R&S®FSVA3000/FSV3000 Signal and Spectrum Analyzer Release Notes

Firmware Version V1.90

These Release Notes apply to the following models of the R&S®FSV3000 and R&S®FSVA3000 Signal and Spectrum Analyzers:

R&S®FSV3004	**order no. 1330.5000K04**
R&S®FSV3007	**order no. 1330.5000K07**
R&S®FSV3013	**order no. 1330.5000K13**
R&S®FSV3030	**order no. 1330.5000K30**
R&S®FSV3044	**order no. 1330.5000K43**
R&S®FSV3050	**order no. 1330.5000K50**

R&S®FSVA3004	**order no. 1330.5000K05**
R&S®FSVA3007	**order no. 1330.5000K08**
R&S®FSVA3013	**order no. 1330.5000K14**
R&S®FSVA3030	**order no. 1330.5000K31**
R&S®FSVA3044	**order no. 1330.5000K44**
R&S®FSVA3050	**order no. 1330.5000K51**

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1178.9378.02 | Version 03 | R&S®FSVA3000/FSV3000 |
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®FSVA3000/FSV3000 is abbreviated as R&S FSVA3000/FSV3000.

PAD-T-M: 3574.3288.02/04.00/CI/1/EN

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Contents

1 Information on the current version and history

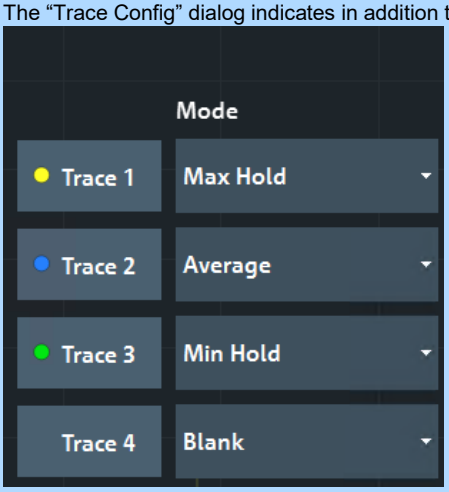
1.1 New functions

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

New function of firmware V1.90:

Version	Function
V1.90	Supports new models for 50 GHz: • R&S FSVA3050 • R&S FSV3050
V1.90	Supports option R&S FSV3-B54G “Frequency extension 54GHz” for R&S FSVA3050.
V1.90	Supports option R&S FSV3-VSE “Local VSE Enabler”.
V1.90	Supports R&S FS-SNS18 smart noise source for noise figure and gain measurements.
V1.90	Spectrum analyzer mode: Additional 8 MHz 3dB Gauss filter available for spectrum analyzer mode. The 8 MHz bandwidth selection needs numerical entry.
V1.90	R&S FSV3-K18: New features “Power Servoing” and “Detailed MSE”.
V1.90	R&S FSV3-K106: Supports save & load user defined sets Supports NB-IoT downlink test model (N-TM) Supports bitstream result display with BER results Added NPDSCH settings
V1.90	R&S FSV3-K171: 5G NR R17 extension for uplink/downlink measurements. Supports frequency range FR-2-2 (FR2-2 Channel bandwidth; 480 kHz and 960 kHz for BWP, SS/PBCH blocks, PRACH; enhanced PUCCH formats 0/1/2/4). 1024 QAM modulation. 35 MHz and 45 MHz channel bandwidth. 3GPP test models 2b and 3.1b according to TS38.141-1 V17.5.0. Signal demodulation and analysis in line with TS38.211 V17.1.0. Time alignment, transmit on/off power, ACLR, SEM measurements in line with TS38.141-1/2 V17.5.0, TS38.521-1 V17.4.0 and TS38.521-2 V16.11.0. BWP specific filtering. Multi numerology in uplink.
V1.90	R&S FSV3-K553 “External frontend control”: Shows “IFCorr” in info bar, if external frontend IF cable correction is active.

New function of firmware V1.80:

Version	Function
V1.80	Spectrum analyzer mode: Additional 6 MHz 3dB Gauss Filter available for spectrum analyzer mode. The 6 MHz bandwidth selection needs numerical entry.
V1.80	Spectrum analyzer mode: Additional unit “dBm/Hz (Power)” available.
V1.80	CCDF measurement: Additional control “Normal Distribution On/Off” to show/hide the normal (Gaussian) distribution trace indication.
V1.80	The “Trace Config” dialog indicates in addition the trace color of the active traces. 
V1.80	B10: The firmware additionally supports the signal generator R&S SMM100A.
V1.80	I/Q Analyzer: New result window “Phase vs Time” (unit rad) is available.
V1.80	R&S FSV3-K18: New features in FSV3-K18M – Hammerstein model and application of memory polynomial model to any given waveform. New feature in FSV3-K18D: Direct DPD now also available without active generator control.
V1.80	R&S FSV3-K30: SCPI command for frequency readout added.
V1.80	R&S FSV3-K70: New mappings “DVB_RCS2” for π/2-BPSK, QPSK, 8PSK and 16QAM.
V1.80	R&S FSV3-K70: Support for DVB-S2X super frame measurement added in DVB-S2(X) configuration tool.
V1.80	R&S FSV3-K100/-K104: New 1024QAM test models (E-TMs 2b and 3.1b)
V1.80	R&S FSV3-K144/-K145/-K147/-K148: Signal demodulation and analysis in line with TS38.211 V17.0.0. Time Alignment, Transmit On/Off Power, ACLR, SEM measurements in line with TS38.141-1/2 V17.4.0, TS38.521-1 V17.3.0 and TS38.521-2 V16.10.0. Time alignment error measurement supports intra-band contiguous carrier aggregation.

	K147: Improved measurement speed by advanced parallel processing. K147: Capture mode “Tx only”.
V1.80	R&S FSV3-K147: New remote command to query all ACLR/SEM results at once.
V1.80	R&S FSV3-K553 “External Frontend Control”: Support for “Frequency Band Config” Auto Mode.
V1.80	R&S FSV3-K980: Support of custom utilizations and custom device history entries.

New function of firmware V1.70:

Version	Function
V1.70	R&S FSV3-K553 “External Frontend Control”: Allow up to two simultaneous LAN connections to one External Frontend. Firmware version V1.70 includes the External Frontend microcontroller firmware V2.1.6. Please note: Incompatible firmware versions installed on analyzer and the External Frontend will lead to a deactivated connection to the External Frontend. Please update the External Frontend firmware in this case (dialog “input source – external frontend – global config – FW update”). FE50DTR Simultaneous Mode requires SMM/SMW Firmware Version > 5.00.044.38. Support for new revisions of External Frontend synthesizer boards: • FE44S_Synthesizer, part number 1338.6570.02, revision ≥ 3.11. • FE50DTR_Synthesizer, part number 1338.6570.02, revision ≥ 3.11. See table ”Setup – System Config – Hardware Info”, column ”Rev”.
V1.70	R&S FSV3-K18: Support of time trigger, auto level and power sensor. Automatic correction of input/output levels. Increased capture length (depending on system configuration).
V1.70	R&S FSV3-K7: Support of Settling Time Measurements.
V1.70	Support of R&S FS-SNS67 smart noise source for noise figure and gain measurement.
V1.70	Support for Three-Path Diode Power Sensor R&S NRP67SN-V, order no. 1424.6415.02.
V1.70	User-defined parameter coupling additionally supports coupling of reference level and center frequency with an R&S SMBV100B (dialog “Setup – Parameter Coupling – Generator Coupling”).
V1.70	New SCPI command to change the frequency indication between center/span and start/stop: `SENSe:FREQuency:ANNotation`.
V1.70	SCPI command :LAYout:WINDow<n>:TYPE? Available now for spectrum mode, I/Q analyzer mode and analog demodulation.
V1.70	R&S FSV3-K144/-K145/-K147/-K148: Signal demodulation and analysis in line with TS38.211 V16.7.0. PUCCH format 3 and 4. Optionally allow PDSCH in unused CORESET CCEs. Optional transport block size calculation including allocation gaps.
V1.70	R&S FSV3-K980: HUMS history export: Additional tracking of the utilization of bandwidth extensions, frequency ranges, relay switching cycle counters, external reference settings.

V1.70	R&S FSV3-K70: Support for external mixers (R&S FSV3-B21) added.
V1.70	R&S FSV3-K70: Configuration tool for DVB-RCS2 measurements available (linear modulation reference waveforms).
V1.70	R&S FSV3-K54: Additionally: linear analog sweep with CISPR detectors, and logarithmic analog sweep with CISPR and classical detectors.

1.2 Modified functions

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

Version	Function
V1.90	R&S FSV3-K144: The preamplifier can now be configured via the amplitude softkey menu.
V1.90	Detailed version information of the operating system is now displayed in the “Versions + Options” dialog.
V1.80	The trace unit conversion for unit dBm/MHz now takes the noise bandwidth into account. In earlier firmware versions the pulse bandwidth was used instead.
V1.80	Continuous Gating: The maximum “Period Count” has been increased from 1023 to 65535.
V1.80	The date format has changed to “YYYY-MM-DD”. **Hint:** The behavior of the remote commands “SYST:TIME?” and “SYST:DATE?” is not affected by this modification.
V1.80	Extended time stamp in filenames for automated creation of trace export files: Function “Event Based Action – export trace” creates a file including a time stamp with <year>-<month>-<day>_<hour>-<minute>-<second>. In case of identical seconds an additional _<milli seconds> suffix is added. e.g. ABC_2022-04-19_09-56-35 first export ABC_2022-04-19_09-56-35_234 2nd ABC_2022-04-19_09-56-35_448 3rd
V1.80	R&S FSV3-K18: “Force ARB mode” now recalculates header information of wv files. AM/AM and AM/PM curve width measurement point is now configurable. Direct DPD (K18D) now adjusts signal level when the evaluation range is shorter than the full reference signal, resulting in improved DPD for bursted signals.
V1.80	Updated NGINX to version 1.20.2.
V1.80	R&S FSV3-K145: Transform precoding configurable also via physical settings dialog.
V1.70	Saving screenshots via SCPI: If the graphics format set via `HCOPy:DEVice:LANGuage<n>` differs from the format indicated by file type ending of the selected filename, the file is saved in the format of the file type ending.
V1.70	The R&S FSV3-B8E evaluation license key is supported now.
V1.70	RF attenuation is set to 75 dB during shutdown.

V1.70	R&S FSV3-K144/K145: Rename FR2 to FR2-1 according to 3GPP.
V1.70	R&S FSV3-K980: Link to HUMS added to instrument web browser interface.
V1.70	R&S FSV3-K54: EMI measurement FFT sweep: Sweep times leading to interruption in signal acquisition within one FFT segment are not possible anymore.

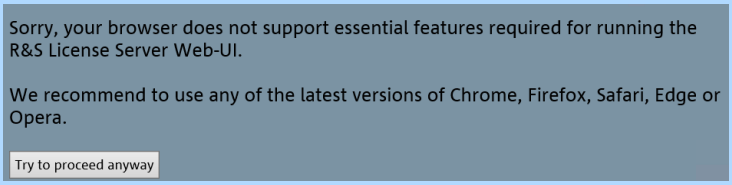
1.3 Improvements

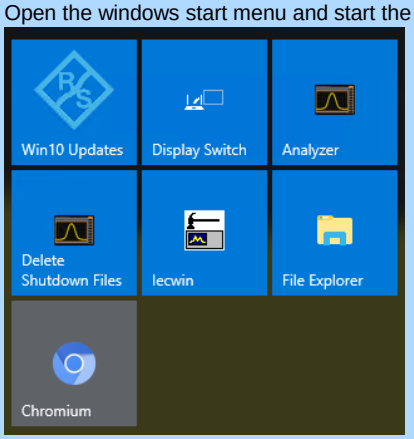
The following tables list the improvements and indicate since which version the issue could be observed:

Improvements of firmware V1.90:

since	Function
V1.10	The export of averaged I/Q data using “TRAC:IQ:DATA?” with “TRAC:IQ:AVER ON” returned zero values only. This issue is solved.

Improvements of firmware V1.80:

since	Function
V1.60	The noise cancellation was not taken into account when switching a trace to “View” mode. This issue is solved.
V1.60	The graphical representation of limit lines with logarithmic frequency axis before and after zooming in and zooming out again did not match. Note: The limit check algorithm and its result (pass or fail) was not affected by this issue. This issue is solved.
V1.60	For ACLR measurements, other trigger sources than “external” were also selectable, although for gated measurements in sweep mode only external triggers are allowed as the trigger source. The selection has been reduced to external triggers.
V1.50	The License Manager of the instrument may have indicated the following message.  This issue is solved by including the Chromium browser into the firmware update package. Note: To get rid of the message activate the Chromium browser as default browser:

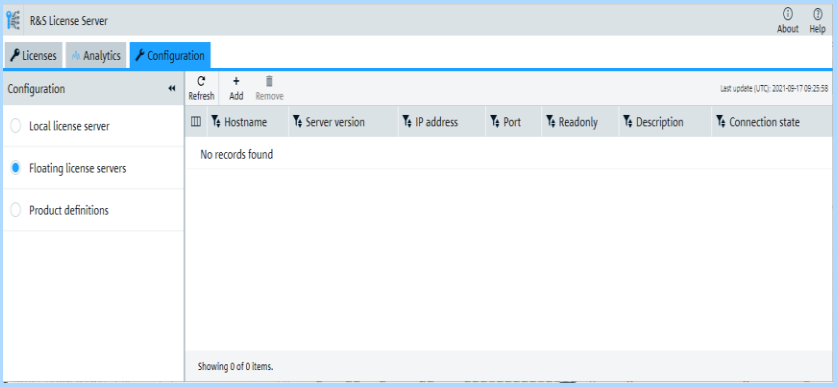
	• Open the windows start menu and start the Chromium browser.  • Click on “Set as default” 
V1.10	The sensitivity when using transducer files (TDF) in combination with “Adjust Ref Level” setting “Auto” has been improved.

Improvements of firmware V1.70:

since	Function
V1.60	Pressing enter in file dialogs did not save or open the file. This issue is solved.
V1.60	Rohde & Schwarz web control file upload failed for file sizes > 8 MB. This issue is solved.
V1.10	R&S FSV3-B10: External tracking generator using TTL mode: Signal dropouts may be visible for certain instrument settings, e.g. number of sweep points, resolution bandwidth, start frequency, stop frequency. This issue is solved. **Hint:** In case of remaining issues an update of the “B5 – Additional interface” board may help if the board revision is ≤ 3.01 (see table “Setup – System Config – Hardware Info”, column “Rev”).

1.4 Known issues

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

since	Function
V1.70	R&S FSV3-B10: With R&S SMBV100A firmware version < 4.70.108.41 the TTL synchronization via handshake might lead to an TTL handshake error. In this case, upgrade the R&S SMBV100A firmware to version 4.70.108.41 or higher.
V1.70	R&S FSV3-K18: Zeroing, Meas->Ref, and Unit settings are currently not available in power sensor mode.
V1.60	R&S FSV3-K980: For very large HUMS database sizes, the remote command DIAGnostic:HUMS[:ALL]? may fail. In this case, use SNMP or REST (Representational State Transfer).
V1.60	The floating license server has to be configured by the instrument's webpage with firmware version 1.60 or above. Open the license server web page with your own browser with the instrument's IP address followed by a colon and the number 9444, e.g. http://10.11.12.13:9444", select tab "Configuration – Floating license servers" and enter the related data.  Changing the configuration by using the instrument's dialog will show an error message.
V1.60	R&S FSV3-K553: When trying to connect to an external frontend providing an invalid host name or aborting (e.g. setting connection state to OFF) an ongoing connection attempt, the application becomes unresponsive for a few seconds.
V1.60	R&S FSV3-B21: Firmware version V1.60 and above fully support the following applications: • Spectrum • I/Q Analyzer • R&S FSV3-K7 – Analog Modulation Analysis • R&S FSV3-K18 – Amplifier Measurements • R&S FSV3-K60 – Transient Measurements • R&S FSV3-K70 – Vector Signal Analysis • R&S FSV3-K144 "3GPP 5G NR DL Measurements". • R&S FSV3-K145 "3GPP 5G NR UL Measurements". Although activation dialogs for external mixers may be accessible in other applications, this feature is not yet fully supported and tested in these applications.

V1.30	R&S FSV3-K6: When applying a trigger offset, the selected analysis bandwidth may be wider than expected: -200 MHz in case that the bandwidth was set to 160 MHz -400 MHz in case that the bandwidth was set to 320MHz or 250 MHz Other analysis bandwidth settings are not affected. There are two possibilities to avoid this issue: - adjust the trigger offset before setting the analysis bandwidth. - set the trigger offset in two steps: set it first to any value ≠ 0 s (example 100 ns) and in a second step to the desired value.
V1.10	R&S FSV3-K7: Online Demodulation Output is not supported but can be selected in the dialog.
V1.10	For IQ-Export > 600 Mio. Samples no Iq.tar preview is available and a Windows message warning about low memory may be displayed. This issue only occurs with option R&S FSV3-B114 Enhanced Computing Power.
V1.10	R&S FSV3-K91/n/ac/ax: The R&S FSV3-K91 does not yet support the Auto Reference Level functionality. Before using remote control scripts developed for other R&S spectrum analyzers, the SCPI command [:CONF:POW:AUTO] must be commented out.
V1.10	A message box “Warning: Missing smartcard or smartcard not initialized” may appear during startup of the instrument in rare cases. In this case, please switch the instrument off and on using the power switch on the rear side of the instrument or disconnect/reconnect the power line to solve this issue.

1.5 Optimizing 10 Gbit LAN Speed (R&S FSV3-B6)

To obtain optimum LAN speed performance using the R&S FSV3-B6 (10Gbit/s LAN Interface), driver settings have to be adjusted. Here is a recommendation on how to adjust the settings for optimized speed:

1. Open Windows “Start Menu”.
2. Search for “Network and Sharing Center”.
3. Select “Network and Sharing Center”.
4. Select “Change adapter settings”.
5. Select “Ethernet 3 – Intel® Ethernet Converged Network Adapter X550-T1”
6. Select “Configure”
7. Select Tab “Advanced”
8. Adjust the following settings:
   - “Interrupt Moderation” > Value: “Enabled”
   - “Jumbo Packet” > “9014 Bytes”
   - “Maximum Number of RSS Queues” > “16 Queues”
   - “Performance Options” > “Properties”
   - “Interrupt Moderation Rate” > “Off”
   - “Receive Buffers” > “4096”
   - “Transmit Buffers” > “16384”

1.6 Windows 10

The R&S FSV3000/R&S FSVA3000 uses the Windows 10 IoT Enterprise LTSB operating system, which is the embedded version of Windows 10 with long term support for Windows patches.

2 Modifications to the documentation

The current documentation is up-to-date.

3 Firmware update

3.1 Validity information

The R&S FSV3000 installer is valid for:

Device	Order Number
R&S®FSV3004	1330.5000K04
R&S®FSV3007	1330.5000K07
R&S®FSV3013	1330.5000K13
R&S®FSV3030	1330.5000K30
R&S®FSV3044	1330.5000K43
R&S®FSV3050	1330.5000K50
R&S®FSVA3004	1330.5000K05
R&S®FSVA3007	1330.5000K08
R&S®FSVA3013	1330.5000K14
R&S®FSVA3030	1330.5000K31
R&S®FSVA3044	1330.5000K44
R&S®FSVA3050	1330.5000K51

3.2 Update information

The firmware update file for the R&S FSVA/R&S FSV is one file including the firmware version number e.g. FSV3000_V1.30.exe. It is referred to as FSV3000Setup.exe later in the text. The file can be found on the Rohde & Schwarz web page https://www.rohde-schwarz.com.

3.3 Performing the Firmware Update on the Instrument

There are three ways to make the FSV3000Setup.exe setup file visible to the device:

Using a memory stick:

1. Copy the file to a directory of the memory stick.
2. Insert the memory stick into one of the USB sockets of the R&S FSV3000.

Using the remote desktop and copying the installation files to a directory of the instrument:

1. Connect the R&S FSV3000 to your LAN.
2. Start the remote desktop on your PC (C:\winnt\system32\mstsc.exe).
3. Enter the TCP/IP address of the instrument you want to update. The IP address consists of 4 numbers between 0 and 255.
   (To get the TCP/IP address of the R&S FSVA/R&S FSV, press the “Setup” key, then select “Network + Remote”.)
4. Ensure that the "local resources" > "drives" option is selected.
5. Press the "Connect" button.
6. Log on to the instrument (user name: “instrument” and default password “894129”).
7. Copy the FSV3000Setup.exe from your PC to a new folder, e.g. C:\FWUpdate.
8. You can now access this directory with the FSV3000Setup.exe from the R&S FSVA/R&S FSV analyzer firmware.

Using a network drive:

1. Connect your R&S FSVA/R&S FSV to your LAN and establish a connection to one of your servers. (Ask the local IT administrator for support.)
2. Copy the FSV3000Setup.exe from your PC to a directory on this server.
3. You can now access the directory with the FSV3000Setup.exe file from the R&S FSVA/R&S FSV analyzer firmware.

Performing the update on the instrument:

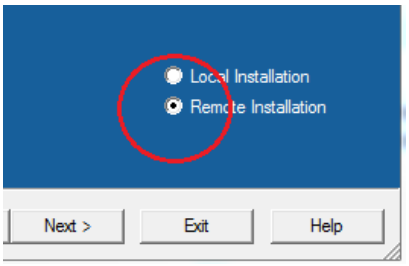
Update the firmware by performing the following steps:

1. Switch the instrument on and wait until the analyzer has resumed operation.
2. Press the "SETUP" key, then select “System Config” > “Firmware Update” tab.
3. A file browser is displayed to select the proper FSV3000*.exe setup file.
4. Change the path to the drive and directory which you prepared in the step before (USB stick directory, remote PC directory or directory on a server).
5. Select “Install” to close the dialog.
6. Select "Next" to display the selection of the firmware packages. By default, all applications are installed. Ensure that the required applications are selected.
7. Select "Install".
8. The firmware is stopped and the installation starts. After a few minutes, the system restarts automatically. After the restart, the firmware installation is complete. After the firmware update, the "UNCAL" flag appears. A self alignment is necessary.
9. Press the "SETUP" key, then select "Alignment" > "Start Self Alignment" to invoke the alignment procedure.

3.4 Performing the Firmware Update from a Windows PC

The R&S FSVA/R&S FSV firmware can also be uploaded without using a memory stick or a network drive. Just a LAN connection from the instrument and a Windows PC is necessary.

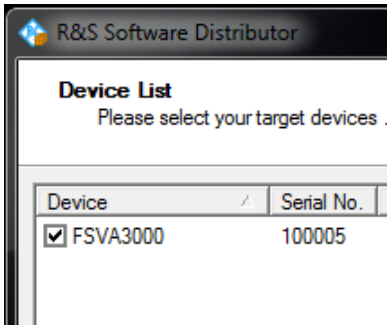
1. Run `FSV3000Setup.exe` on your PC.
2. Select “Remote Installation”.
3. Select “Next.”



4. Select the packages to install.
5. Select “Next”.

   Note:

   FOR FIREWALL USERS: The `FSV3000Setup.exe` communicates with the instruments via LAN. Therefore, the `FSV3000Setup.exe` file must pass the firewall. Add it to the firewall rules, then restart the scan using “Rescan”.



6. The setup procedure scans your LAN subnet and displays all found instruments
7. Select the instruments you want to update.

NOTICE

Be careful and check twice if you have selected the correct instruments. Depending on your company’s network structure, also instruments of other departments are included!

8. Select “Help” to display additional help.
   Select “Install” to start the installation.
9. Confirm the message to reboot the instrument to activate the firmware update.
   The instrument then restarts automatically.
10. After the restart, the firmware installation is complete and the "UNCAL" flag appears. A self alignment is necessary.
11. Press the "SETUP" key, then select "Alignment" > "Start Self Alignment" to invoke the alignment procedure.

3.5 Installing firmware options

3.5.1 Firmware options included in basic instrument

The R&S FSV3-K7, R&S FSV3-K9, R&S FSV3-K33, R&S-K553, R&S FSV3-K544, R&S FSV3-K703 and R&S FSV3-K980 application software packages are included in the basic instrument firmware. Therefore, they do not have a separate item in the installer to be selected.

3.5.2 Other firmware options within the FSV3000setup.exe File

The R&S FSV3-K6, R&S FSV3-K10, R&S FSV3-K18, R&S FSV3-K30, R&S FSV3-K40, R&S FSV3-K60, R&S FSV3-K70, R&S FSV3-K72/73, R&S FSV3-K91, R&S FSV3-K100/101/102/104/105/106, R&S FSV3-K144/145/147/148/171 application software packages have their own installation item and are therefore added to the selection list during the firmware update. Ensure that the checkbox is checked ☑ if the installation is requested.

NOTICE

The functionality of R&S FSV3-K18D, R&S FSV3-K18F, and R&S FSV3-K18M is integrated within R&S FSV3-K18 and is activated by its own key code.
The functionality of R&S FSV3-K70M, R&S FSV3-K70P are integrated within R&S FSV3-K70 and are activated by their own key code.
The functionality of the R&S FSV3-K91P, R&S FSV3-K91N, R&S FSV3-K91AC, R&S FSV3-K91AX and R&S FSV3-K91BE are integrated within R&S FSV3-K91 and are activated by their own key code.
The functionality of the R&S FSV3-K60C and R&S FSV3-K60H are integrated within R&S FSV3-K60 and are activated by their own key code.

3.5.3 Enabling options by entering option key codes

NOTICE

Skip this section if the option key was entered once.

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

If an 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. Open a Remote Desktop Connection to the instrument via ethernet or connect an external monitor and keyboard/mouse]
2. Select "SETUP".
3. Go to the tab “Versions + Options”
4. Press the button "Install Option".
   A dialog box is displayed.
5. Enter the option key number using the keypad.
6. Press "ENTER".
   After a successful validation the message "Option Key valid" is displayed. If the validation failed, the option software is not installed.
7. Reboot the device.

Installation of options via XML-file

1. Open a Remote Desktop Connection to the instrument via ethernet or connect an external monitor and keyboard/mouse]
2. Select "SETUP".
3. Go to the tab “Versions + Options”
4. Press the button "Install Option by XML".
   A file browser is displayed.
5. Select the path to the XML file (e.g. network drive or USB stick)
6. 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:

QR code to the Rohde & Schwarz support page