

R&S®VSE

Vector Signal Explorer

Release Notes

Software Version V2.10 SP2

These Release Notes are for following models of the R&S®VSE Vector Signal Explorer:

R&S® VSE Basic Edition, order no. 1345.1011.06
R&S® VSE Enterprise Edition, order no. 1345.1105.06

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The software makes use of several valuable open source software packages. For information, see the "Open Source Acknowledgment" provided with the product.
The following abbreviations are used throughout this document: R&S®VSE is abbreviated as R&S VSE.

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1 Information on the current version and history

1.1 New functions

The following table lists the new functions and indicates the version in which the new function was introduced:

New function of firmware V2.10SP1:

Version	Function
V2.10 SP1	VSE uses level information stored in .wv files.

New function of firmware V2.10:

Version	Function
V2.10	Support for R&S power meters. See VSE datasheet for details.
V2.10	Support for R&S FPL1-B11 option. Requires R&S FPL firmware version 1.80 or newer
V2.10	Support for new R&S spectrum analyzer models: R&S FPL 1014 1304.0004K14 R&S FPL 1026 1304.0004K26 R&S ZNL4 1323.0012K04
V2.10	R&S VSE-K7: Support of Settling Time Measurements.
V2.10	R&S VSE-K91BE: Support of IEEE 802.11be measurements.
V2.10	R&S VSE-K149: Support of user-defined groups of packets, Evaluation Offset, MAC FCS, SRMarker, Pulse Rise-Time Measurement, STS Gap and finer burst/sync configuration.
V2.10	R&S VSE-K18: Support of auto level and power sensors. Automatic correction of input/output levels. Support of offline direct DPD (no generator connected).
V2.10	R&S VSE-K106: Support NB-IoT Non-anchor carriers. CONFigure[:LTE]:TYPE <ANCHor NANChor>
V2.10	R&S VSE-K175: In line with O-RAN.WG4.CONF.0-v04.00 5G: Test Cases: FDD 3.2.3.1.1-17, TDD 3.2.5.1.1-8 (BW 20 MHz to 80 MHz) LTE: FDD Test Case 3.2.3.7.1 - 3.2.3.7.6 (DL & UL)
V2.10	R&S VSE-K144/-K146/-K148: Signal demodulation and analysis in line with TS38.211 V16.7.0. Multi processing of multi carrier analysis for increased analysis speed

	New SCPI query returns all result summary entries at once Optionally allow PDSCH in unused CORESET CCEs
V2.10	R&S VSE-K70: Configuration tool for DVB-RCS2 measurements available (linear modulation reference waveforms).
V2.10	R&S VSE-K6: Support for segmented capture with a connected R&S FSW instrument.

New function of firmware V2.00:

Version	Function
V2.00	Supports R&S VSESIM-VSS
V2.00	Supports R&S VSE-K149 option: HRP UWB measurements according to IEEE 802.15.4 and 802.15.4z
V2.00	Supports R&S VSE-K175 option: O-RAN Measurements. In line with O-RAN.WG4.CONF.0-v02.00.
V2.00	Supports R&S VSE-K148 option: 5G NR R16 Extension for Uplink / Downlink.
V2.00	Supports VSE-K18, VSE-K18D, VSE-K18F, VSE-K18M options : Amplifier (and other non-linear devices) characterization measurements including digital predistortion
V2.00	<p>R&S VSE-K144/-K146/-K148:</p> <ul style="list-style-type: none"> ● Signal demodulation and analysis in line with TS38.211 V16.4.0. ● Time Alignment, Transmit On/Off Power, ACLR, SEM measurements in line with TS38.141-1/2 V16.6.0 and TS38.521-1/2 V16.6.0. ● Test models in line with TS38.141-1/2 V16.6.0 ● Generator to VSE settings transfer (requires generator 5G application version 20.12 or later) ● RS Magnitude display ● Frequency Error vs. Subframe display ● Result summary display for UL in-band emission ● Extension of Beamforming Summary for Average RS Weights and rel. Power results ● 5G ACLR supports power unit dBm/MHz ● Analysis of multiple CSI antenna ports ● Power mode "Average active symbols" ● Auto detection of Cell IDs in the range of 0 to 10 for downlink ● Auto Demod Once functionality ● CORESET reference data verification according to NR-TM PN23 ● Additional settings to ease the configuration of multicarrier setups ● Custom definition of symbol time position ● Extension of Bitstream for total number of bits and bit errors of PDSCH/PUSCH ● Intraslot frequency hopping for PUCCH format 2 ● Bitstream format "Symbols" or "Bits" selectable
V2.00	R&S VSE-K544: Added refresh button to parse files while the dialog is open.
V2.00	R&S VSE-K70: New predefined digital standard: DMR (Digital Mobile Radio).

V2.00	Support for external frontends with FSV3000 and FSVA3000.
	<ul style="list-style-type: none"> • R&S FE44S “External Frontend 24 GHz to 44 GHz”, order number 1338.7001.02 • R&S FE50DTR “External Frontend up to 50 GHz”, order number 1347.4099.02
	Requires FSV3-K553 “External Frontend Control” and FSV3000 Firmware Version 1.50 or higher.

New function of firmware V1.90:

Version	Function
V1.90	Expert Mode when connected to R&S®RTP and R&S®RTO devices. See VSE User Manual section 7.4 for details
V1.90	Supports R&S®FSW B4001, B6001 and B8001 bandwidth extensions
V1.90	Supports B400 and B200 bandwidth extensions for R&S®FSV3000 and R&S®FSVA3000. This requires FSV3000 and FSVA3000 device firmware V1.31 or later
V1.90	Supports R&S®FSVA3000 B600, B1000 bandwidth extensions. This requires FSVA3000 device firmware V1.31 or later
V1.90	Supports R&S VSE-K91AX option. Support of IEEE802.11ax measurements
V1.90	Supports AMMON I/Q data file format (*.aid files)
V1.90	New button in Instruments dialog to connect to localhost if VSE is running on one of its supported devices
V1.90	R&S VSE-K91N/AC/AX: Support of MIMO measurements
V1.90	R&S VSE-K96: Support of bitstream result window that shows the demodulated data stream.
V1.90	R&S VSE-K96: Improved channel estimation, if only two pilot carriers are present.
V1.90	R&S VSE-K96: If the channel filter is active, its 6-dB bandwidth is now displayed in spectrum windows.
V1.90	R&S VSE-K144: Major enhancement of DL auto detection and support of auto detection in UL Support parsing of DCI parameters (all DCI formats) Extended Cyclic Prefix UL frequency hopping Extended frequency lock range Faster Auto EVM speed via additional Auto Set configuration settings Slot / allocation copying for eased signal configuration Extension of results summary for All CC results in multi carrier scenarios 3D display view for Alloc ID / Power / EVM vs. Symb X carrier displays Event based actions within the 5G application

New function of firmware V1.80:

Version	Function
V1.80	Supports 40 GSa/s mode of R&S®RTP134-K11 and R&S®RTP164-K11
V1.80	Supports Trigger mode "Manual" for R&S®RTO and R&S®RTP devices. See manual for more details.
V1.80	Supports RF-Power trigger when connected to R&S®FSV3000. Requires R&S®FSV3000 firmware V1.30 or later.
V1.80	Supports loading of I/Q files with just I components instead of the usual I&Q.
V1.80	R&S VSE-K100: Supports Custom Sync Weight for P-/S-sync.
V1.80	R&S VSE-K100: Supports Suppress Interferer for Synchronization.
V1.80	R&S VSE-K100/K106: Supports "Layer EVM" in Allocation Summary (Downlink only).
V1.80	R&S VSE-K100/K106: Supports modulation type information for 2-D result displays in marker result (downlink only).
V1.80	R&S VSE-K106: Supports "After MIMO/CDMA Decoder" filter for Constellation result.
V1.80	R&S VSE-K106: Supports "MIMO Compensate Crosstalk" setting in Demodulation dialog.
V1.80	R&S VSE-K106: Supports "NB-IoT Power" in Result Summary for stand-alone and guardband modes.
V1.80	<p>R&S VSE-K144:</p> <p>Signal demodulation and analysis in line with TS38.211 V15.8.0</p> <p>Test models in line with TS38.141-1/2 V15.5.0</p> <p>ACLR/SEM in line with 38.141-1/2 V15.4.0 and 38.521-1/2 V15.3.0</p> <p>On/Off power measurements in line with 38.141-1/2 V15.4.0</p> <p>Inband Emission limit check for FR1/FR2 according to 38.521-1/2 V15.3.0</p> <p>Equalizer spectrum flatness limit check in line with 38.521-1/2 V15.3.0</p> <p>Frequency error limit check in line with 38.141-1/2 V15.4.0 and 38.521-1/2 V15.3.0</p> <p>UL measurement mode PRACH Analysis</p> <p>LTE-CRS Coexistence</p> <p>Analysis of multiple CSI RS resources</p> <p>CSI periodicities greater than one frame</p> <p>Half frame offset for synchronization signals</p> <p>PRB bundling combining PDSCH allocations with same user ID</p> <p>PDSCH VRB to PRB mapping</p> <p>PDSCH reference data "All 0" or "PRS23"</p> <p>Transport block scaling factor</p> <p>Timing position EVM_h and EVM_L as EVM calculation method</p> <p>Fixed CC offset for easier multi component carrier configuration</p> <p>Slotwise calculation of result summary</p> <p>EVM peak in result summary</p> <p>Configuration of multiple BWPs with same SCS in UL</p> <p>Frame start offset in result summary</p>
V1.80	R&S VSE-K6: Support for segmented capture with a compatible oscilloscope. See datasheet for more details.
V1.80	R&S VSE-K6: First release of R&S VSE-K6A Phased Array Measurements option, providing multi-channel pulse measurements with a supported oscilloscope. See manual or datasheet for more details.

V1.80	R&S VSE-K544: Supports multi-channel input with R&S VSE-K6A Phased Array Measurements option.
V1.80	R&S VSE-K70: Improved burst search for low reference levels.
V1.80	R&S VSE-K70: Improved coarse synchronization for 64APSKs.
V1.80	R&S VSE-K70P: Additionally supported PRBS types 7 and 31.
V1.80	R&S VSE-K96: Support DFT-S OFDM / SC-FDMA / Transform Precoding.
V1.80	R&S VSE-K96: Data for K96 Configuration File Wizard can now be exported directly by the VSE-K96. This allows the user to create the K96 xml configuration file later or on another PC.
V1.80	R&S VSE-K96: New SCPI commands to query the Peak EVM values for all symbols, only the pilot symbols and only the data symbols.
V1.80	VSE-K96 Configuration File Wizard: A cell region in the frame matrix or allocation matrix can now be selected more easily by directly entering the desired symbol and carrier range.

New function of firmware V1.70:

Version	Function
V1.70	VSE installer supports automatic de-installation of previous versions.
V1.70	Toolbar has a new button to start an external application
V1.70	Supports R&S®IQW. Support is based on the .iqx file format and includes the selection of recorded trigger information for post analysis.
V1.70	Supports R&S®NRQ6
V1.70	Supports R&S®FSW-B21
V1.70	Supports R&S®RTP134 and R&S®RTP164
V1.70	Supports R&S®RTP-K11 including support for the following R&S VSE options: K10, K71, K91, K91p, K91n, K91ac, K100, K102, K014, K016, K144, K146
V1.70	Supports R&S VSE-K146 5G-NR MIMO Measurements R&S VSE-K146: Supports phase-coherent measurements of multiple input sources with R&S®RTO, R&S®RTP, R&S®NRQ
V1.70	R&S VSE-K144: Signal demodulation and analysis in line with TS38.211 V15.6.0 Supports CSI reference signal Supports SRS reference signal Supports PUCCH format 0/1 Supports test models according to TS38.141-1/2 V15.2.0 Supports configuration of PDCCH within CORESET (including interleaving) Supports PDCCH decoding (bitstream) Supports auto detection of signal configuration for BWP and SS/PBCH blocks Supports beamforming summary for phase measurements

Supports "RS Phase" and "RS Phase Difference" display
 Supports CCDF result display
 Supports Frequency Error vs. Symbol display
 Supports inband emission measurement (without limit lines)
 Supports I/Q Offset, I/Q Gain Imbalance, I/Q Quadrature Error, OSTP, RSTP, CSI-RSRP, SS-RSRP in result summary
 Supports configuration of number of slots to analyze
 Supports analysis of short captures without trigger for repetitive signals (e.g. repeating slot 0)
 Supports Time and Level Tracking
 Supports phase tracking option "Pilot only"
 Supports EVM calculation method "at optimal timing position"
 Supports long capture mode for capture times ≥ 50.1 ms
 Supports EVM max hold functionality
 Supports compensation of carrier leakage
 Supports readable/modifiable .allocation file format
 Supports display of up to 16 component carrier results at once in result summary
 Supports custom configuration of parameters displayed in result summary
 Supports DMRS only selection for PDSCH allocations
 Supports CORESET interleaving shift index "Cell ID"
 Supports CORESET start as reference point for CORESET DMRS
 Supports BWP start as reference point for PDSCH DMRS
 Supplies updated VSE demo files
 Supports analog baseband input via R&S RTO

V1.70	<p>R&S VSE-K6:</p> <p>New Pulse-Pulse Spectrum display useful for Doppler measurements.</p> <p>New user-definable detection range for analyzing a subset of the acquisition.</p> <p>New fixed-level algorithm for pulse envelope measurements.</p> <p>Incorporation of trigger position in sample into timestamp values for better resolution with external trigger.</p> <p>The overall measured pulse count is now shown in the Pulse Results table header and per parameter as an extra row in the Pulse Statistics table.</p>
V1.70	<p>R&S VSE-K70:</p> <p>Density trace mode for polar displays and eye diagram</p> <p>Auto-refresh functionality in Run Single mode</p> <p>Supports equalizer data in Frequency Response Correction format .fres for K544.</p> <p>New mapping "Gray" for pi/4-QPSK</p> <p>New mapping "SMx" for pi/8-D8PSK and pi/4-DQPSK</p> <p>New predefined standard: GBAS (Ground Based Augmentation System)</p> <p>"Channel Bar" now displays more setting parameters.</p> <p>Various new SCPI commands that facilitate the handling of e.g. burst/pattern search scenarios, bit error rate measurements.</p> <p>QAMs with orders up to 16,384 can now be used.</p> <p>Supports input of encrypted *.wv files.</p> <p>Only relevant with connected R&S®FPL1-K70: For sample rates lower than or equal to 6.25 MHz, the SAW filter can now be deactivated. Before, it was always active for sample rates lower than or equal to 6.25 MHz. Deactivating the SAW filter can improve the residual EVM.</p>
V1.70	<p>R&S VSE-K96: "Channel Bar" now displays more setting parameters.</p>
V1.70	<p>R&S VSE-K544: Supports multiple stream input for 5G-NR MIMO measurements</p>

1.2 Modified functions

The following table lists the modified functions and indicates the version in which the modification was carried out:

Modifications of firmware V2.10:

Version	Function
V2.10	Saving screenshots via SCPI has been optimized. If the chosen file format (HCOPY:DEVice:LANGuage) differs from the file type ending, the file is saved in the format of the file type.
V2.10	R&S VSE-K175: 5G: For TDD UL Test Cases, the special slot is not analyzed
V2.10	R&S VSE-K146: The number of input sources can be increased to 32 in Multi SISO mode
V2.10	R&S VSE-K144: FR2 renamed to FR2-1 according to 3GPP
V2.10	R&S VSE-K144: Payload bits are also output when CRC fails
V2.10	R&S VSE-K144: Wording of DMRS-Downlink-R16 changed to DMRS-Downlink according to 38.211
V2.10	R&S VSE-K149: Payload octets start with the LSB instead of the MSB as required in IEEE 802.15.4.

Modifications of firmware V2.00:

Version	Function
V2.00	Loading an .iqw file via SCPI now allows to specify a center frequency.
V2.00	R&S VSE-K144: A multicarrier channel spacing less than the nominal channel spacing can be configured.
V2.00	R&S VSE-K144: The frequency error limit check result is now also indicated for Min and Max in the result summary
V2.00	R&S VSE-K144: Frequency error limit check can be optionally switched off
V2.00	R&S VSE-K70: Preview windows have been removed to provide more compact dialogs.
V2.00	R&S VSE-K70: In order to better visualize the symbol transitions for result type 'Vector I/Q', the sample points are now connected in density trace mode.
V2.00	R&S VSE-K7: Option renamed to AM/FM/PM Modulation Analysis.
V2.00	R&S VSE-K7: Higher resolution of modulation frequency provided in Result Summary table.

Modifications of firmware V1.90:

Version	Function
V1.90	R&S VSE-K144: The PTRS rel. power is now calculated automatically for UL TP
V1.90	R&S VSE-K144: N_ID [^] RS can now be configured explicitly for UL TP
V1.90	R&S VSE-K144: One Micro Service file is now exported for each component carrier
V1.90	R&S VSE-K144: The symbol offset of the CORESET was restricted to 3. It can now be set in the range 0-13

Modifications of firmware V1.80:

Version	Function
V1.80	R&S VSE-K106: Renamed "RB Power Excluding EUTRA" to "NB-IoT Power" in Result Summary for Inband mode.
V1.80	The maximum number of markers in an *.iqx files was previously unlimited. It is now limited to 1000 markers.
V1.80	The "10dB min" button in the GUI (only visible when connected to certain devices) has been moved from the "Input Source" dialog to the "Amplitude" dialog.
V1.80	R&S VSE-K146: Cross talk compensation is steered via Conducted / OTA selection in measurement setup helper
V1.80	R&S VSE-K146: Show frame start offset input source specific
V1.80	R&S VSE-K144: Time Alignment restricted to multi layer configurations
V1.80	R&S VSE-K144: In UL, antenna port mapping is extended for PUSCH DMRS
V1.80	R&S VSE-K144: Renaming of Deploy frequency selections to "FR1 <= 3GHz", "FR1 > 3GHz" and "FR2"
V1.80	R&S VSE-K144: Calculate OSTP according to R4-1916043 and R4-1916044
V1.80	R&S VSE-K144: Renaming of "DMRS-Scrambling-ID" to "N_ID [^] DMRS" in PDSCH and "N_ID [^] PUSCH" to "N_ID [^] DMRS" in PUSCH enhanced settings
V1.80	R&S VSE-K144: In specific scenarios, the PUSCH DMRS was moved to a different symbol for mapping type B.
V1.80	R&S VSE-K70: After preset and for the predefined standard 3G_WCDMA.xml, the trace in the constellation diagram in window 1 is now a "Density" trace and no longer a "Clear Write" trace. This only affects the coloring of the trace. The trace values remain the same.
V1.80	R&S VSE-K96: The calculation of the averaged MER value was changed. Originally, the average was taken over $\frac{P_{ideal\ reference\ signal}}{P_{error\ vector}}$ now, the average is taken over $\frac{P_{error\ vector}}{P_{ideal\ reference\ signal}}$

V1.80	R&S VSE-K96: Renaming settings in dialog "Result Units". "Time Axes" was renamed into "Magnitude Capture" and "Frequency Axes" was renamed into "Power Spectrum", because it wasn't clear that these settings only apply to these results.
V1.80	R&S VSE-K96: The result "Trigger to Sync" is no longer displayed in the channel bar. It can now be viewed in a separate result window.
V1.80	R&S VSE-K91/N/AC: Signal Field result table has a new layout and includes all results according to the standard.

Modifications of firmware V1.70:

Version	Function
V1.70	VSE-K144: BWP (bandwidth part) minimum is now reduced to 1 RB (resource block)
V1.70	VSE-K144: Replaced CORESET DMRS parameter "Sequence Generation / Scrambling" by "Use DMRS Scrambling ID" according to TS38.211 V15.6.0
V1.70	VSE-K144: RF upconversion phase compensation according to TS 38.211 V15.4.0 5.4 is now activated by default
V1.70	VSE-K144: Sampling rates of 15/30/60/70 MHz carrier bandwidth adapted according to TS 38.141-1 V15.1.0 6.5.3
V1.70	VSE-K144: Spectrum flatness in UL inverted according to 3GPP definition.
V1.70	VSE-K70: Only relevant for capture lengths > 256,000 samples: Title of the window now indicates whether the entire capture buffer or only a section of the entire capture buffer is displayed.
V1.70	VSE-K70: Only relevant for capture lengths > 256,000 samples: Lines in the Mag Overview (Capture Buffer) display now visualize which section of the capture buffer is displayed in windows that show only a part of the entire capture, e.g. Mag (Selected CB Section).
V1.70	VSE-K70: Only relevant for capture lengths > 256,000 samples: Windows that display just a section of the capture buffer only support the trace modes "ClearWrite" and "View".
V1.70	VSE-K70: Improved layouts for the "Predefined Display Configurations"
V1.70	VSE-K70: Up/Down increment for the capture length and result length parameters has been increased, both for the scroll wheel step size and for the corresponding SCPI commands.
V1.70	VSE-K70: Adding/changing a result window triggers an auto refresh on the current capture buffer. The currently selected result range is then the last possible result range in the current capture buffer.
V1.70	VSE-K70: The blue marker that highlights the currently analyzed result range in the capture buffer is now also displayed if there is only one result range in the capture buffer.
V1.70	VSE-K70: The name of the default QPSK mapping has changed from "WCDMA" to "GRAY". The mapping values themselves remain identical. Depending on the order of

settings in a remote script, this might change the default mappings for other modulation schemes as well.

V1.70

VSE-K96: Optimized layout for some dialogs.

1.3 Improvements

The following tables list the improvements and indicate since which version the issue could be observed:

Improvements of firmware V2.10SP2:

since	Function
V2.10	VSE licenses without dongle did not enable the corresponding options when installed on R&S RTO and RTP devices. This issue is solved.

Improvements of firmware V2.10SP1:

since	Function
V2.10	VSE-K544 was not enabled when using VSE-SIMCAD license key. This issue is solved.
V2.00	Loading a .wv file as IQ source caused the center frequency to be displayed as 1 kHz instead of 0 Hz. This issue is solved.

Improvements of firmware V2.10:

since	Function
V2.10	Pressing enter in file dialogs did not save or open the file. This issue is solved
V2.10	The new 15 dB gain step of option FSW-B24 for FSW43 and above was not available in all cases. This issue is solved.
V2.10	R&S VSE-K144: In multi carrier scenarios, the display of the frequency of the RF up-conversion was not updated with respect to the global multi carrier frequency. The issue is fixed.
V2.10	R&S VSE-K144: In multi carrier scenarios, the global multi carrier frequency could not be increased above 40 GHz under special conditions. The issue is fixed.

Improvements of firmware V2.00SP2:

since	Function
V2.00	Manual trigger mode wasn't allowed for R&S RTO6 devices. This issue is solved.
V2.00	Differential I+Q mode was unavailable for R&S RTO6. This issue is solved.
V2.00	R&S VSE-K149: Analog baseband modes were unavailable when connected to an R&S RTO6 device. This issue is resolved.

Improvements of firmware V2.00SP1:

since	Function
V2.00	RTx-K0 didn't allow VSE to start directly on the RTX device. This issue has been resolved.
V2.00	VSE-K0 didn't include VSE-K91AX. This issue has been resolved.

Improvements of firmware V2.00:

since	Function
V1.90	R&S VSE-K6A: When using segmented capture with a connected Rohde & Schwarz oscilloscope, the maximum possible number of events could not be configured. This issue has been resolved.
V1.80	R&S VSE-K144: The sequence generation of the PTRS for UL TP was adapted according to TS38.211 with respect to m and m'.
V1.80	R&S VSE-K144: For test model 3.2 and 3.3, the user ID (RNTI) changed for different PDSCH allocations. The issue is solved.
V1.80	R&S VSE-K144: For dynamic spectrum sharing, the LTE CRS were not excluded when calculating the OSTP. The issue is solved.

Improvements of firmware V1.90:

since	Function
V1.90	Improved compatibility of installer if launched with limited user rights or in combination with security hardening applications
V1.80	R&S VSE-K6A: When using segmented capture with a connected R&S RTP16, the transfer of acquisition settings to the oscilloscope failed. This issue has been resolved.
V1.80	Creating a hardcopy (SCPI command: HCOPY:IMMEDIATE) did not create the destination folder. Instead it simply failed with error code -200 "Execution error". This issue is solved.
V1.70	Permanent product license keys didn't show any maintenance date in the Help / License dialog. This issue is solved.
V1.80	R&S VSE-K144: When switching from EVM to On/Off power measurement mode, the settings were not transferred in certain scenarios. The issue is solved.
V1.70	R&S VSE-K144: CSI-RS with antenna ports other than 3000 could not be analyzed. The issue is solved.

Improvements of firmware V1.80:

since	Function
V1.70	When connected to an R&S®FSWP device, the following message appears on the device screen: -200 Execution error, option not available: SYST:COMM:RDEV:OSC:TCP This issue is solved.
V1.70	When connected to an R&S®FSW with B24 option or R&S®FSV3000 with B24 option, the preamplifier step size of 15dB and/or 30dB was not recognized correctly under all circumstances. This issue is solved, but requires the firmware V4.70 or newer of the R&S®FSW and firmware V1.30 or newer of the R&S®FSV3000.
V1.70	When connected to an R&S®FSW85 device, the second RF connector was not supported in VSE. This issue is solved.
V1.70	R&S VSE-K144: No time alignment results were shown in certain scenarios with multiple PDSCH allocations. The issue is solved.
V1.70	R&S VSE-K144: The PDCCH RNTI was restricted to a maximum of 3. The issue is solved.
V1.60	R&S VSE-K144: In certain scenarios, the max trace in the EVM vs. carrier display showed spikes for a signal with added noise and utilizing 256 QAM modulation. The issue is solved.
V1.70	R&S VSE-K91/N/AC: For measurement from file, inconsistencies with respect to the capture time were fixed.

Improvements of firmware V1.70SP1:

since	Function
V1.60	R&S VSE-K106: Uplink measurement didn't work with Basic Edition. This issue is solved.
V1.70	R&S VSE-K91N: In case the Signal Field data was incorrect, the PPDU was discarded. This issue is fixed.
V1.70	Running VSE directly on the device sometimes could cause the VSE to freeze in case a measurement parameter had been changed. This issue has been solved.
V1.70	Connecting the VSE with an R&S® FSV3000 / R&S® FSVA3000 could lead to incomplete IQ captures. This issue has been solved, but requires R&S® FSV3000 / R&S® FSVA3000 firmware 1.30 or newer.

Improvements of firmware V1.70:

since	Function
V1.60	R&S VSE-K106 : Uplink measurement didn't work with VSE Basic Edition. This issue is solved.

1.4 Known issues

The following tables list the known issues and indicate since which version the issue could be observed:

Known issues of software:

since	Function
V2.10	VSE-K18: Zeroing, Meas->Ref, and Unit settings currently not available in power sensor mode.
V2.00	VSE-K6: When using segmented capture with an oscilloscope device, the appropriate limit on the maximum no. of segments will not be reported until after a sweep has been performed.
V2.00	VSE-K18: Parameter Sweep not yet supported
V1.90	Activation and immediate deactivation of the RTx Expert Mode will lead to a misleading information dialog which states that some parameters have been changed on the RTx. The parameters were not changed and the message can be ignored.
V1.70	R&S VSE-K6: Cumulative statistics for pulse-pulse values are always calculated with the default reference pulse setting. Non-default settings are only applied to the current capture statistics.
V1.70	R&S VSE-K146: For phase-coherent MIMO measurement with multiple NRQs and NRQ firmware earlier than 02.20.19111801: High power values for the most recently captured I/Q capture buffer and power spectrum measurements
V1.70	R&S VSE-K146: For phase-coherent MIMO measurements with multiple NRQs and NRQ firmware earlier than 02.20.19120202: Analysis results of first I/Q capture may return "sync failed".
V1.70	R&S VSE-K146: For phase-coherent MIMO measurements with multiple NRQs: Measuring with external trigger may not work for subcarrier spacings larger than 30kHz.
V1.50	LTE MIMO in combination with option K544 (User Defined Frequency Response Correction) results in an incomplete measurement. The capture does not finish.
V1.05	I/Q Vector display may slow down the R&S VSE when choosing a long record length.
V1.10	R&S VSE-K6: The following remote control command is not available: [SENSe:] FREQuency:CENTer:STEP
V1.10	Saving and recalling Matlab files (*.mat) only supports ASCII compatible file names unless activated in Windows OS. In order to allow Unicode characters in file names, make sure to enable support for 8.3 file names on the drive(s) the file is being read from or exported to. For more information please refer to this MSDN: https://support.microsoft.com/de-de/help/121007/how-to-disable-8.3-file-name-creation-on-ntfs-partitions

The following table lists known issues with supported instruments and additional software:

Function	Instrument/ Software	FW/SW Version
R&S VSE-K100/104: Using the current R&S®FSV or R&S®FSW firmware, the Frame Start Offset calculation has an uncertainty of +/- 100 ns.	R&S®FSV R&S®FSW	all
K72: Using the current R&S®FSV or R&S®FSW firmware, the Trigger to Frame calculation has an uncertainty of +/- 100 ns.	R&S®FSV R&S®FSW	all
1. The Auto Level routine does not finish when connected with an R&S®RTO. 2. The Reference Level setting does not work reliably.	R&S®RTO	FW 2.6.x.x FW 2.7.x.x, FW 3.4.x.x
The R&S VSE software may stop working in random situations if Visa packages of different vendors are installed in parallel on the PC. Removing the ambiguity solves this issue.	Any VISA	
Using R&S®Visa (V5.5.4.0) may cause the R&S VSE to stop measuring I/Q data. The issue was observed using the Waveform Mode of the RTO (default in R&S VSE-K6) or with high traffic on the LAN connection.	R&S®VISA	5.5.4.0
K7: There is a carrier offset of up to 120 Hz in RF spectrum when using the Waveform mode for an ABW < 1,6 kHz. Please use the IQ mode for small bandwidths.	R&S®RTO R&S®RTP	all

2 Modifications to the documentation

The current documentation is up-to-date.

3 Software Installation

3.1 Validity information

The R&S VSE can only be installed on the 64-Bit Version of Windows 7 or Windows 10. Windows 10 64 Bit is recommended.

3.2 Update information

The software installation file for the R&S VSE is one file including the main version number e.g. VSESetup_V1.30.exe. It will be referred to as VSESetup.exe later in the text. The file can be found on the Rohde & Schwarz web page.

3.3 Installing the Software on your PC

Performing the installation on your PC:

The R&S VSE needs some additional software components to run properly.

The following components are needed:

- Microsoft .NET Framework Version 4.0
- VISA (Virtual Instrument Software Architecture)

Install Microsoft .NET Framework

The R&S VSE installer will try to install the .Net 4.0 from the internet.

Install VISA

It is necessary to install VISA (Virtual Instrument Software Architecture) to access instruments connected to the PC via IEEE or LAN bus.

Please use the R&S VISA provided with the VSE installer or visit www.rohde-schwarz.com/rsvisa to get the latest version

Installing VSE

Please save the VSE Installer on your hard disc in order to install the Software

3.4 Installing Software Options

3.4.1 Software options included in base software

The K7 application software package is included in the base software. Therefore, it does not have a separate item in the installer to be selected.

3.4.2 Other Firmware Options within the VSESetup.exe File

General VSE Options

The R&S VSE-K70 and other application software packages have their own installation item and are therefore added to the selection list during the software update. Ensure that the checkboxes are checked if installation is requested.

ETL-K470 CDR License

The Convergent Digital Radio (CDR) feature available in the R&S VSE requires an Ethernet connection to an R&S ETL. The R&S ETL must have a valid R&S ETL-K470 CDR license and a firmware version 3.51 or later.

To use the R&S ETL CDR, you have to install the following R&S VSE packages:

- R&S VSE Vector Signal Explorer software
- R&S VSE K96 OFDM signal analysis
- Activate R&S ETL-CDR K470

When you activate the R&S ETL-K470, R&S VSE runs in an exclusive CDR mode. CDR mode is designed to analyze CDR signals within the VSE. Therefore, it has the following restrictions:

- You can only use the I/Q analyzer and the OFDM analysis for CDR signals. Using other (optional) applications is not possible, even if you have a valid license for them (for example on an R&S FSPC dongle).
- You can only connect to an R&S ETL. Connecting to other instruments otherwise supported by the R&S VSE is not possible.
- You can only connect to one R&S ETL at a time.

3.4.3 Enabling Options by Entering Option Key Codes



This section can be skipped if the option key was entered once.

To activate application software packages, you must enter a license key for validation.

If a XML-file with an option key was sent to you see the install description below.

The license key is in the device certificate or delivered as a part of the software package. The process is performed in the following steps:

1. Go to the "Help" menu
2. Press the "License" menu item.
3. Press the "Install Option" Button
A dialog box is displayed.
4. Enter the option key number.
5. Press "ENTER".
After a successful validation the message "Option Key valid" is displayed. If the validation failed, the option software is not installed.
6. Restart the software.

Installation of options via XML-file

1. Go to the "Help" menu.
2. Press the "License" menu item.
3. Press the button "Install Option by XML" button.
A file browser is displayed.
4. Select the path to the XML file (e.g. network drive or USB stick).
5. Press "Select".
After a successful validation the message "Option Key valid" is displayed. If the validation failed, the option software is not installed.
6. Reboot the device.

4 Customer support

Technical support – where and when you need it

For quick, expert help with any Rohde & Schwarz product, contact our customer support center. A team of highly qualified engineers provides support and works with you to find a solution to your query on any aspect of the operation, programming or applications of Rohde & Schwarz products.

Contact information

Contact our customer support center at www.rohde-schwarz.com/support or follow this QR code:



Figure 4-1: QR code to the Rohde & Schwarz support page