice:GENerator:COUNt?`,
    `SYSTem:COMMunicate:RDEVice:GENerator:CATalog?`,
    `SYSTem:COMMunicate:RDEVice:PMETer:COUNt?`,
    `SYSTem:COMMunicate:RDEVice:PMETer:CATalog?`
  - New reference marker commands
    `CALCulate<Chn>:MARKer<Mk>:REFerence:MODE` and
    `CALCulate<Chn>:MARKer<Mk>:REFerence[:STATe]`
  - New command `SOURce<Ch>:POWer<Pt>:GENerator<Gen>:STATe`, turns an external generator on or off
  - Command `CALCulate:DATA` can be used to write a memory trace.
  - Commands `SOURce<Ch>:POWer<Pt>:ALC:CONTrol` and `SOURce<Ch>:POWer<Pt>:ALC[:STATe]`, define channel-specific ALC settings.
  - New command `[SENSe<Ch>:]SEGMent<Seg>:SWEep:TIME:SUM?`, returns the total duration of a segmented sweep.

Product improvements:

- Frequency values queried via remote control are returned as 12-digit numbers. This ensures a frequency resolution of 1 Hz at RF frequencies >10 GHz
- Support of new external power sensor and generator types. The supported types are listed in the *System Configuration – External Power Meters – Add External Power Meter* and in the *System Configuration – External Generators – Add External Generator* dialogs.
- Network analyzers are configured with enabled virtual memory paging file.
- Improved bandfilter search functions
- Data lines in Touchstone files are terminated with a newline character

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New Features in Firmware V2.53 (Compared to V2.52)

- Support for calibration unit R&S ZV-Z55.

Fixed issues:

- Occasional problems with stimulus range definition solved.

- The port groups for system error correction data and power calibration data stored together in a cal group file are independent from each other. In firmware versions V2.50 and V2.51, the power-calibrated ports (including drive ports) had to be a subset of the system error-corrected ports.

New Features in Firmware V2.52 (Compared to V2.51)

- Fixture Compensation, corrects the measurement result for the effects of a text fixture.
- New command `CALCulate:DATA:DALL?`, returns the trace data of all data traces.
- New parameter `HCOPy:DESTination 'DEFPRT'`, selects the default printer for printing.

New Features in Firmware V2.51 (Compared to V2.50)

- 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.

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)
- New "Low Noise" mode for generator step attenuators
- 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

- *System Configuration* – Matrix Configuration tab
- 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)

New Features in Firmware V2.40 (Compared to V2.30)

- 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.

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 exernal 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:TYPE`, start an automatic calibration with a specific calibration type.

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

- Support of R&S ZVA50 vector analyzers including generator and receiver attenuators. Notice the maximum attenuation factors: 50 dB for generator attenuators, 35 dB for receiver attenuators.
- 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)

- Compliance with LXI class C
- 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:EFEed` 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)

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

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

- Occasional problems with Automatic Level Control (ALC) in combination with active automatic generator attenuation fixed (no error message "Port <n> output power unleveled").

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.
- Extension of the frequency range for ZVA 24 vector network analyzers up to 25 GHz (specified range 10 MHz to 24 GHz).

- **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:DEXPort: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.
- The generator step attenuators can be controlled from the Port <Port_no> Source Power dialog.

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.

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.
