R&S®VSE
Vector Signal Explorer
Release Notes
Firmware Version V1.61

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**

The following abbreviations are used throughout this document:
R&S®VSE is abbreviated as R&S VSE.

Table of Contents

1 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 Functions in Software V1.61:

Version	Function
V1.61	Support of ETL-K470 CDR (Convergent Digital Radio) License
V1.61	VSE-K70: Support of sub-option VSE-K70M for multimodulation analysis (requires separate option key)
V1.61	VSE-K70: Support of sub-option VSE-K70P for bit error rate measurements with PRBS (requires separate option key)
V1.61	VSE-K70: Support of new Bluetooth standards Bluetooth_5_LE_S2 and Bluetooth_5_LE_S8
V1.61	VSE-K70: The error vector trace can now be exported to an iq-tar file. This allows for carrier-in-carrier measurements.
V1.61	VSE-K70: The maximum available I/Q bandwidth can now be queried with TRAC:IQ:BWIDTh? MAX.
V1.61	VSE-K70: New SCPI command that allows for querying the capture length in symbols: :SENSe:DDEMod:RLENgth:SYMBols:VALue?

New Functions in Software V1.60:

Version	Function
V1.60	Support of Floating Licenses
V1.60	Support of VSE-K144 5G-NR Uplink&Downlink Measurements (in line with TS38.211 15.2.0)
V1.60	Support for R&S RTP
V1.60	Support for *.wv files in the following applications: I/Q Analyzer,K6, K7 ,K60,K72,K96, K100-K104,K106
V1.60	Support for: FSW8, order no. 1331.5003K08, FSW13, order no. 1331.5003K13, FSW26, order no. 1331.5003K26, FSW43, order no. 1331.5003K43, FSW50, order no. 1331.5003K50, FSW67, order no. 1331.5003K67, FSW85, order no. 1331.5003K85
V1.60	I/Q Analyzer: Support for gating on I/Q files, including continued gate trigger with possibility for a detailed specification of the gating pattern.
V1.60	I/Q Analyzer & options support I/Q data input: For the input source "I/Q File" a repetition number is supported which determines how often the data stream is copied in the I/Q data memory
V1.60	VSE-K106: New result "RB power excluding E-UTRA (dBm)" in result summary of downlink inband mode. This result is necessary for calculating the "NB-IoT RB power dynamic range" in 3GPP specification 36.141 chapter 6.3.3
V1.60	VSE-K544: Support of preview for selected file magnitude and phase, covered frequencies and combined frequency response for I/Q mode

New Functions in Software V1.50:

Version	Function
V1.50	Support of VSE-K544 Frequency Response Correction
V1.50	Supports Limit Line Import and Export using CSV (comma separated) files.

Version	Function
V1.50	Support for FSW-B106
V1.50	Simple CSV and *.mat format is supported. See operating manual for details.
V1.50	IQ Analyzer: Support for Time Trigger on I/Q Files for ACLR and SEM Measurements
V1.50	VSE-K70: Increased precision for filter roll-off factor (Alpha/BT). Now three digits after the decimal point can be entered.
V1.50	VSE-K70: Several new mappings (e.g. for 1024QAM and 4096QAM)
V1.50	VSE-K70: Support of I/Q skew measurement and compensation (only for PSK/QAM/Offset QPSK)
V1.50	VSE-K70: Support of 64FSK
V1.50	VSE-K70: Support of new Bluetooth standards Bluetooth5_LE1M and Bluetooth5_LE2M
V1.50	VSE-K70: New mappings for 512QAM and 2048QAM.
V1.50	VSE-K96: Support of the SCPI command "INPut:ATTenuation:AUTO:MODE" which allows to configure the optimization priority after the RF attenuation has been supplied.
V1.50	VSE-K96: It is now possible to configure the result units for EVM, Impulse Response, Symbol Axes, Carrier Axes, Time Axes and Frequency Axes.
V1.50	VSE-K96: Added the possibility to configure the minimum time and frame synchronization thresholds in the user interface.
V1.50	VSE-K96: The data displayed in the Constellation Diagram can now be filtered by clicking on the label of the corresponding modulation.
V1.50	VSE-K96: Added the possibility to configure the size of the constellation points in the Constellation Diagram.
V1.50	VSE-K96: The Configuration File Wizard now supports to configure two different cyclic prefix lengths.
V1.50	VSE-K96: The Constellation Diagram now supports zooming.
V1.50	VSE-K96: The Constellation Diagram now supports markers.
V1.50	VSE-K96: Configuration files can now be loaded using "drag and drop".
V1.50	VSE-K100: Support of MIMO-measurements with simultaneous measurements of up to 4 input streams. This feature requires the VSE-K102.
V1.50	VSE-K100: Support of SCPI command TRACe\<n\>:DATA:X? TRACe1 | TRACe2 | TRACe3 For reading out the X-values of result diagrams in the EVM-measurement.
V1.50	VSE-K100: For measuring EUTRA-carriers with an embedded NB-IoT carrier, the NB-IoT carrier can now be cut out so that the analysis of the EUTRA -part of the signal is possible.
V1.50	VSE-K106: Suppport of Multi Frame Capture in downlink
V1.50	VSE-K106: In downlink in-band-mode, all possible offset to the E-UTRA carrier can now be selected from a list

New Functions in Software V1.41:

Version	Function
V1.41	Support for R&S ZNL, requires ZNL-B1
V1.41	Support for VSE Basic Edition (Order No. 1345.1011. 06) and VSE Enterprise Edition (Order No. 1320.7500.06). The R&S VSE Enterprise Edition and Basic Edition differ in the number of channels, groups, and instruments that you can configure at the same time:

Supported number of	Enterprise Edition	Basic Edition
Instruments	128	1
Groups	30	1

|

Version	Function		
	Channels	30	3
V1.41	New SCPI command to load a single IQ File into multiple channels at once. INSTrument:BLOCk:FILE<fi>:MAT INSTrument:BLOCk:FILE<fi>:IQW INSTrument:BLOCk:FILE<fi>:IQTar INSTrument:BLOCk:FILE<fi>:CSV Only available for VSE Enterprise Edition		
V1.41	New SCPI Command command to load a single IQ File into a channel without reprocessing the meta information like sample rate etc. INSTrument:BLOCk:FILE<fi>:REPLace <FileName> Only available for VSE Enterprise Edition		

New Functions in Software V1.40:

Version	Function
V1.40	Support for FSW-B2001
V1.40	Support for VSE-K96 OFDM VSA
V1.40	Support for R&S FPL
V1.40	Analog Baseband Support with RTO1000 and RTO2000 series
V1.40	Support of external and IF-Power Trigger for FSW-B1200
V1.40	Update of R&S Visa to Version 5.8.2.
V1.40	Support for 20GHz sampling rate when using RTO in Waveform mode
V1.40	VSE-K70: Start of the current result range within the capture buffer can now be queried with sample precision by [SENSe:]DDEMod:SEARch:MBURst:STARt:SAMPles? VSE-K70: All eye diagrams support two horizontal and two vertical display lines, which allow a manual measurement of the eye size (Limits -> Vertical/Horizontal Line …). VSE-K70: Predefined display configurations are offered for e.g. PSK/QAM signals and FSK signals (File -> Preset-> Predefined Display…)
V1.40	K6: Increased pulse analysis limit to 200,000 pulses
V1.40	K100/104: The parameter Channel Estimation can now be set to Off, which deactivates the equalizing filter.

1.2 Modified Functions

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

Modified functions of Software V1.61:

Version	Function
V1.61	VSE-K70: The "reset equalizer" button is now only active if the equalizer is in "Tracking" or "Averaging" mode.
V1.61	VSE-K70: Symbol errors that are detected in a bit error rate measurement are not highlighted with a red frame anymore, but are displayed in red text within the symbol table.
V1.61	VSE-K70: The menu entry "Digital Standards" has been moved from "File"->"Preset" to "Meas Setup"
V1.61	VSE-K70: PSK/QAM constellations are now always normalized to an RMS value of 1. This may lead to a different scaling of the results based on the measurement or reference signal, e.g. the I/Q constellation diagram.
V1.61	VSE-K70: The bit error rate result table can now be open, even if the bit error rate measurement is not active.
V1.61	VSE-K96: The result length can now be set automatically whenever a new configuration file is loaded. Whenever the parameter <DefaultResultLength> exists in the <GeneralParameters> group, this parameter is used as result length.

Modified functions of Software V1.50:

Version	Function
V1.50	The query answer string of $*OPT?$ is now always terminated with a 'comma' to simply string comparison.
V1.50	Online Help stays visible while VSE is in Remote Mode. Help Windows can no longer be docked into the main application window,
V1.50	VSE-K70: For very large capture oversampling rates (≥ 64), a lower number of display points per symbol (i.e. 32) is now used by default to avoid prolonged display times and extremely large amounts of trace data.
V1.50	VSE-K70: Increased limit for maximum burst length (upper limit now equal to the limit for the result length)
V1.50	VSE-K70: The bit error rate result is now displayed in scientific format.
V1.50	VSE-K96: Increased maximum number of different constellation types within one configuration file to 63.
V1.50	VSE-K96: Increased maximum number of OFDM cells that can be analyzed from 1500000 to 6144000.
V1.50	VSE-K96: Carriers at the edges of the spectrum that contain only "Don't Care"-cells are no longer used in the channel estimation.
V1.41	VSE-K106: Extended F_offset for SEM measurement to +/- 200 kHz in case of standalone distribution according to table 5.6-3A of 3GPP of document 36.141 revision 14

Modified functions of Software V1.41:

Version	Function
V1.41	Input "Baseband Oscilloscope" renamed to "Oscilloscope Baseband" for harmonization with other products.

Modified functions of Software V1.40:

Version	Function
V1.40	VSE-K70: FSK Ref Deviation can now be set to 60 * Symbol Rate (15 * Symbol Rate before)

Version	Function
	VSE-K70: The maximum number of "Display Points/Sym" for all result windows is now limited to 32 (exceptions: Result Summary and Capture Buffer Displays)

1.3 Improvements

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

Improvements of Software V1.61:

since	Function
V1.50	VSE-K70: Remote commands INP:IMP? and INP:IMP:PTYP? did not work. This issue is solved.
V1.40	VSE-K70: "Meas only if Pattern Symbols Correct" functionality did not work for short patterns. This issue is solved.
V1.30	VSE-K10: When using EDIT→ COPY TO CLIPBOARD to transfer the results of TRANSIENT SPECTRUM TABLE or MODULATION SPECTRUM TABLE the limit check verdict was always shown as FAILED. This issue is solved.
V1.50	VSE-K96: After recall, Cyclic Prefix and Preamble settings were sometimes overwritten by the content of the configuration file used. This no longer happens.
V1.50	VSE-K96: After loading an I/Q file, the capture length is now always automatically set to the length of the I/Q file content.
V1.50	VSE-K96: Loading the same XML file twice no longer leads to unloading the OFDM configuration.
V1.50	VSE-K96: Markers are now also transferred to new channels when using the "Duplicate Channel"-functionality.

Improvements of Software V1.60:

since	Function
V1.50	I/Q Analyzer: During I/Q Vector ASCII Trace Export, the I-values were sorted in ascending order. This issue is solved and these values are not sorted anymore.
V1.50	VSE-K106: Controls for "E-UTRA CRS Sequence Info" and "E-UTRA PRB Index" were corrupt and no value could be selected. This issue is solved.

Improvements of Software V1.50 SP2:

since	Function
V1.50	VSE software occasionally crashed if the I/Q input file was replaced for all channels of a channel group. This issue is solved.
V1.50	VSE software crashed when SCPI commands were sent in a very quick succession. This issue is solved.
V1.30	When loading .iq.tar input files the VSE software could crash under rare circumstances. This issue is solved.
V1.50	VSE-K91: Improved auto level functionality for WLAN signals with low duty cycle.

Improvements of Software V1.50 SP1:

since	Function
V1.50SP1	VSE-K96: In some cases the Capture Time was not recalled correctly when loading a saveset in which multiple VSE-K96 measurement channels were open. This issue is solved.
V1.50	VSE-K96: If the Stop Time in the Player gets increased above the maximum Capture Time that is allowed by the VSE-K96 signal processing, the limits for the K96 Capture Time setting are not set correctly. This can lead to a state in which a higher Capture Time can be

since	Function
	configured than can actually be processed. In this case the displayed results are calculated on a shorter capture time than configured. The actually used capture time is displayed on the Magnitude Capture display
	This issue is solved
V1.50	Maximum Frequency was incorrectly limited to 26.5GHz when YIG Preselector was active.
	This issue is solved

Improvements of Software V1.50:

since	Function
V1.10	VSE-K70: File input can now be selected by INP:SEL FIQ
V1.10	Entering an option key code manually lead to a lock up of the firmware. Nevertheless the key code was working fine after a reboot. This issue is solved.
V1.10	The I/Q Swap setting was not restored when loading a saveset. This issue is solved
V1.10	The external reference setting was temporarily reset when loading a saveset. This issue is solved
V1.10	VSE-K70: "Meas only if Pattern Symbols Correct" functionality did not work for short patterns. This issue is solved.
V1.40	VSE-K96: When creating multiple VSE-K96 channels using the "Duplicate Channel" functionality or when loading a saveset with multiple VSE-K96 channels, the sample rate was not applied to all channels. This issue is solved.
V1.40	VSE-K96: When using "Baseband Oscilloscope" as input source, the deskew-button did not work. This issue is solved.
V1.40	VSE-K96: The positions of the Cyclic Prefix lines in the Impulse Response result display are now updated when changing the "FFT Shift relative to Cyclic Prefix Length" setting.
V1.40	VSE-K96: The ideal constellation markers are now also available when using symbolwise or carrierwise modulation detection.
V1.41	VSE-K100: A logfile including an error message was created in C:\Temp in case that the synchronization failed. This problem is solved.

Improvements of Software V1.40:

since	Function
V1.10	VSE-K70: File input can now be selected by INP:SEL FIQ

1.4 Known Issues

The following table lists the known issues and indicates since which version the issue could be observed:

since	Function
V 1.50	LTE MIMO in combination with K544 results in an incomplete measurement. The capture doesn't finish.
V 1.05	IQ Vector display can slow down VSE when choosing a long record length
V 1.10	K6: The following commands are not available: `[SENSe:]FREQuency:CENTer:STEP`
V1.10	Saving and Recalling Matlab Files (*.mat) only supports ASCII compatible File names unless activated in windows. 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
VSE-K100/104: Using the current FSV or FSW Firmware the Frame Start Offset calculation has an accuracy of less than +/- 100ns with the current FSV and FSW Firmware	FSV FSW	all
K72: Using the current FSV or FSW Firmware the Trigger to Frame calculation has an accuracy of less than +/- 100ns	FSV FSW	all
The Auto Level doesn't finish when connected with an RTO. The Reference Level Setting doesn't work reliable	RTO	FW 2.6x.x FW 2.7x.x, FW 3.4.x.x
The VSE Software will stop working at random when visa packages from different vendors are installed in parallel on the PC. Removing the ambiguity solves this issue.	Any VISA	
Using the R&S Visa (V5.5.4.0) can cause the R&S VSE to stop measuring IQ data. The issue was observed using the Waveform Mode of the RTO (default in VSE-K6) or with high traffic on the LAN connection.	R&S VISA	5.5.4.0

1.5 Modifications to the Documentation

2 Software Installation

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.

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

2.1 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

2.2 Installing Software Options

2.2.1 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.

2.2.2 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.

2.2.3 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.

3 Customer Support

Technical support – where and when you need it

For quick, expert help with any Rohde & Schwarz equipment, contact one of our Customer Support Centers. A team of highly qualified engineers provides telephone support and will work with you to find a solution to your query on any aspect of the operation, programming or applications of Rohde & Schwarz equipment.

Up-to-date information and upgrades

To keep your software up-to-date and to be informed about new application notes related to your software, please send an e-mail to the Customer Support Center stating your software and your wish. We will take care that you will get the right information.

Europe, Africa, Middle East
Phone +49 89 4129 12345
customersupport@rohde-schwarz.com

North America
Phone 1-888-TEST-RSA (1-888-837-8772)
customer.support@rsa.rohde-schwarz.com

Latin America
Phone +1-410-910-7988
customersupport.la@rohde-schwarz.com

Asia/Pacific
Phone +65 65 13 04 88
customersupport.asia@rohde-schwarz.com

China
Phone +86-800-810-8828 / +86-400-650-5896
customersupport.china@rohde-schwarz.com