

Release Notes

Revision: 01

R&S® FSH4/FSH8/FSH13/FSH20 Handheld Spectrum Analyzer

Firmware Release 2.40

These Release Notes describe the following models and options of the R&S® Handheld Spectrum Analyzer:

- R&S® Handheld Spectrum Analyzer FSH4, all models ¹⁾
- R&S® Handheld Spectrum Analyzer FSH8, all models ¹⁾
- R&S® Handheld Spectrum Analyzer FSH13, all models ¹⁾
- R&S® Handheld Spectrum Analyzer FSH20, all models ¹⁾

New features in V2.40:

- Interference Analysis Measurement Application (R&S®FSH-K15):
 - Carrier-to-Noise measurement
 - Carrier-to-Interference measurement
 - Diff Mode for immediate calculation of trace mathematics
 - Added the possibility to manually enter an Azimuth value when storing a GPS position
- Geotagging Measurement Application (R&S®FSH-K16):
 - Colors can be specified for indicating the field strength measured at stored positions
 - Added limit checks
- Distance-to-Fault Measurement (R&S®FSH-K41): SCPI command to query the Cable Loss value
- Added remote control commands for performing a calibration in Vector Network Analysis (R&S®FSH-K42) and Distance-to-Fault Measurement (R&S®FSH-K41)
- Wizard extensions:
 - Define the number of measurements to perform
 - Skip measurements
 - Finish Wizard execution on demand

New features in FSH4View Software Version V2.40

- Support of Microsoft Windows 8

Important notes:

- If a USB stick is used to update the firmware it needs to be formatted either in FAT16 or FAT32 format.
- Please refer to sections 6.2.3 and 6.2.4 before updating instruments from firmware version 1.11 or below.

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1 New Functions

The following table lists the new functions in V2.40:

Version	Function
V2.40	Interference Analysis Measurement Application (R&S®FSH-K15): <ul style="list-style-type: none"> - Carrier-to-Noise measurement - Carrier-to-Interference measurement - Diff Mode for immediate calculation of trace mathematics - Added the possibility to manually enter an Azimuth value when storing a GPS position
V2.40	Geotagging Measurement Application (R&S®FSH-K16): <ul style="list-style-type: none"> - Colors can be specified for indicating the field strength measured at stored positions - Added limits check
V2.40	Distance-to-Fault Measurement (R&S®FSH-K41): SCPI command to query the Cable Loss value
V2.40	Added remote control commands for performing a calibration in Vector Network Analysis (R&S®FSH-K42) and Distance-to-Fault Measurement (R&S®FSH-K41)
V2.40	Wizard extensions: <ul style="list-style-type: none"> - Define the number of measurements to perform - Skip measurements - Finish Wizard execution on demand
V2.40	FSH4View: Support of Microsoft Windows 8

The following table lists modifications, which were introduced in earlier versions, and indicates the version in which the modification was introduced:

Version	Function
V2.31	Improved visualization of the highest peak per segment in Spectrum Emission Mask and 3GPP BTS Spurious Emission measurement
V2.31	Averaging, Max Hold and Min Hold function added to the Result Summary display and to all parameters in the Spectrum Overview Display of all Digital Modulation Applications
V2.31	Tone output in Interference Analysis Measurement Application (R&S®FSH-K15) and Geotagging Measurement Application (R&S®FSH-K16): squelch level and threshold tone frequency added as parameters
V2.31	Support of the R&S®HE300 antenna
V2.30	Interference Analysis Measurement Application (R&S®FSH-K15)
V2.30	Geotagging Measurement Application (R&S®FSH-K16)
V2.30	Support of the R&S®HL300 Antenna
V2.30	3GPP BTS Spurious Emission Measurement
V2.30	Save on Event

R&S FSH4/FSH8/FSH13/FSH20 Handheld Spectrum Analyzer

V2.30	Additional measurements in in LTE FDD Downlink Application (R&S®FSH-K50) and LTE TDD Downlink Application (R&S®FSH-K51): <ul style="list-style-type: none">- RSRP (Reference Signal Received Power)- RSSI (Received Signal Strength Indicator)- RSRQ (Reference Signal Received Quality)- SINR (Signal to Interference and Noise Ratio)- Time Alignment between transmitter branches
V2.30	SCPI support of GSM/EDGE Measurement Application (R&S®FSH-K10)
V2.30	SCPI command to query the Tx Power value
V2.30	SCPI command to activate trace averaging in LTE FDD Downlink Application (R&S®FSH-K50), LTE TDD Downlink Application (R&S®FSH-K51) and 3GPP WCDMA BTS Application (R&S®FSH-K44)
V2.30	Date and time indication available when playing back data recorded with the Spectrogram measurement application (R&S®FSH-K14)
V2.30	FSH4View: Spectrogram Playback
V2.30	FSH4View: Export to s2p file format

2 Modified Functions

The following table lists the functions modified in V2.40:

Version	Function
V2.40	Spectrum Analyzer: modified the default display position of trace mathematics results

The following table lists modifications, which were introduced in earlier versions, and indicates the version in which the modification was introduced:

Version	Function
V2.31	Modified calculation scheme of carrier frequency to provide higher stability of the displayed results in 3GPP WCDMA BTS Application (R&S®FSH-K44)
V2.30	Setting of the start and stop frequency values via remote control now updates the displayed values in the user interface.
V2.30	Network Analyzer: increased temperature range for calibration status 'cal'
V2.30	Optimized synthesizer setup table

3 Improvements

The following table lists the issues eliminated in V2.40:

Version	Function
V2.40	Spectrum Analyzer: Status of the preamplifier is displayed in the hardware settings summary
V2.40	Receiver Mode (R&S®FSH-K43): Secondary transducer factors are taken into account
V2.40	FSH4View: Removed possible error message when opening the marker editor
V2.40	FSH4View: The FSH is now reliably recognized via USB if switched on with the USB cable already connected to the PC
V2.40	FSH4View: After loading a dataset and changing the marker search ranges these modifications will be preserved if the file gets saved as a dataset
V2.40	FSH4View: The measurement format of a DTF dataset can be modified subsequently

The following table lists the issues already eliminated in earlier versions and indicates the version in which the issues were eliminated:

Version	Function
V2.30	By using Remote Control it is now possible to synchronize to the end of the loading process of a Spectrum Emission Mask standard file.
V2.30	Improved frequency estimator of EV-DO BTS scanner in R&S®FSH-K47E measurement application
V2.30	FSH4View: Removed possible wrong display of the center frequency when loading a dataset

4 Known Issues

The following table lists the known issues in V2.40:

None

5 Modifications to the Documentation

The latest manual can be downloaded from the R&S FSH4/8 spectrum analyzer product web page under: <http://www.rohde-schwarz.com>. Select "DOWNLOADS" and "MANUALS".

6 Installation Information

6.1 General Information

- Firmware release V2.40 corresponds to FSH4View V2.40, which is available on the Rohde & Schwarz web page as a separate update package.
- Although older versions of FSH4View might be able to communicate with firmware release V2.40, an update of FSH4View is highly recommended, as older FSH4View versions might not support all functions included in the new firmware release.
- FSH4View V2.40 does not display the sweep window if the instrument is equipped with firmware release V1.01. It also does not preview datasets stored with firmware release V1.01. Newer firmware releases are supported in both cases.

6.2 Firmware Update

The firmware update file for the R&S FSH4/FSH8 is one file with the name FSH4_V2_40.EXE from the Rohde & Schwarz web page.

The installation can be done via SD-Card or via USB-Stick

6.2.1 Preparing the Installation via SD-Card

In order to update the device after downloading the FSH4_V2_40.EXE installation file, an SD memory card is required, e.g. R&S HA-Z231 (1 GB), order # 1309.6217.00, or R&S HA-Z232 (2 GB), order # 1309.6223.00. Please make sure that your PC is equipped with an SD card reader.

Make a backup of datasets, screenshots and modified files

Before you start the firmware update, make sure that you created a backup with FSH4View of all datasets and screenshots which you previously stored on the instrument. The same holds true for all channel tables, standards, limit lines, transducer factors and cable models which you created or modified. The factory preset necessary to complete the firmware update procedure will otherwise erase or overwrite the files.

Preparing the installation files

1. Insert an SD card into the SD card reader and wait until Windows[®] has identified the SD card as a new volume (e.g. D:)
2. Copy FSH4_V2_40.EXE into the root directory of the SD card, e.g. D:\

Execute FSH4_V2_40.EXE. The self-extracting .ZIP file will be unpacked.

The SD card should now contain the following files:

bootloader_SA_V2_40.bin
osimage_SA_V2_40.bin
updater_SA_V2_40.bin
splashscreen_SA.bmp
FSH4_V2_40.EXE

Note:

Please make sure that only one file of each type is present on the SD card. The update mechanism will reject the card if it detects two versions of the same file type (e.g. bootloader_SA_V1_01 and bootloader_SA_V2_40) in the root directory and abort the update later on.

Prepare the instrument

1. Switch the instrument OFF.
2. Connect the R&S FSH to AC mains via its power adapter.

Note:

The instrument firmware will refuse to perform the update if the instrument runs on battery.

3. Insert the SD card into the SD card slot at the right side of the instrument.
4. Continue with “Performing the Firmware Update on the Instrument” in Section **Error! Reference source not found.**

6.2.2 Preparing the installation via USB (instruments with serial numbers above 105000)

In order to update the device after downloading the FSH4_V2_40.EXE installation file, a USB stick is required.

Make a backup of datasets, screenshots and modified files.

Before you start the firmware update, make sure that you created a backup with FSH4View of all datasets and screenshots which you previously stored on the instrument. The same holds true for all channel tables, standards, limit lines, transducer factors and cable models which you created or modified. The factory preset necessary to complete the firmware update procedure will otherwise erase or overwrite the files.

Preparing the installation files

1. Insert a USB stick into the USB slot and wait until windows has identified the USB stick as a new volume (e.g. D:)
2. Copy FSH4_V2_40.EXE into the root directory of the USB stick, e.g. D:\

Execute FSH4_V2_40.EXE. The self-extracting .ZIP file will be unpacked.

The SD card should now contain the following files:

bootloader_SA_V2_40.bin
osimage_SA_V2_40.bin
updater_SA_V2_40.bin
splashscreen_SA.bmp
FSH4_V2_40.EXE

Note:

Please make sure that only one file of each type is present on the SD card. The update mechanism will reject the card if it detects two versions of the same file type (e.g. bootloader_SA_V1_01 and bootloader_SA_V2_40) in the root directory and abort the update later on.

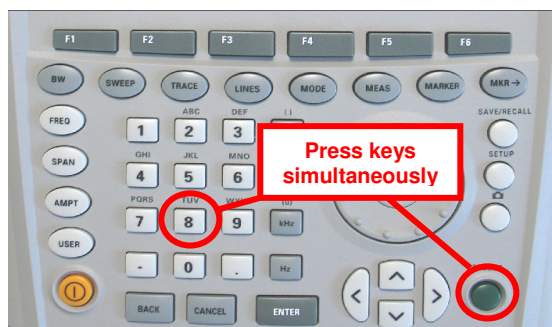
Prepare the instrument

1. Switch the instrument OFF.
2. Insert the USB stick into the USB slot of the instrument.

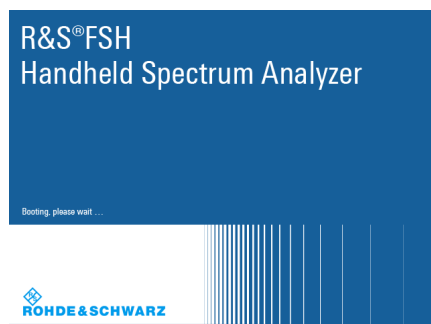
6.2.3 Performing the Firmware Update on the Instrument

The firmware update process is performed by the following steps:

1. Press the keys PRESET and 8 on the numeric keypad simultaneously.



2. Switch the instrument on and keep PRESET and 8 pressed for at least 5 seconds after the startup screen has appeared on the screen.



3. Release the keys PRESET and 8.

The FSH will continue its boot process and after a couple of seconds the following information will appear on the screen:

Instrument Firmware Update

Searching for firmware update (updater_*.bin)
...Found \USB\updater_SA_V2_40.bin
...OK
Checking updater_SA_V2_40.bin: ... OK

Update instrument to software version V2.40
Press [ENTER] to update the firmware.
Press [CANCEL] to abort firmware updating.

Note:

If the AC mains connection is missing at the start of the firmware update process, the following message will appear at the bottom of the screen in step 3:

Instrument not powered by the power adapter. Please connect power adapter.
Press [ENTER] to retry.
Press [CANCEL] to abort firmware updating.

In this case check the power supply connection.
Continue the update process with step 4.

4. Press ENTER to start the firmware update process.

The instrument will perform the firmware update. This will take about 5 minutes. The progress of the update will be displayed in a sequence of messages on the screen.

Warning:

Do not switch the instrument off during the update process in order to avoid data corruption of the internal flash memory!

5. As soon as the firmware update is completed, the R&S FSH will display the following message at the bottom of the screen:

Firmware updating is successfully completed.
Please switch off the instrument.

Switch the instrument off and on again. The FSH will boot with the new firmware version.

6. After the boot process is completed, press SETUP – INSTRUMENT SETUP. Select "RESET TO FACTORY SETTINGS" by moving the cursor down the list with the cursor keys or the rotary knob. Confirm the selection with ENTER, and re-confirm with YES when prompted.
Please be patient: the subsequent reset and reboot process will take about a minute to complete.

Note:

Restoring the factory settings is necessary to update the pre-installed channel tables, cable models and transducer factors. If this step is omitted, bug fixes and updates to these pre-installed files will not be installed.

7. For instrument models .14, .18, .24 and .28 perform a self alignment according to chapter 6.2.4, if the instrument was equipped with firmware version 1.10 or below.

6.2.4 Performing the Self Alignment on the Instrument



This section is relevant for R&S FSH4.14, R&S FSH8.18, R&S FSH4.24 and R&S FSH8.28 when being updated from firmware versions below V2.00.

In Network operating mode the instrument models R&S FSH4.14, R&S FSH8.18, R&S FSH4.24 and R&S FSH8.28 support a default set of calibration data, the so-called factory calibration. This dataset is used whenever the instrument displays "fcal" in the title bar.

Instruments equipped with firmware versions below V2.00 need an update of this dataset, as V2.40 uses improved algorithms which need more data in order to obtain optimum results.

The self alignment procedure requires a calibration standard R&S FSH-Z28 (order # 1300.7810.03), which is suitable for R&S FSH8 and R&S FSH4 instruments, or at least a calibration standard R&S FSH-Z29 (order # 1300.7510.03) for R&S FSH4 instruments. In addition a RF cable with two N connectors is required in order to provide a through connection between measurement port 1 and port 2.

The self alignment is performed by the following steps:

1. Switch the instrument on
2. Select Network operation by pressing MODE – NETWORK.
3. Make sure that the instrument runs for at least 30 minutes at room temperature.
4. Press the keys SETUP – INSTRUMENT SETUP. Place the cursor on the menu entry "Self Alignment" by scrolling the menu bar down with the rotary knob and press ENTER.

The instrument will prompt you to confirm that the factory calibration data will be overwritten.

5. Press softkey YES.

The self alignment procedure will start and prompt you to connect the calibration standards and the through connection to port 1 and 2 in the sequence.

6. Follow the instructions until the instrument reports "Self Alignment Done!".
7. Press softkey EXIT to return to the measurement screen.

6.3 Installing Firmware Options

6.3.1 Enabling Options by Entering Option Key Codes



This section can be skipped if the option keys were already entered once. Option keys are not affected by a firmware update.

To activate application software packages, you must enter a license key for validation. 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. Press the SETUP key.
2. Press the softkey **INSTALLED OPTIONS**.
3. Use the rotary knob or the cursor keys to select the **INSTALL OPTION...** menu item and confirm the entry with the ENTER key.
4. Enter the key code (32 digit number) for the option with the numeric keys and confirm with the ENTER key.

If the correct key code is entered, the R&S FSH displays "Installation successful", and the option is marked as "Installed" in the option list (example: Remote Control (K40)).

If an invalid key code is entered, the R&S FSH displays "Invalid key code!". The correct key code can then be entered.

Installed Options	
Option Administration	
Install Option...	
Option Installation Status	
Remote Control (K40)	Not Installed
Distance to Fault (K41)	Not Installed
Vector Network Analysis (K42)	Not Installed

Measure Setup | Instrument Setup | HW/SW Info | **Installed Options** | Exit

Installed Options	
Option Administration	
Install Option...	
Option Installation Status	
Remote Control (K40)	Installed
Distance to Fault (K41)	Not Installed
Vector Network Analysis (K42)	Not Installed

Installation successful!

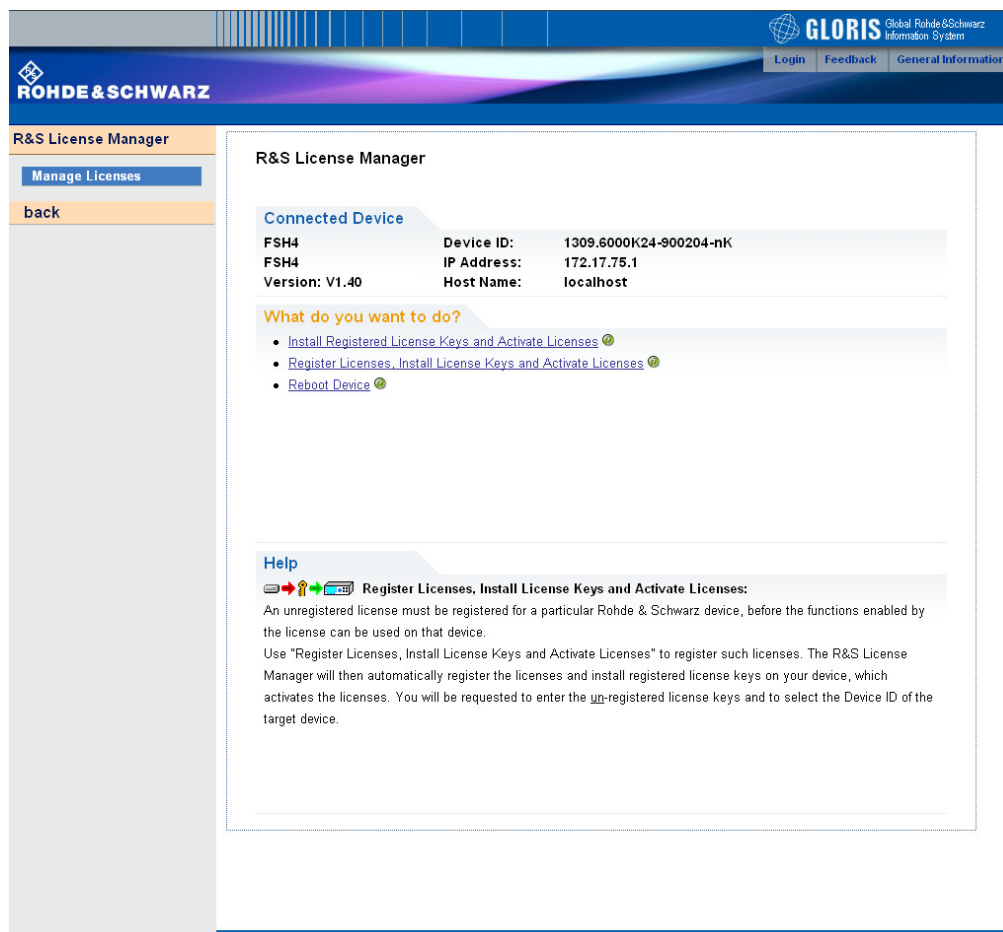
Measure Setup | Instrument Setup | HW/SW Info | **Installed Options** | Exit

6.3.2 Enabling Options via the R&S License Manager

This feature is only available starting with firmware version V1.40 and higher.

Prerequisite: Your PC must be connected via Ethernet to the instrument and to the internet.

1. Open your browser and type in the IP address of your instrument.



The screenshot shows the R&S License Manager web interface. The top navigation bar includes the Rohde & Schwarz logo and the GLORIS Global Rohde & Schwarz Information System logo. The main content area is titled "R&S License Manager" and displays the following information:

Connected Device

FSH4	Device ID:	1309.6000K24-900204-nK
FSH4	IP Address:	172.17.75.1
Version: V1.40	Host Name:	localhost

What do you want to do?

- [Install Registered License Keys and Activate Licenses](#)
- [Register Licenses, Install License Keys and Activate Licenses](#)
- [Reboot Device](#)

Help

Register Licenses, Install License Keys and Activate Licenses:

An unregistered license must be registered for a particular Rohde & Schwarz device, before the functions enabled by the license can be used on that device.

Use "Register Licenses, Install License Keys and Activate Licenses" to register such licenses. The R&S License Manager will then automatically register the licenses and install registered license keys on your device, which activates the licenses. You will be requested to enter the un-registered license keys and to select the Device ID of the target device.

2. Select "License Manager" > "Manage Licenses".
3. Choose "Register Licenses, Install License Keys and Activate Licenses" and follow the instructions.

7 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 instrument up-to-date and to be informed about new application notes related to your instrument, please send an e-mail to the Customer Support Center stating your instrument and your wish.

We will take care that you will get the right information.

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Release Notes

Revision: 01

R&S[®] FSH4/FSH8/FSH13/FSH20 Handheld Spectrum Analyzer

Firmware Release 2.31

These Release Notes describe the following models and options of the R&S[®] Handheld Spectrum Analyzer:

- R&S[®] Handheld Spectrum Analyzer FSH4, all models ¹⁾
- R&S[®] Handheld Spectrum Analyzer FSH8, all models ¹⁾
- R&S[®] Handheld Spectrum Analyzer FSH13, all models ¹⁾
- R&S[®] Handheld Spectrum Analyzer FSH20, all models ¹⁾

New features in V2.31:

- Improved visualization of the highest peak per segment in Spectrum Emission Mask and 3GPP BTS Spurious Emission measurement
- Averaging, Max Hold and Min Hold function added to the Result Summary display and to all parameters in the Spectrum Overview Display of all Digital Modulation Applications
- Tone output in Interference Analysis Measurement Application (R&S[®]FSH-K15) and Geotagging Measurement Application (R&S[®]FSH-K16): squelch level and threshold tone frequency added as parameters
- Support of the R&S[®]HE300 antenna

Important notes:

- ¹⁾ After updating instrument models R&S[®]FSH4.14, R&S[®]FSH8.18, R&S[®]FSH4.24, R&S[®]FSH8.28 from firmware versions below V2.00, the self alignment function must be performed once as described in chapter 1.2.4.

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1 New Functions

The following table lists the new functions in V2.31:

Version	Function
V2.31	Improved visualization of the highest peak per segment in Spectrum Emission Mask and 3GPP BTS Spurious Emission measurement
V2.31	Averaging, Max Hold and Min Hold function added to the Result Summary display and to all parameters in the Spectrum Overview Display of all Digital Modulation Applications
V2.31	Tone output in Interference Analysis Measurement Application (R&S®FSH-K15) and Geotagging Measurement Application (R&S®FSH-K16): squelch level and threshold tone frequency added as parameters
V2.31	Support of the R&S®HE300 antenna

The following table lists modifications, which were introduced in earlier versions, and indicates the version in which the modification was introduced:

Version	Function
V2.30	Interference Analysis Application (R&S®FSH-K15)
V2.30	Geotagging Application (R&S®FSH-K16)
V2.30	Support of the R&S®HL300 Antenna
V2.30	3GPP BTS Spurious Emission Measurement
V2.30	Save on Event
V2.30	Additional measurements in in LTE FDD Downlink Application (R&S®FSH-K50) and LTE TDD Downlink Application (R&S®FSH-K51): <ul style="list-style-type: none"> - RSRP (Reference Signal Received Power) - RSSI (Received Signal Strength Indicator) - RSRQ (Reference Signal Received Quality) - SINR (Signal to Interference and Noise Ratio) - Time Alignment between transmitter branches
V2.30	SCPI support of GSM/EDGE Measurement Application (R&S®FSH-K10)
V2.30	SCPI command to query the Tx Power value
V2.30	SCPI command to activate trace averaging in LTE FDD Downlink Application (R&S®FSH-K50), LTE TDD Downlink Application (R&S®FSH-K51) and 3GPP WCDMA BTS Application (R&S®FSH-K44)
V2.30	Date and time indication available when playing back data recorded with the Spectrogram measurement application (R&S®FSH-K14)
V2.30	FSH4View: Spectrogram Playback
V2.30	FSH4View: Export to s2p file format
V2.21	Support for R&S®FSH13 and R&S®FSH20
V2.21	FSH4View: Support for R&S®FSH13 and R&S®FSH20

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Version	Function
V2.20	FSH4View: Support for Receiver Mode Application (R&S®FSH-K43)
V2.20	FSH4View: Constellation Diagram is supported by the Report Generator
V2.11	GSM/EDGE Measurement Application (R&S®FSH-K10)
V2.11	Occupied bandwidth measurements in all digital modulation applications
V2.11	Trace mode settings (min/max/avg) in spectrum overview and scanner displays in all digital modulation applications
V2.11	Ec/Io measurements in 3GPP WCDMA (R&S®FSH-K44E) scrambling codes display
V2.11	FSH4View: Support of GSM/EDGE Measurement Application (R&S®FSH-K10)
V2.10	3GPP TD-SCDMA BTS power and P-CCPCH EVM measurement application (R&S®FSH-K48)
V2.10	Measurement Wizard
V2.10	SCPI command to create limit lines
V2.10	Network Analyzer: site name folder for measurement results is supported
V2.10	FSH4View: Command line support to convert .set files into .csv files
V2.00	Receiver mode and channel scan measurement application (R&S®FSH-K43) available, including remote control commands.
V2.00	Support of new power sensors R&S®NRP-Z211 and R&S®NRP-Z221
V2.00	Instrument protection with personalized PIN Code
V2.00	Spectrum Analyzer: Trace color changes on limit line violation
V2.00	Beep on fail and overload
V2.00	FSH4View: Support for Limits Screen for R&S®FSH-K50/K44 FSH4View: Support for Signal Overview display for R&S®FSH-K50/K47 FSH4View: Support for Isotropic Antenna display for R&S®FSH-K50 FSH4View: Support for Constellation display for R&S®FSH-K50 FSH4View: Support for Channel selection for R&S®FSH-K44
V1.60	Spectrum Analyzer: faster sweep time with narrow resolution bandwidth due to use of FFT filters
V1.60	Network Analyzer: trace mathematics available
V1.60	Support for different time zones. This new function should be used to adapt time and date to the local geographic conditions.
V1.60	A file rename function was added to the file manager.
V1.60	Remote Control: new data collection query and control commands for the isotropic antenna
V1.60	FSH4View: Remote Instrument Desktop available
V1.60	FSH4View: Report Generator for stored measurement results (datasets) available

2 Modified Functions

The following table lists the functions modified in V2.31:

Version	Function
V2.31	Modified calculation scheme of carrier frequency to provide higher stability of the displayed results in 3GPP WCDMA BTS Application (R&S®FSH-K44)

The following table lists modifications, which were introduced in earlier versions, and indicates the version in which the modification was introduced:

Version	Function
V2.30	Setting of the start and stop frequency values via remote control now updates the displayed values in the user interface.
V2.30	Network Analyzer: increased temperature range for calibration status 'cal'
V2.30	Optimized synthesizer setup table
V2.20	The Occupied Bandwidth measurement allows to set any desired span independently of the selected Channel Bandwidth
V2.20	Receiver Mode: values below 9 kHz are now accepted as receiver frequency
V2.20	Added configuration files for GSM EDGE standard
V2.20	Added and revised channel table files for digital standards
V2.13	Receiver Mode (R&S®FSH-K43): <ul style="list-style-type: none"> – SCPI command SENS:FREQ:CENT supports synchronization with measurement via *OPC / *OPC? / *WAI command – SCPI command TRAC:DATA? supports error handling for invalid result (returns 199.99 if result is queried when the measurement is not complete).
V2.11	Digital Modulation Applications: In the Spectrum Overview and Scanner Displays of the digital modulation applications, it is possible to apply TRACE mode settings
V2.10	FFT sweep now supports larger spans with narrow RBW
V2.10	Network Analyzer: manual sweep time entry is enabled again
V2.10	DTF: Change behavior upon cable model load
V2.10	DTF: Warning instead of changing center frequency on cable model load
V2.00	Vector Network Analyzer: The hardware setup was optimized to increase the margin before an overload condition is reported and to minimize the trace variation on transmission measurements with high accuracy calibration. This resulted in changes to the internal calibration data structures. As a consequence a self-alignment must be performed when updating older firmware versions to V2.00
V2.00	FSH4View: Remote desktop display available without R&S®FSH-K40
V2.00	Optimized synthesizer setup table
V1.60	Activating the isotropic antenna in the MEAS menu will automatically open the transducer factor selection list.
V1.60	When switching between operating modes (e.g. Spectrum Analyzer -> Network Analyzer), the display now shows the target operating mode while the switch is in progress.

Version	Function
V1.60	User must now explicitly confirm when changing the date settings. Together with the new support for time zones this mechanism should help avoiding conflicts with timed option licenses.
V1.60	Remote Control: In manual operation the span is adjusted automatically when selecting narrow resolution bandwidths. Via remote control the resolution bandwidth command was rejected if the span settings didn't match. Starting with V1.60 the remote control behavior is equal to the behavior in manual operation.
V1.59	LTE Constellation Display Show Allocations menu has been modified/improved
V1.59	Display of WCDMA composite EVM for instruments with serial numbers below 105000 with new frequency response alignment

3 Improvements

The following table lists the issues eliminated in V2.31:

None

The following table lists the issues already eliminated in earlier versions and indicates the version in which the issues were eliminated:

Version	Function
V2.30	By using Remote Control it is now possible to synchronize to the end of the loading process of a Spectrum Emission Mask standard file.
V2.30	Improved frequency estimator of EV-DO BTS scanner in R&S®FSH-K47E measurement application
V2.30	FSH4View: Removed possible wrong display of the center frequency when loading a dataset
V2.21	Network Analyzer: Increased the displayed resolution of marker results
V2.21	FSH4View: "File – Save As" did not work with Windows 7. This has been fixed.
V2.20	Receiver Mode and Channel Scan Measurement Application (R&S®FSH-K43): <ul style="list-style-type: none"> – GPS coordinate display is now supported – Scan result display supports polygon line drawing – Ext. Ref. indicator is now supported – Improved compensation for level drift over temperature changes
V2.20	Fixed a memory leak in Power Meter when using USB Power Sensor
V2.20	FSH4View: Removed possible error message when adding a front page logo to the report
V2.20	FSH4View: File conversion stores the previously selected file type
V2.20	FSH4View: The capture date of the datasets is shown in the result summary page
V2.13	Receiver Mode (R&S®FSH-K43): Improved measurement speed for Fixed Frequency mode when remote controlled.
V2.11	Improved performance of LTE BTS scanner in R&S®FSH-K50E application
V2.11	Improved performance of EV-DO BTS scanner in R&S®FSH-K47E application
V2.11	cdma2000 & 1xEV-DO: The GPS trigger has been corrected to avoid displaying wrong PN offsets
V2.10	DTF: Tracking Generator attenuation is not taken into account in DTF measurement

V2.10	DTF: Reflection measurement on port 2 doesn't work without prior calibration
V1.59	For digital modulation measurements, the level adjust algorithm has been optimized
V1.59	WCDMA customized channel table entries did not increment (this works now)
V1.59	1xEV-DO Measurements have been optimized with a known PN offset
V1.59	Spectral inversion in cdma2000 and 1xEV-DO spectrum overview displays (has been eliminated)
V1.59	DC offset in Digital Modulation spectrum overview displays (has been eliminated)
V1.59	Display of Constellation Diagram in LTE has been optimized (speed up)
V1.59	LTE over-the-air performance has been improved

4 Known Issues

The following table lists the known issues in V2.31:

Issues
When activating trace averaging in the Isotropic Antenna result display in LTE FDD Downlink Application (R&S®FSH-K50), LTE TDD Downlink Application (R&S®FSH-K51) or 3GPP WCDMA BTS Application (R&S®FSH-K44) the sweep counter as well as the trace are updated every 5 th sweep instead of every single sweep.

5 Modifications to the Documentation

The latest manual can be downloaded from the R&S FSH4/8 spectrum analyzer product web page under: <http://www.rohde-schwarz.com>. Select "DOWNLOADS" and "MANUALS".

6 Installation Information

6.1 General Information

- Firmware release V2.31 corresponds to FSH4View V2.31, which is available on the Rohde & Schwarz web page as a separate update package.
- Although older versions of FSH4View might be able to communicate with firmware release V2.31, an update of FSH4View is highly recommended, as older FSH4View versions might not support all functions included in the new firmware release.
- FSH4View V2.31 does not display the sweep window if the instrument is equipped with firmware release V1.01. It also does not preview datasets stored with firmware release V1.01. Newer firmware releases are supported in both cases.

6.2 Firmware Update

The firmware update file for the R&S FSH4/FSH8 is one file with the name FSH4_V2_31.EXE from the Rohde & Schwarz web page.

The installation can be done via SD-Card or via USB-Stick

6.2.1 Preparing the Installation via SD-Card

In order to update the device after downloading the FSH4_V2_31.EXE installation file, an SD memory card is required, e.g. R&S HA-Z231 (1 GB), order # 1309.6217.00, or R&S HA-Z232 (2 GB), order # 1309.6223.00. Please make sure that your PC is equipped with an SD card reader.

Make a backup of datasets, screenshots and modified files

Before you start the firmware update, make sure that you created a backup with FSH4View of all datasets and screenshots which you previously stored on the instrument. The same holds true for all channel tables, standards, limit lines, transducer factors and cable models which you created or modified. The factory preset necessary to complete the firmware update procedure will otherwise erase or overwrite the files.

Preparing the installation files

1. Insert an SD card into the SD card reader and wait until Windows® has identified the SD card as a new volume (e.g. D:)
2. Copy FSH4_V2_31.EXE into the root directory of the SD card, e.g. D:\

Execute FSH4_V2_31.EXE. The self-extracting .ZIP file will be unpacked.

The SD card should now contain the following files:

bootloader_SA_V2_31.bin
osimage_SA_V2_31.bin
updater_SA_V2_31.bin
splashscreen_SA.bmp
FSH4_V2_31.EXE

Note:

Please make sure that only one file of each type is present on the SD card. The update mechanism will reject the card if it detects two versions of the same file type (e.g. bootloader_SA_V1_01 and bootloader_SA_V2_31) in the root directory and abort the update later on.

Prepare the instrument

1. Switch the instrument OFF.
2. Connect the R&S FSH to AC mains via its power adapter.

Note:

The instrument firmware will refuse to perform the update if the instrument runs on battery.

3. Insert the SD card into the SD card slot at the right side of the instrument.
4. Continue with “Performing the Firmware Update on the Instrument” in Section **Fehler! Verweisquelle konnte nicht gefunden werden.**

6.2.2 Preparing the installation via USB (instruments with serial numbers above 105000)

In order to update the device after downloading the FSH4_V2_31.EXE installation file, a USB stick is required.

Make a backup of datasets, screenshots and modified files.

Before you start the firmware update, make sure that you created a backup with FSH4View of all datasets and screenshots which you previously stored on the instrument. The same holds true for all channel tables, standards, limit lines, transducer factors and cable models which you created or modified. The factory preset necessary to complete the firmware update procedure will otherwise erase or overwrite the files.

Preparing the installation files

1. Insert a USB stick into the USB slot and wait until windows has identified the USB stick as a new volume (e.g. D:)
2. Copy FSH4_V2_31.EXE into the root directory of the USB stick, e.g. D:\

Execute FSH4_V2_31.EXE. The self-extracting .ZIP file will be unpacked.

The SD card should now contain the following files:

bootloader_SA_V2_31.bin
osimage_SA_V2_31.bin
updater_SA_V2_31.bin
splashscreen_SA.bmp
FSH4_V2_31.EXE

Note:

Please make sure that only one file of each type is present on the SD card. The update mechanism will reject the card if it detects two versions of the same file type (e.g. bootloader_SA_V1_01 and bootloader_SA_V2_31) in the root directory and abort the update later on.

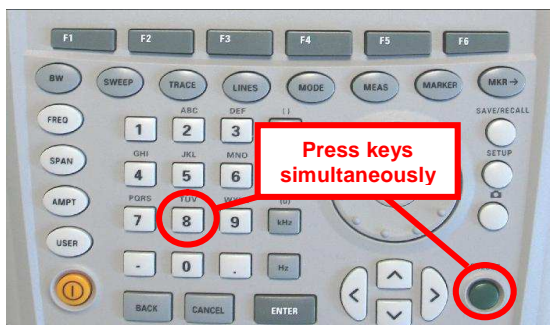
Prepare the instrument

1. Switch the instrument OFF.
2. Insert the USB stick into the USB slot of the instrument.

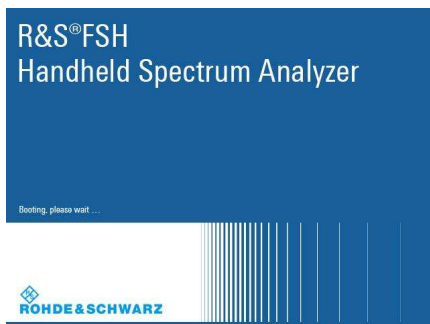
6.2.3 Performing the Firmware Update on the Instrument

The firmware update process is performed by the following steps:

1. Press the keys PRESET and 8 on the numeric keypad simultaneously.



2. Switch the instrument on and keep PRESET and 8 pressed for at least 5 seconds after the startup screen has appeared on the screen.



3. Release the keys PRESET and 8.

The FSH will continue its boot process and after a couple of seconds the following information will appear on the screen:

Instrument Firmware Update

Searching for firmware update (updater_*.bin)
...Found \USB\updater _SA_V2_31.bin
...OK
Checking updater_SA_V2_31.bin: ... OK

Update instrument to software version V2.31
Press [ENTER] to update the firmware.
Press [CANCEL] to abort firmware updating.

Note:

If the AC mains connection is missing at the start of the firmware update process, the following message will appear at the bottom of the screen in step 3:

Instrument not powered by the power adapter. Please connect power adapter.
Press [ENTER] to retry.
Press [CANCEL] to abort firmware updating.

In this case check the power supply connection.
Continue the update process with step 4.

4. Press ENTER to start the firmware update process.

The instrument will perform the firmware update. This will take about 5 minutes. The progress of the update will be displayed in a sequence of messages on the screen.

Warning:

Do not switch the instrument off during the update process in order to avoid data corruption of the internal flash memory!

5. As soon as the firmware update is completed, the R&S FSH will display the following message at the bottom of the screen:

Firmware updating is successfully completed.
Please switch off the instrument.

Switch the instrument off and on again. The FSH will boot with the new firmware version.

6. After the boot process is completed, press SETUP – INSTRUMENT SETUP. Select "RESET TO FACTORY SETTINGS" by moving the cursor down the list with the cursor keys or the rotary knob. Confirm the selection with ENTER, and re-confirm with YES when prompted.
Please be patient: the subsequent reset and reboot process will take about a minute to complete.

Note:

Restoring the factory settings is necessary to update the pre-installed channel tables, cable models and transducer factors. If this step is omitted, bug fixes and updates to these pre-installed files will not be installed.

7. For instrument models .14, .18, .24 and .28 perform a self alignment according to chapter 1.2.4, if the instrument was equipped with firmware version 1.10 or below.

6.2.4 Performing the Self Alignment on the Instrument



This section is relevant for R&S FSH4.14, R&S FSH8.18, R&S FSH4.24 and R&S FSH8.28 when being updated from firmware versions below V2.00.

In Network operating mode the instrument models R&S FSH4.14, R&S FSH8.18, R&S FSH4.24 and R&S FSH8.28 support a default set of calibration data, the so-called factory calibration. This dataset is used whenever the instrument displays "fcal" in the title bar.

Instruments equipped with firmware versions below V2.00 need an update of this dataset, as V2.31 uses improved algorithms which need more data in order to obtain optimum results.

The self alignment procedure requires a calibration standard R&S FSH-Z28 (order # 1300.7810.03), which is suitable for R&S FSH8 and R&S FSH4 instruments, or at least a calibration standard R&S FSH-Z29 (order # 1300.7510.03) for R&S FSH4 instruments. In addition a RF cable with two N connectors is required in order to provide a through connection between measurement port 1 and port 2.

The self alignment is performed by the following steps:

1. Switch the instrument on
2. Select Network operation by pressing MODE – NETWORK.
3. Make sure that the instrument runs for at least 30 minutes at room temperature.
4. Press the keys SETUP – INSTRUMENT SETUP. Place the cursor on the menu entry "Self Alignment" by scrolling the menu bar down with the rotary knob and press ENTER.

The instrument will prompt you to confirm that the factory calibration data will be overwritten.

5. Press softkey YES.

The self alignment procedure will start and prompt you to connect the calibration standards and the through connection to port 1 and 2 in the sequence.

6. Follow the instructions until the instrument reports "Self Alignment Done!".
7. Press softkey EXIT to return to the measurement screen.

6.3 Installing Firmware Options

6.3.1 Enabling Options by Entering Option Key Codes



This section can be skipped if the option keys were already entered once. Option keys are not affected by a firmware update.

To activate application software packages, you must enter a license key for validation. 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. Press the SETUP key.
2. Press the softkey **INSTALLED OPTIONS**.
3. Use the rotary knob or the cursor keys to select the **INSTALL OPTION...** menu item and confirm the entry with the ENTER key.
4. Enter the key code (32 digit number) for the option with the numeric keys and confirm with the ENTER key.

If the correct key code is entered, the R&S FSH displays "Installation successful", and the option is marked as "Installed" in the option list (example: Remote Control (K40)).

If an invalid key code is entered, the R&S FSH displays "Invalid key code!". The correct key code can then be entered.



6.3.2 Enabling Options via the R&S License Manager

This feature is only available starting with firmware version V1.40 and higher.

Prerequisite: Your PC must be connected via Ethernet to the instrument and to the internet.

1. Open your browser and type in the IP address of your instrument.

The screenshot shows the R&S License Manager web interface. The top navigation bar includes the Rohde & Schwarz logo and the GLORIS (Global Rohde & Schwarz Information System) logo. The main content area is titled "R&S License Manager" and displays the following information:

Connected Device

FSH4	Device ID:	1309.6000K24-900204-nK
FSH4	IP Address:	172.17.75.1
Version: V1.40	Host Name:	localhost

What do you want to do?

- [Install Registered License Keys and Activate Licenses](#)
- [Register Licenses, Install License Keys and Activate Licenses](#)
- [Reboot Device](#)

Help

Register Licenses, Install License Keys and Activate Licenses:
An unregistered license must be registered for a particular Rohde & Schwarz device, before the functions enabled by the license can be used on that device.
Use "Register Licenses, Install License Keys and Activate Licenses" to register such licenses. The R&S License Manager will then automatically register the licenses and install registered license keys on your device, which activates the licenses. You will be requested to enter the un-registered license keys and to select the Device ID of the target device.

2. Select "License Manager" > "Manage Licenses".
3. Choose "Register Licenses, Install License Keys and Activate Licenses" and follow the instructions.

7 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 instrument up-to-date and to be informed about new application notes related to your instrument, please send an e-mail to the Customer Support Center stating your instrument and your wish.

We will take care that you will get the right information.

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Phone +49 89 4129 12345

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Release Notes

Revision: 01

R&S[®] FSH4/FSH8/FSH13/FSH20 Handheld Spectrum Analyzer

Firmware Release 2.30

These Release Notes describe the following models and options of the R&S[®] Handheld Spectrum Analyzer:

- R&S[®] Handheld Spectrum Analyzer FSH4, all models ¹⁾
- R&S[®] Handheld Spectrum Analyzer FSH8, all models ¹⁾
- R&S[®] Handheld Spectrum Analyzer FSH13, all models ¹⁾
- R&S[®] Handheld Spectrum Analyzer FSH20, all models ¹⁾

New features in V2.30:

- Interference Analysis Application (R&S[®]FSH-K15)
- Geotagging Application (R&S[®]FSH-K16)
- Support of the R&S[®]HL300 antenna
- 3GPP BTS Spurious Emission Measurement
- Save on Event
- Additional measurements in in LTE FDD Downlink Application (R&S[®]FSH-K50) and LTE TDD Downlink Application (R&S[®]FSH-K51):
 - RSRP (Reference Signal Received Power)
 - RSSI (Received Signal Strength Indicator)
 - RSRQ (Reference Signal Received Quality)
 - SINR (Signal to Interference and Noise Ratio)
 - Time Alignment between transmitter branches
- SCPI support of GSM/EDGE Measurement Application (R&S[®]FSH-K10)
- SCPI command to query the Tx Power value
- SCPI command to activate trace averaging in LTE FDD Downlink Application (R&S[®]FSH-K50), LTE TDD Downlink Application (R&S[®]FSH-K51) and 3GPP WCDMA BTS Application (R&S[®]FSH-K44)
- Date and time indication available when playing back data recorded with the Spectrogram measurement application (R&S[®]FSH-K14)

New features in FSH4View Software Version V2.30

- Spectrogram Playback
- Export to s2p file format

Important notes:

- ¹⁾ After updating instrument models R&S[®]FSH4.14, R&S[®]FSH8.18, R&S[®]FSH4.24, R&S[®]FSH8.28 from firmware versions below V2.00, the self alignment function must be performed once as described in chapter 1.2.4.

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1 New Functions

The following table lists the new functions in V2.30:

Version	Function
V2.30	Interference Analysis Application (R&S®FSH-K15)
V2.30	Geotagging Application (R&S®FSH-K16)
V2.30	Support of the R&S®HL300 Antenna
V2.30	3GPP BTS Spurious Emission Measurement
V2.30	Save on Event
V2.30	Additional measurements in in LTE FDD Downlink Application (R&S®FSH-K50) and LTE TDD Downlink Application (R&S®FSH-K51): <ul style="list-style-type: none"> - RSRP (Reference Signal Received Power) - RSSI (Received Signal Strength Indicator) - RSRQ (Reference Signal Received Quality) - SINR (Signal to Interference and Noise Ratio) - Time Alignment between transmitter branches
V2.30	SCPI support of GSM/EDGE Measurement Application (R&S®FSH-K10)
V2.30	SCPI command to query the Tx Power value
V2.30	SCPI command to activate trace averaging in LTE FDD Downlink Application (R&S®FSH-K50), LTE TDD Downlink Application (R&S®FSH-K51) and 3GPP WCDMA BTS Application (R&S®FSH-K44)
V2.30	Date and time indication available when playing back data recorded with the Spectrogram measurement application (R&S®FSH-K14)
V2.30	FSH4View: Spectrogram Playback
V2.30	FSH4View: Export to s2p file format

The following table lists modifications, which were introduced in earlier versions, and indicates the version in which the modification was introduced:

Version	Function
V2.21	Support for R&S®FSH13 and R&S®FSH20
V2.21	FSH4View: Support for R&S®FSH13 and R&S®FSH20
V2.20	3GPP TD-SCDMA / HSDPA BTS Code Domain Power and EVM Measurement Application (R&S®FSH-K48E)
V2.20	Support for Precision Frequency Reference option (R&S®FSH-Z114)
V2.20	Network Analyzer: Supports display of four traces in one screen (S11 and S22 measurement as well as S12 and S21 measurement are displayed in one diagram)
V2.20	Network Analyzer: Easy 1-Port Calibration available
V2.20	Configurable screenshot button for immediate storing of datasets or pictures
V2.20	Receiver Mode and Channel Scan Measurement Application (R&S®FSH-K43): <ul style="list-style-type: none"> - Limit lines - Support for isotropic antenna (R&S®TS-EMF)

R&S FSH4/FSH8/FSH13/FSH20 Handheld Spectrum Analyzer

Version	Function
V2.20	FSH4View: Calibration Pool: previously stored calibration data can be reused when using the wizard
V2.20	FSH4View: Synchronization button for easy exchange of settings and result files between PC and instrument
V2.20	FSH4View: Protection of FSH4View Wizard Sets with personalized PIN Code
V2.20	FSH4View: Support for Receiver Mode Application (R&S®FSH-K43)
V2.20	FSH4View: Constellation Diagram is supported by the Report Generator
V2.11	GSM/EDGE Measurement Application (R&S®FSH-K10)
V2.11	Occupied bandwidth measurements in all digital modulation applications
V2.11	Trace mode settings (min/max/avg) in spectrum overview and scanner displays in all digital modulation applications
V2.11	Ec/Io measurements in 3GPP WCDMA (R&S®FSH-K44E) scrambling codes display
V2.11	FSH4View: Support of GSM/EDGE Measurement Application (R&S®FSH-K10)
V2.10	3GPP TD-SCDMA BTS power and P-CCPCH EVM measurement application (R&S®FSH-K48)
V2.10	Measurement Wizard
V2.10	SCPI command to create limit lines
V2.10	Network Analyzer: site name folder for measurement results is supported
V2.10	FSH4View: Command line support to convert .set files into .csv files
V2.00	Receiver mode and channel scan measurement application (R&S®FSH-K43) available, including remote control commands.
V2.00	Support of new power sensors R&S®NRP-Z211 and R&S®NRP-Z221
V2.00	Instrument protection with personalized PIN Code
V2.00	Spectrum Analyzer: Trace color changes on limit line violation
V2.00	Beep on fail and overload
V2.00	FSH4View: Support for Limits Screen for R&S®FSH-K50/K44 FSH4View: Support for Signal Overview display for R&S®FSH-K50/K47 FSH4View: Support for Isotropic Antenna display for R&S®FSH-K50 FSH4View: Support for Constellation display for R&S®FSH-K50 FSH4View: Support for Channel selection for R&S®FSH-K44
V1.60	Spectrum Analyzer: faster sweep time with narrow resolution bandwidth due to use of FFT filters
V1.60	Network Analyzer: trace mathematics available
V1.60	Support for different time zones. This new function should be used to adapt time and date to the local geographic conditions.
V1.60	A file rename function was added to the file manager.
V1.60	Remote Control: new data collection query and control commands for the isotropic antenna
V1.60	FSH4View: Remote Instrument Desktop available
V1.60	FSH4View: Report Generator for stored measurement results (datasets) available

2 Modified Functions

The following table lists the functions modified in V2.30:

Version	Function
V2.30	Setting of the start and stop frequency values via remote control now updates the displayed values in the user interface.
V2.30	Network Analyzer: increased temperature range for calibration status 'cal'
V2.30	Optimized synthesizer setup table

The following table lists modifications, which were introduced in earlier versions, and indicates the version in which the modification was introduced:

Version	Function
V2.20	The Occupied Bandwidth measurement allows to set any desired span independently of the selected Channel Bandwidth
V2.20	Receiver Mode: values below 9 kHz are now accepted as receiver frequency
V2.20	Added configuration files for GSM EDGE standard
V2.20	Added and revised channel table files for digital standards
V2.13	Receiver Mode (R&S®FSH-K43): <ul style="list-style-type: none"> – SCPI command SENS:FREQ:CENT supports synchronization with measurement via *OPC / *OPC? / *WAI command – SCPI command TRAC:DATA? supports error handling for invalid result (returns 199.99 if result is queried when the measurement is not complete).
V2.11	Digital Modulation Applications: In the Spectrum Overview and Scanner Displays of the digital modulation applications, it is possible to apply TRACE mode settings
V2.10	FFT sweep now supports larger spans with narrow RBW
V2.10	Network Analyzer: manual sweep time entry is enabled again
V2.10	DTF: Change behavior upon cable model load
V2.10	DTF: Warning instead of changing center frequency on cable model load
V2.00	Vector Network Analyzer: The hardware setup was optimized to increase the margin before an overload condition is reported and to minimize the trace variation on transmission measurements with high accuracy calibration. This resulted in changes to the internal calibration data structures. As a consequence a self-alignment must be performed when updating older firmware versions to V2.00
V2.00	FSH4View: Remote desktop display available without R&S®FSH-K40
V2.00	Optimized synthesizer setup table
V1.60	Activating the isotropic antenna in the MEAS menu will automatically open the transducer factor selection list.
V1.60	When switching between operating modes (e.g. Spectrum Analyzer -> Network Analyzer), the display now shows the target operating mode while the switch is in progress.
V1.60	User must now explicitly confirm when changing the date settings. Together with the new support for time zones this mechanism should help avoiding conflicts with timed option licenses.

Version	Function
V1.60	Remote Control: In manual operation the span is adjusted automatically when selecting narrow resolution bandwidths. Via remote control the resolution bandwidth command was rejected if the span settings didn't match. Starting with V1.60 the remote control behavior is equal to the behavior in manual operation.
V1.59	LTE Constellation Display Show Allocations menu has been modified/improved
V1.59	Display of WCDMA composite EVM for instruments with serial numbers below 105000 with new frequency response alignment

3 Improvements

The following table lists the issues eliminated in V2.30:

Version	Function
V2.30	By using Remote Control it is now possible to synchronize to the end of the loading process of a Spectrum Emission Mask standard file.
V2.30	Improved frequency estimator of EV-DO BTS scanner in R&S®FSH-K47E measurement application
V2.30	FSH4View: Removed possible wrong display of the center frequency when loading a dataset

The following table lists the issues already eliminated in earlier versions and indicates the version in which the issues were eliminated:

Version	Function
V2.21	Network Analyzer: Increased the displayed resolution of marker results
V2.21	FSH4View: "File – Save As" did not work with Windows 7. This has been fixed.
V2.20	Receiver Mode and Channel Scan Measurement Application (R&S®FSH-K43): <ul style="list-style-type: none"> – GPS coordinate display is now supported – Scan result display supports polygon line drawing – Ext. Ref. indicator is now supported – Improved compensation for level drift over temperature changes
V2.20	Fixed a memory leak in Power Meter when using USB Power Sensor
V2.20	FSH4View: Removed possible error message when adding a front page logo to the report
V2.20	FSH4View: File conversion stores the previously selected file type
V2.20	FSH4View: The capture date of the datasets is shown in the result summary page
V2.13	Receiver Mode (R&S®FSH-K43): Improved measurement speed for Fixed Frequency mode when remote controlled.
V2.11	Improved performance of LTE BTS scanner in R&S®FSH-K50E application
V2.11	Improved performance of EV-DO BTS scanner in R&S®FSH-K47E application
V2.11	cdma2000 & 1xEV-DO: The GPS trigger has been corrected to avoid displaying wrong PN offsets
V2.10	DTF: Tracking Generator attenuation is not taken into account in DTF measurement
V2.10	DTF: Reflection measurement on port 2 doesn't work without prior calibration

V1.59	For digital modulation measurements, the level adjust algorithm has been optimized
V1.59	WCDMA customized channel table entries did not increment (this works now)
V1.59	1xEV-DO Measurements have been optimized with a known PN offset
V1.59	Spectral inversion in cdma2000 and 1xEV-DO spectrum overview displays (has been eliminated)
V1.59	DC offset in Digital Modulation spectrum overview displays (has been eliminated)
V1.59	Display of Constellation Diagram in LTE has been optimized (speed up)
V1.59	LTE over-the-air performance has been improved

4 Known Issues

The following table lists the known issues in V2.30:

Issues
When activating trace averaging in the Isotropic Antenna result display in LTE FDD Downlink Application (R&S®FSH-K50), LTE TDD Downlink Application (R&S®FSH-K51) or 3GPP WCDMA BTS Application (R&S®FSH-K44) the sweep counter as well as the trace are updated every 5 th sweep instead of every single sweep.

5 Modifications to the Documentation

The latest manual can be downloaded from the R&S FSH4/8 spectrum analyzer product web page under: <http://www.rohde-schwarz.com>. Select "DOWNLOADS" and "MANUALS".

6 Installation Information

6.1 General Information

- Firmware release V2.30 corresponds to FSH4View V2.30, which is available on the Rohde & Schwarz web page as a separate update package.
- Although older versions of FSH4View might be able to communicate with firmware release V2.30, an update of FSH4View is highly recommended, as older FSH4View versions might not support all functions included in the new firmware release.
- FSH4View V2.30 does not display the sweep window if the instrument is equipped with firmware release V1.01. It also does not preview datasets stored with firmware release V1.01. Newer firmware releases are supported in both cases.

6.2 Firmware Update

The firmware update file for the R&S FSH4/FSH8 is one file with the name FSH4_V2_30.EXE from the Rohde & Schwarz web page.

The installation can be done via SD-Card or via USB-Stick

6.2.1 Preparing the Installation via SD-Card

In order to update the device after downloading the FSH4_V2_30.EXE installation file, an SD memory card is required, e.g. R&S HA-Z231 (1 GB), order # 1309.6217.00, or R&S HA-Z232 (2 GB), order # 1309.6223.00. Please make sure that your PC is equipped with an SD card reader.

Make a backup of datasets, screenshots and modified files

Before you start the firmware update, make sure that you created a backup with FSH4View of all datasets and screenshots which you previously stored on the instrument. The same holds true for all channel tables, standards, limit lines, transducer factors and cable models which you created or modified. The factory preset necessary to complete the firmware update procedure will otherwise erase or overwrite the files.

Preparing the installation files

1. Insert an SD card into the SD card reader and wait until Windows® has identified the SD card as a new volume (e.g. D:)
2. Copy FSH4_V2_30.EXE into the root directory of the SD card, e.g. D:\
Execute FSH4_V2_30.EXE. The self-extracting .ZIP file will be unpacked.

The SD card should now contain the following files:

bootloader_SA_V2_30.bin
osimage_SA_V2_30.bin
updater_SA_V2_30.bin
splashscreen_SA.bmp
FSH4_V2_30.EXE

Note:

Please make sure that only one file of each type is present on the SD card. The update mechanism will reject the card if it detects two versions of the same file type (e.g. bootloader_SA_V1_01 and bootloader_SA_V2_30) in the root directory and abort the update later on.

Prepare the instrument

1. Switch the instrument OFF.
2. Connect the R&S FSH to AC mains via its power adapter.
Note:
The instrument firmware will refuse to perform the update if the instrument runs on battery.
3. Insert the SD card into the SD card slot at the right side of the instrument.
4. Continue with “Performing the Firmware Update on the Instrument”

6.2.2 Preparing the installation via USB (instruments with serial numbers above 105000)

In order to update the device after downloading the FSH4_V2_30.EXE installation file, a USB stick is required.

Make a backup of datasets, screenshots and modified files.

Before you start the firmware update, make sure that you created a backup with FSH4View of all datasets and screenshots which you previously stored on the instrument. The same holds true for all channel tables, standards, limit lines, transducer factors and cable models which you created or modified. The factory preset necessary to complete the firmware update procedure will otherwise erase or overwrite the files.

Preparing the installation files

1. Insert a USB stick into the USB slot and wait until windows has identified the USB stick as a new volume (e.g. D:)
2. Copy FSH4_V2_30.EXE into the root directory of the USB stick, e.g. D:\
Execute FSH4_V2_30.EXE. The self-extracting .ZIP file will be unpacked.

The SD card should now contain the following files:

bootloader_SA_V2_30.bin
osimage_SA_V2_30.bin
updater_SA_V2_30.bin
splashscreen_SA.bmp
FSH4_V2_30.EXE

Note:

Please make sure that only one file of each type is present on the SD card. The update mechanism will reject the card if it detects two versions of the same file type (e.g. bootloader_SA_V1_01 and bootloader_SA_V2_30) in the root directory and abort the update later on.

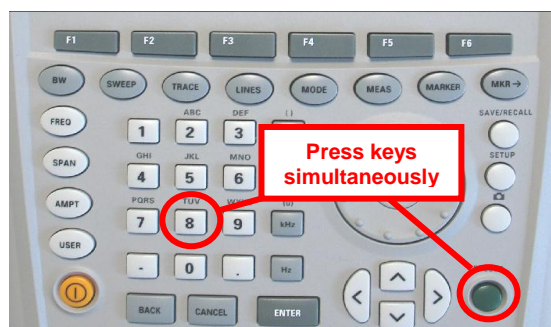
Prepare the instrument

1. Switch the instrument OFF.
2. Insert the USB stick into the USB slot of the instrument.

6.2.3 Performing the Firmware Update on the Instrument

The firmware update process is performed by the following steps:

1. Press the keys PRESET and 8 on the numeric keypad simultaneously.



2. Switch the instrument on and keep PRESET and 8 pressed for at least 5 seconds after the startup screen has appeared on the screen.



3. Release the keys PRESET and 8.

The FSH will continue its boot process and after a couple of seconds the following information will appear on the screen:

Instrument Firmware Update

Searching for firmware update (updater_*.bin)
...Found \USB\updater_SA_V2_30.bin
...OK
Checking updater_SA_V2_30.bin: ... OK

Update instrument to software version V2.30
Press [ENTER] to update the firmware.
Press [CANCEL] to abort firmware updating.

Note:

If the AC mains connection is missing at the start of the firmware update process, the following message will appear at the bottom of the screen in step 3:

Instrument not powered by the power adapter. Please connect power adapter.
Press [ENTER] to retry.
Press [CANCEL] to abort firmware updating.

In this case check the power supply connection.
Continue the update process with step 4.

4. Press ENTER to start the firmware update process.

The instrument will perform the firmware update. This will take about 5 minutes. The progress of the update will be displayed in a sequence of messages on the screen.

Warning:

Do not switch the instrument off during the update process in order to avoid data corruption of the internal flash memory!

5. As soon as the firmware update is completed, the R&S FSH will display the following message at the bottom of the screen:

Firmware updating is successfully completed.
Please switch off the instrument.

Switch the instrument off and on again. The FSH will boot with the new firmware version.

6. After the boot process is completed, press SETUP – INSTRUMENT SETUP. Select "RESET TO FACTORY SETTINGS" by moving the cursor down the list with the cursor keys or the rotary knob. Confirm the selection with ENTER, and re-confirm with YES when prompted.
Please be patient: the subsequent reset and reboot process will take about a minute to complete.

Note:

Restoring the factory settings is necessary to update the pre-installed channel tables, cable models and transducer factors. If this step is omitted, bug fixes and updates to these pre-installed files will not be installed.

7. For instrument models .14, .18, .24 and .28 perform a self alignment according to chapter 1.2.4, if the instrument was equipped with firmware version 1.10 or below.

6.2.4 Performing the Self Alignment on the Instrument



This section is relevant for R&S FSH4.14, R&S FSH8.18, R&S FSH4.24 and R&S FSH8.28 when being updated from firmware versions below V2.00.

In Network operating mode the instrument models R&S FSH4.14, R&S FSH8.18, R&S FSH4.24 and R&S FSH8.28 support a default set of calibration data, the so-called factory calibration. This dataset is used whenever the instrument displays "fcal" in the title bar.

Instruments equipped with firmware versions below V2.00 need an update of this dataset, as V2.30 uses improved algorithms which need more data in order to obtain optimum results.

The self alignment procedure requires a calibration standard R&S FSH-Z28 (order # 1300.7810.03), which is suitable for R&S FSH8 and R&S FSH4 instruments, or at least a calibration standard R&S FSH-Z29 (order # 1300.7510.03) for R&S FSH4 instruments. In addition a RF cable with two N connectors is required in order to provide a through connection between measurement port 1 and port 2.

The self alignment is performed by the following steps:

1. Switch the instrument on
2. Select Network operation by pressing MODE – NETWORK.
3. Make sure that the instrument runs for at least 30 minutes at room temperature.
4. Press the keys SETUP – INSTRUMENT SETUP. Place the cursor on the menu entry "Self Alignment" by scrolling the menu bar down with the rotary knob and press ENTER.

The instrument will prompt you to confirm that the factory calibration data will be overwritten.

5. Press softkey YES.

The self alignment procedure will start and prompt you to connect the calibration standards and the through connection to port 1 and 2 in the sequence.

6. Follow the instructions until the instrument reports "Self Alignment Done!".
7. Press softkey EXIT to return to the measurement screen.

6.3 Installing Firmware Options

6.3.1 Enabling Options by Entering Option Key Codes



This section can be skipped if the option keys were already entered once. Option keys are not affected by a firmware update.

To activate application software packages, you must enter a license key for validation. 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. Press the SETUP key.
2. Press the softkey **INSTALLED OPTIONS**.
3. Use the rotary knob or the cursor keys to select the **INSTALL OPTION...** menu item and confirm the entry with the ENTER key.
4. Enter the key code (32 digit number) for the option with the numeric keys and confirm with the ENTER key.

If the correct key code is entered, the R&S FSH displays "Installation successful", and the option is marked as "Installed" in the option list (example: Remote Control (K40)).

If an invalid key code is entered, the R&S FSH displays "Invalid key code!". The correct key code can then be entered.

Installed Options	
Option Administration	
Install Option...	
Option Installation Status	
Remote Control (K40)	Not Installed
Distance to Fault (K41)	Not Installed
Vector Network Analysis (K42)	Not Installed
Measure Setup Instrument Setup HW/SW Info Installed Options Exit	

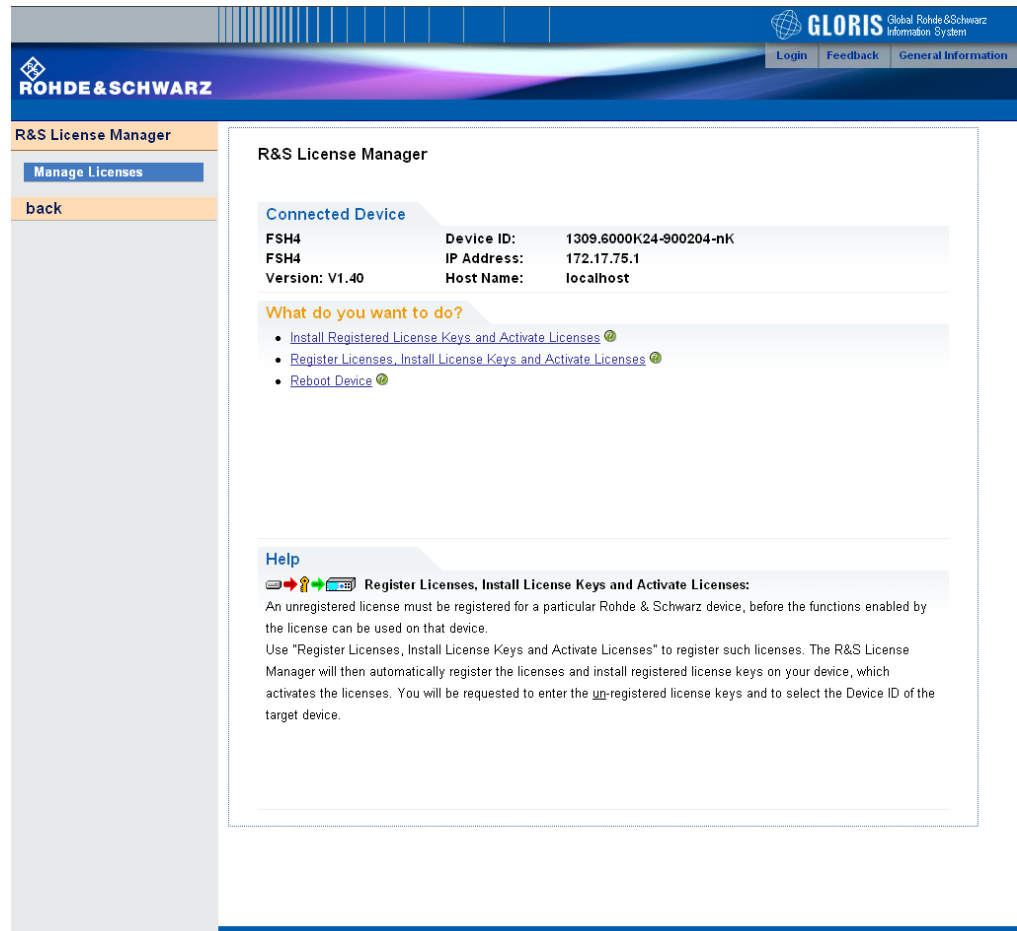
Installed Options	
Option Administration	
Install Option...	
Option Installation Status	
Remote Control (K40)	Installed
Distance to Fault (K41)	Not Installed
Vector Network Analysis (K42)	Not Installed
Installation successful! Measure Setup Instrument Setup HW/SW Info Installed Options Exit	

6.3.2 Enabling Options via the R&S License Manager

This feature is only available starting with firmware version V1.40 and higher.

Prerequisite: Your PC must be connected via Ethernet to the instrument and to the internet.

1. Open your browser and type in the IP address of your instrument.



The screenshot displays the R&S License Manager web interface. The top navigation bar includes the Rohde & Schwarz logo and the GLORIS (Global Rohde & Schwarz Information System) logo with links for Login, Feedback, and General Information. The main content area is titled 'R&S License Manager' and features a sidebar with 'Manage Licenses' and 'back' buttons. The main content area shows the following information:

Connected Device

FSH4	Device ID:	1309.6000K24-900204-nK
FSH4	IP Address:	172.17.75.1
Version: V1.40	Host Name:	localhost

What do you want to do?

- [Install Registered License Keys and Activate Licenses](#)
- [Register Licenses, Install License Keys and Activate Licenses](#)
- [Reboot Device](#)

Help

Register Licenses, Install License Keys and Activate Licenses:
An unregistered license must be registered for a particular Rohde & Schwarz device, before the functions enabled by the license can be used on that device.
Use "Register Licenses, Install License Keys and Activate Licenses" to register such licenses. The R&S License Manager will then automatically register the licenses and install registered license keys on your device, which activates the licenses. You will be requested to enter the un-registered license keys and to select the Device ID of the target device.

2. Select "License Manager" > "Manage Licenses".
3. Choose "Register Licenses, Install License Keys and Activate Licenses" and follow the instructions.

7 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 instrument up-to-date and to be informed about new application notes related to your instrument, please send an e-mail to the Customer Support Center stating your instrument and your wish.

We will take care that you will get the right information.

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Release Notes

Revision: 01

R&S[®] FSH4/FSH8/FSH13/FSH20 Handheld Spectrum Analyzer

Firmware Release 2.21

These Release Notes describe the following models and options of the R&S[®] Handheld Spectrum Analyzer:

- R&S[®] Handheld Spectrum Analyzer FSH4, order no. 1309.6000.x4 ¹⁾
- R&S[®] Handheld Spectrum Analyzer FSH8, order no. 1309.6000.x8 ¹⁾
- R&S[®] Handheld Spectrum Analyzer FSH13, order no. 1314.2000.13 ¹⁾
- R&S[®] Handheld Spectrum Analyzer FSH20, order no. 1314.2000.20 ¹⁾

New features in V2.21:

- Support for R&S[®]FSH13 and R&S[®]FSH20

Improvement in V2.21:

- Network Analyzer: Increased the displayed resolution of marker results

New features in FSH4View Software Version V2.21

- Support for R&S[®]FSH13 and R&S[®]FSH20

Improvement in FSH4View Software Version V2.21:

- “File – Save As” did not work with Windows 7. This has been fixed.

Important notes:

- ¹⁾ After updating instrument models R&S[®]FSH4.14, R&S[®]FSH8.18, R&S[®]FSH4.24, R&S[®]FSH8.28 from firmware versions below V2.00, the self alignment function must be performed once as described in chapter 1.2.4.

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1 New Functions

The following table lists the new functions in V2.21:

Version	Function
V2.21	Support for R&S@FSH13 and R&S@FSH20
V2.21	FSH4View: Support for R&S@FSH13 and R&S@FSH20

The following table lists modifications, which were introduced in earlier versions, and indicates the version in which the modification was introduced:

Version	Function
V2.20	3GPP TD-SCDMA / HSDPA BTS Code Domain Power and EVM Measurement Application (R&S@FSH-K48E)
V2.20	Support for Precision Frequency Reference option (R&S@FSH-Z114)
V2.20	Network Analyzer: Supports display of four traces in one screen (S11 and S22 measurement as well as S12 and S21 measurement are displayed in one diagram)
V2.20	Network Analyzer: Easy 1-Port Calibration available
V2.20	Configurable screenshot button for immediate storing of datasets or pictures
V2.20	Receiver Mode and Channel Scan Measurement Application (R&S@FSH-K43): – Limit lines – Support for isotropic antenna (R&S@TS-EMF)
V2.20	FSH4View: Calibration Pool: previously stored calibration data can be reused when using the wizard
V2.20	FSH4View: Synchronization button for easy exchange of settings and result files between PC and instrument
V2.20	FSH4View: Protection of FSH4View Wizard Sets with personalized PIN Code
V2.20	FSH4View: Support for Receiver Mode Application (R&S@FSH-K43)
V2.20	FSH4View: Constellation Diagram is supported by the Report Generator
V2.11	GSM/EDGE Measurement Application (R&S@FSH-K10)
V2.11	Occupied bandwidth measurements in all digital modulation applications
V2.11	Trace mode settings (min/max/avg) in spectrum overview and scanner displays in all digital modulation applications
V2.11	Ec/Io measurements in 3GPP WCDMA (R&S@FSH-K44E) scrambling codes display
V2.11	FSH4View: Support of 3GPP GSM/EDGE (R&S@FSH-K10) application
V2.10	3GPP TD-SCDMA BTS power and P-CCPCH EVM measurement application (R&S@FSH-K48)
V2.10	Measurement Wizard
V2.10	SCPI command to create limit lines
V2.10	Network Analyzer: site name folder for measurement results is supported
V2.10	FSH4View: Command line support to convert .set files into .csv files

R&S FSH4/FSH8/FSH13/FSH20 Handheld Spectrum Analyzer

Version	Function
V2.00	Receiver mode and channel scan measurement application (R&S@FSH-K43) available, including remote control commands.
V2.00	Support of new power sensors R&S@NRP-Z211 and R&S@NRP-Z221
V2.00	Instrument protection with personalized PIN Code
V2.00	Spectrum Analyzer: Trace color changes on limit line violation
V2.00	Beep on fail and overload
V2.00	FSH4View: Support for Limits Screen for R&S@FSH-K50/K44 FSH4View: Support for Signal Overview display for R&S@FSH-K50/K47 FSH4View: Support for Isotropic Antenna display for R&S@FSH-K50 FSH4View: Support for Constellation display for R&S@FSH-K50 FSH4View: Support for Channel selection for R&S@FSH-K44
V1.60	Spectrum Analyzer: faster sweep time with narrow resolution bandwidth due to use of FFT filters
V1.60	Network Analyzer: trace mathematics available
V1.60	Support for different time zones. This new function should be used to adapt time and date to the local geographic conditions.
V1.60	A file rename function was added to the file manager.
V1.60	Remote Control: new data collection query and control commands for the isotropic antenna
V1.60	FSH4View: Remote Instrument Desktop available
V1.60	FSH4View: Report Generator for stored measurement results (datasets) available

2 Modified Functions

The following table lists the functions modified in V2.21:

None

The following table lists modifications, which were introduced in earlier versions, and indicates the version in which the modification was introduced:

Version	Function
V2.20	The Occupied Bandwidth measurement allows to set any desired span independently of the selected Channel Bandwidth
V2.20	Receiver Mode: values below 9 kHz are now accepted as receiver frequency
V2.20	Added configuration files for GSM EDGE standard
V2.20	Added and revised channel table files for digital standards
V2.13	Receiver Mode (R&S®FSH-K43): <ul style="list-style-type: none"> – SCPI command SENS:FREQ:CENT supports synchronization with measurement via *OPC / *OPC? / *WAI command – SCPI command TRAC:DATA? supports error handling for invalid result (returns 199.99 if result is queried when the measurement is not complete).
V2.11	Digital Modulation Applications: In the Spectrum Overview and Scanner Displays of the digital modulation applications, it is possible to apply TRACE mode settings
V2.10	FFT sweep now supports larger spans with narrow RBW
V2.10	Network Analyzer: manual sweep time entry is enabled again
V2.10	DTF: Change behavior upon cable model load
V2.10	DTF: Warning instead of changing center frequency on cable model load
V2.00	Vector Network Analyzer: The hardware setup was optimized to increase the margin before an overload condition is reported and to minimize the trace variation on transmission measurements with high accuracy calibration. This resulted in changes to the internal calibration data structures. As a consequence a self-alignment must be performed when updating older firmware versions to V2.00
V2.00	FSH4View: Remote desktop display available without R&S®FSH-K40
V2.00	Optimized synthesizer setup table
V1.60	Activating the isotropic antenna in the MEAS menu will automatically open the transducer factor selection list.
V1.60	When switching between operating modes (e.g. Spectrum Analyzer -> Network Analyzer), the display now shows the target operating mode while the switch is in progress.
V1.60	User must now explicitly confirm when changing the date settings. Together with the new support for time zones this mechanism should help avoiding conflicts with timed option licenses.
V1.60	Remote Control: In manual operation the span is adjusted automatically when selecting narrow resolution bandwidths. Via remote control the resolution bandwidth command was rejected if the span settings didn't match. Starting with V1.60 the remote control behavior is equal to the behavior in manual operation.

R&S FSH4/FSH8/FSH13/FSH20 Handheld Spectrum Analyzer

Version	Function
V1.59	LTE Constellation Display Show Allocations menu has been modified/improved
V1.59	Display of WCDMA composite EVM for instruments with serial numbers below 105000 with new frequency response alignment

3 Improvements

The following table lists the issues eliminated in V2.21:

Version	Function
V2.21	Network Analyzer: Increased the displayed resolution of marker results
V2.21	FSH4View: "File – Save As" did not work with Windows 7. This has been fixed.

The following table lists the issues already eliminated in earlier versions and indicates the version in which the issues were eliminated:

Version	Function
V2.20	Receiver Mode and Channel Scan Measurement Application (R&S®FSH-K43): <ul style="list-style-type: none"> – GPS coordinate display is now supported – Scan result display supports polygon line drawing – Ext. Ref. indicator is now supported – Improved compensation for level drift over temperature changes
V2.20	Fixed a memory leak in Power Meter when using USB Power Sensor
V2.20	FSH4View: Removed possible error message when adding a front page logo to the report
V2.20	FSH4View: File conversion stores the previously selected file type
V2.20	FSH4View: The capture date of the datasets is shown in the result summary page
V2.13	Receiver Mode (R&S®FSH-K43): Improved measurement speed for Fixed Frequency mode when remote controlled.
V2.11	Improved performance of LTE BTS scanner in R&S®FSH-K50E application
V2.11	Improved performance of EV-DO BTS scanner in R&S®FSH-K47E application
V2.11	cdma2000 & 1xEV-DO: The GPS trigger has been corrected to avoid displaying wrong PN offsets
V2.10	DTF: Tracking Generator attenuation is not taken into account in DTF measurement
V2.10	DTF: Reflection measurement on port 2 doesn't work without prior calibration
V1.59	For digital modulation measurements, the level adjust algorithm has been optimized
V1.59	WCDMA customized channel table entries did not increment (this works now)
V1.59	1xEV-DO Measurements have been optimized with a known PN offset
V1.59	Spectral inversion in cdma2000 and 1xEV-DO spectrum overview displays (has been eliminated)
V1.59	DC offset in Digital Modulation spectrum overview displays (has been eliminated)
V1.59	Display of Constellation Diagram in LTE has been optimized (speed up)
V1.59	LTE over-the-air performance has been improved

4 Known Issues

The following table lists the known issues in V2.21:

Issues
In the TD-SCDMA application the measurement result for P-CCPCH Ec/Io is not correct, if a transducer is selected.
If Over-the-Air (OTA) measurements with the LTE applications are performed and a Cell ID of the BTS has been predefined, the resulting Cell ID is possibly detected wrongly and therefore not equal to the specified one. All other results related to the predefined Cell ID, including a possible "SYNC NOT FOUND" message in case the Cell ID is not present, are correct.

5 Modifications to the Documentation

The latest manual can be downloaded from the R&S FSH4/8 spectrum analyzer product web page under: <http://www.rohde-schwarz.com>. Select "DOWNLOADS" and "MANUALS".

6 Installation Information

6.1 General Information

- Firmware release V2.21 corresponds to FSH4View V2.21, which is available on the Rohde & Schwarz web page as a separate update package.
- Although older versions of FSH4View might be able to communicate with firmware release V2.21, an update of FSH4View is highly recommended, as older FSH4View versions might not support all functions included in the new firmware release.
- FSH4View V2.21 does not display the sweep window if the instrument is equipped with firmware release V1.01. It also does not preview datasets stored with firmware release V1.01. Newer firmware releases are supported in both cases.

6.2 Firmware Update

The firmware update file for the R&S FSH4/FSH8 is one file with the name FSH4_V2_21.EXE from the Rohde & Schwarz web page.

The installation can be done via SD-Card or via USB-Stick

6.2.1 Preparing the Installation via SD-Card

In order to update the device after downloading the FSH4_V2_21.EXE installation file, an SD memory card is required, e.g. R&S HA-Z231 (1 GB), order # 1309.6217.00, or R&S HA-Z232 (2 GB), order # 1309.6223.00. Please make sure that your PC is equipped with an SD card reader.

Make a backup of datasets, screenshots and modified files

Before you start the firmware update, make sure that you created a backup with FSH4View of all datasets and screenshots which you previously stored on the instrument. The same holds true for all channel tables, standards, limit lines, transducer factors and cable models which you created or modified. The factory preset necessary to complete the firmware update procedure will otherwise erase or overwrite the files.

Preparing the installation files

1. Insert an SD card into the SD card reader and wait until Windows[®] has identified the SD card as a new volume (e.g. D:)
2. Copy FSH4_V2_21.EXE into the root directory of the SD card, e.g. D:\

Execute FSH4_V2_21.EXE. The self-extracting .ZIP file will be unpacked.

The SD card should now contain the following files:

bootloader_SA_V2_21.bin
osimage_SA_V2_21.bin
updater_SA_V2_21.bin
splashscreen_SA.bmp
FSH4_V2_21.EXE

Note:

Please make sure that only one file of each type is present on the SD card. The update mechanism will reject the card if it detects two versions of the same file type (e.g. bootloader_SA_V1_01 and bootloader_SA_V2_21) in the root directory and abort the update later on.

Prepare the instrument

1. Switch the instrument OFF.
2. Connect the R&S FSH to AC mains via its power adapter.

Note:

The instrument firmware will refuse to perform the update if the instrument runs on battery.

3. Insert the SD card into the SD card slot at the right side of the instrument.
4. Continue with “Performing the Firmware Update on the Instrument” in Section **Error! Reference source not found.**

6.2.2 Preparing the installation via USB (instruments with serial numbers above 105000)

In order to update the device after downloading the FSH4_V2_21.EXE installation file, a USB stick is required.

Make a backup of datasets, screenshots and modified files.

Before you start the firmware update, make sure that you created a backup with FSH4View of all datasets and screenshots which you previously stored on the instrument. The same holds true for all channel tables, standards, limit lines, transducer factors and cable models which you created or modified. The factory preset necessary to complete the firmware update procedure will otherwise erase or overwrite the files.

Preparing the installation files

1. Insert a USB stick into the USB slot and wait until windows has identified the USB stick as a new volume (e.g. D:)
2. Copy FSH4_V2_21.EXE into the root directory of the USB stick, e.g. D:\

Execute FSH4_V2_21.EXE. The self-extracting .ZIP file will be unpacked.

The SD card should now contain the following files:

bootloader_SA_V2_21.bin
osimage_SA_V2_21.bin
updater_SA_V2_21.bin
splashscreen_SA.bmp
FSH4_V2_21.EXE

Note:

Please make sure that only one file of each type is present on the SD card. The update mechanism will reject the card if it detects two versions of the same file type (e.g. bootloader_SA_V1_01 and bootloader_SA_V2_21) in the root directory and abort the update later on.

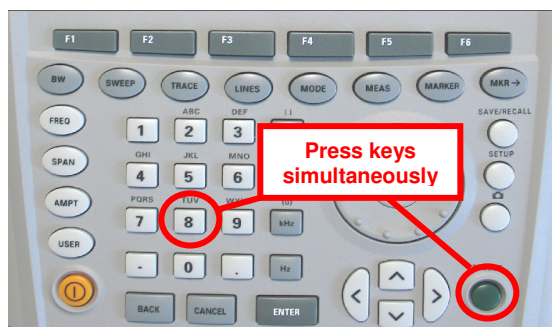
Prepare the instrument

1. Switch the instrument OFF.
2. Insert the USB stick into the USB slot of the instrument.

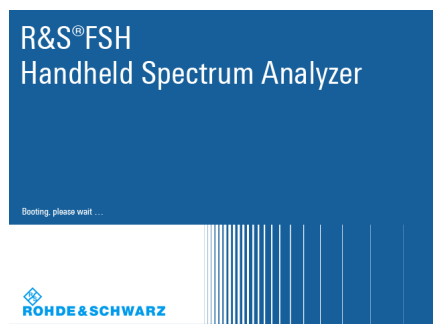
6.2.3 Performing the Firmware Update on the Instrument

The firmware update process is performed by the following steps:

1. Press the keys PRESET and 8 on the numeric keypad simultaneously.



2. Switch the instrument on and keep PRESET and 8 pressed for at least 5 seconds after the startup screen has appeared on the screen.



3. Release the keys PRESET and 8.

The FSH will continue its boot process and after a couple of seconds the following information will appear on the screen:

Instrument Firmware Update

Searching for firmware update (updater_*.bin)
...Found \USB\updater_SA_V2_21.bin
...OK
Checking updater_SA_V2_21.bin: ... OK

Update instrument to software version V2.21
Press [ENTER] to update the firmware.
Press [CANCEL] to abort firmware updating.

Note:

If the AC mains connection is missing at the start of the firmware update process, the following message will appear at the bottom of the screen in step 3:

Instrument not powered by the power adapter. Please connect power adapter.
Press [ENTER] to retry.
Press [CANCEL] to abort firmware updating.

In this case check the power supply connection.
Continue the update process with step 4.

4. Press ENTER to start the firmware update process.

The instrument will perform the firmware update. This will take about 5 minutes. The progress of the update will be displayed in a sequence of messages on the screen.

Warning:

Do not switch the instrument off during the update process in order to avoid data corruption of the internal flash memory!

5. As soon as the firmware update is completed, the R&S FSH will display the following message at the bottom of the screen:

Firmware updating is successfully completed.
Please switch off the instrument.

Switch the instrument off and on again. The FSH will boot with the new firmware version.

6. After the boot process is completed, press SETUP – INSTRUMENT SETUP. Select "RESET TO FACTORY SETTINGS" by moving the cursor down the list with the cursor keys or the rotary knob. Confirm the selection with ENTER, and re-confirm with YES when prompted.
Please be patient: the subsequent reset and reboot process will take about a minute to complete.

Note:

Restoring the factory settings is necessary to update the pre-installed channel tables, cable models and transducer factors. If this step is omitted, bug fixes and updates to these pre-installed files will not be installed.

7. For instrument models .14, .18, .24 and .28 perform a self alignment according to chapter 1.2.4, if the instrument was equipped with firmware version 1.10 or below.

6.2.4 Performing the Self Alignment on the Instrument



This section is relevant for R&S FSH4.14, R&S FSH8.18, R&S FSH4.24 and R&S FSH8.28 when being updated from firmware versions below V2.00.

In Network operating mode the instrument models R&S FSH4.14, R&S FSH8.18, R&S FSH4.24 and R&S FSH8.28 support a default set of calibration data, the so-called factory calibration. This dataset is used whenever the instrument displays "fcal" in the title bar.

Instruments equipped with firmware versions below V2.00 need an update of this dataset, as V2.21 uses improved algorithms which need more data in order to obtain optimum results.

The self alignment procedure requires a calibration standard R&S FSH-Z28 (order # 1300.7810.03), which is suitable for R&S FSH8 and R&S FSH4 instruments, or at least a calibration standard R&S FSH-Z29 (order # 1300.7510.03) for R&S FSH4 instruments. In addition a RF cable with two N connectors is required in order to provide a through connection between measurement port 1 and port 2.

The self alignment is performed by the following steps:

1. Switch the instrument on
2. Select Network operation by pressing MODE – NETWORK.
3. Make sure that the instrument runs for at least 30 minutes at room temperature.
4. Press the keys SETUP – INSTRUMENT SETUP. Place the cursor on the menu entry "Self Alignment" by scrolling the menu bar down with the rotary knob and press ENTER.

The instrument will prompt you to confirm that the factory calibration data will be overwritten.

5. Press softkey YES.

The self alignment procedure will start and prompt you to connect the calibration standards and the through connection to port 1 and 2 in the sequence.

6. Follow the instructions until the instrument reports "Self Alignment Done!".
7. Press softkey EXIT to return to the measurement screen.

6.3 Installing Firmware Options

6.3.1 Enabling Options by Entering Option Key Codes



This section can be skipped if the option keys were already entered once. Option keys are not affected by a firmware update.

To activate application software packages, you must enter a license key for validation. 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. Press the SETUP key.
2. Press the softkey **INSTALLED OPTIONS**.
3. Use the rotary knob or the cursor keys to select the **INSTALL OPTION...** menu item and confirm the entry with the ENTER key.
4. Enter the key code (32 digit number) for the option with the numeric keys and confirm with the ENTER key.

If the correct key code is entered, the R&S FSH displays "Installation successful", and the option is marked as "Installed" in the option list (example: Remote Control (K40)).

If an invalid key code is entered, the R&S FSH displays "Invalid key code!". The correct key code can then be entered.

Installed Options	
Option Administration	
Install Option...	
Option Installation Status	
Remote Control (K40)	Not Installed
Distance to Fault (K41)	Not Installed
Vector Network Analysis (K42)	Not Installed

Measure Setup | Instrument Setup | HW/SW Info | **Installed Options** | Exit

Installed Options	
Option Administration	
Install Option...	
Option Installation Status	
Remote Control (K40)	Installed
Distance to Fault (K41)	Not Installed
Vector Network Analysis (K42)	Not Installed

Installation successful!

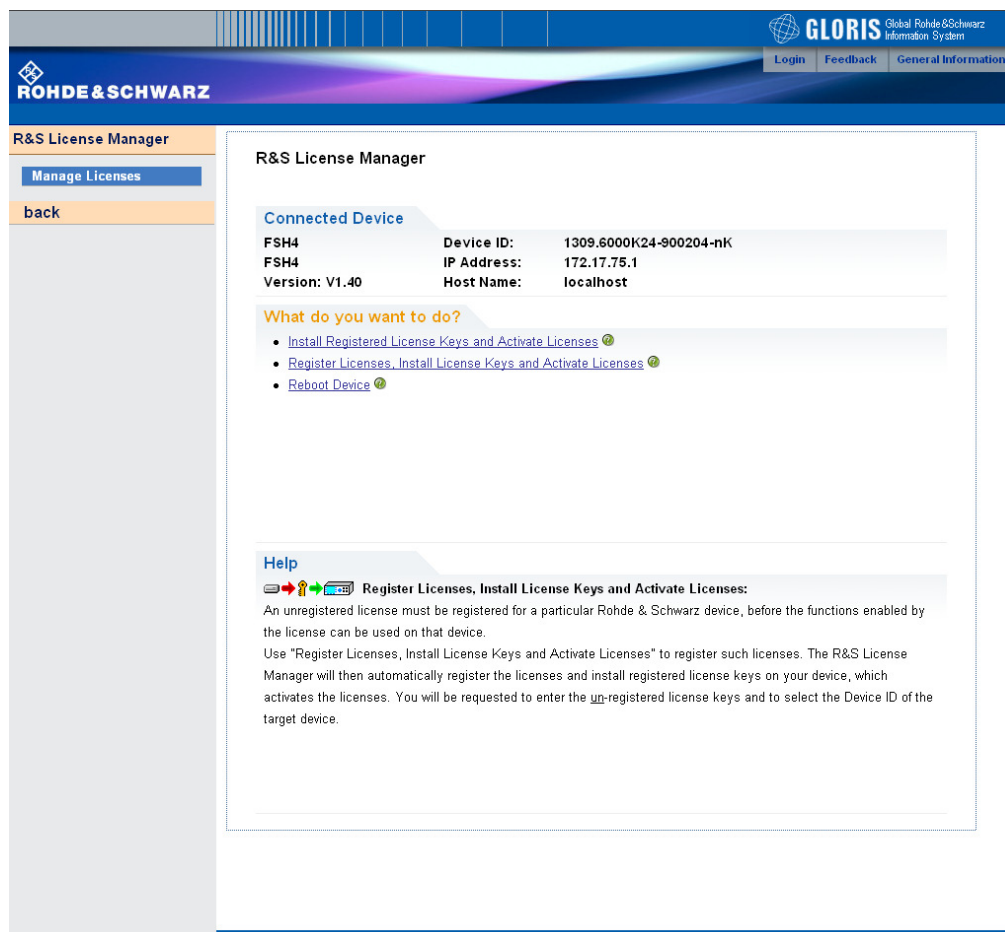
Measure Setup | Instrument Setup | HW/SW Info | **Installed Options** | Exit

6.3.2 Enabling Options via the R&S License Manager

This feature is only available starting with firmware version V1.40 and higher.

Prerequisite: Your PC must be connected via Ethernet to the instrument and to the internet.

1. Open your browser and type in the IP address of your instrument.



The screenshot displays the R&S License Manager web interface. The top navigation bar includes the Rohde & Schwarz logo and the GLORIS (Global Rohde & Schwarz Information System) logo with links for Login, Feedback, and General Information. The main content area is titled 'R&S License Manager' and features a sidebar with 'Manage Licenses' and 'back' buttons. The main panel shows the following information:

Connected Device	
FSH4	Device ID: 1309.6000K24-900204-nK
FSH4	IP Address: 172.17.75.1
Version: V1.40	Host Name: localhost

What do you want to do?

- [Install Registered License Keys and Activate Licenses](#)
- [Register Licenses, Install License Keys and Activate Licenses](#)
- [Reboot Device](#)

Help

Register Licenses, Install License Keys and Activate Licenses:
An unregistered license must be registered for a particular Rohde & Schwarz device, before the functions enabled by the license can be used on that device.
Use "Register Licenses, Install License Keys and Activate Licenses" to register such licenses. The R&S License Manager will then automatically register the licenses and install registered license keys on your device, which activates the licenses. You will be requested to enter the un-registered license keys and to select the Device ID of the target device.

2. Select "License Manager" > "Manage Licenses".
3. Choose "Register Licenses, Install License Keys and Activate Licenses" and follow the instructions.

7 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 instrument up-to-date and to be informed about new application notes related to your instrument, please send an e-mail to the Customer Support Center stating your instrument and your wish.

We will take care that you will get the right information.

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Release Notes

Revision: 01

R&S® FSH4/FSH8 Handheld Spectrum Analyzer

Firmware Release 2.20

These Release Notes describe the following models and options of the R&S® Handheld Spectrum Analyzer:

- R&S® Handheld Spectrum Analyzer FSH4, order no. 1309.6000.x4 ¹⁾
- R&S® Handheld Spectrum Analyzer FSH8, order no. 1309.6000.x8 ¹⁾

New features in V2.20:

- 3GPP TD-SCDMA / HSDPA BTS Code Domain Power and EVM Measurement Application (R&S®FSH-K48E)
- Support for Precision Frequency Reference option (R&S®FSH-Z114)
- Network Analyzer: Supports display of four traces in one screen (S11 and S22 measurement as well as S12 and S21 measurement are displayed in one diagram)
- Network Analyzer: Easy 1-Port Calibration available
- Configurable screenshot button for immediate storing of datasets or pictures
- Receiver Mode and Channel Scan Measurement Application (R&S®FSH-K43):
 - Limit lines
 - Support for isotropic antenna (R&S®TS-EMF)

New features in FSH4View Software Version V2.20

- Calibration Pool: previously stored calibration data can be reused when using the wizard
- Synchronization button for easy exchange of settings and result files between PC and instrument
- Protection of FSH4View Wizard Sets with personalized PIN Code
- FSH4View: Support for Receiver Mode Application (R&S®FSH-K43)

Important notes:

- ¹⁾ After updating instrument models R&S®FSH4.14, R&S®FSH8.18, R&S®FSH4.24, R&S®FSH8.28 from firmware versions below V2.00, the self alignment function must be performed once as described in chapter 1.2.4.

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1 New Functions

The following table lists the new functions in V2.20:

Version	Function
V2.20	3GPP TD-SCDMA / HSDPA BTS Code Domain Power and EVM Measurement Application (R&S®FSH-K48E)
V2.20	Support for Precision Frequency Reference option (R&S®FSH-Z114)
V2.20	Network Analyzer: Supports display of four traces in one screen (S11 and S22 measurement as well as S12 and S21 measurement are displayed in one diagram)
V2.20	Network Analyzer: Easy 1-Port Calibration available
V2.20	Configurable screenshot button for immediate storing of datasets or pictures
V2.20	Receiver Mode and Channel Scan Measurement Application (R&S®FSH-K43): <ul style="list-style-type: none"> • Limit lines • Support for isotropic antenna (R&S®TS-EMF)
V2.20	FSH4View: Calibration Pool: previously stored calibration data can be reused when using the wizard
V2.20	FSH4View: Synchronization button for easy exchange of settings and result files between PC and instrument
V2.20	FSH4View: Protection of FSH4View Wizard Sets with personalized PIN Code
V2.20	FSH4View: Support for Receiver Mode Application (R&S®FSH-K43)
V2.20	FSH4View: Constellation Diagram is supported by the Report Generator

The following table lists modifications, which were introduced in earlier versions, and indicates the version in which the modification was introduced:

Version	Function
V2.11	GSM/EDGE Measurement Application (R&S®FSH-K10)
V2.11	Occupied bandwidth measurements in all digital modulation applications
V2.11	Trace mode settings (min/max/avg) in spectrum overview and scanner displays in all digital modulation applications
V2.11	Ec/Io measurements in 3GPP WCDMA (R&S®FSH-K44E) scrambling codes display
V2.11	FSH4View: Support of 3GPP GSM/EDGE (R&S®FSH-K10) application
V2.10	3GPP TD-SCDMA BTS power and P-CCPCH EVM measurement application (R&S®FSH-K48)
V2.10	Measurement Wizard
V2.10	SCPI command to create limit lines
V2.10	Network Analyzer: site name folder for measurement results is supported
V2.10	FSH4View: Command line support to convert .set files into .csv files
V2.00	Receiver mode and channel scan measurement application (R&S®FSH-K43) available, including remote control commands.
V2.00	Support of new power sensors R&S®NRP-Z211 and R&S®NRP-Z221
V2.00	Instrument protection with personalized PIN Code
V2.00	Spectrum Analyzer: Trace color changes on limit line violation
V2.00	Beep on fail and overload
V2.00	FSH4View: Support for Limits Screen for R&S®FSH-K50/K44 FSH4View: Support for Signal Overview display for R&S®FSH-K50/K47 FSH4View: Support for Isotropic Antenna display for R&S®FSH-K50 FSH4View: Support for Constellation display for R&S®FSH-K50 FSH4View: Support for Channel selection for R&S®FSH-K44
V1.60	Spectrum Analyzer: faster sweep time with narrow resolution bandwidth due to use of FFT filters
V1.60	Network Analyzer: trace mathematics available
V1.60	Support for different time zones. This new function should be used to adapt time and date to the local geographic conditions.
V1.60	A file rename function was added to the file manager.
V1.60	Remote Control: new data collection query and control commands for the isotropic antenna
V1.60	FSH4View: Remote Instrument Desktop available
V1.60	FSH4View: Report Generator for stored measurement results (datasets) available

2 Modified Functions

The following table lists the functions modified in V2.20:

Version	Function
V2.20	The Occupied Bandwidth measurement allows to set any desired span independently of the selected Channel Bandwidth
V2.20	Receiver Mode: values below 9 kHz are now accepted as receiver frequency
V2.20	Added configuration files for GSM EDGE standard
V2.20	Added and revised channel table files for digital standards

The following table lists modifications, which were introduced in earlier versions, and indicates the version in which the modification was introduced:

Version	Function
V2.13	Receiver Mode (R&S®FSH-K43): – SCPI command SENS:FREQ:CENT supports synchronization with measurement via *OPC / *OPC? / *WAI command – SCPI command TRAC:DATA? supports error handling for invalid result (returns 199.99 if result is queried when the measurement is not complete).
V2.11	Digital Modulation Applications: In the Spectrum Overview and Scanner Displays of the digital modulation applications, it is possible to apply TRACE mode settings
V2.10	FFT sweep now supports larger spans with narrow RBW
V2.10	Network Analyzer: manual sweep time entry is enabled again
V2.10	DTF: Change behavior upon cable model load
V2.10	DTF: Warning instead of changing center frequency on cable model load
V2.00	Vector Network Analyzer: The hardware setup was optimized to increase the margin before an overload condition is reported and to minimize the trace variation on transmission measurements with high accuracy calibration. This resulted in changes to the internal calibration data structures. As a consequence a self-alignment must be performed when updating older firmware versions to V2.00
V2.00	FSH4View: Remote desktop display available without R&S®FSH-K40
V2.00	Optimized synthesizer setup table
V1.60	Activating the isotropic antenna in the MEAS menu will automatically open the transducer factor selection list.
V1.60	When switching between operating modes (e.g. Spectrum Analyzer -> Network Analyzer), the display now shows the target operating mode while the switch is in progress.
V1.60	User must now explicitly confirm when changing the date settings. Together with the new support for time zones this mechanism should help avoiding conflicts with timed option licenses.
V1.60	Remote Control: In manual operation the span is adjusted automatically when selecting narrow resolution bandwidths. Via remote control the resolution bandwidth command was rejected if the span settings didn't match. Starting with V1.60 the remote control behavior is equal to the behavior in manual operation.
V1.59	LTE Constellation Display Show Allocations menu has been modified/improved
V1.59	Display of WCDMA composite EVM for instruments with serial numbers below 105000 with new frequency response alignment

3 Improvements

The following table lists the issues eliminated in V2.20:

Version	Function
V2.20	Receiver Mode and Channel Scan Measurement Application (R&S®FSH-K43): <ul style="list-style-type: none"> – GPS coordinate display is now supported – Scan result display supports polygon line drawing – Ext. Ref. indicator is now supported – Improved compensation for level drift over temperature changes
V2.20	Fixed a memory leak in Power Meter when using USB Power Sensor
V2.20	FSH4View: Removed possible error message when adding a front page logo to the report
V2.20	FSH4View: File conversion stores the previously selected file type
V2.20	FSH4View: The capture date of the datasets is shown in the result summary page

The following table lists the issues already eliminated in earlier versions and indicates the version in which the issues were eliminated:

Version	Function
V2.13	Receiver Mode (R&S®FSH-K43): Improved measurement speed for Fixed Frequency mode when remote controlled.
V2.11	Improved performance of LTE BTS scanner in R&S®FSH-K50E application
V2.11	Improved performance of EV-DO BTS scanner in R&S®FSH-K47E application
V2.11	cdma2000 & 1xEV-DO: The GPS trigger has been corrected to avoid displaying wrong PN offsets
V2.10	DTF: Tracking Generator attenuation is not taken into account in DTF measurement
V2.10	DTF: Reflection measurement on port 2 doesn't work without prior calibration
V1.59	For digital modulation measurements, the level adjust algorithm has been optimized
V1.59	WCDMA customized channel table entries did not increment (this works now)
V1.59	1xEV-DO Measurements have been optimized with a known PN offset
V1.59	Spectral inversion in cdma2000 and 1xEV-DO spectrum overview displays (has been eliminated)
V1.59	DC offset in Digital Modulation spectrum overview displays (has been eliminated)
V1.59	Display of Constellation Diagram in LTE has been optimized (speed up)
V1.59	LTE over-the-air performance has been improved

4 Known Issues

The following table lists the known issues in V2.20:

Issues
In the TD-SCDMA application the measurement result for P-CCPCH E_c/I_0 is not correct, if a transducer is selected.
If Over-the-Air (OTA) measurements with the LTE applications are performed and a Cell ID of the BTS has been predefined, the resulting Cell ID is possibly detected wrongly and therefore not equal to the specified one. All other results related to the predefined Cell ID, including a possible "SYNC NOT FOUND" message in case the Cell ID is not present, are correct.

5 Modifications to the Documentation

The latest manual can be downloaded from the R&S FSH4/8 spectrum analyzer product web page under: <http://www.rohde-schwarz.com>. Select "DOWNLOADS" and "MANUALS".

6 Installation Information

6.1 General Information

- Firmware release V2.20 corresponds to FSH4View V2.20, which is available on the Rohde & Schwarz web page as a separate update package.
- Although older versions of FSH4View might be able to communicate with firmware release V2.20, an update of FSH4View is highly recommended, as older FSH4View versions might not support all functions included in the new firmware release.
- FSH4View V2.20 does not display the sweep window if the instrument is equipped with firmware release V1.01. It also does not preview datasets stored with firmware release V1.01. Newer firmware releases are supported in both cases.

6.2 Firmware Update

The firmware update file for the R&S FSH4/FSH8 is one file with the name FSH4_V2_20.EXE from the Rohde & Schwarz web page.

The installation can be done via SD-Card or via USB-Stick

6.2.1 Preparing the Installation via SD-Card

In order to update the device after downloading the FSH4_V2_20.EXE installation file, an SD memory card is required, e.g. R&S HA-Z231 (1 GB), order # 1309.6217.00, or R&S HA-Z232 (2 GB), order # 1309.6223.00. Please make sure that your PC is equipped with an SD card reader.

Make a backup of datasets, screenshots and modified files

Before you start the firmware update, make sure that you created a backup with FSH4View of all datasets and screenshots which you previously stored on the instrument. The same holds true for all channel tables, standards, limit lines, transducer factors and cable models which you created or modified. The factory preset necessary to complete the firmware update procedure will otherwise erase or overwrite the files.

Preparing the installation files

1. Insert an SD card into the SD card reader and wait until Windows[®] has identified the SD card as a new volume (e.g. D:)
2. Copy FSH4_V2_20.EXE into the root directory of the SD card, e.g. D:\

Execute FSH4_V2_20.EXE. The self-extracting .ZIP file will be unpacked.

The SD card should now contain the following files:

bootloader_SA_V2_20.bin
osimage_SA_V2_20.bin
updater_SA_V2_20.bin
splashscreen_SA.bmp
FSH4_V2_20.EXE

Note:

Please make sure that only one file of each type is present on the SD card. The update mechanism will reject the card if it detects two versions of the same file type (e.g. bootloader_SA_V1_01 and bootloader_SA_V2_20) in the root directory and abort the update later on.

Prepare the instrument

1. Switch the instrument OFF.
2. Connect the R&S FSH to AC mains via its power adapter.
Note:
The instrument firmware will refuse to perform the update if the instrument runs on battery.
3. Insert the SD card into the SD card slot at the right side of the instrument.
4. Continue with “Performing the Firmware Update on the Instrument” in Section 1.2.3

6.2.2 Preparing the installation via USB (instruments with serial numbers above 105000)

In order to update the device after downloading the FSH4_V2_20.EXE installation file, a USB stick is required.

Make a backup of datasets, screenshots and modified files.

Before you start the firmware update, make sure that you created a backup with FSH4View of all datasets and screenshots which you previously stored on the instrument. The same holds true for all channel tables, standards, limit lines, transducer factors and cable models which you created or modified. The factory preset necessary to complete the firmware update procedure will otherwise erase or overwrite the files.

Preparing the installation files

1. Insert a USB stick into the USB slot and wait until windows has identified the USB stick as a new volume (e.g. D:)
2. Copy FSH4_V2_20.EXE into the root directory of the USB stick, e.g. D:\

Execute FSH4_V2_20.EXE. The self-extracting .ZIP file will be unpacked.

The SD card should now contain the following files:

bootloader_SA_V2_20.bin
osimage_SA_V2_20.bin
updater_SA_V2_20.bin
splashscreen_SA.bmp
FSH4_V2_20.EXE

Note:

Please make sure that only one file of each type is present on the SD card. The update mechanism will reject the card if it detects two versions of the same file type (e.g. bootloader_SA_V1_01 and bootloader_SA_V2_20) in the root directory and abort the update later on.

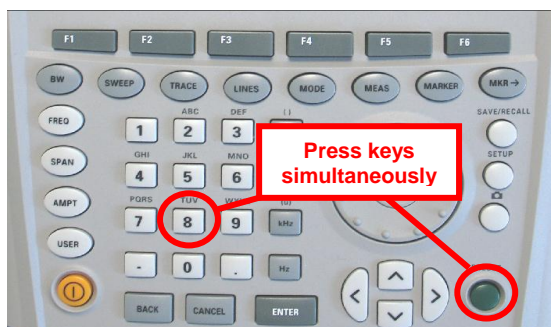
Prepare the instrument

1. Switch the instrument OFF.
2. Insert the USB stick into the USB slot of the instrument.

6.2.3 Performing the Firmware Update on the Instrument

The firmware update process is performed by the following steps:

1. Press the keys PRESET and 8 on the numeric keypad simultaneously.



2. Switch the instrument on and keep PRESET and 8 pressed for at least 5 seconds after the startup screen has appeared on the screen.



3. Release the keys PRESET and 8.

The FSH will continue its boot process and after a couple of seconds the following information will appear on the screen:

Instrument Firmware Update

Searching for firmware update (updater_*.bin)
...Found \USB\updater_SA_V2_20.bin
...OK
Checking updater_SA_V2_20.bin: ... OK

Update instrument to software version V2.20
Press [ENTER] to update the firmware.
Press [CANCEL] to abort firmware updating.

Note:

If the AC mains connection is missing at the start of the firmware update process, the following message will appear at the bottom of the screen in step 3:

Instrument not powered by the power adapter. Please connect power adapter.
Press [ENTER] to retry.
Press [CANCEL] to abort firmware updating.

In this case check the power supply connection.
Continue the update process with step 4.

4. Press ENTER to start the firmware update process.

The instrument will perform the firmware update. This will take about 5 minutes. The progress of the update will be displayed in a sequence of messages on the screen.

Warning:

Do not switch the instrument off during the update process in order to avoid data corruption of the internal flash memory!

5. As soon as the firmware update is completed, the R&S FSH will display the following message at the bottom of the screen:

Firmware updating is successfully completed.
Please switch off the instrument.

Switch the instrument off and on again. The FSH will boot with the new firmware version.

6. After the boot process is completed, press SETUP – INSTRUMENT SETUP. Select "RESET TO FACTORY SETTINGS" by moving the cursor down the list with the cursor keys or the rotary knob. Confirm the selection with ENTER, and re-confirm with YES when prompted.
Please be patient: the subsequent reset and reboot process will take about a minute to complete.

Note:

Restoring the factory settings is necessary to update the pre-installed channel tables, cable models and transducer factors. If this step is omitted, bug fixes and updates to these pre-installed files will not be installed.

7. For instrument models .14, .18, .24 and .28 perform a self alignment according to chapter 1.2.4, if the instrument was equipped with firmware version 1.10 or below.

6.2.4 Performing the Self Alignment on the Instrument



This section is relevant for R&S FSH4.14, R&S FSH8.18, R&S FSH4.24 and R&S FSH8.28 when being updated from firmware versions below V2.00.

In Network operating mode the instrument models R&S FSH4.14, R&S FSH8.18, R&S FSH4.24 and R&S FSH8.28 support a default set of calibration data, the so-called factory calibration. This dataset is used whenever the instrument displays "fcal" in the title bar.

Instruments equipped with firmware versions below V2.00 need an update of this dataset, as V2.20 uses improved algorithms which need more data in order to obtain optimum results.

The self alignment procedure requires a calibration standard R&S FSH-Z28 (order # 1300.7810.03), which is suitable for R&S FSH8 and R&S FSH4 instruments, or at least a calibration standard R&S FSH-Z29 (order # 1300.7510.03) for R&S FSH4 instruments. In addition a RF cable with two N connectors is required in order to provide a through connection between measurement port 1 and port 2.

The self alignment is performed by the following steps:

1. Switch the instrument on
2. Select Network operation by pressing MODE – NETWORK.
3. Make sure that the instrument runs for at least 30 minutes at room temperature.
4. Press the keys SETUP – INSTRUMENT SETUP. Place the cursor on the menu entry "Self Alignment" by scrolling the menu bar down with the rotary knob and press ENTER.

The instrument will prompt you to confirm that the factory calibration data will be overwritten.

5. Press softkey YES.

The self alignment procedure will start and prompt you to connect the calibration standards and the through connection to port 1 and 2 in the sequence.

6. Follow the instructions until the instrument reports "Self Alignment Done!".
7. Press softkey EXIT to return to the measurement screen.

6.3 Installing Firmware Options

6.3.1 Enabling Options by Entering Option Key Codes



This section can be skipped if the option keys were already entered once. Option keys are not affected by a firmware update.

To activate application software packages, you must enter a license key for validation. 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. Press the SETUP key.
2. Press the softkey INSTALLED OPTIONS.
3. Use the rotary knob or the cursor keys to select the INSTALL OPTION... menu item and confirm the entry with the ENTER key.
4. Enter the key code (32 digit number) for the option with the numeric keys and confirm with the ENTER key.

If the correct key code is entered, the R&S FSH displays "Installation successful", and the option is marked as "Installed" in the option list (example: Remote Control (K40)).

If an invalid key code is entered, the R&S FSH displays "Invalid key code!". The correct key code can then be entered.

Installed Options	
Option Administration	
Install Option...	
Option Installation Status	
Remote Control (K40)	Not Installed
Distance to Fault (K41)	Not Installed
Vector Network Analysis (K42)	Not Installed

Measure Setup Instrument Setup HW/SW Info **Installed Options** Exit

Installed Options	
Option Administration	
Install Option...	
Option Installation Status	
Remote Control (K40)	Installed
Distance to Fault (K41)	Not Installed
Vector Network Analysis (K42)	Not Installed

Installation successful!

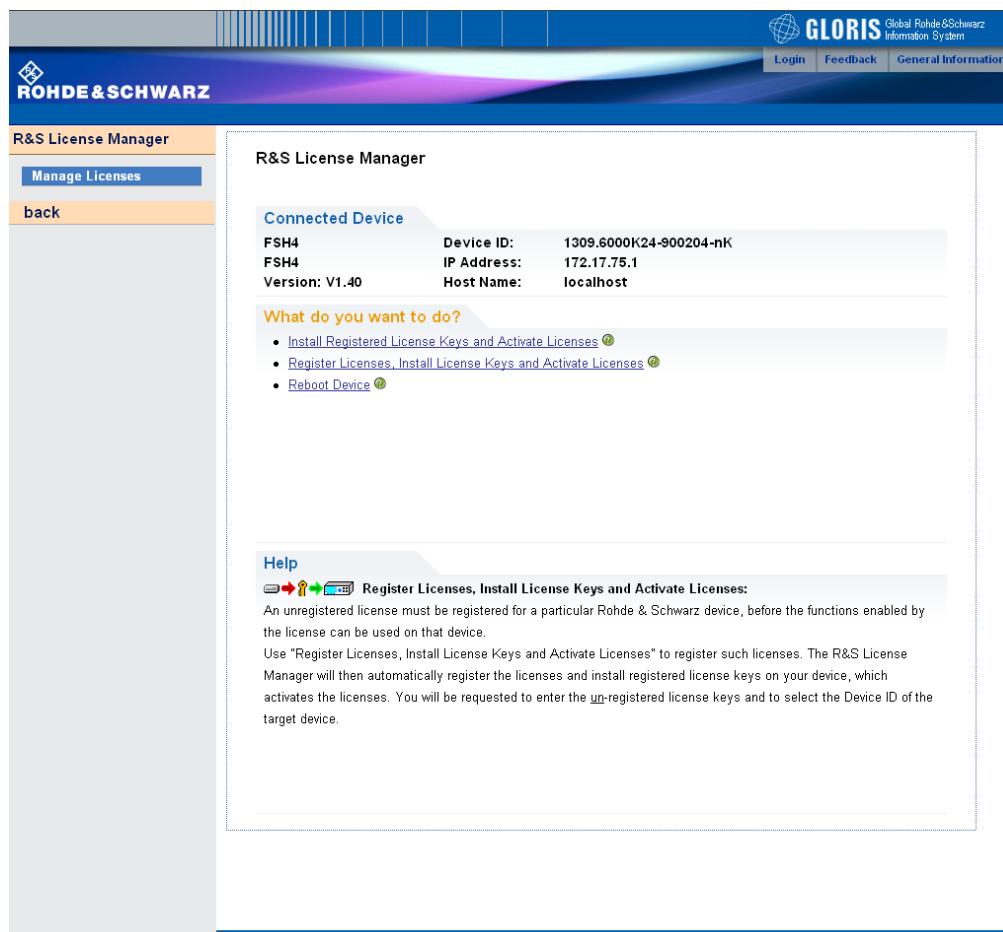
Measure Setup Instrument Setup HW/SW Info **Installed Options** Exit

6.3.2 Enabling Options via the R&S License Manager

This feature is only available starting with firmware version V1.40 and higher.

Prerequisite: Your PC must be connected via Ethernet to the instrument and to the internet.

1. Open your browser and type in the IP address of your instrument.



The screenshot shows the R&S License Manager web interface. The top navigation bar includes the Rohde & Schwarz logo and the GLORIS Global Rohde & Schwarz Information System logo. The main content area is titled "R&S License Manager" and displays the following information:

Connected Device

FSH4	Device ID:	1309.6000K24-900204-nK
FSH4	IP Address:	172.17.75.1
Version: V1.40	Host Name:	localhost

What do you want to do?

- [Install Registered License Keys and Activate Licenses](#)
- [Register Licenses, Install License Keys and Activate Licenses](#)
- [Reboot Device](#)

Help

Register Licenses, Install License Keys and Activate Licenses:

An unregistered license must be registered for a particular Rohde & Schwarz device, before the functions enabled by the license can be used on that device.

Use "Register Licenses, Install License Keys and Activate Licenses" to register such licenses. The R&S License Manager will then automatically register the licenses and install registered license keys on your device, which activates the licenses. You will be requested to enter the un-registered license keys and to select the Device ID of the target device.

2. Select "License Manager" > "Manage Licenses".
3. Choose "Register Licenses, Install License Keys and Activate Licenses" and follow the instructions.

7 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 instrument up-to-date and to be informed about new application notes related to your instrument, please send an e-mail to the Customer Support Center stating your instrument and your wish.

We will take care that you will get the right information.

Europe, Africa, Middle East

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customersupport@rohde-schwarz.com

North America

Phone 1-888-TEST-RSA (1-888-837-8772)

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Release Notes

Revision: 01

R&S® FSH13/FSH20 Handheld Spectrum Analyzer

Firmware Release 2.14

These Release Notes describe the following models and options of the R&S® Handheld Spectrum Analyzer:

- R&S® Handheld Spectrum Analyzer FSH13, order no. 1314.2000.13 ¹⁾
- R&S® Handheld Spectrum Analyzer FSH20, order no. 1314.2000.20 ¹⁾

New features in V2.14:

- Support for R&S®FSH13 and R&S®FSH20

New features in FSH4View Software Version V2.14

- Support for R&S®FSH13 and R&S®FSH20

Important notes:

- ¹⁾ Firmware V2.14 is released for R&S®FSH13 and R&S®FSH20 only, not for R&S®FSH4 and R&S®FSH8. For R&S®FSH4 and R&S®FSH8 firmware V2.20 should be used.

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1 New Functions

The following table lists the new functions in V2.14:

Version	Function
V2.14	Support for R&S@FSH13 and R&S@FSH20
V2.14	FSH4View: Support for R&S@FSH13 and R&S@FSH20

The following table lists modifications, which were introduced in earlier versions, and indicates the version in which the modification was introduced:

Version	Function
V2.11	GSM/EDGE Measurement Application (R&S®FSH-K10)
V2.11	Occupied bandwidth measurements in all digital modulation applications
V2.11	Trace mode settings (min/max/avg) in spectrum overview and scanner displays in all digital modulation applications
V2.11	Ec/Io measurements in 3GPP WCDMA (R&S®FSH-K44E) scrambling codes display
V2.11	FSH4View: Support of 3GPP GSM/EDGE (R&S®FSH-K10) application
V2.10	3GPP TD-SCDMA BTS power and P-CCPCH EVM measurement application (R&S®FSH-K48)
V2.10	Measurement Wizard
V2.10	SCPI command to create limit lines
V2.10	Network Analyzer: site name folder for measurement results is supported
V2.10	FSH4View: Command line support to convert .set files into .csv files
V2.00	Receiver mode and channel scan measurement application (R&S®FSH-K43) available, including remote control commands.
V2.00	Support of new power sensors R&S®NRP-Z211 and R&S®NRP-Z221
V2.00	Instrument protection with personalized PIN Code
V2.00	Spectrum Analyzer: Trace color changes on limit line violation
V2.00	Beep on fail and overload
V2.00	FSH4View: Support for Limits Screen for R&S®FSH-K50/K44 FSH4View: Support for Signal Overview display for R&S®FSH-K50/K47 FSH4View: Support for Isotropic Antenna display for R&S®FSH-K50 FSH4View: Support for Constellation display for R&S®FSH-K50 FSH4View: Support for Channel selection for R&S®FSH-K44
V1.60	Spectrum Analyzer: faster sweep time with narrow resolution bandwidth due to use of FFT filters
V1.60	Network Analyzer: trace mathematics available
V1.60	Support for different time zones. This new function should be used to adapt time and date to the local geographic conditions.
V1.60	A file rename function was added to the file manager.
V1.60	Remote Control: new data collection query and control commands for the isotropic antenna
V1.60	FSH4View: Remote Instrument Desktop available
V1.60	FSH4View: Report Generator for stored measurement results (datasets) available

2 Modified Functions

The following table lists the functions modified in V2.14:

None

The following table lists modifications, which were introduced in earlier versions, and indicates the version in which the modification was introduced:

Version	Function
V2.13	Receiver Mode (R&S®FSH-K43): <ul style="list-style-type: none"> – SCPI command SENS:FREQ:CENT supports synchronization with measurement via *OPC / *OPC? / *WAI command – SCPI command TRAC:DATA? supports error handling for invalid result (returns 199.99 if result is queried when the measurement is not complete).
V2.11	Digital Modulation Applications: In the Spectrum Overview and Scanner Displays of the digital modulation applications, it is possible to apply TRACE mode settings
V2.10	FFT sweep now supports larger spans with narrow RBW
V2.10	Network Analyzer: manual sweep time entry is enabled again
V2.10	DTF: Change behavior upon cable model load
V2.10	DTF: Warning instead of changing center frequency on cable model load
V2.00	Vector Network Analyzer: The hardware setup was optimized to increase the margin before an overload condition is reported and to minimize the trace variation on transmission measurements with high accuracy calibration. This resulted in changes to the internal calibration data structures. As a consequence a self-alignment must be performed when updating older firmware versions to V2.00
V2.00	FSH4View: Remote desktop display available without R&S®FSH-K40
V2.00	Optimized synthesizer setup table
V1.60	Activating the isotropic antenna in the MEAS menu will automatically open the transducer factor selection list.
V1.60	When switching between operating modes (e.g. Spectrum Analyzer -> Network Analyzer), the display now shows the target operating mode while the switch is in progress.
V1.60	User must now explicitly confirm when changing the date settings. Together with the new support for time zones this mechanism should help avoiding conflicts with timed option licenses.
V1.60	Remote Control: In manual operation the span is adjusted automatically when selecting narrow resolution bandwidths. Via remote control the resolution bandwidth command was rejected if the span settings didn't match. Starting with V1.60 the remote control behavior is equal to the behavior in manual operation.
V1.59	LTE Constellation Display Show Allocations menu has been modified/improved
V1.59	Display of WCDMA composite EVM for instruments with serial numbers below 105000 with new frequency response alignment

3 Improvements

The following table lists the issues eliminated in V2.14:

None

The following table lists the issues already eliminated in earlier versions and indicates the version in which the issues were eliminated:

Version	Function
V2.13	Receiver Mode (R&S®FSH-K43): Improved measurement speed for Fixed Frequency mode when remote controlled.
V2.11	Improved performance of LTE BTS scanner in R&S®FSH-K50E application
V2.11	Improved performance of EV-DO BTS scanner in R&S®FSH-K47E application
V2.11	cdma2000 & 1xEV-DO: The GPS trigger has been corrected to avoid displaying wrong PN offsets
V2.10	DTF: Tracking Generator attenuation is not taken into account in DTF measurement
V2.10	DTF: Reflection measurement on port 2 doesn't work without prior calibration
V1.59	For digital modulation measurements, the level adjust algorithm has been optimized
V1.59	WCDMA customized channel table entries did not increment (this works now)
V1.59	1xEV-DO Measurements have been optimized with a known PN offset
V1.59	Spectral inversion in cdma2000 and 1xEV-DO spectrum overview displays (has been eliminated)
V1.59	DC offset in Digital Modulation spectrum overview displays (has been eliminated)
V1.59	Display of Constellation Diagram in LTE has been optimized (speed up)
V1.59	LTE over-the-air performance has been improved

4 Known Issues

The following table lists the known issues in V2.14:

Issues
In WCDMA, if the scrambling code is entered manually, a new sweep has to be performed always to make the changes valid. To overcome this "Scrambling Code Auto" should be used.

5 Modifications to the Documentation

The latest manual can be downloaded from the R&S FSH4/8 spectrum analyzer product web page under: <http://www.rohde-schwarz.com>. Select "DOWNLOADS" and "MANUALS".

6 Installation Information

6.1 General Information

- Firmware release V2.14 corresponds to FSH4View V2.14, which is available on the Rohde & Schwarz web page as a separate update package.
- Although older versions of FSH4View might be able to communicate with firmware release V2.14, an update of FSH4View is highly recommended, as older FSH4View versions might not support all functions included in the new firmware release.
- FSH4View V2.14 does not display the sweep window if the instrument is equipped with firmware release V1.01. It also does not preview datasets stored with firmware release V1.01. Newer firmware releases are supported in both cases.

6.2 Firmware Update

The firmware update file for the R&S FSH4/FSH8 is one file with the name FSH4_V2_14.EXE from the Rohde & Schwarz web page.

The installation can be done via SD-Card or via USB-Stick

6.2.1 Preparing the Installation via SD-Card

In order to update the device after downloading the FSH4_V2_14.EXE installation file, an SD memory card is required, e.g. R&S HA-Z231 (1 GB), order # 1309.6217.00, or R&S HA-Z232 (2 GB), order # 1309.6223.00. Please make sure that your PC is equipped with an SD card reader.

Make a backup of datasets, screenshots and modified files

Before you start the firmware update, make sure that you created a backup with FSH4View of all datasets and screenshots which you previously stored on the instrument. The same holds true for all channel tables, standards, limit lines, transducer factors and cable models which you created or modified. The factory preset necessary to complete the firmware update procedure will otherwise erase or overwrite the files.

Preparing the installation files

1. Insert an SD card into the SD card reader and wait until Windows[®] has identified the SD card as a new volume (e.g. D:)
2. Copy FSH4_V2_14.EXE into the root directory of the SD card, e.g. D:\

Execute FSH4_V2_14.EXE. The self-extracting .ZIP file will be unpacked.

The SD card should now contain the following files:

bootloader_SA_V2_14.bin
osimage_SA_V2_14.bin
updater_SA_V2_14.bin
splashscreen_SA.bmp
FSH4_V2_14.EXE

Note:

Please make sure that only one file of each type is present on the SD card. The update mechanism will reject the card if it detects two versions of the same file type (e.g. bootloader_SA_V1_01 and bootloader_SA_V2_14) in the root directory and abort the update later on.

Prepare the instrument

1. Switch the instrument OFF.
2. Connect the R&S FSH to AC mains via its power adapter.

Note:

The instrument firmware will refuse to perform the update if the instrument runs on battery.

3. Insert the SD card into the SD card slot at the right side of the instrument.
4. Continue with “Performing the Firmware Update on the Instrument” in Section **Error! Reference source not found.**

6.2.2 Preparing the installation via USB (instruments with serial numbers above 105000)

In order to update the device after downloading the FSH4_V2_14.EXE installation file, a USB stick is required.

Make a backup of datasets, screenshots and modified files.

Before you start the firmware update, make sure that you created a backup with FSH4View of all datasets and screenshots which you previously stored on the instrument. The same holds true for all channel tables, standards, limit lines, transducer factors and cable models which you created or modified. The factory preset necessary to complete the firmware update procedure will otherwise erase or overwrite the files.

Preparing the installation files

1. Insert a USB stick into the USB slot and wait until windows has identified the USB stick as a new volume (e.g. D:)
2. Copy FSH4_V2_14.EXE into the root directory of the USB stick, e.g. D:\

Execute FSH4_V2_14.EXE. The self-extracting .ZIP file will be unpacked.

The SD card should now contain the following files:

bootloader_SA_V2_14.bin
osimage_SA_V2_14.bin
updater_SA_V2_14.bin
splashscreen_SA.bmp
FSH4_V2_14.EXE

Note:

Please make sure that only one file of each type is present on the SD card. The update mechanism will reject the card if it detects two versions of the same file type (e.g. bootloader_SA_V1_01 and bootloader_SA_V2_14) in the root directory and abort the update later on.

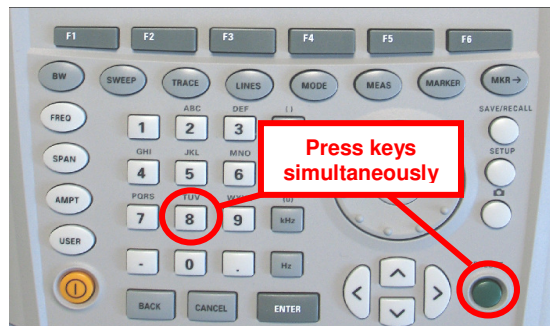
Prepare the instrument

1. Switch the instrument OFF.
2. Insert the USB stick into the USB slot of the instrument.

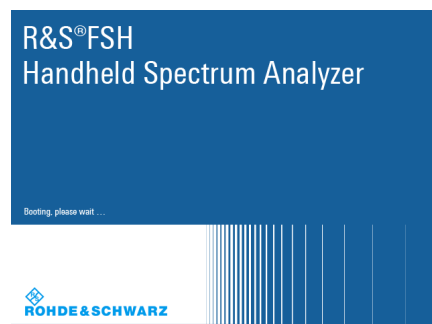
6.2.3 Performing the Firmware Update on the Instrument

The firmware update process is performed by the following steps:

1. Press the keys PRESET and 8 on the numeric keypad simultaneously.



2. Switch the instrument on and keep PRESET and 8 pressed for at least 5 seconds after the startup screen has appeared on the screen.



3. Release the keys PRESET and 8.

The FSH will continue its boot process and after a couple of seconds the following information will appear on the screen:

Instrument Firmware Update

Searching for firmware update (updater_*.bin)
...Found \USB\updater_SA_V2_14.bin
...OK
Checking updater_SA_V2_14.bin: ... OK

Update instrument to software version V2.14
Press [ENTER] to update the firmware.
Press [CANCEL] to abort firmware updating.

Note:

If the AC mains connection is missing at the start of the firmware update process, the following message will appear at the bottom of the screen in step 3:

Instrument not powered by the power adapter. Please connect power adapter.
Press [ENTER] to retry.
Press [CANCEL] to abort firmware updating.

In this case check the power supply connection.
Continue the update process with step 4.

4. Press ENTER to start the firmware update process.

The instrument will perform the firmware update. This will take about 5 minutes. The progress of the update will be displayed in a sequence of messages on the screen.

Warning:

Do not switch the instrument off during the update process in order to avoid data corruption of the internal flash memory!

5. As soon as the firmware update is completed, the R&S FSH will display the following message at the bottom of the screen:

Firmware updating is successfully completed.
Please switch off the instrument.

Switch the instrument off and on again. The FSH will boot with the new firmware version.

6. After the boot process is completed, press SETUP – INSTRUMENT SETUP. Select "RESET TO FACTORY SETTINGS" by moving the cursor down the list with the cursor keys or the rotary knob. Confirm the selection with ENTER, and re-confirm with YES when prompted.
Please be patient: the subsequent reset and reboot process will take about a minute to complete.

Note:

Restoring the factory settings is necessary to update the pre-installed channel tables, cable models and transducer factors. If this step is omitted, bug fixes and updates to these pre-installed files will not be installed.

7. For instrument models .14, .18, .24 and .28 perform a self alignment according to chapter 1.2.4, if the instrument was equipped with firmware version 1.10 or below.

6.2.4 Performing the Self Alignment on the Instrument



This section is relevant for R&S FSH4.14, R&S FSH8.18, R&S FSH4.24 and R&S FSH8.28 when being updated from firmware versions below V2.00.

In Network operating mode the instrument models R&S FSH4.14, R&S FSH8.18, R&S FSH4.24 and R&S FSH8.28 support a default set of calibration data, the so-called factory calibration. This dataset is used whenever the instrument displays "fcal" in the title bar.

Instruments equipped with firmware versions below V2.00 need an update of this dataset, as V2.14 uses improved algorithms which need more data in order to obtain optimum results.

The self alignment procedure requires a calibration standard R&S FSH-Z28 (order # 1300.7810.03), which is suitable for R&S FSH8 and R&S FSH4 instruments, or at least a calibration standard R&S FSH-Z29 (order # 1300.7510.03) for R&S FSH4 instruments. In addition a RF cable with two N connectors is required in order to provide a through connection between measurement port 1 and port 2.

The self alignment is performed by the following steps:

1. Switch the instrument on
2. Select Network operation by pressing MODE – NETWORK.
3. Make sure that the instrument runs for at least 30 minutes at room temperature.
4. Press the keys SETUP – INSTRUMENT SETUP. Place the cursor on the menu entry "Self Alignment" by scrolling the menu bar down with the rotary knob and press ENTER.

The instrument will prompt you to confirm that the factory calibration data will be overwritten.

5. Press softkey YES.

The self alignment procedure will start and prompt you to connect the calibration standards and the through connection to port 1 and 2 in the sequence.

6. Follow the instructions until the instrument reports "Self Alignment Done!".
7. Press softkey EXIT to return to the measurement screen.

6.3 Installing Firmware Options

6.3.1 Enabling Options by Entering Option Key Codes



This section can be skipped if the option keys were already entered once. Option keys are not affected by a firmware update.

To activate application software packages, you must enter a license key for validation. 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. Press the SETUP key.
2. Press the softkey INSTALLED OPTIONS.
3. Use the rotary knob or the cursor keys to select the INSTALL OPTION... menu item and confirm the entry with the ENTER key.
4. Enter the key code (32 digit number) for the option with the numeric keys and confirm with the ENTER key.

If the correct key code is entered, the R&S FSH displays "Installation successful", and the option is marked as "Installed" in the option list (example: Remote Control (K40)).

If an invalid key code is entered, the R&S FSH displays "Invalid key code!". The correct key code can then be entered.

Installed Options	
Option Administration	
Install Option...	
Option Installation Status	
Remote Control (K40)	Not Installed
Distance to Fault (K41)	Not Installed
Vector Network Analysis (K42)	Not Installed

Measure Setup | Instrument Setup | HW/SW Info | **Installed Options** | Exit

Installed Options	
Option Administration	
Install Option...	
Option Installation Status	
Remote Control (K40)	Installed
Distance to Fault (K41)	Not Installed
Vector Network Analysis (K42)	Not Installed

Installation successful!

Measure Setup | Instrument Setup | HW/SW Info | **Installed Options** | Exit

6.3.2 Enabling Options via the R&S License Manager

This feature is only available starting with firmware version V1.40 and higher.

Prerequisite: Your PC must be connected via Ethernet to the instrument and to the internet.

1. Open your browser and type in the IP address of your instrument.

The screenshot displays the R&S License Manager web interface. At the top, there is a navigation bar with the R&S logo and the text 'R&S License Manager'. Below this, there is a sidebar with a 'Manage Licenses' button and a 'back' button. The main content area is titled 'R&S License Manager' and contains the following sections:

- Connected Device:** A table showing device information:

FSH4	Device ID:	1309.6000K24-900204-nK
FSH4	IP Address:	172.17.75.1
Version: V1.40	Host Name:	localhost
- What do you want to do?:** A list of three actions:
 - [Install Registered License Keys and Activate Licenses](#)
 - [Register Licenses, Install License Keys and Activate Licenses](#)
 - [Reboot Device](#)
- Help:** A section titled 'Register Licenses, Install License Keys and Activate Licenses:' with the following text:

An unregistered license must be registered for a particular Rohde & Schwarz device, before the functions enabled by the license can be used on that device.

Use "Register Licenses, Install License Keys and Activate Licenses" to register such licenses. The R&S License Manager will then automatically register the licenses and install registered license keys on your device, which activates the licenses. You will be requested to enter the un-registered license keys and to select the Device ID of the target device.

2. Select "License Manager" > "Manage Licenses".
3. Choose "Register Licenses, Install License Keys and Activate Licenses" and follow the instructions.

7 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 instrument up-to-date and to be informed about new application notes related to your instrument, please send an e-mail to the Customer Support Center stating your instrument and your wish.

We will take care that you will get the right information.

Europe, Africa, Middle East

Phone +49 89 4129 12345

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Release Notes

Revision: 01

R&S[®] FSH4/FSH8 Handheld Spectrum Analyzer

Firmware Release 2.12

These Release Notes describe the following models and options of the R&S[®] Handheld Spectrum Analyzer:

- R&S[®] Handheld Spectrum Analyzer FSH4, order no. 1309.6000.x4 ¹⁾
- R&S[®] Handheld Spectrum Analyzer FSH8, order no. 1309.6000.x8 ¹⁾

New features in V2.12:

- Support for Precision Frequency Reference option (R&S[®]FSH-Z114)
- Receiver Mode and Channel Scan Measurement Application (R&S[®]FSH-K43):
 - Limit lines
 - Polygon display
 - Support for the isotropic antenna (R&S[®]TS-EMF)

New features in FSH4View Software Version V2.12

- FSH4View: Support for Receiver Mode Application (R&S[®]FSH-K43)

Important notes:

- ¹⁾ After updating instrument models R&S[®] FSH4.14, R&S[®] FSH8.18, R&S[®] FSH4.24, R&S[®] FSH8.28 from firmware versions below V2.00, the self alignment function must be performed once as described in chapter 1.2.4.

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1 Installation Information

1.1 General Information

- Firmware release V2.12 corresponds to FSH4View V2.12, which is available on the Rohde & Schwarz web page as a separate update package.
- Although older versions of FSH4View might be able to communicate with firmware release V2.12, an update of FSH4View is highly recommended, as older FSH4View versions might not support all functions included in the new firmware release.
- FSH4View V2.12 does not display the sweep window if the instrument is equipped with firmware release V1.01. It also does not preview datasets stored with firmware release V1.01. Newer firmware releases are supported in both cases.

1.2 Firmware Update

The firmware update file for the R&S FSH4/FSH8 is one file with the name FSH4_V2_12.EXE from the Rohde & Schwarz web page.

The installation can be done via SD-Card or via USB-Stick

1.2.1 Preparing the Installation via SD-Card

In order to update the device after downloading the FSH4_V2_12.EXE installation file, an SD memory card is required, e.g. R&S HA-Z231 (1 GB), order # 1309.6217.00, or R&S HA-Z232 (2 GB), order # 1309.6223.00. Please make sure that your PC is equipped with an SD card reader.

Make a backup of datasets, screenshots and modified files

Before you start the firmware update, make sure that you created a backup with FSH4View of all datasets and screenshots which you previously stored on the instrument. The same holds true for all channel tables, standards, limit lines, transducer factors and cable models which you created or modified. The factory preset necessary to complete the firmware update procedure will otherwise erase or overwrite the files.

Preparing the installation files

1. Insert an SD card into the SD card reader and wait until Windows[®] has identified the SD card as a new volume (e.g. D:)
2. Copy FSH4_V2_12.EXE into the root directory of the SD card, e.g. D:\

3. Execute FSH4_V2_12.EXE. The self-extracting .ZIP file will be unpacked.

The SD card should now contain the following files:

bootloader_SA_V2_12.bin
osimage_SA_V2_12.bin
updater_SA_V2_12.bin
splashscreen_SA.bmp
FSH4_V2_12.EXE

Note:

Please make sure that only one file of each type is present on the SD card. The update mechanism will reject the card if it detects two versions of the same file type (e.g. bootloader_SA_V1_01 and bootloader_SA_V2_12) in the root directory and abort the update later on.

Prepare the instrument

1. Switch the instrument OFF.
2. Connect the R&S FSH to AC mains via its power adapter.
Note:
The instrument firmware will refuse to perform the update if the instrument runs on battery.
3. Insert the SD card into the SD card slot at the right side of the instrument.
4. Continue with “Performing the Firmware Update on the Instrument” in Section 1.2.3

1.2.2 Preparing the installation via USB (instruments with serial numbers above 105000)

In order to update the device after downloading the FSH4_V2_12.EXE installation file, a USB stick is required.

Make a backup of datasets, screenshots and modified files.

Before you start the firmware update, make sure that you created a backup with FSH4View of all datasets and screenshots which you previously stored on the instrument. The same holds true for all channel tables, standards, limit lines, transducer factors and cable models which you created or modified. The factory preset necessary to complete the firmware update procedure will otherwise erase or overwrite the files.

Preparing the installation files

1. Insert a USB stick into the USB slot and wait until windows has identified the USB stick as a new volume (e.g. D:)
2. Copy FSH4_V2_12.EXE into the root directory of the USB stick, e.g. D:\

- Execute FSH4_V2_12.EXE. The self-extracting .ZIP file will be unpacked.

The SD card should now contain the following files:

bootloader_SA_V2_12.bin
osimage_SA_V2_12.bin
updater_SA_V2_12.bin
splashscreen_SA.bmp
FSH4_V2_12.EXE

Note:

Please make sure that only one file of each type is present on the SD card. The update mechanism will reject the card if it detects two versions of the same file type (e.g. bootloader_SA_V1_01 and bootloader_SA_V2_12) in the root directory and abort the update later on.

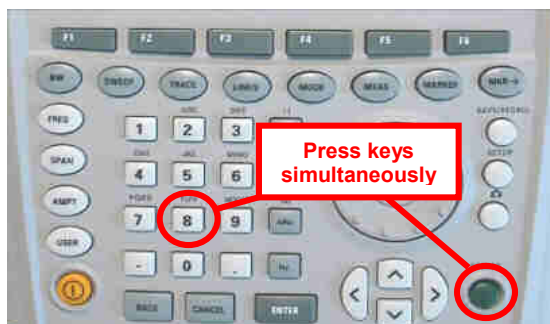
Prepare the instrument

- Switch the instrument OFF.
- Insert the USB stick into the USB slot of the instrument.

1.2.3 Performing the Firmware Update on the Instrument

The firmware update process is performed by the following steps:

- Press the keys PRESET and 8 on the numeric keypad simultaneously.



- Switch the instrument on and keep PRESET and 8 pressed for at least 5 seconds after the startup screen has appeared on the screen.



- Release the keys PRESET and 8.

The FSH will continue its boot process and after a couple of seconds the following information will appear on the screen:

Instrument Firmware Update

Searching for firmware update (updater_*.bin)
...Found \USB\updater_SA_V2_12.bin
...OK
Checking updater_SA_V2_12.bin: ... OK

Update instrument to software version V2.12
Press [ENTER] to update the firmware.
Press [CANCEL] to abort firmware updating.

Note:

If the AC mains connection is missing at the start of the firmware update process, the following message will appear at the bottom of the screen in step 3:

Instrument not powered by the power adapter. Please connect power adapter.
Press [ENTER] to retry.
Press [CANCEL] to abort firmware updating.

In this case check the power supply connection.
Continue the update process with step 4.

4. Press ENTER to start the firmware update process.
The instrument will perform the firmware update. This will take about 5 minutes.
The progress of the update will be displayed in a sequence of messages on the screen.

Warning:

Do not switch the instrument off during the update process in order to avoid data corruption of the internal flash memory!

5. As soon as the firmware update is completed, the R&S FSH will display the following message at the bottom of the screen:

Firmware updating is successfully completed.
Please switch off the instrument.

Switch the instrument off and on again. The FSH will boot with the new firmware version.

6. After the boot process is completed, press SETUP – INSTRUMENT SETUP.
Select "RESET TO FACTORY SETTINGS" by moving the cursor down the list with the cursor keys or the rotary knob. Confirm the selection with ENTER, and re-confirm with YES when prompted.
Please be patient: the subsequent reset and reboot process will take about a minute to complete.

Note:

Restoring the factory settings is necessary to update the pre-installed channel tables, cable models and transducer factors. If this step is omitted, bug fixes and updates to these pre-installed files will not be installed.

7. For instrument models .14, .18, .24 and .28 perform a self alignment according to chapter 1.2.4, if the instrument was equipped with firmware version 1.10 or below.

1.2.4 Performing the Self Alignment on the Instrument



This section is relevant for R&S FSH4.14, R&S FSH8.18, R&S FSH4.24 and R&S FSH8.28 when being updated from firmware versions below V2.00.

In Network operating mode the instrument models R&S FSH4.14, R&S FSH8.18, R&S FSH4.24 and R&S FSH8.28 support a default set of calibration data, the so-called factory calibration. This dataset is used whenever the instrument displays "fcal" in the title bar.

Instruments equipped with firmware versions below V2.00 need an update of this dataset, as V2.12 uses improved algorithms which need more data in order to obtain optimum results.

The self alignment procedure requires a calibration standard R&S FSH-Z28 (order # 1300.7810.03), which is suitable for R&S FSH8 and R&S FSH4 instruments, or at least a calibration standard R&S FSH-Z29 (order # 1300.7510.03) for R&S FSH4 instruments. In addition a RF cable with two N connectors is required in order to provide a through connection between measurement port 1 and port 2.

The self alignment is performed by the following steps:

8. Switch the instrument on
9. Select Network operation by pressing MODE – NETWORK.
10. Make sure that the instrument runs for at least 30 minutes at room temperature.
11. Press the keys SETUP – INSTRUMENT SETUP. Place the cursor on the menu entry "Self Alignment" by scrolling the menu bar down with the rotary knob and press ENTER.
The instrument will prompt you to confirm that the factory calibration data will be overwritten.
12. Press softkey YES.
The self alignment procedure will start and prompt you to connect the calibration standards and the through connection to port 1 and 2 in the sequence.
13. Follow the instructions until the instrument reports "Self Alignment Done!".
14. Press softkey EXIT to return to the measurement screen.

1.3 Installing Firmware Options

1.3.1 Enabling Options by Entering Option Key Codes



This section can be skipped if the option keys were already entered once. Option keys are not affected by a firmware update.

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

- Press the SETUP key.
- Press the softkey INSTALLED OPTIONS.
- Use the rotary knob or the cursor keys to select the INSTALL OPTION... menu item and confirm the entry with the ENTER key.
- Enter the key code (32 digit number) for the option with the numeric keys and confirm with the ENTER key.



If the correct key code is entered, the R&S FSH displays "Installation successful", and the option is marked as "Installed" in the option list (example: Remote Control (K40)).

If an invalid key code is entered, the R&S FSH displays "Invalid key code!". The correct key code can then be entered.

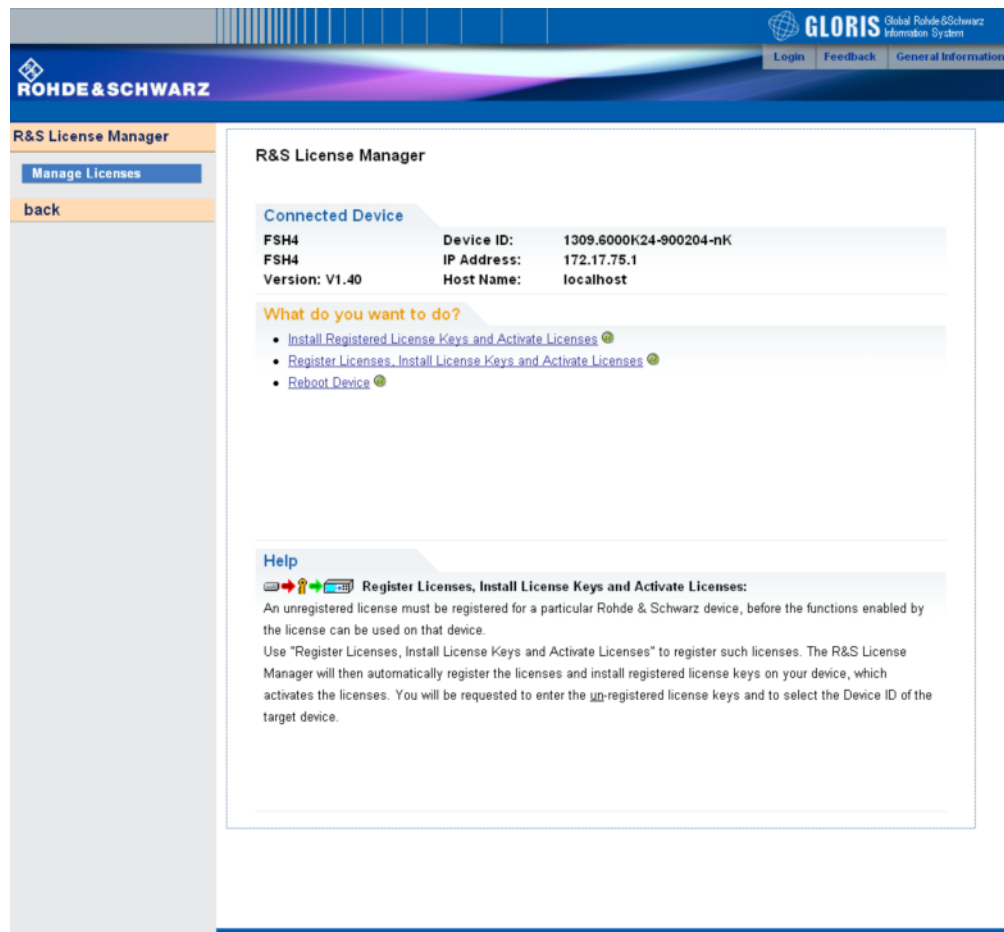


1.3.2 Enabling Options via the R&S License Manager

This feature is only available starting with firmware version V1.40 and higher.

Prerequisite: Your PC must be connected via Ethernet to the instrument and to the internet.

- Open your browser and type in the IP address of your instrument.



The screenshot displays the R&S License Manager web interface. The top navigation bar includes the Rohde & Schwarz logo and the GLORIS (Global Rohde & Schwarz Information System) logo. The main content area is titled 'R&S License Manager' and features a 'Connected Device' section with the following details:

Connected Device	Device ID:	1309.6000K24-900204-nK
FSH4	IP Address:	172.17.75.1
FSH4	Host Name:	localhost

Below this, the 'What do you want to do?' section offers three actions:

- [Install Registered License Keys and Activate Licenses](#)
- [Register Licenses, Install License Keys and Activate Licenses](#)
- [Reboot Device](#)

The 'Help' section provides instructions for the selected action:

Register Licenses, Install License Keys and Activate Licenses:
An unregistered license must be registered for a particular Rohde & Schwarz device, before the functions enabled by the license can be used on that device.
Use "Register Licenses, Install License Keys and Activate Licenses" to register such licenses. The R&S License Manager will then automatically register the licenses and install registered license keys on your device, which activates the licenses. You will be requested to enter the un-registered license keys and to select the Device ID of the target device.

- Select "License Manager" > "Manage Licenses".
- Choose "Register Licenses, Install License Keys and Activate Licenses" and follow the instructions.

2 New Functions

The following table lists the new functions in V2.12:

Version	Function
V2.12	Support for Precision Frequency Reference option (R&S®FSH-Z114)
V2.12	Receiver Mode and Channel Scan Measurement Application (R&S®FSH-K43): <ul style="list-style-type: none">• Limit lines• Polygon display• Support for isotropic antenna (R&S®TS-EMF)
V2.12	FSH4View: Support for Receiver Mode and Channel Scan Measurement Application (R&S®FSH-K43)

The following table lists modifications, which were introduced in earlier versions, and indicates the version in which the modification was introduced:

Version	Function
V2.11	GSM/EDGE Measurement Application (R&S®FSH-K10)
V2.11	Occupied bandwidth measurements in all digital modulation applications
V2.11	Trace mode settings (min/max/avg) in spectrum overview and scanner displays in all digital modulation applications
V2.11	Ec/Io measurements in 3GPP WCDMA (R&S®FSH-K44E) scrambling codes display
V2.11	FSH4View: Support of 3GPP GSM/EDGE (R&S®FSH-K10) application
V2.10	3GPP TD-SCDMA BTS power and P-CCPCH EVM measurement application (R&S®FSH-K48)
V2.10	Measurement Wizard
V2.10	SCPI command to create limit lines
V2.10	Network Analyzer: site name folder for measurement results is supported
V2.10	FSH4View: Command line support to convert .set files into .csv files
V2.00	Receiver mode and channel scan measurement application (R&S®FSH-K43) available, including remote control commands.
V2.00	Support of new power sensors R&S®NRP-Z211 and R&S®NRP-Z221
V2.00	Instrument protection with personalized PIN Code
V2.00	Spectrum Analyzer: Trace color changes on limit line violation
V2.00	Beep on fail and overload
V2.00	FSH4View: Support for Limits Screen for R&S®FSH-K50/K44 FSH4View: Support for Signal Overview display for R&S®FSH-K50/K47 FSH4View: Support for Isotropic Antenna display for R&S®FSH-K50 FSH4View: Support for Constellation display for R&S®FSH-K50 FSH4View: Support for Channel selection for R&S®FSH-K44
V1.60	Spectrum Analyzer: faster sweep time with narrow resolution bandwidth due to use of FFT filters
V1.60	Network Analyzer: trace mathematics available
V1.60	Support for different time zones. This new function should be used to adapt time and date to the local geographic conditions.
V1.60	A file rename function was added to the file manager.
V1.60	Remote Control: new data collection query and control commands for the isotropic antenna
V1.60	FSH4View: Remote Instrument Desktop available
V1.60	FSH4View: Report Generator for stored measurement results (datasets) available

3 Modified Functions

The following table lists the functions modified in V2.12:

Version	Function
V2.12	Receiver Mode: values below 9 kHz are now accepted as receiver frequency.
V2.12	Added configuration files for GSM EDGE standard
V2.12	Added and revised channel table files for digital standards

The following table lists modifications, which were introduced in earlier versions, and indicates the version in which the modification was introduced:

Version	Function
V2.11	Digital Modulation Applications: In the Spectrum Overview and Scanner Displays of the digital modulation applications, it is possible to apply TRACE mode settings
V2.10	FFT sweep now supports larger spans with narrow RBW
V2.10	Network Analyzer: manual sweep time entry is enabled again
V2.10	DTF: Change behavior upon cable model load
V2.10	DTF: Warning instead of changing center frequency on cable model load
V2.00	Vector Network Analyzer: The hardware setup was optimized to increase the margin before an overload condition is reported and to minimize the trace variation on transmission measurements with high accuracy calibration. This resulted in changes to the internal calibration data structures. As a consequence a self-alignment must be performed when updating older firmware versions to V2.00
V2.00	FSH4View: Remote desktop display available without R&S®FSH-K40
V2.00	Optimized synthesizer setup table
V1.60	Activating the isotropic antenna in the MEAS menu will automatically open the transducer factor selection list.
V1.60	When switching between operating modes (e.g. Spectrum Analyzer -> Network Analyzer), the display now shows the target operating mode while the switch is in progress.
V1.60	User must now explicitly confirm when changing the date settings. Together with the new support for time zones this mechanism should help avoiding conflicts with timed option licenses.
V1.60	Remote Control: In manual operation the span is adjusted automatically when selecting narrow resolution bandwidths. Via remote control the resolution bandwidth command was rejected if the span settings didn't match. Starting with V1.60 the remote control behavior is equal to the behavior in manual operation.
V1.59	LTE Constellation Display Show Allocations menu has been modified/improved
V1.59	Display of WCDMA composite EVM for instruments with serial numbers below 105000 with new frequency response alignment

4 Improvements

The following table lists the issues eliminated in V2.12:

Version	Function
V2.12	Fixed a memory leak in Power Meter when using USB Power Sensor
V2.12	Receiver Mode and Channel Scan Measurement Application (R&S®FSH-K43): <ul style="list-style-type: none"> • GPS coordinate display is now supported • Ext. Ref. indicator is now supported • Improved compensation for level drift over temperature changes

The following table lists the issues already eliminated in earlier versions and indicates the version in which the issues were eliminated:

Version	Function
V2.11	Improved performance of LTE BTS scanner in R&S®FSH-K50E application
V2.11	Improved performance of EV-DO BTS scanner in R&S®FSH-K47E application
V2.11	cdma2000 & 1xEV-DO: The GPS trigger has been corrected to avoid displaying wrong PN offsets
V2.10	DTF: Tracking Generator attenuation is not taken into account in DTF measurement
V2.10	DTF: Reflection measurement on port 2 doesn't work without prior calibration
V1.59	For digital modulation measurements, the level adjust algorithm has been optimized
V1.59	WCDMA customized channel table entries did not increment (this works now)
V1.59	1xEV-DO Measurements have been optimized with a known PN offset
V1.59	Spectral inversion in cdma2000 and 1xEV-DO spectrum overview displays (has been eliminated)
V1.59	DC offset in Digital Modulation spectrum overview displays (has been eliminated)
V1.59	Display of Constellation Diagram in LTE has been optimized (speed up)
V1.59	LTE over-the-air performance has been improved

5 Known Issues

The following table lists the known issues in V2.12:

Issues
When using Frequency Counter function in the Single Sweep mode, and using Precision Frequency Reference option (R&S®FSH-Z114), the Frequency Counter result always shows a value of zero. To overcome this, Continues Sweep mode should be used.
In WCDMA, if the scrambling code is entered manually, a new sweep has to be performed always to make the changes valid. To overcome this "Scrambling Code Auto" should be used.

6 Modifications to the Documentation

The latest manual can be downloaded from the R&S FSH4/8 spectrum analyzer product web page under: <http://www.rohde-schwarz.com>. Select "DOWNLOADS" and "MANUALS".

7 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 instrument up-to-date and to be informed about new application notes related to your instrument, please send an e-mail to the Customer Support Center stating your instrument 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

Release Notes

Revision: 01

R&S[®] FSH4/FSH8 Handheld Spectrum Analyzer

Firmware Release 2.11

These Release Notes describe the following models and options of the R&S[®] Handheld Spectrum Analyzer:

- R&S[®] Handheld Spectrum Analyzer FSH4, order no. 1309.6000.x4 ¹⁾
- R&S[®] Handheld Spectrum Analyzer FSH8, order no. 1309.6000.x8 ¹⁾

New features in V2.11:

- GSM, EDGE Measurement Application (R&S@FSH-K10)
- Occupied Bandwidth Measurement in all Digital Modulation applications
- New Trace Mode settings in all Digital Modulation applications
- Added Ec/Io measurements in 3GPP WCDMA (R&S@FSH-K44) scrambling codes display

New features of FSH4View Software Version V2.11

- FSH4View: Support for 3GPP GSM/EDGE BTS Application (R&S@FSH-K10)

Important notes:

- ¹⁾ After updating instrument models R&S[®]FSH4.14, R&S[®]FSH8.18, R&S[®]FSH4.24, R&S[®]FSH8.28 from firmware versions below V2.00, the self alignment function must be performed once as described in chapter 1.2.4.

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1 Installation Information

1.1 General Information

- Firmware release V2.11 corresponds to FSH4View V2.11, which is available on the Rohde & Schwarz web page as a separate update package.
- Although older versions of FSH4View might be able to communicate with firmware release V2.11, an update of FSH4View is highly recommended, as older FSH4View versions might not support all functions included in the new firmware release.
- FSH4View V2.11 does not display the sweep window if the instrument is equipped with firmware release V1.01. It also does not preview datasets stored with firmware release V1.01. Newer firmware releases are supported in both cases.

1.2 Firmware Update

The firmware update file for the R&S FSH4/FSH8 is one file with the name FSH4_V2_11.EXE from the Rohde & Schwarz web page.

The installation can be done via SD-Card or via USB-Stick

1.2.1 Preparing the Installation via SD-Card

In order to update the device after downloading the FSH4_V2_11.EXE installation file, an SD memory card is required, e.g. R&S HA-Z231 (1 GB), order # 1309.6217.00, or R&S HA-Z232 (2 GB), order # 1309.6223.00. Please make sure that your PC is equipped with an SD card reader.

Make a backup of datasets, screenshots and modified files

Before you start the firmware update, make sure that you created a backup with FSH4View of all datasets and screenshots which you previously stored on the instrument. The same holds true for all channel tables, standards, limit lines, transducer factors and cable models which you created or modified. The factory preset necessary to complete the firmware update procedure will otherwise erase or overwrite the files.

Preparing the installation files

1. Insert an SD card into the SD card reader and wait until Windows® has identified the SD card as a new volume (e.g. D:)
2. Copy FSH4_V2_11.EXE into the root directory of the SD card, e.g. D:\

3. Execute FSH4_V2_11.EXE. The self-extracting .ZIP file will be unpacked.

The SD card should now contain the following files:

bootloader_SA_V2_11.bin
osimage_SA_V2_11.bin
updater_SA_V2_11.bin
splashscreen_SA.bmp
FSH4_V2_11.EXE

Note:

Please make sure that only one file of each type is present on the SD card. The update mechanism will reject the card if it detects two versions of the same file type (e.g. bootloader_SA_V1_01 and bootloader_SA_V2_11) in the root directory and abort the update later on.

Prepare the instrument

1. Switch the instrument OFF.
2. Connect the R&S FSH to AC mains via its power adapter.

Note:

The instrument firmware will refuse to perform the update if the instrument runs on battery.

3. Insert the SD card into the SD card slot at the right side of the instrument.
4. Continue with “Performing the Firmware Update on the Instrument” in Section 1.2.3

1.2.2 Preparing the installation via USB (instruments with serial numbers above 105000)

In order to update the device after downloading the FSH4_V2_11.EXE installation file, a USB stick is required.

Make a backup of datasets, screenshots and modified files.

Before you start the firmware update, make sure that you created a backup with FSH4View of all datasets and screenshots which you previously stored on the instrument. The same holds true for all channel tables, standards, limit lines, transducer factors and cable models which you created or modified. The factory preset necessary to complete the firmware update procedure will otherwise erase or overwrite the files.

Preparing the installation files

1. Insert a USB stick into the USB slot and wait until windows has identified the USB stick as a new volume (e.g. D:)
2. Copy FSH4_V2_11.EXE into the root directory of the USB stick, e.g. D:\

- Execute FSH4_V2_11.EXE. The self-extracting .ZIP file will be unpacked.

The SD card should now contain the following files:

bootloader_SA_V2_11.bin
osimage_SA_V2_11.bin
updater_SA_V2_11.bin
splashscreen_SA.bmp
FSH4_V2_11.EXE

Note:

Please make sure that only one file of each type is present on the SD card. The update mechanism will reject the card if it detects two versions of the same file type (e.g. bootloader_SA_V1_01 and bootloader_SA_V2_11) in the root directory and abort the update later on.

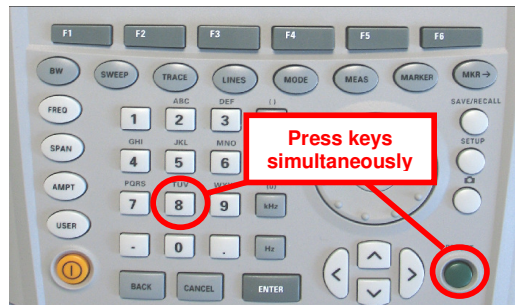
Prepare the instrument

- Switch the instrument OFF.
- Insert the USB stick into the USB slot of the instrument.

1.2.3 Performing the Firmware Update on the Instrument

The firmware update process is performed by the following steps:

- Press the keys PRESET and 8 on the numeric keypad simultaneously.



- Switch the instrument on and keep PRESET and 8 pressed for at least 5 seconds after the startup screen has appeared on the screen.



- Release the keys PRESET and 8.

The FSH will continue its boot process and after a couple of seconds the following information will appear on the screen:

Instrument Firmware Update

Searching for firmware update (updater_*.bin)
...Found \USB\updater_SA_V2_11.bin
...OK
Checking updater_SA_V2_11.bin: ... OK

Update instrument to software version V2.11
Press [ENTER] to update the firmware.
Press [CANCEL] to abort firmware updating.

Note:

If the AC mains connection is missing at the start of the firmware update process, the following message will appear at the bottom of the screen in step 3:

Instrument not powered by the power adapter. Please connect power adapter.
Press [ENTER] to retry.
Press [CANCEL] to abort firmware updating.

In this case check the power supply connection.
Continue the update process with step 4.

4. Press ENTER to start the firmware update process.
The instrument will perform the firmware update. This will take about 5 minutes.
The progress of the update will be displayed in a sequence of messages on the screen.

Warning:

Do not switch the instrument off during the update process in order to avoid data corruption of the internal flash memory!

5. As soon as the firmware update is completed, the R&S FSH will display the following message at the bottom of the screen:

Firmware updating is successfully completed.
Please switch off the instrument.

Switch the instrument off and on again. The FSH will boot with the new firmware version.

6. After the boot process is completed, press SETUP – INSTRUMENT SETUP.
Select "RESET TO FACTORY SETTINGS" by moving the cursor down the list with the cursor keys or the rotary knob. Confirm the selection with ENTER, and re-confirm with YES when prompted.
Please be patient: the subsequent reset and reboot process will take about a minute to complete.

Note:

Restoring the factory settings is necessary to update the pre-installed channel tables, cable models and transducer factors. If this step is omitted, bug fixes and updates to these pre-installed files will not be installed.

7. For instrument models .14, .18, .24 and .28 perform a self alignment according to chapter 1.2.4, if the instrument was equipped with firmware version 1.10 or below.

1.2.4 Performing the Self Alignment on the Instrument



This section is relevant for R&S FSH4.14, R&S FSH8.18, R&S FSH4.24 and R&S FSH8.28 when being updated from firmware versions below V2.00.

In Network operating mode the instrument models R&S FSH4.14, R&S FSH8.18, R&S FSH4.24 and R&S FSH8.28 support a default set of calibration data, the so-called factory calibration. This dataset is used whenever the instrument displays "fcal" in the title bar.

Instruments equipped with firmware versions below V2.00 need an update of this dataset, as V2.11 uses improved algorithms which need more data in order to obtain optimum results.

The self alignment procedure requires a calibration standard R&S FSH-Z28 (order # 1300.7810.03), which is suitable for R&S FSH8 and R&S FSH4 instruments, or at least a calibration standard R&S FSH-Z29 (order # 1300.7510.03) for R&S FSH4 instruments. In addition a RF cable with two N connectors is required in order to provide a through connection between measurement port 1 and port 2.

The self alignment is performed by the following steps:

8. Switch the instrument on
9. Select Network operation by pressing MODE – NETWORK.
10. Make sure that the instrument runs for at least 30 minutes at room temperature.
11. Press the keys SETUP – INSTRUMENT SETUP. Place the cursor on the menu entry "Self Alignment" by scrolling the menu bar down with the rotary knob and press ENTER.
The instrument will prompt you to confirm that the factory calibration data will be overwritten.
12. Press softkey YES.
The self alignment procedure will start and prompt you to connect the calibration standards and the through connection to port 1 and 2 in the sequence.
13. Follow the instructions until the instrument reports "Self Alignment Done!".
14. Press softkey EXIT to return to the measurement screen.

1.3 Installing Firmware Options

1.3.1 Enabling Options by Entering Option Key Codes



This section can be skipped if the option keys were already entered once. Option keys are not affected by a firmware update.

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

- Press the SETUP key.
- Press the softkey INSTALLED OPTIONS.
- Use the rotary knob or the cursor keys to select the INSTALL OPTION... menu item and confirm the entry with the ENTER key.
- Enter the key code (32 digit number) for the option with the numeric keys and confirm with the ENTER key.

Installed Options	
Option Administration	
Install Option...	
Option Installation Status	
Remote Control (K40)	Not Installed
Distance to Fault (K41)	Not Installed
Vector Network Analysis (K42)	Not Installed

Measure Setup Instrument Setup HW/SW Info **Installed Options** Exit

If the correct key code is entered, the R&S FSH displays "Installation successful", and the option is marked as "Installed" in the option list (example: Remote Control (K40)).

If an invalid key code is entered, the R&S FSH displays "Invalid key code!". The correct key code can then be entered.

Installed Options	
Option Administration	
Install Option...	
Option Installation Status	
Remote Control (K40)	Installed
Distance to Fault (K41)	Not Installed
Vector Network Analysis (K42)	Not Installed

Installation successful!

Measure Setup Instrument Setup HW/SW Info **Installed Options** Exit

1.3.2 Enabling Options via the R&S License Manager

This feature is only available starting with firmware version V1.40 and higher.

Prerequisite: Your PC must be connected via Ethernet to the instrument and to the internet.

- Open your browser and type in the IP address of your instrument.

The screenshot shows the R&S License Manager web interface. The top navigation bar includes the Rohde & Schwarz logo and the GLORIS logo. The sidebar on the left has 'R&S License Manager' and 'Manage Licenses' selected. The main content area displays the following information:

R&S License Manager

Connected Device

FSH4	Device ID:	1309.6000K24-900204-nK
FSH4	IP Address:	172.17.75.1
Version: V1.40	Host Name:	localhost

What do you want to do?

- [Install Registered License Keys and Activate Licenses](#)
- [Register Licenses, Install License Keys and Activate Licenses](#)
- [Reboot Device](#)

Help

Register Licenses, Install License Keys and Activate Licenses:

An unregistered license must be registered for a particular Rohde & Schwarz device, before the functions enabled by the license can be used on that device.

Use "Register Licenses, Install License Keys and Activate Licenses" to register such licenses. The R&S License Manager will then automatically register the licenses and install registered license keys on your device, which activates the licenses. You will be requested to enter the un-registered license keys and to select the Device ID of the target device.

- Select "License Manager" > "Manage Licenses".
- Choose "Register Licenses, Install License Keys and Activate Licenses" and follow the instructions.

2 New Functions

The following table lists the new functions in V2.11:

Version	Function
V2.11	GSM/EDGE Measurement Application (R&S®FSH-K10)
V2.11	Occupied bandwidth measurements in all digital modulation applications
V2.11	Trace mode settings (min/max/avg) in spectrum overview and scanner displays in all digital modulation applications
V2.11	Ec/Io measurements in 3GPP WCDMA (R&S®FSH-K44E) scrambling codes display
V2.11	FSH4View: Support of 3GPP GSM/EDGE (R&S®FSH-K10) application

The following table lists modifications, which were introduced in earlier versions, and indicates the version in which the modification was introduced:

Version	Function
V2.10	3GPP TD-SCDMA BTS power and P-CCPCH EVM measurement application (R&S@FSH-K48)
V2.10	Measurement Wizard
V2.10	SCPI command to create limit lines
V2.10	Network Analyzer: site name folder for measurement results is supported
V2.10	FSH4View: Command line support to convert .set files into .csv files
V2.00	Receiver mode and channel scan measurement application (R&S@FSH-K43) available, including remote control commands.
V2.00	Support of new power sensors R&S@NRP-Z211 and R&S@NRP-Z221
V2.00	Instrument protection with personalized PIN Code
V2.00	Spectrum Analyzer: Trace color changes on limit line violation
V2.00	Beep on fail and overload
V2.00	FSH4View: Support for Limits Screen for R&S@FSH-K50/K44 FSH4View: Support for Signal Overview display for R&S@FSH-K50/K47 FSH4View: Support for Isotropic Antenna display for R&S@FSH-K50 FSH4View: Support for Constellation display for R&S@FSH-K50 FSH4View: Support for Channel selection for R&S@FSH-K44
V1.60	Spectrum Analyzer: faster sweep time with narrow resolution bandwidth due to use of FFT filters
V1.60	Network Analyzer: trace mathematics available
V1.60	Support for different time zones. This new function should be used to adapt time and date to the local geographic conditions.
V1.60	A file rename function was added to the file manager.
V1.60	Remote Control: new data collection query and control commands for the isotropic antenna
V1.60	FSH4View: Remote Instrument Desktop available
V1.60	FSH4View: Report Generator for stored measurement results (datasets) available
V1.59	V1.59 LTE (R&S@FSH-K50E/-K51E): Resource Allocations Display
V1.59	LTE (R&S@FSH-K50E/-K51E): Isotropic Antenna Display
V1.59	LTE (R&S@FSH-K50/-K51/-K50E/-K51E): Composite EVM measurement
V1.59	3GPP/WCDMA (R&S@FSH-K44/-K44E): Limit check status screen for PASS/FAIL check of selectable measurement results
V1.59	1xEV-DO (R&S@FSH-K47E): PN Scanner Display
V1.59	1xEV-DO (R&S@FSH-K47E): Burst Power Display
V1.59	All Digital Modulation Applications (R&S@FSH-K44/-K46/-K47/-K50/-K51): Improved Level Adjust Operation

3 Modified Functions

The following table lists the functions modified in V2.11:

Version	Function
V2.11	Digital Modulation Applications: In the Spectrum Overview and Scanner Displays of the digital modulation applications, it is possible to apply TRACE mode settings

The following table lists modifications, which were introduced in earlier versions, and indicates the version in which the modification was introduced:

Version	Function
V2.10	FFT sweep now supports larger spans with narrow RBW
V2.10	Network Analyzer: manual sweep time entry is enabled again
V2.10	DTF: Change behavior upon cable model load
V2.10	DTF: Warning instead of changing center frequency on cable model load
V2.00	Vector Network Analyzer: The hardware setup was optimized to increase the margin before an overload condition is reported and to minimize the trace variation on transmission measurements with high accuracy calibration. This resulted in changes to the internal calibration data structures. As a consequence a self-alignment must be performed when updating older firmware versions to V2.00
V2.00	FSH4View: Remote desktop display available without R&S®FSH-K40
V2.00	Optimized synthesizer setup table
V1.60	Activating the isotropic antenna in the MEAS menu will automatically open the transducer factor selection list.
V1.60	When switching between operating modes (e.g. Spectrum Analyzer -> Network Analyzer), the display now shows the target operating mode while the switch is in progress.
V1.60	User must now explicitly confirm when changing the date settings. Together with the new support for time zones this mechanism should help avoiding conflicts with timed option licenses.
V1.60	Remote Control: In manual operation the span is adjusted automatically when selecting narrow resolution bandwidths. Via remote control the resolution bandwidth command was rejected if the span settings didn't match. Starting with V1.60 the remote control behavior is equal to the behavior in manual operation.
V1.59	LTE Constellation Display Show Allocations menu has been modified/improved
V1.59	Display of WCDMA composite EVM for instruments with serial numbers below 105000 with new frequency response alignment
V1.58	Optimized synthesizer setup table

4 Improvements

The following table lists the issues eliminated in V2.11:

Version	Function
V2.11	Improved performance of LTE BTS scanner in R&S®FSH-K50E application
V2.11	Improved performance of EV-DO BTS scanner in R&S®FSH-K47E application
V2.11	cdma2000 & 1xEV-DO: The GPS trigger has been corrected to avoid displaying wrong PN offsets

The following table lists the issues already eliminated in earlier versions and indicates the version in which the issues were eliminated:

Version	Function
V2.10	DTF: Tracking Generator attenuation is not taken into account in DTF measurement
V2.10	DTF: Reflection measurement on port 2 doesn't work without prior calibration
V1.59	For digital modulation measurements, the level adjust algorithm has been optimized
V1.59	WCDMA customized channel table entries did not increment (this works now)
V1.59	1xEV-DO Measurements have been optimized with a known PN offset
V1.59	Spectral inversion in cdma2000 and 1xEV-DO spectrum overview displays (has been eliminated)
V1.59	DC offset in Digital Modulation spectrum overview displays (has been eliminated)
V1.59	Display of Constellation Diagram in LTE has been optimized (speed up)
V1.59	LTE over-the-air performance has been improved
V1.58	Improved speed on marker frequency change with active Marker Demod function.
V1.58	Network Analyzer: Improved full two port calibration accuracy
V1.58	SCPI command for Electrical Cable length didn't work
V1.58	SCPI command for Detector Auto on Trace 2 didn't work
V1.58	FSH4View: Improved import of limit lines in .csv format if values contain digits behind the decimal point
V1.58	FSH4View: Improved display of measurements with active transducer in unit V/m

5 Known Issues

The following table lists the known issues in V2.11:

Issues
In WCDMA, if the scrambling code is entered manually, a new sweep has to be performed always to make the changes valid. To overcome this "Scrambling Code Auto" should be used.

6 Modifications to the Documentation

The latest manual can be downloaded from the R&S FSH4/8 spectrum analyzer product web page under: <http://www.rohde-schwarz.com>. Select "DOWNLOADS" and "MANUALS".

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

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Release Notes

Revision: 01

R&S® FSH4/FSH8 Handheld Spectrum Analyzer

Firmware Release V2.10

These Release Notes describe the following models and options of the R&S® Handheld Spectrum Analyzer:

- R&S® Handheld Spectrum Analyzer FSH4, order no. 1309.6000.x4 ¹⁾
- R&S® Handheld Spectrum Analyzer FSH8, order no. 1309.6000.x8 ¹⁾

New features in V2.10:

- 3GPP TD-SCDMA BTS power and P-CCPCH EVM measurement application (R&S®FSH-K48)
- Measurement Wizard
- SCPI command to create limit lines
- Network Analyzer: site name folder for measurement results is supported

New features of FSH4View Software Version V2.10

- FSH4View: Command line support to convert .set files into .csv files

Important notes:

- ¹⁾ After updating instrument models R&S®FSH4.14, R&S®FSH8.18, R&S®FSH4.24, R&S®FSH8.28 from firmware versions below V2.00, the self alignment function must be performed once as described in chapter 1.2.4.

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1 Installation Information

1.1 General Information

- Firmware release V2.10 corresponds to FSH4View V2.10, which is available on the Rohde & Schwarz web page as a separate update package.
- Although older versions of FSH4View might be able to communicate with firmware release V2.10, an update of FSH4View is highly recommended, as older FSH4View versions might not support all functions included in the new firmware release.
- FSH4View V2.10 does not display the sweep window if the instrument is equipped with firmware release V1.01. It also does not preview datasets stored with firmware release V1.01. Newer firmware releases are supported in both cases.

1.2 Firmware Update

The firmware update file for the R&S FSH4/FSH8 is one file with the name FSH4_V2_10.EXE from the Rohde & Schwarz web page.

The installation can be done via SD-Card or via USB-Stick

1.2.1 Preparing the Installation via SD-Card

In order to update the device after downloading the FSH4_V2_10.EXE installation file, an SD memory card is required, e.g. R&S HA-Z231 (1 GB), order # 1309.6217.00, or R&S HA-Z232 (2 GB), order # 1309.6223.00. Please make sure that your PC is equipped with an SD card reader.

Make a backup of datasets, screenshots and modified files

Before you start the firmware update, make sure that you created a backup with FSH4View of all datasets and screenshots which you previously stored on the instrument. The same holds true for all channel tables, standards, limit lines, transducer factors and cable models which you created or modified. The factory preset necessary to complete the firmware update procedure will otherwise erase or overwrite the files.

Preparing the installation files

1. Insert an SD card into the SD card reader and wait until Windows[®] has identified the SD card as a new volume (e.g. D:)
2. Copy FSH4_V2_10.EXE into the root directory of the SD card, e.g. D:\

3. Execute FSH4_V2_10.EXE. The self-extracting .ZIP file will be unpacked.

The SD card should now contain the following files:

bootloader_SA_V2_10.bin
osimage_SA_V2_10.bin
updater_SA_V2_10.bin
splashscreen_SA.bmp
FSH4_V2_10.EXE

Note:

Please make sure that only one file of each type is present on the SD card. The update mechanism will reject the card if it detects two versions of the same file type (e.g. bootloader_SA_V1_01 and bootloader_SA_V2_10) in the root directory and abort the update later on.

Prepare the instrument

1. Switch the instrument OFF.
2. Connect the R&S FSH to AC mains via its power adapter.
Note:
The instrument firmware will refuse to perform the update if the instrument runs on battery.
3. Insert the SD card into the SD card slot at the right side of the instrument.
4. Continue with “Performing the Firmware Update on the Instrument” in Section 1.2.3

1.2.2 Preparing the installation via USB (instruments with serial numbers above 105000)

In order to update the device after downloading the FSH4_V2_10.EXE installation file, a USB stick is required.

Make a backup of datasets, screenshots and modified files.

Before you start the firmware update, make sure that you created a backup with FSH4View of all datasets and screenshots which you previously stored on the instrument. The same holds true for all channel tables, standards, limit lines, transducer factors and cable models which you created or modified. The factory preset necessary to complete the firmware update procedure will otherwise erase or overwrite the files.

Preparing the installation files

1. Insert a USB stick into the USB slot and wait until windows has identified the USB stick as a new volume (e.g. D:)
2. Copy FSH4_V2_10.EXE into the root directory of the USB stick, e.g. D:\

- Execute FSH4_V2_10.EXE. The self-extracting .ZIP file will be unpacked.

The SD card should now contain the following files:

bootloader_SA_V2_10.bin
osimage_SA_V2_10.bin
updater_SA_V2_10.bin
splashscreen_SA.bmp
FSH4_V2_10.EXE

Note:

Please make sure that only one file of each type is present on the SD card. The update mechanism will reject the card if it detects two versions of the same file type (e.g. bootloader_SA_V1_01 and bootloader_SA_V2_10) in the root directory and abort the update later on.

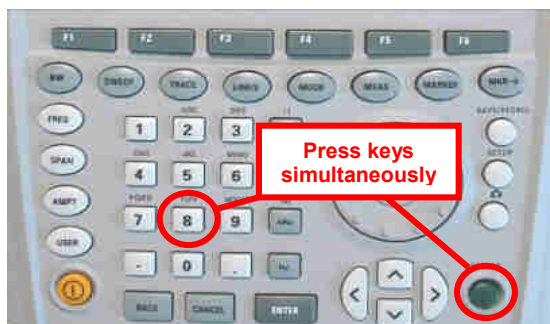
Prepare the instrument

- Switch the instrument OFF.
- Insert the USB stick into the USB slot of the instrument.

1.2.3 Performing the Firmware Update on the Instrument

The firmware update process is performed by the following steps:

- Press the keys PRESET and 8 on the numeric keypad simultaneously.



- Switch the instrument on and keep PRESET and 8 pressed for at least 5 seconds after the startup screen has appeared on the screen.



- Release the keys PRESET and 8.

The FSH will continue its boot process and after a couple of seconds the following information will appear on the screen:

Instrument Firmware Update

Searching for firmware update (updater_*.bin)
...Found \USB\updater_SA_V2_10.bin
...OK
Checking updater_SA_V2_10.bin: ... OK

Update instrument to software version V2.10
Press [ENTER] to update the firmware.
Press [CANCEL] to abort firmware updating.

Note:

If the AC mains connection is missing at the start of the firmware update process, the following message will appear at the bottom of the screen in step 3:

Instrument not powered by the power adapter. Please connect power adapter.
Press [ENTER] to retry.
Press [CANCEL] to abort firmware updating.

In this case check the power supply connection.
Continue the update process with step 4.

4. Press ENTER to start the firmware update process.
The instrument will perform the firmware update. This will take about 5 minutes.
The progress of the update will be displayed in a sequence of messages on the screen.

Warning:

Do not switch the instrument off during the update process in order to avoid data corruption of the internal flash memory!

5. As soon as the firmware update is completed, the R&S FSH will display the following message at the bottom of the screen:

Firmware updating is successfully completed.
Please switch off the instrument.

Switch the instrument off and on again. The FSH will boot with the new firmware version.

6. After the boot process is completed, press SETUP – INSTRUMENT SETUP.
Select "RESET TO FACTORY SETTINGS" by moving the cursor down the list with the cursor keys or the rotary knob. Confirm the selection with ENTER, and re-confirm with YES when prompted.
Please be patient: the subsequent reset and reboot process will take about a minute to complete.

Note:

Restoring the factory settings is necessary to update the pre-installed channel tables, cable models and transducer factors. If this step is omitted, bug fixes and updates to these pre-installed files will not be installed.

7. For instrument models .14, .18, .24 and .28 perform a self alignment according to chapter 1.2.4, if the instrument was equipped with firmware version 1.10 or below.

1.2.4 Performing the Self Alignment on the Instrument



This section is relevant for R&S FSH4.14, R&S FSH8.18, R&S FSH4.24 and R&S FSH8.28 when being updated from firmware versions below V2.00.

In Network operating mode the instrument models R&S FSH4.14, R&S FSH8.18, R&S FSH4.24 and R&S FSH8.28 support a default set of calibration data, the so-called factory calibration. This dataset is used whenever the instrument displays "fcal" in the title bar.

Instruments equipped with firmware versions below V2.00 need an update of this dataset, as V2.10 uses improved algorithms which need more data in order to obtain optimum results.

The self alignment procedure requires a calibration standard R&S FSH-Z28 (order # 1300.7810.03), which is suitable for R&S FSH8 and R&S FSH4 instruments, or at least a calibration standard R&S FSH-Z29 (order # 1300.7510.03) for R&S FSH4 instruments. In addition a RF cable with two N connectors is required in order to provide a through connection between measurement port 1 and port 2.

The self alignment is performed by the following steps:

8. Switch the instrument on
9. Select Network operation by pressing MODE – NETWORK.
10. Make sure that the instrument runs for at least 30 minutes at room temperature.
11. Press the keys SETUP – INSTRUMENT SETUP. Place the cursor on the menu entry "Self Alignment" by scrolling the menu bar down with the rotary knob and press ENTER.
The instrument will prompt you to confirm that the factory calibration data will be overwritten.
12. Press softkey YES.
The self alignment procedure will start and prompt you to connect the calibration standards and the through connection to port 1 and 2 in the sequence.
13. Follow the instructions until the instrument reports "Self Alignment Done!".
14. Press softkey EXIT to return to the measurement screen.

1.3 Installing Firmware Options

1.3.1 Enabling Options by Entering Option Key Codes



This section can be skipped if the option keys were already entered once. Option keys are not affected by a firmware update.

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

- Press the SETUP key.
- Press the softkey INSTALLED OPTIONS.
- Use the rotary knob or the cursor keys to select the INSTALL OPTION... menu item and confirm the entry with the ENTER key.
- Enter the key code (32 digit number) for the option with the numeric keys and confirm with the ENTER key.



If the correct key code is entered, the R&S FSH displays "Installation successful", and the option is marked as "Installed" in the option list (example: Remote Control (K40)).

If an invalid key code is entered, the R&S FSH displays "Invalid key code!". The correct key code can then be entered.

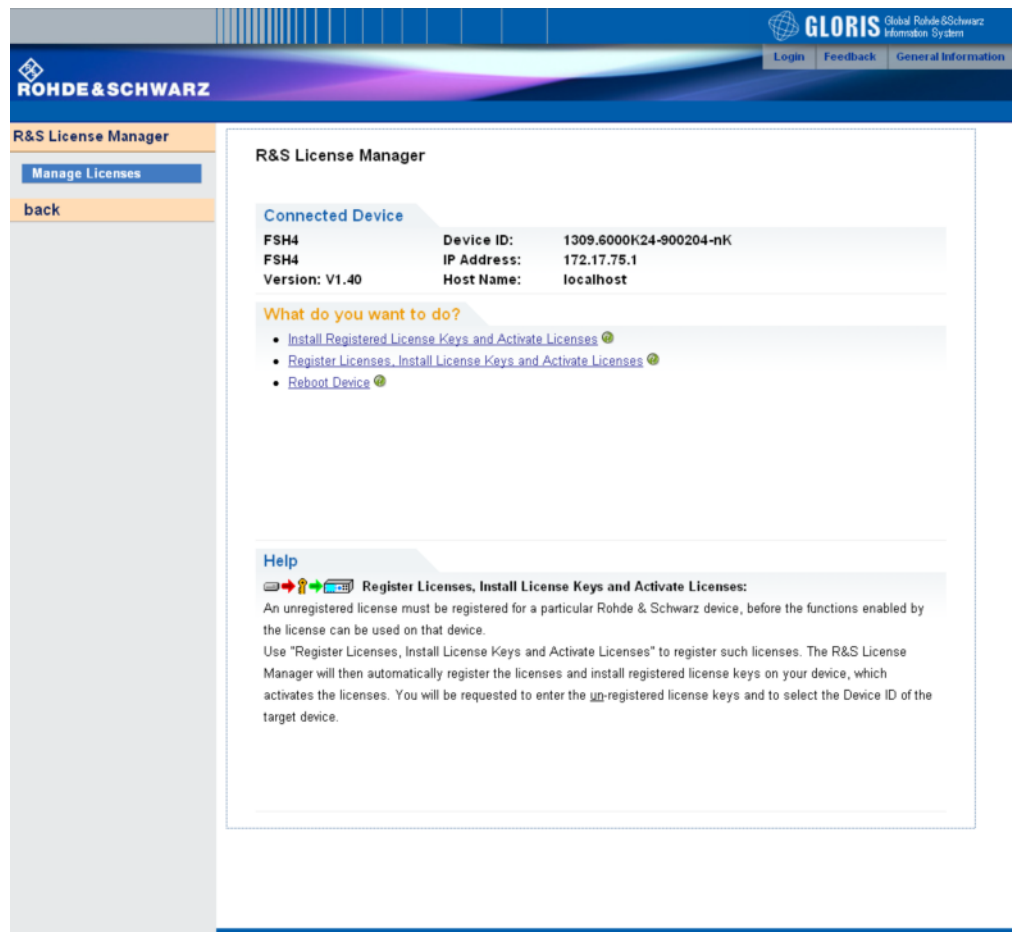


1.3.2 Enabling Options via the R&S License Manager

This feature is only available starting with firmware version V1.40 and higher.

Prerequisite: Your PC must be connected via Ethernet to the instrument and to the internet.

- Open your browser and type in the IP address of your instrument.



The screenshot displays the R&S License Manager web interface. The top navigation bar includes the Rohde & Schwarz logo and the GLORIS (Global Rohde & Schwarz Information System) logo. The main content area is titled 'R&S License Manager' and features a sidebar with 'Manage Licenses' and 'back' buttons. The 'Connected Device' section shows the following information:

FSH4	Device ID:	1309.6000K24-900204-nK
FSH4	IP Address:	172.17.75.1
Version: V1.40	Host Name:	localhost

The 'What do you want to do?' section offers three actions:

- [Install Registered License Keys and Activate Licenses](#)
- [Register Licenses, Install License Keys and Activate Licenses](#)
- [Reboot Device](#)

The 'Help' section provides instructions for the 'Register Licenses, Install License Keys and Activate Licenses' action:

Register Licenses, Install License Keys and Activate Licenses:
An unregistered license must be registered for a particular Rohde & Schwarz device, before the functions enabled by the license can be used on that device.
Use "Register Licenses, Install License Keys and Activate Licenses" to register such licenses. The R&S License Manager will then automatically register the licenses and install registered license keys on your device, which activates the licenses. You will be requested to enter the un-registered license keys and to select the Device ID of the target device.

- Select "License Manager" > "Manage Licenses".
- Choose "Register Licenses, Install License Keys and Activate Licenses" and follow the instructions.

2 New Functions

The following table lists the new functions in V2.10:

Version	Function
V2.10	3GPP TD-SCDMA BTS power and P-CCPCH EVM measurement application (R&S@FSH-K48)
V2.10	Measurement Wizard
V2.10	SCPI command to create limit lines
V2.10	Network Analyzer: site name folder for measurement results is supported
V2.10	FSH4View: Command line support to convert .set files into .csv files

The following table lists modifications, which were introduced in earlier versions, and indicates the version in which the modification was introduced:

Version	Function
V2.00	Receiver mode and channel scan measurement application (R&S®FSH-K43) available, including remote control commands.
V2.00	Support of new power sensors R&S®NRP-Z211 and R&S®NRP-Z221
V2.00	Instrument protection with personalized PIN Code
V2.00	Spectrum Analyzer: Trace color changes on limit line violation
V2.00	Beep on fail and overload
V2.00	FSH4View: Support for Limits Screen for R&S®FSH-K50/K44 FSH4View: Support for Signal Overview display for R&S®FSH-K50/K47 FSH4View: Support for Isotropic Antenna display for R&S®FSH-K50 FSH4View: Support for Constellation display for R&S®FSH-K50 FSH4View: Support for Channel selection for R&S®FSH-K44
V1.60	Spectrum Analyzer: faster sweep time with narrow resolution bandwidth due to use of FFT filters
V1.60	Network Analyzer: trace mathematics available
V1.60	Support for different time zones. This new function should be used to adapt time and date to the local geographic conditions.
V1.60	A file rename function was added to the file manager.
V1.60	Remote Control: new data collection query and control commands for the isotropic antenna
V1.60	FSH4View: Remote Instrument Desktop available
V1.60	FSH4View: Report Generator for stored measurement results (datasets) available
V1.59	V1.59 LTE (R&S®FSH-K50E/-K51E): Resource Allocations Display
V1.59	LTE (R&S®FSH-K50E/-K51E): Isotropic Antenna Display
V1.59	LTE (R&S®FSH-K50/-K51/-K50E/-K51E): Composite EVM measurement
V1.59	3GPP/WCDMA (R&S®FSH-K44/-K44E): Limit check status screen for PASS/FAIL check of selectable measurement results
V1.59	1xEV-DO (R&S®FSH-K47E): PN Scanner Display
V1.59	1xEV-DO (R&S®FSH-K47E): Burst Power Display
V1.59	All Digital Modulation Applications (R&S®FSH-K44/-K46/-K47/-K50/-K51): Improved Level Adjust Operation
V1.59	FSH4View: Support for Limits Editor for R&S®FSH-K47 FSH4View: Support for Spectrum Overview display for R&S®FSH-K47 FSH4View: Support for Isotropic Antenna display for R&S®FSH-K47 FSH4View: Support for Code Domain display for R&S®FSH-K47E FSH4View: Support for Code Domain table for R&S®FSH-K47E
V1.58	Distance To Fault: Update of cable models: LDF4-50A (8 GHz), LDF4-50A (8 GHz), RG-11 , RG-6 and RG-11 AU
V1.58	Network Analyzer: Limit lines added, including pass / fail display
V1.58	Remote Control: Shutdown command added

3 Modified Functions

The following table lists the functions modified in V2.10:

Version	Function
V2.10	FFT sweep now supports larger spans with narrow RBW
V2.10	Network Analyzer: manual sweep time entry is enabled again
V2.10	DTF: Change behavior upon cable model load
V2.10	DTF: Warning instead of changing center frequency on cable model load

The following table lists modifications, which were introduced in earlier versions, and indicates the version in which the modification was introduced:

Version	Function
V2.00	Vector Network Analyzer: The hardware setup was optimized to increase the margin before an overload condition is reported and to minimize the trace variation on transmission measurements with high accuracy calibration. This resulted in changes to the internal calibration data structures. As a consequence a self-alignment must be performed when updating older firmware versions to V2.00
V2.00	FSH4View: Remote desktop display available without R&S®FSH-K40
V2.00	Optimized synthesizer setup table
V1.60	Activating the isotropic antenna in the MEAS menu will automatically open the transducer factor selection list.
V1.60	When switching between operating modes (e.g. Spectrum Analyzer -> Network Analyzer), the display now shows the target operating mode while the switch is in progress.
V1.60	User must now explicitly confirm when changing the date settings. Together with the new support for time zones this mechanism should help avoiding conflicts with timed option licenses.
V1.60	Remote Control: In manual operation the span is adjusted automatically when selecting narrow resolution bandwidths. Via remote control the resolution bandwidth command was rejected if the span settings didn't match. Starting with V1.60 the remote control behavior is equal to the behavior in manual operation.
V1.59	LTE Constellation Display Show Allocations menu has been modified/improved
V1.59	Display of WCDMA composite EVM for instruments with serial numbers below 105000 with new frequency response alignment
V1.58	Optimized synthesizer setup table

4 Improvements

The following table lists the issues eliminated in V2.10:

Version	Function
V2.10	DTF: Tracking Generator attenuation is not taken into account in DTF measurement
V2.10	DTF: Reflection measurement on port 2 doesn't work without prior calibration

The following table lists the issues already eliminated in earlier versions and indicates the version in which the issues were eliminated:

Version	Function
V1.59	For digital modulation measurements, the level adjust algorithm has been optimized
V1.59	WCDMA customized channel table entries did not increment (this works now)
V1.59	1xEV-DO Measurements have been optimized with a known PN offset
V1.59	Spectral inversion in cdma2000 and 1xEV-DO spectrum overview displays (has been eliminated)
V1.59	DC offset in Digital Modulation spectrum overview displays (has been eliminated)
V1.59	Display of Constellation Diagram in LTE has been optimized (speed up)
V1.59	LTE over-the-air performance has been improved
V1.58	Improved speed on marker frequency change with active Marker Demod function.
V1.58	Network Analyzer: Improved full two port calibration accuracy
V1.58	SCPI command for Electrical Cable length didn't work
V1.58	SCPI command for Detector Auto on Trace 2 didn't work
V1.58	FSH4View: Improved import of limit lines in .csv format if values contain digits behind the decimal point
V1.58	FSH4View: Improved display of measurements with active transducer in unit V/m

5 Known Issues

The following table lists the known issues in V2.10:

Issues
In 1xEV-DO a memory trace saved in the Spectrum Overview display will show up in the Burst Power display
In all of the Digital Modulation Spectrum Overview displays, the memory trace can not be saved in continuous mode, only in single sweep mode
In WCDMA, if the scrambling code is entered manually, a new sweep has to be performed always to make the changes valid. To overcome this "Scrambling Code Auto" should be used.

6 Modifications to the Documentation

The latest manual can be downloaded from the R&S FSH4/8 spectrum analyzer product web page under: <http://www.rohde-schwarz.com>. Select "DOWNLOADS" and "MANUALS".

7 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 instrument up-to-date and to be informed about new application notes related to your instrument, please send an e-mail to the Customer Support Center stating your instrument and your wish.

We will take care that you will get the right information.

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Release Notes

Revision: 01

R&S® FSH4/FSH8 Handheld Spectrum Analyzer

Firmware Release V2.00

These Release Notes describe the following models and options of the R&S® Handheld Spectrum Analyzer:

- R&S® Handheld Spectrum Analyzer FSH4, order no. 1309.6000.x4 ¹⁾
- R&S® Handheld Spectrum Analyzer FSH8, order no. 1309.6000.x8 ¹⁾

New features in V2.00:

- Receiver mode and channel scan measurement application (R&S®FSH-K43)
- Support of new power sensors R&S®NRP-Z211 and R&S®NRP-Z221
- Instrument protection with personalized PIN Code
- Spectrum Analyzer: Trace color changes on limit line violation
- Beep on fail and overload

New features of FSH4View Software Version V2.00

- Support of additional result display screens for WCDMA, CDMA2000, 1xEvDO and LTE measurement applications

Important notes:

- ¹⁾ After updating instrument models R&S®FSH4.14, R&S®FSH8.18, R&S®FSH4.24, R&S®FSH8.28 from firmware versions below V2.00, the self alignment function must be performed once as described in chapter 1.2.4.

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1 Installation Information

1.1 General Information

- Firmware release V2.00 corresponds to FSH4View V2.00, which is available on the Rohde & Schwarz web page as a separate update package.
- Although older versions of FSH4View might be able to communicate with firmware release V2.00, an update of FSH4View is highly recommended, as older FSH4View versions might not support all functions included in the new firmware release.
- FSH4View V2.00 does not display the sweep window if the instrument is equipped with firmware release V1.01. It also does not preview datasets stored with firmware release V1.01. Newer firmware releases are supported in both cases.

1.2 Firmware Update

The firmware update file for the R&S FSH4/FSH8 is one file with the name FSH4_V2_00.EXE from the Rohde & Schwarz web page.

The installation can be done via SD-Card or via USB-Stick

1.2.1 Preparing the Installation via SD-Card

In order to update the device after downloading the FSH4_V2_00.EXE installation file, an SD memory card is required, e.g. R&S HA-Z231 (1 GB), order # 1309.6217.00, or R&S HA-Z232 (2 GB), order # 1309.6223.00. Please make sure that your PC is equipped with an SD card reader.

Make a backup of datasets, screenshots and modified files

Before you start the firmware update, make sure that you created a backup with FSH4View of all datasets and screenshots which you previously stored on the instrument. The same holds true for all channel tables, standards, limit lines, transducer factors and cable models which you created or modified. The factory preset necessary to complete the firmware update procedure will otherwise erase or overwrite the files.

Preparing the installation files

1. Insert an SD card into the SD card reader and wait until Windows[®] has identified the SD card as a new volume (e.g. D:)
2. Copy FSH4_V2_00.EXE into the root directory of the SD card, e.g. D:\

3. Execute FSH4_V2_00.EXE. The self-extracting .ZIP file will be unpacked.

The SD card should now contain the following files:

bootloader_SA_V2_00.bin
osimage_SA_V2_00.bin
updater_SA_V2_00.bin
splashscreen_SA.bmp
FSH4_V2_00.EXE

Note:

Please make sure that only one file of each type is present on the SD card. The update mechanism will reject the card if it detects two versions of the same file type (e.g. bootloader_SA_V1_01 and bootloader_SA_V2_00) in the root directory and abort the update later on.

Prepare the instrument

1. Switch the instrument OFF.
2. Connect the R&S FSH to AC mains via its power adapter.
Note:
The instrument firmware will refuse to perform the update if the instrument runs on battery.
3. Insert the SD card into the SD card slot at the right side of the instrument.
4. Continue with “Performing the Firmware Update on the Instrument” in Section 1.2.3

1.2.2 Preparing the installation via USB (instruments with serial numbers above 105000)

In order to update the device after downloading the FSH4_V2_00.EXE installation file, a USB stick is required.

Make a backup of datasets, screenshots and modified files.

Before you start the firmware update, make sure that you created a backup with FSH4View of all datasets and screenshots which you previously stored on the instrument. The same holds true for all channel tables, standards, limit lines, transducer factors and cable models which you created or modified. The factory preset necessary to complete the firmware update procedure will otherwise erase or overwrite the files.

Preparing the installation files

1. Insert a USB stick into the USB slot and wait until windows has identified the USB stick as a new volume (e.g. D:)
2. Copy FSH4_V2_00.EXE into the root directory of the USB stick, e.g. D:\

- Execute FSH4_V2_00.EXE. The self-extracting .ZIP file will be unpacked.

The SD card should now contain the following files:

bootloader_SA_V2_00.bin
osimage_SA_V2_00.bin
updater_SA_V2_00.bin
splashscreen_SA.bmp
FSH4_V2_00.EXE

Note:

Please make sure that only one file of each type is present on the SD card. The update mechanism will reject the card if it detects two versions of the same file type (e.g. bootloader_SA_V1_01 and bootloader_SA_V2_00) in the root directory and abort the update later on.

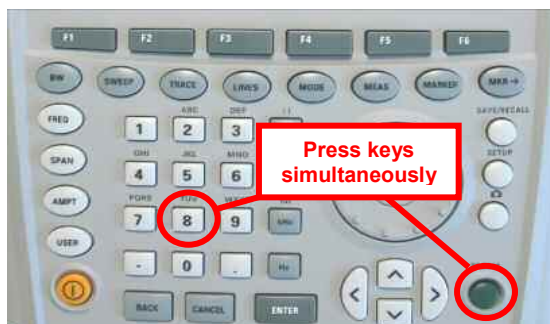
Prepare the instrument

- Switch the instrument OFF.
- Insert the USB stick into the USB slot of the instrument.

1.2.3 Performing the Firmware Update on the Instrument

The firmware update process is performed by the following steps:

- Press the keys PRESET and 8 on the numeric keypad simultaneously.



- Switch the instrument on and keep PRESET and 8 pressed for at least 5 seconds after the startup screen has appeared on the screen.



- Release the keys PRESET and 8.

The FSH will continue its boot process and after a couple of seconds the following information will appear on the screen:

Instrument Firmware Update

Searching for firmware update (updater_*.bin)
...Found \USB\updater_SA_V2_00.bin
...OK
Checking updater_SA_V2_00.bin: ... OK

Update instrument to software version V2.00
Press [ENTER] to update the firmware.
Press [CANCEL] to abort firmware updating.

Note:

If the AC mains connection is missing at the start of the firmware update process, the following message will appear at the bottom of the screen in step 3:

Instrument not powered by the power adapter. Please connect power adapter.
Press [ENTER] to retry.
Press [CANCEL] to abort firmware updating.

In this case check the power supply connection.
Continue the update process with step 4.

4. Press ENTER to start the firmware update process.
The instrument will perform the firmware update. This will take about 5 minutes.
The progress of the update will be displayed in a sequence of messages on the screen.

Warning:

Do not switch the instrument off during the update process in order to avoid data corruption of the internal flash memory!

5. As soon as the firmware update is completed, the R&S FSH will display the following message at the bottom of the screen:

Firmware updating is successfully completed.
Please switch off the instrument.

Switch the instrument off and on again. The FSH will boot with the new firmware version.

6. After the boot process is completed, press SETUP – INSTRUMENT SETUP.
Select "RESET TO FACTORY SETTINGS" by moving the cursor down the list with the cursor keys or the rotary knob. Confirm the selection with ENTER, and re-confirm with YES when prompted.
Please be patient: the subsequent reset and reboot process will take about a minute to complete.

Note:

Restoring the factory settings is necessary to update the pre-installed channel tables, cable models and transducer factors. If this step is omitted, bug fixes and updates to these pre-installed files will not be installed.

7. For instrument models .14, .18, .24 and .28 perform a self alignment according to chapter 1.2.4, if the instrument was equipped with firmware version 1.10 or below.

1.2.4 Performing the Self Alignment on the Instrument



This section is relevant for R&S FSH4.14, R&S FSH8.18, R&S FSH4.24 and R&S FSH8.28 when being updated from firmware versions below V2.00.

In Network operating mode the instrument models R&S FSH4.14, R&S FSH8.18, R&S FSH4.24 and R&S FSH8.28 support a default set of calibration data, the so-called factory calibration. This dataset is used whenever the instrument displays "fcal" in the title bar.

Instruments equipped with firmware versions below V2.00 need an update of this dataset, as V2.00 uses improved algorithms which need more data in order to obtain optimum results.

The self alignment procedure requires a calibration standard R&S FSH-Z28 (order # 1300.7810.03), which is suitable for R&S FSH8 and R&S FSH4 instruments, or at least a calibration standard R&S FSH-Z29 (order # 1300.7510.03) for R&S FSH4 instruments. In addition a RF cable with two N connectors is required in order to provide a through connection between measurement port 1 and port 2.

The self alignment is performed by the following steps:

8. Switch the instrument on
9. Select Network operation by pressing MODE – NETWORK.
10. Make sure that the instrument runs for at least 30 minutes at room temperature.
11. Press the keys SETUP – INSTRUMENT SETUP. Place the cursor on the menu entry "Self Alignment" by scrolling the menu bar down with the rotary knob and press ENTER.
The instrument will prompt you to confirm that the factory calibration data will be overwritten.
12. Press softkey YES.
The self alignment procedure will start and prompt you to connect the calibration standards and the through connection to port 1 and 2 in the sequence.
13. Follow the instructions until the instrument reports "Self Alignment Done!".
14. Press softkey EXIT to return to the measurement screen.

1.3 Installing Firmware Options

1.3.1 Enabling Options by Entering Option Key Codes



This section can be skipped if the option keys were already entered once. Option keys are not affected by a firmware update.

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

- Press the SETUP key.
- Press the softkey INSTALLED OPTIONS.
- Use the rotary knob or the cursor keys to select the INSTALL OPTION... menu item and confirm the entry with the ENTER key.
- Enter the key code (32 digit number) for the option with the numeric keys and confirm with the ENTER key.



If the correct key code is entered, the R&S FSH displays "Installation successful", and the option is marked as "Installed" in the option list (example: Remote Control (K40)).

If an invalid key code is entered, the R&S FSH displays "Invalid key code!". The correct key code can then be entered.

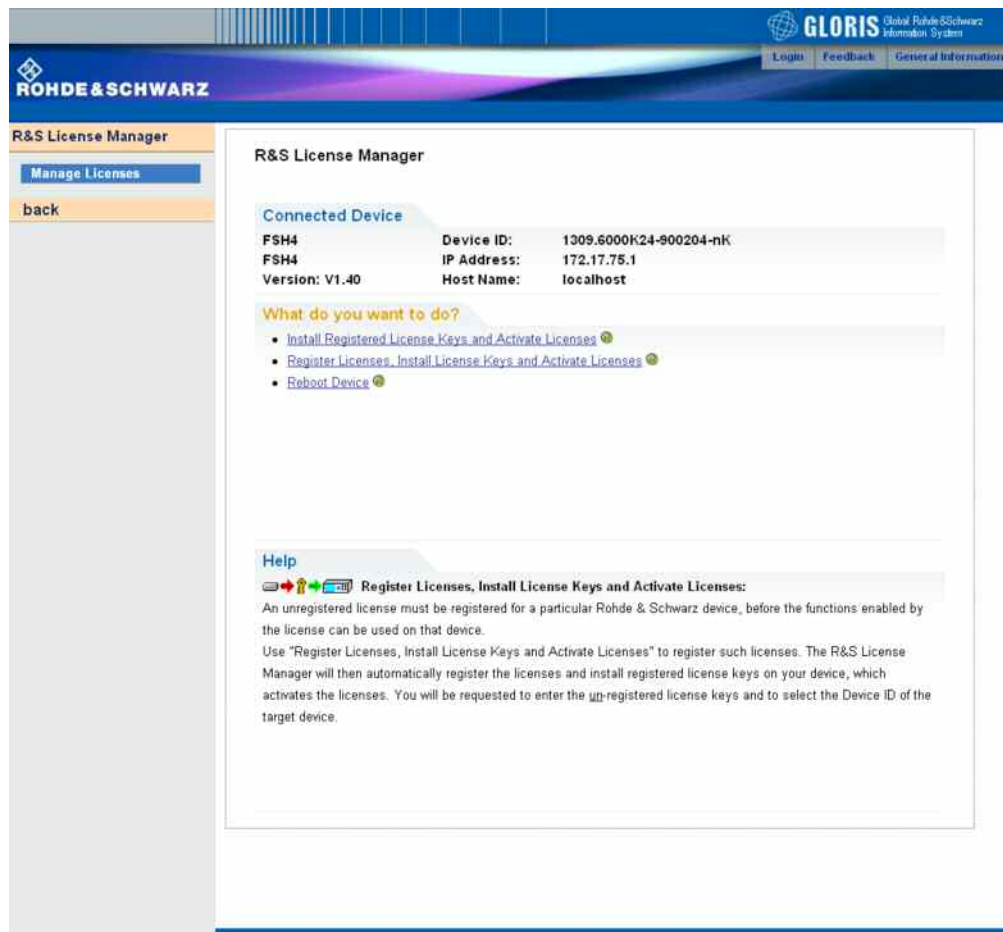


1.3.2 Enabling Options via the R&S License Manager

This feature is only available starting with firmware version V1.40 and higher.

Prerequisite: Your PC must be connected via Ethernet to the instrument and to the internet.

- Open your browser and type in the IP address of your instrument.



The screenshot displays the R&S License Manager web interface. The top navigation bar includes the Rohde & Schwarz logo and the GLORIS logo. The main content area is titled "R&S License Manager" and shows the following information:

Connected Device		
FSH4	Device ID:	1309.6000K24-900204-nK
FSH4	IP Address:	172.17.75.1
Version: V1.40	Host Name:	localhost

Below the device information, there is a section titled "What do you want to do?" with three options:

- [Install Registered License Keys and Activate Licenses](#)
- [Register Licenses, Install License Keys and Activate Licenses](#)
- [Reboot Device](#)

A "Help" section provides instructions on how to register licenses:

Register Licenses, Install License Keys and Activate Licenses:
An unregistered license must be registered for a particular Rohde & Schwarz device, before the functions enabled by the license can be used on that device.
Use "Register Licenses, Install License Keys and Activate Licenses" to register such licenses. The R&S License Manager will then automatically register the licenses and install registered license keys on your device, which activates the licenses. You will be requested to enter the un-registered license keys and to select the Device ID of the target device.

- Select "License Manager" > "Manage Licenses".
- Choose "Register Licenses, Install License Keys and Activate Licenses" and follow the instructions.

2 New Functions

The following table lists the new functions in V2.00:

Version	Function
V2.00	Receiver mode and channel scan measurement application (R&S®FSH-K43) available, including remote control commands.
V2.00	Support of new power sensors R&S®NRP-Z211 and R&S®NRP-Z221
V2.00	Instrument protection with personalized PIN Code
V2.00	Spectrum Analyzer: Trace color changes on limit line violation
V2.00	Beep on fail and overload
V2.00	FSH4View: Support for Limits Screen for R&S®FSH-K50/K44 FSH4View: Support for Signal Overview display for R&S®FSH-K50/K47 FSH4View: Support for Isotropic Antenna display for R&S®FSH-K50 FSH4View: Support for Constellation display for R&S®FSH-K50 FSH4View: Support for Channel selection for R&S®FSH-K44

The following table lists extensions which were introduced in earlier versions, and indicates the version in which the extension was introduced:

Version	Function
V1.60	Spectrum Analyzer: faster sweep time with narrow resolution bandwidth due to use of FFT filters
V1.60	Network Analyzer: trace mathematics available
V1.60	Support for different time zones. This new function should be used to adapt time and date to the local geographic conditions.
V1.60	A file rename function was added to the file manager.
V1.60	Remote Control: new data collection query and control commands for the isotropic antenna
V1.60	FSH4View: Remote Instrument Desktop available
V1.60	FSH4View: Report Generator for stored measurement results (datasets) available
V1.59	V1.59 LTE (R&S®FSH-K50E/-K51E): Resource Allocations Display
V1.59	LTE (R&S®FSH-K50E/-K51E): Isotropic Antenna Display
V1.59	LTE (R&S®FSH-K50/-K51/-K50E/-K51E): Composite EVM measurement
V1.59	3GPP/WCDMA (R&S®FSH-K44/-K44E): Limit check status screen for PASS/FAIL check of selectable measurement results
V1.59	1xEV-DO (R&S®FSH-K47E): PN Scanner Display
V1.59	1xEV-DO (R&S®FSH-K47E): Burst Power Display
V1.59	All Digital Modulation Applications (R&S®FSH-K44/-K46/-K47/-K50/-K51): Improved Level Adjust Operation
V1.59	FSH4View: Support for Limits Editor for R&S®FSH-K47 FSH4View: Support for Spectrum Overview display for R&S®FSH-K47 FSH4View: Support for Isotropic Antenna display for R&S®FSH-K47 FSH4View: Support for Code Domain display for R&S®FSH-K47E FSH4View: Support for Code Domain table for R&S®FSH-K47E
V1.58	Distance To Fault: Update of cable models: LDF4-50A (8 GHz), LDF4-50A (8 GHz), RG-11 , RG-6 and RG-11 AU
V1.58	Network Analyzer: Limit lines added, including pass / fail display
V1.58	Remote Control: Shutdown command added
V1.57	Network Analyzer: New function "Interference suppression" in Trace Mode menu
V1.57	Vector Voltmeter: Format "Vector Voltmeter VSWR + Reflection Coefficient"
V1.57	Limit lines: Horizontal threshold line available in addition to limit lines loaded from file
V1.57	Trace from recalled setup file is automatically stored in memory trace
V1.57	Default name for saving datasets can be changed by user
V1.56	LTE (R&S®FSH-K50/-K51/-K50E/-K51E): Limit check status screen for PASS/FAIL check of selectable measurement results
V1.56	LTE (R&S®FSH-K50/-K51/-K50E/-K51E): OFDM Symbol TX Power (OSTP) measurement
V1.54	Support for the LTE FDD Downlink Extended Channel and Modulation Measurement Application R&S®FSH-K50E
V1.54	Support for the LTE TDD Downlink Extended Channel and Modulation Measurement Application R&S®FSH-K51E

V1.54	Support for the 3GPP WCDMA BTS / Node B Code Domain Power and EVM Measurement Application and HSDPA / HSPA+ Analyzer R&S®FSH-K44E
V1.54	WCDMA: Support of Isotropic Antenna measurements with transducers
V1.54	Remote Control: Support for LTE measurement applications K50 and K51
V1.54	Remote Control: Support for WCDMA measurement application K44
V1.54	Automatic level adjustment for WCDMA, CDMA2000, 1xEVDO and LTE measurement applications

3 Modified Functions

The following table lists the functions modified in V2.00:

Version	Function
V2.00	Vector Network Analyzer: The hardware setup was optimized to increase the margin before an overload condition is reported and to minimize the trace variation on transmission measurements with high accuracy calibration. This resulted in changes to the internal calibration data structures. As a consequence a self-alignment must be performed when updating older firmware versions to V2.00.
V2.00	FSH4View: Remote desktop display available without R&S®FSH-K40
V2.00	Optimized synthesizer setup table

The following table lists modifications, which were introduced in earlier versions, and indicates the version in which the modification was introduced:

Version	Function
V1.60	Activating the isotropic antenna in the Meas menu will automatically open the transducer factor selection list.
V1.60	When switching between operating modes (e.g. Spectrum Analyzer -> Network Analyzer), the display now shows the target operating mode while the switch is in progress.
V1.60	User must now explicitly confirm when changing the date settings. Together with the new support for time zones this mechanism should help avoiding conflicts with timed option licenses.
V1.60	Remote Control: In manual operation the span is adjusted automatically when selecting narrow resolution bandwidths. Via remote control the resolution bandwidth command was rejected if the span settings didn't match. Starting with V1.60 the remote control behaviour is equal to the behaviour in manual operation.
V1.59	LTE Constellation Display Show Allocations menu has been modified/improved
V1.59	Display of WCDMA composite EVM for instruments with serial numbers below 105000 with new frequency response alignment
V1.58	Optimized synthesizer setup table
V1.55	Optimized synthesizer setup table
V1.53	Optimized synthesizer setup table
V1.53	Optimized 1MHz resolution filter shape for instruments with serial number <105000
V1.52	Optimized synthesizer setup table

4 Improvements

The following table lists the issues eliminated in V2.00:

Version	Function
V2.00	None

The following table lists the issues already eliminated in earlier versions and indicates the version in which the issues were eliminated:

Version	Function
V1.59	For digital modulation measurements, the level adjust algorithm has been optimized
V1.59	WCDMA customized channel table entries did not increment (this works now)
V1.59	1xEV-DO Measurements have been optimized with a known PN offset
V1.59	Spectral inversion in cdma2000 and 1xEV-DO spectrum overview displays (has been eliminated)
V1.59	DC offset in Digital Modulation spectrum overview displays (has been eliminated)
V1.59	Display of Constellation Diagram in LTE has been optimized (speed up)
V1.59	LTE over-the-air performance has been improved
V1.58	Improved speed on marker frequency change with active Marker Demod function.
V1.58	Network Analyzer: Improved full two port calibration accuracy
V1.58	SCPI command for Electrical Cable length didn't work
V1.58	SCPI command for Detector Auto on Trace 2 didn't work
V1.58	FSH4View: Improved import of limit lines in .csv format if values contain digits behind the decimal point
V1.58	FSH4View: Improved display of measurements with active transducer in unit V/m
V1.57	Save/Recall: Instrument datasets stored with firmware releases < 1.56 fro the WCDMA options K44/K44E could not be loaded in V1.56. This was fixed.
V1.56	WCDMA: The Result Display RESULT SUMMARY allows switching off the channel search in order to shorten the sweep time. When the Result Display is changed to one of the displays CODE DOMAIN POWER or CODE DOMAIN CHANNEL TABLE, the channel search has always to be turned on manually by the user by setting Display Settings → Result Summary mode to Channel Search On – Normal.
V1.56	Reintroduced missing remote control commands “:TRACe1?” and “:TRACe1:DATA?”.
V1.55	Network Analyzer: External trigger supported with two active traces on screen.
V1.55	Minimum display backlight brightness adjusted
V1.53	Distance To Fault: Extension of predefined Cable Models to higher frequencies
V1.52	Spectrum Analyzer: Random fails of Isotropic Antenna control
V1.52	Distance To Fault: Update of predefined Cable Models

5 Known Issues

The following table lists the known issues in V2.00:

Issues
In 1xEV-DO a memory trace saved in the Spectrum Overview display will show up in the Burst Power display
In all of the Digital Modulation Spectrum Overview displays, the memory trace can not be saved in continuous mode, only in single sweep mode
In WCDMA, if the scrambling code is entered manually, a new sweep has to be performed always to make the changes valid. To overcome this "Scrambling Code Auto" should be used.

6 Modifications to the Documentation

The latest manual can be downloaded from the R&S FSH4/8 spectrum analyzer product web page under: <http://www.rohde-schwarz.com>. Select "DOWNLOADS" and "MANUALS".

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

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Release Notes

Revision: 01

R&S[®] FSH4/FSH8 Handheld Spectrum Analyzer

Firmware Release V1.60

These Release Notes describe the following models and options of the R&S[®] Handheld Spectrum Analyzer:

- R&S[®] Handheld Spectrum Analyzer FSH4, order no. 1309.6000.x4 ¹⁾
- R&S[®] Handheld Spectrum Analyzer FSH8, order no. 1309.6000.x8 ¹⁾

New features in V1.60:

- Spectrum Analyzer: faster sweep time with narrow resolution bandwidth due to use of FFT filters
- Network Analyzer: trace mathematics available
- Support for different time zones
- File rename function
- Remote Control: new data collection query and control commands for the isotropic antenna

New features of FSH4View Software Version V1.60

- Remote Instrument Desktop available
- Report Generator for stored measurement results (datasets) available

Important notes:

- ¹⁾ On instrument models R&S[®]FSH4.14, R&S[®]FSH8.18, R&S[®]FSH4.24, which have been shipped with firmware version V1.31 or lower, as well as on instruments which were later updated to V1.60, the self alignment function must be performed once as described in chapter 1.2.4 after installation of V1.60.

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1 Installation Information

1.1 General Information

- Firmware release V1.60 corresponds to FSH4View V1.60, which is available on the Rohde & Schwarz web page as a separate update package.
- Although older versions of FSH4View might be able to communicate with firmware release V1.60, an update of FSH4View is highly recommended, as older FSH4View versions might not support all functions included in the new firmware release.
- FSH4View V1.60 does not display the sweep window if the instrument is equipped with firmware release V1.01. It also does not preview datasets stored with firmware release V1.01. Newer firmware releases are supported in both cases.

1.2 Firmware Update

The firmware update file for the R&S FSH4/FSH8 is one file with the name FSH4_V1_60.EXE from the Rohde & Schwarz web page.

The installation can be done via SD-Card or via USB-Stick

1.2.1 Preparing the Installation via SD-Card

In order to update the device after downloading the FSH4_V1_60.EXE installation file, an SD memory card is required, e.g. R&S HA-Z231 (1 GB), order # 1309.6217.00, or R&S HA-Z232 (2 GB), order # 1309.6223.00. Please make sure that your PC is equipped with an SD card reader.

Make a backup of datasets, screenshots and modified files

Before you start the firmware update, make sure that you created a backup with FSH4View of all datasets and screenshots which you previously stored on the instrument. The same holds true for all channel tables, standards, limit lines, transducer factors and cable models which you created or modified. The factory preset necessary to complete the firmware update procedure will otherwise erase or overwrite the files.

Preparing the installation files

1. Insert an SD card into the SD card reader and wait until Windows[®] has identified the SD card as a new volume (e.g. D:)
2. Copy FSH4_V1_60.EXE into the root directory of the SD card, e.g. D:\

3. Execute FSH4_V1_60.EXE. The self-extracting .ZIP file will be unpacked.

The SD card should now contain the following files:

bootloader_SA_V1_60.bin
osimage_SA_V1_60.bin
updater_SA_V1_60.bin
splashscreen_SA.bmp
FSH4_V1_60.EXE

Note:

Please make sure that only one file of each type is present on the SD card. The update mechanism will reject the card if it detects two versions of the same file type (e.g. bootloader_SA_V1_01 and bootloader_SA_V1_60) in the root directory and abort the update later on.

Prepare the instrument

1. Switch the instrument OFF.
2. Connect the R&S FSH to AC mains via its power adapter.
Note:
The instrument firmware will refuse to perform the update if the instrument runs on battery.
3. Insert the SD card into the SD card slot at the right side of the instrument.
4. Continue with “Performing the Firmware Update on the Instrument” in Section 1.2.3

1.2.2 Preparing the installation via USB (instruments with serial numbers above 105000)

In order to update the device after downloading the FSH4_V1_60.EXE installation file, a USB stick is required.

Make a backup of datasets, screenshots and modified files.

Before you start the firmware update, make sure that you created a backup with FSH4View of all datasets and screenshots which you previously stored on the instrument. The same holds true for all channel tables, standards, limit lines, transducer factors and cable models which you created or modified. The factory preset necessary to complete the firmware update procedure will otherwise erase or overwrite the files.

Preparing the installation files

1. Insert a USB stick into the USB slot and wait until windows has identified the USB stick as a new volume (e.g. D:)
2. Copy FSH4_V1_60.EXE into the root directory of the USB stick, e.g. D:\

- Execute FSH4_V1_60.EXE. The self-extracting .ZIP file will be unpacked.

The SD card should now contain the following files:

bootloader_SA_V1_60.bin
osimage_SA_V1_60.bin
updater_SA_V1_60.bin
splashscreen_SA.bmp
FSH4_V1_60.EXE

Note:

Please make sure that only one file of each type is present on the SD card. The update mechanism will reject the card if it detects two versions of the same file type (e.g. bootloader_SA_V1_01 and bootloader_SA_V1_60) in the root directory and abort the update later on.

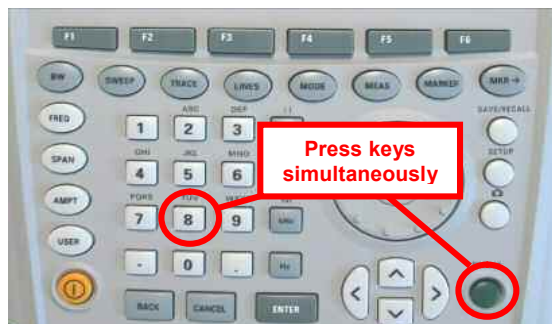
Prepare the instrument

- Switch the instrument OFF.
- Insert the USB stick into the USB slot of the instrument.

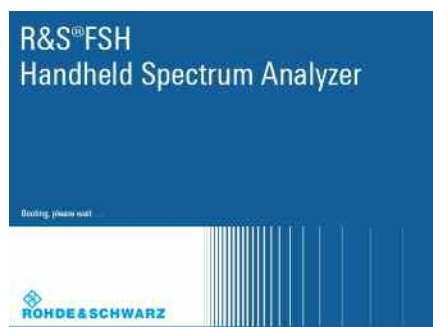
1.2.3 Performing the Firmware Update on the Instrument

The firmware update process is performed by the following steps:

- Press the keys PRESET and 8 on the numeric keypad simultaneously.



- Switch the instrument on and keep PRESET and 8 pressed for at least 5 seconds after the startup screen has appeared on the screen.



- Release the keys PRESET and 8.

The FSH will continue its boot process and after a couple of seconds the following information will appear on the screen:

Instrument Firmware Update

Searching for firmware update (updater_*.bin)
...Found \USB\updater_SA_V1_60.bin
...OK
Checking updater_SA_V1_60.bin: ... OK

Update instrument to software version V1.60
Press [ENTER] to update the firmware.
Press [CANCEL] to abort firmware updating.

Note:

If the AC mains connection is missing at the start of the firmware update process, the following message will appear at the bottom of the screen in step 3:

Instrument not powered by the power adapter. Please connect power adapter.
Press [ENTER] to retry.
Press [CANCEL] to abort firmware updating.

In this case check the power supply connection.
Continue the update process with step 4.

4. Press ENTER to start the firmware update process.
The instrument will perform the firmware update. This will take about 5 minutes.
The progress of the update will be displayed in a sequence of messages on the screen.

Warning:

Do not switch the instrument off during the update process in order to avoid data corruption of the internal flash memory!

5. As soon as the firmware update is completed, the R&S FSH will display the following message at the bottom of the screen:

Firmware updating is successfully completed.
Please switch off the instrument.

Switch the instrument off and on again. The FSH will boot with the new firmware version.

6. After the boot process is completed, press SETUP – INSTRUMENT SETUP.
Select "RESET TO FACTORY SETTINGS" by moving the cursor down the list with the cursor keys or the rotary knob. Confirm the selection with ENTER, and re-confirm with YES when prompted.
Please be patient: the subsequent reset and reboot process will take about a minute to complete.

Note:

Restoring the factory settings is necessary to update the pre-installed channel tables, cable models and transducer factors. If this step is omitted, bug fixes and updates to these pre-installed files will not be installed.

7. For instrument models .14, .18, .24 and .28 perform a self alignment according to chapter 1.2.4, if the instrument was equipped with firmware version 1.10 or below.

1.2.4 Performing the Self Alignment on the Instrument



This section is relevant for R&S FSH4.14, R&S FSH8.18, R&S FSH4.24 and R&S FSH8.28 shipped with firmware version 1.31 or below, or instruments which were later updated to firmware version 1.59.

In Network operating mode the instrument models R&S FSH4.14, R&S FSH8.18, R&S FSH4.24 and R&S FSH8.28 support a default set of calibration data, the so-called factory calibration. This dataset is used whenever the instrument displays "fcal" in the title bar.

Instruments equipped with one of the above firmware versions need an update of this dataset, as V1.60 uses improved algorithms which need more data in order to obtain optimum results.

The self alignment procedure requires a calibration standard R&S FSH-Z28 (order # 1300.7810.03), which is suitable for R&S FSH8 and R&S FSH4 instruments, or at least a calibration standard R&S FSH-Z29 (order # 1300.7510.03) for R&S FSH4 instruments. In addition a RF cable with two N connectors is required in order to provide a through connection between measurement port 1 and port 2.

The self alignment is performed by the following steps:

8. Switch the instrument on
9. Select Network operation by pressing MODE – NETWORK.
10. Make sure that the instrument runs for at least 30 minutes at room temperature.
11. Press the keys SETUP – INSTRUMENT SETUP. Place the cursor on the menu entry "Self Alignment" by scrolling the menu bar down with the rotary knob and press ENTER.
The instrument will prompt you to confirm that the factory calibration data will be overwritten.
12. Press softkey YES.
The self alignment procedure will start and prompt you to connect the calibration standards and the through connection to port 1 and 2 in the sequence.
13. Follow the instructions until the instrument reports "Self Alignment Done!".
14. Press softkey EXIT to return to the measurement screen.

1.3 Installing Firmware Options

1.3.1 Enabling Options by Entering Option Key Codes



This section can be skipped if the option keys were already entered once. Option keys are not affected by a firmware update.

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

- Press the SETUP key.
- Press the softkey INSTALLED OPTIONS.
- Use the rotary knob or the cursor keys to select the INSTALL OPTION... menu item and confirm the entry with the ENTER key.
- Enter the key code (32 digit number) for the option with the numeric keys and confirm with the ENTER key.



If the correct key code is entered, the R&S FSH displays "Installation successful", and the option is marked as "Installed" in the option list (example: Remote Control (K40)).

If an invalid key code is entered, the R&S FSH displays "Invalid key code!". The correct key code can then be entered.



1.3.2 Enabling Options via the R&S License Manager

This feature is only available starting with firmware version V1.40 and higher.

Prerequisite: Your PC must be connected via Ethernet to the instrument and to the internet.

- Open your browser and type in the IP address of your instrument.

The screenshot shows the R&S License Manager web interface. The top navigation bar includes the Rohde & Schwarz logo and the GLORIS logo. The main content area is titled 'R&S License Manager' and displays the following information:

Connected Device

FSH4	Device ID:	1309.6000K24-900204-nK
FSH4	IP Address:	172.17.75.1
Version: V1.40	Host Name:	localhost

What do you want to do?

- [Install Registered License Keys and Activate Licenses](#)
- [Register Licenses, Install License Keys and Activate Licenses](#)
- [Reboot Device](#)

Help

Register Licenses, Install License Keys and Activate Licenses:
An unregistered license must be registered for a particular Rohde & Schwarz device, before the functions enabled by the license can be used on that device.
Use "Register Licenses, Install License Keys and Activate Licenses" to register such licenses. The R&S License Manager will then automatically register the licenses and install registered license keys on your device, which activates the licenses. You will be requested to enter the un-registered license keys and to select the Device ID of the target device.

- Select "License Manager" > "Manage Licenses".
- Choose "Register Licenses, Install License Keys and Activate Licenses" and follow the instructions.

2 New Functions

The following table lists the new functions in V1.60:

Version	Function
V1.60	Spectrum Analyzer: faster sweep time with narrow resolution bandwidth due to use of FFT filters
V1.60	Network Analyzer: trace mathematics available
V1.60	Support for different time zones. This new function should be used to adapt time and date to the local geographic conditions.
V1.60	A file rename function was added to the file manager.
V1.60	Remote Control: new data collection query and control commands for the isotropic antenna
V1.60	FSH4View: Remote Instrument Desktop available
V1.60	FSH4View: Report Generator for for stored measurement results (datasets) available

The following table lists extensions which were introduced in earlier versions, and indicates the version in which the extension was introduced:

Version	Function
V1.59	V1.59 LTE (R&S®FSH-K50E/-K51E): Resource Allocations Display
V1.59	LTE (R&S®FSH-K50E/-K51E): Isotropic Antenna Display
V1.59	LTE (R&S®FSH-K50/-K51/-K50E/-K51E): Composite EVM measurement
V1.59	3GPP/WCDMA (R&S®FSH-K44/-K44E): Limit check status screen for PASS/FAIL check of selectable measurement results
V1.59	1xEV-DO (R&S®FSH-K47E): PN Scanner Display
V1.59	1xEV-DO (R&S®FSH-K47E): Burst Power Display
V1.59	All Digital Modulation Applications (R&S®FSH-K44/-K46/-K47/-K50/-K51): Improved Level Adjust Operation
V1.59	FSH4View: Support for Limits Editor for R&S®FSH-K47 FSH4View: Support for Spectrum Overview display for R&S®FSH-K47 FSH4View: Support for Isotropic Antenna display for R&S®FSH-K47 FSH4View: Support for Code Domain display for R&S®FSH-K47E FSH4View: Support for Code Domain table for R&S®FSH-K47E
V1.58	Distance To Fault: Update of cable models: LDF4-50A (8 GHz), LDF4-50A (8 GHz), RG-11 , RG-6 and RG-11 AU
V1.58	Network Analyzer: Limit lines added, including pass / fail display
V1.58	Remote Control: Shutdown command added
V1.57	Network Analyzer: New function "Interference suppression" in Trace Mode menu
V1.57	Vector Voltmeter: Format "Vector Voltmeter VSWR + Reflection Coefficient"
V1.57	Limit lines: Horizontal threshold line available in addition to limit lines loaded from file
V1.57	Trace from recalled setup file is automatically stored in memory trace
V1.57	Default name for saving datasets can be changed by user
V1.56	LTE (R&S®FSH-K50/-K51/-K50E/-K51E): Limit check status screen for PASS/FAIL check of selectable measurement results
V1.56	LTE (R&S®FSH-K50/-K51/-K50E/-K51E): OFDM Symbol TX Power (OSTP) measurement
V1.54	Support for the LTE FDD Downlink Extended Channel and Modulation Measurement Application R&S®FSH-K50E
V1.54	Support for the LTE TDD Downlink Extended Channel and Modulation Measurement Application R&S®FSH-K51E
V1.54	Support for the 3GPP WCDMA BTS / Node B Code Domain Power and EVM Measurement Application and HSDPA / HSPA+ Analyzer R&S®FSH-K44E
V1.54	WCDMA: Support of Isotropic Antenna measurements with transducers
V1.54	Remote Control: Support for LTE measurement applications K50 and K51
V1.54	Remote Control: Support for WCDMA measurement application K44
V1.54	Automatic level adjustment for WCDMA, CDMA2000, 1xEvDO and LTE measurement applications

3 Modified Functions

The following table lists the functions modified in V1.60:

Version	Function
V1.60	Activating the isotropic antenna in the Meas menu will automatically open the transducer factor selection list.
V1.60	When switching between operating modes (e.g. Spectrum Analyzer -> Network Analyzer), the display now shows the target operating mode while the switch is in progress.
V1.60	User must now explicitly confirm when changing the date settings. Together with the new support for time zones this mechanism should help avoiding conflicts with timed option licenses.
V1.60	Remote Control: In manual operation the span is adjusted automatically when selecting narrow resolution bandwidths. Via remote control the resolution bandwidth command was rejected if the span settings didn't match. Starting with V1.60 the remote control behaviour is equal to the behaviour in manual operation.

The following table lists modifications, which were introduced in earlier versions, and indicates the version in which the modification was introduced:

Version	Function
V1.59	LTE Constellation Display Show Allocations menu has been modified/improved
V1.59	Display of WCDMA composite EVM for instruments with serial numbers below 105000 with new frequency response alignment
V1.58	Optimized synthesizer setup table
V1.55	Optimized synthesizer setup table
V1.53	Optimized synthesizer setup table
V1.53	Optimized 1MHz resolution filter shape for instruments with serial number <105000
V1.52	Optimized synthesizer setup table

4 Improvements

The following table lists the issues eliminated in V1.60:

Version	Function
V1.60	none

The following table lists the issues already eliminated in earlier versions and indicates the version in which the issues were eliminated:

Version	Function
V1.59	For digital modulation measurements, the level adjust algorithm has been optimized
V1.59	WCDMA customized channel table entries did not increment (this works now)
V1.59	1xEV-DO Measurements have been optimized with a known PN offset
V1.59	Spectral inversion in cdma2000 and 1xEV-DO spectrum overview displays (has been eliminated)
V1.59	DC offset in Digital Modulation spectrum overview displays (has been eliminated)
V1.59	Display of Constellation Diagram in LTE has been optimized (speed up)
V1.59	LTE over-the-air performance has been improved
V1.58	Improved speed on marker frequency change with active Marker Demod function.
V1.58	Network Analyzer: Improved full two port calibration accuracy
V1.58	SCPI command for Electrical Cable length didn't work
V1.58	SCPI command for Detector Auto on Trace 2 didn't work
V1.58	FSH4View: Improved import of limit lines in .csv format if values contain digits behind the decimal point
V1.58	FSH4View: Improved display of measurements with active transducer in unit V/m
V1.57	Save/Recall: Instrument datasets stored with firmware releases < 1.56 fro the WCDMA options K44/K44E could not be loaded in V1.56. This was fixed.
V1.56	WCDMA: The Result Display RESULT SUMMARY allows switching off the channel search in order to shorten the sweep time. When the Result Display is changed to one of the displays CODE DOMAIN POWER or CODE DOMAIN CHANNEL TABLE, the channel search has always to be turned on manually by the user by setting Display Settings → Result Summary mode to Channel Search On – Normal.
V1.56	Reintroduced missing remote control commands ":TRACe1?" and ":TRACe1:DATA?".
V1.55	Network Analyzer: External trigger supported with two active traces on screen.
V1.55	Minimum display backlight brightness adjusted
V1.53	Distance To Fault: Extension of predefined Cable Models to higher frequencies
V1.52	Spectrum Analyzer: Random fails of Isotropic Antenna control
V1.52	Distance To Fault: Update of predefined Cable Models

5 Known Issues

The following table lists the known issues in V1.60:

Issues
In 1xEV-DO a memory trace saved in the Spectrum Overview display will show up in the Burst Power display
In all of the Digital Modulation Spectrum Overview displays, the memory trace can not be saved in continuous mode, only in single sweep mode
In WCDMA, if the scrambling code is entered manually, a new sweep has to be performed always to make the changes valid. To overcome this "Scrambling Code Auto" should be used.

6 Modifications to the Documentation

The latest manual can be downloaded from the R&S FSH4/8 spectrum analyzer product web page under: <http://www.rohde-schwarz.com>. Select "DOWNLOADS" and "MANUALS".

7 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 instrument up-to-date and to be informed about new application notes related to your instrument, please send an e-mail to the Customer Support Center stating your instrument and your wish.

We will take care that you will get the right information.

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Release Notes

Revision: 01

R&S[®] FSH4/FSH8 Handheld Spectrum Analyzer

Firmware Release 1.59 SP1

These Release Notes describe the following models and options of the R&S[®] Handheld Spectrum Analyzer:

- R&S[®] Handheld Spectrum Analyzer FSH4, order no. 1309.6000.x4
- R&S[®] Handheld Spectrum Analyzer FSH8, order no. 1309.6000.x8

New Features of V1.59 SP1

- Production relevant extensions for new production site

Important notes for V1.59 SP1:

- **After updating instrument models R&S[®] FSH4.14, R&S[®] FSH8.18, R&S[®] FSH4.24, R&S[®] FSH8.28 from firmware versions below V1.59 SP1, the self alignment function must be performed once as described in chapter 1.2.4..**

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1 Installation Information

1.1 General Information

- Firmware release V1.59 SP1 corresponds to FSH4View V1.59 SP1, which is available on the Rohde & Schwarz web page as a separate update package.
- Although older versions of FSH4View might be able to communicate with firmware release V1.59 SP1, an update of FSH4View is highly recommended, as older FSH4View versions might not support all functions included in the new firmware release.
- FSH4View V1.59 SP1 does not display the sweep window if the instrument is equipped with firmware release V1.01. It also does not preview datasets stored with firmware release V1.01. Newer firmware releases are supported in both cases.

1.2 Firmware Update

The firmware update file for the R&S FSH4/FSH8 is one file with the name FSH4_V1_59_SP1.EXE from the Rohde & Schwarz web page.

The installation can be done via SD-Card or via USB-Stick

1.2.1 Preparing the Installation via SD-Card

In order to update the device after downloading the FSH4_V1_59_SP1.EXE installation file, an SD memory card is required, e.g. R&S HA-Z231 (1 GB), order # 1309.6217.00, or R&S HA-Z232 (2 GB), order # 1309.6223.00. Please make sure that your PC is equipped with an SD card reader.

Make a backup of datasets, screenshots and modified files

Before you start the firmware update, make sure that you created a backup with FSH4View of all datasets and screenshots which you previously stored on the instrument. The same holds true for all channel tables, standards, limit lines, transducer factors and cable models which you created or modified. The factory preset necessary to complete the firmware update procedure will otherwise erase or overwrite the files.

Preparing the installation files

1. Insert an SD card into the SD card reader and wait until Windows® has identified the SD card as a new volume (e.g. D:)
2. Copy FSH4_V1_59_SP1.EXE into the root directory of the SD card, e.g. D:\

3. Execute FSH4_V1_59_SP1.EXE. The self-extracting .ZIP file will be unpacked.

The SD card should now contain the following files:

bootloader_SA_V1_59_SP1.bin
osimage_SA_V1_59_SP1.bin
updater_SA_V1_59_SP1.bin
splashscreen_SA.bmp
FSH4_V1_59_SP1.EXE

Note:

Please make sure that only one file of each type is present on the SD card. The update mechanism will reject the card if it detects two versions of the same file type (e.g. bootloader_SA_V1_01 and bootloader_SA_V1_59_SP1) in the root directory and abort the update later on.

Prepare the instrument

1. Switch the instrument OFF.
2. Connect the R&S FSH to AC mains via its power adapter.
Note:
The instrument firmware will refuse to perform the update if the instrument runs on battery.
3. Insert the SD card into the SD card slot at the right side of the instrument.
4. Continue with “Performing the Firmware Update on the Instrument” in Section 1.2.3

1.2.2 Preparing the installation via USB (instruments with serial numbers above 105000)

In order to update the device after downloading the FSH4_V1_59_SP1.EXE installation file, a USB stick is required.

Make a backup of datasets, screenshots and modified files.

Before you start the firmware update, make sure that you created a backup with FSH4View of all datasets and screenshots which you previously stored on the instrument. The same holds true for all channel tables, standards, limit lines, transducer factors and cable models which you created or modified. The factory preset necessary to complete the firmware update procedure will otherwise erase or overwrite the files.

Preparing the installation files

1. Insert a USB stick into the USB slot and wait until windows has identified the USB stick as a new volume (e.g. D:)
2. Copy FSH4_V1_59_SP1.EXE into the root directory of the USB stick, e.g. D:\

- Execute FSH4_V1_59_SP1.EXE. The self-extracting .ZIP file will be unpacked.

The SD card should now contain the following files:

bootloader_SA_V1_59_SP1.bin
osimage_SA_V1_59_SP1.bin
updater_SA_V1_59_SP1.bin
splashscreen_SA.bmp
FSH4_V1_59_SP1.EXE

Note:

Please make sure that only one file of each type is present on the SD card. The update mechanism will reject the card if it detects two versions of the same file type (e.g. bootloader_SA_V1_01 and bootloader_SA_V1_59_SP1) in the root directory and abort the update later on.

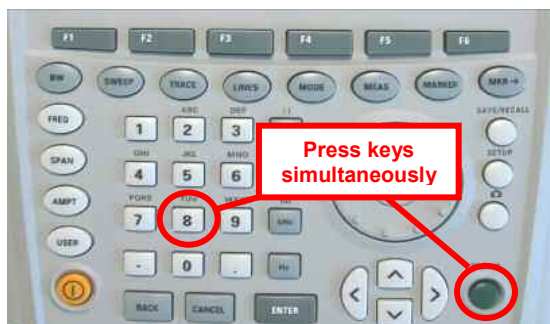
Prepare the instrument

- Switch the instrument OFF.
- Insert the USB stick into the USB slot of the instrument.

1.2.3 Performing the Firmware Update on the Instrument

The firmware update process is performed by the following steps:

- Press the keys PRESET and 8 on the numeric keypad simultaneously.



- Switch the instrument on and keep PRESET and 8 pressed for at least 5 seconds after the startup screen has appeared on the screen.



- Release the keys PRESET and 8.

The FSH will continue its boot process and after a couple of seconds the following information will appear on the screen:

Instrument Firmware Update

Searching for firmware update (updater_*.bin)
...Found \USB\updater_SA_V1_59_SP1.bin
...OK
Checking updater_SA_V1_59_SP1.bin: ... OK

Update instrument to software version V1.59 SP1
Press [ENTER] to update the firmware.
Press [CANCEL] to abort firmware updating.

Note:

If the AC mains connection is missing at the start of the firmware update process, the following message will appear at the bottom of the screen in step 3:

Instrument not powered by the power adapter. Please connect power adapter.
Press [ENTER] to retry.
Press [CANCEL] to abort firmware updating.

In this case check the power supply connection.
Continue the update process with step 4.

4. Press ENTER to start the firmware update process.
The instrument will perform the firmware update. This will take about 5 minutes.
The progress of the update will be displayed in a sequence of messages on the screen.

Warning:

Do not switch the instrument off during the update process in order to avoid data corruption of the internal flash memory!

5. As soon as the firmware update is completed, the R&S FSH will display the following message at the bottom of the screen:

Firmware updating is successfully completed.
Please switch off the instrument.

Switch the instrument off and on again. The FSH will boot with the new firmware version.

6. After the boot process is completed, press SETUP – INSTRUMENT SETUP.
Select "RESET TO FACTORY SETTINGS" by moving the cursor down the list with the cursor keys or the rotary knob. Confirm the selection with ENTER, and re-confirm with YES when prompted.
Please be patient: the subsequent reset and reboot process will take about a minute to complete.

Note:

Restoring the factory settings is necessary to update the pre-installed channel tables, cable models and transducer factors. If this step is omitted, bug fixes and updates to these pre-installed files will not be installed.

7. For instrument models .14, .18, .24 and .28 perform a self alignment according to chapter 1.2.4, if the instrument was equipped with firmware version 1.10 or below.

1.2.4 Performing the Self Alignment on the Instrument



This section is relevant for R&S FSH4.14, R&S FSH8.18, R&S FSH4.24 and R&S FSH8.28 when being updated from firmware versions below V1.59 SP1.

In Network operating mode the instrument models R&S FSH4.14, R&S FSH8.18, R&S FSH4.24 and R&S FSH8.28 support a default set of calibration data, the so-called factory calibration. This dataset is used whenever the instrument displays "fcal" in the title bar.

Instruments equipped with one of the above firmware versions need an update of this dataset, as V1.59 SP1 uses improved algorithms which need more data in order to obtain optimum results.

The self alignment procedure requires a calibration standard R&S FSH-Z28 (order # 1300.7810.03), which is suitable for R&S FSH8 and R&S FSH4 instruments, or at least a calibration standard R&S FSH-Z29 (order # 1300.7510.03) for R&S FSH4 instruments. In addition a RF cable with two N connectors is required in order to provide a through connection between measurement port 1 and port 2.

The self alignment is performed by the following steps:

8. Switch the instrument on
9. Select Network operation by pressing MODE – NETWORK.
10. Make sure that the instrument runs for at least 30 minutes at room temperature.
11. Press the keys SETUP – INSTRUMENT SETUP. Place the cursor on the menu entry "Self Alignment" by scrolling the menu bar down with the rotary knob and press ENTER.
The instrument will prompt you to confirm that the factory calibration data will be overwritten.
12. Press softkey YES.
The self alignment procedure will start and prompt you to connect the calibration standards and the through connection to port 1 and 2 in the sequence.
13. Follow the instructions until the instrument reports "Self Alignment Done!".
14. Press softkey EXIT to return to the measurement screen.

1.3 Installing Firmware Options

1.3.1 Enabling Options by Entering Option Key Codes



This section can be skipped if the option keys were already entered once. Option keys are not affected by a firmware update.

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

- Press the SETUP key.
- Press the softkey INSTALLED OPTIONS.
- Use the rotary knob or the cursor keys to select the INSTALL OPTION... menu item and confirm the entry with the ENTER key.
- Enter the key code (32 digit number) for the option with the numeric keys and confirm with the ENTER key.



If the correct key code is entered, the R&S FSH displays "Installation successful", and the option is marked as "Installed" in the option list (example: Remote Control (K40)).

If an invalid key code is entered, the R&S FSH displays "Invalid key code!". The correct key code can then be entered.

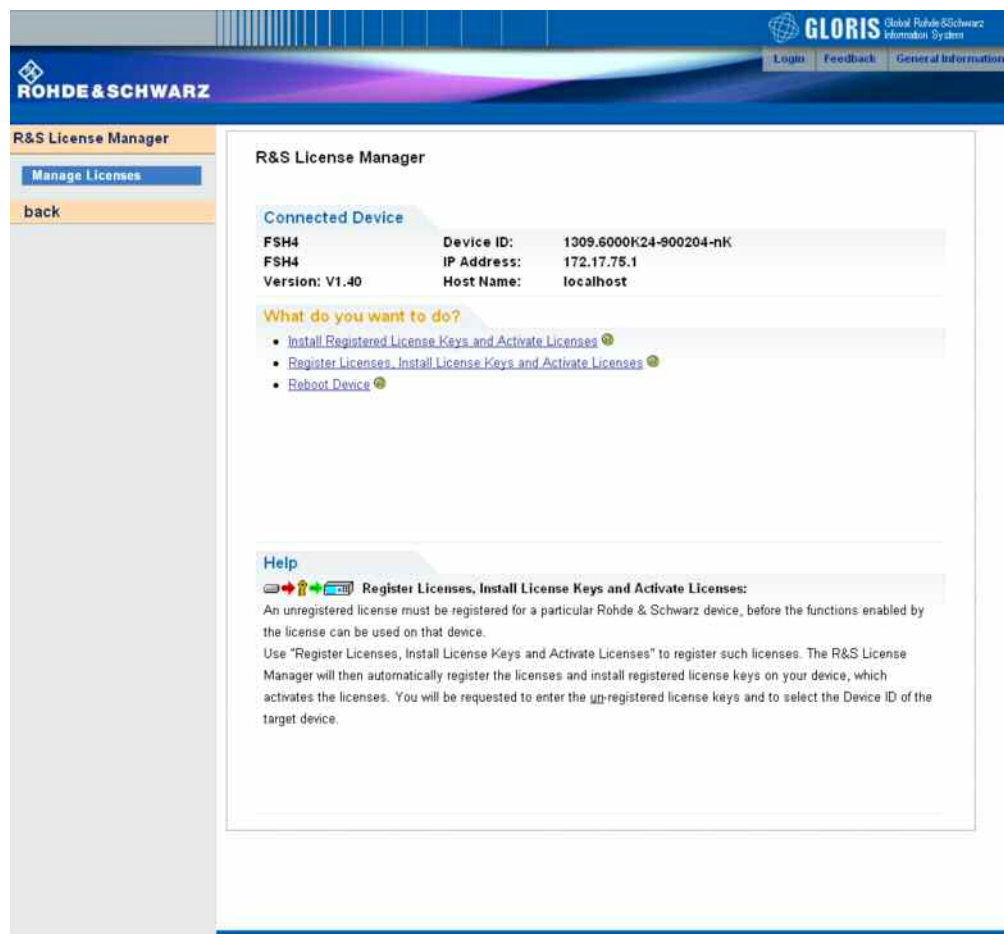


1.3.2 Enabling Options via the R&S License Manager

This feature is only available starting with firmware version V1.40 and higher.

Prerequisite: Your PC must be connected via Ethernet to the instrument and to the internet.

- Open your browser and type in the IP address of your instrument.



The screenshot displays the R&S License Manager web interface. The top navigation bar includes the Rohde & Schwarz logo and the GLORIS logo. The main content area is titled 'R&S License Manager' and features a sidebar with 'Manage Licenses' and 'back' buttons. The 'Connected Device' section shows the following information:

FSH4	Device ID:	1309.6000K24-900204-nK
FSH4	IP Address:	172.17.75.1
Version: V1.40	Host Name:	localhost

The 'What do you want to do?' section offers three actions:

- [Install Registered License Keys and Activate Licenses](#)
- [Register Licenses, Install License Keys and Activate Licenses](#)
- [Reboot Device](#)

The 'Help' section provides instructions for the 'Register Licenses, Install License Keys and Activate Licenses' option:

Register Licenses, Install License Keys and Activate Licenses:
An unregistered license must be registered for a particular Rohde & Schwarz device, before the functions enabled by the license can be used on that device.
Use "Register Licenses, Install License Keys and Activate Licenses" to register such licenses. The R&S License Manager will then automatically register the licenses and install registered license keys on your device, which activates the licenses. You will be requested to enter the un-registered license keys and to select the Device ID of the target device.

- Select "License Manager" > "Manage Licenses".
- Choose "Register Licenses, Install License Keys and Activate Licenses" and follow the instructions.

2 New Functions

The following table lists the new functions in V1.59 SP1:

Version	Function
V1.59 SP1	None

The following table lists extensions which were introduced in earlier versions, and indicates the version in which the extension was introduced:

Version	Function
V1.59	LTE (R&S@FSH-K50E/-K51E): Resource Allocations Display
V1.59	LTE (R&S@FSH-K50E/-K51E): Isotropic Antenna Display
V1.59	LTE (R&S@FSH-K50/-K51/-K50E/-K51E): Composite EVM measurement
V1.59	3GPP/WCDMA (R&S@FSH-K44/-K44E): Limit check status screen for PASS/FAIL check of selectable measurement results
V1.59	1xEV-DO (R&S@FSH-K47E): PN Scanner Display
V1.59	1xEV-DO (R&S@FSH-K47E): Burst Power Display
V1.59	DigMod Applications (R&S@FSH-K44/-K46/-K47/-K50/-K51): Improved Level Adjust Operation
V1.59	FSH4View: Support for Limits Editor for R&S@FSH-K47
V1.59	FSH4View: Support for Spectrum Overview display for R&S@FSH-K47
V1.59	FSH4View: Support for Isotropic Antenna display for R&S@FSH-K47
V1.59	FSH4View: Support for Code Domain display for R&S@FSH-K47E
V1.59	FSH4View: Support for Code Domain table for R&S@FSH-K47E
V1.58	Distance To Fault: Update of cable models: LDF4-50A (8 GHz), LDF4-50A (8 GHz), RG-11 , RG-6 and RG-11 AU
V1.58	Network Analyzer: Limit lines added, including pass / fail display
V1.58	Remote Control: Shutdown command added
V1.57	Network Analyzer: New function "Interference suppression" in Trace Mode menu
V1.57	Vector Voltmeter: Format "Vector Voltmeter VSWR + Reflection Coefficient"
V1.57	Limit lines: Horizontal threshold line available in addition to limit lines loaded from file
V1.57	Trace from recalled setup file is automatically stored in memory trace
V1.57	Default name for saving datasets can be changed by user
V1.56	LTE (R&S@FSH-K50/-K51/-K50E/-K51E): Limit check status screen for PASS/FAIL check of selectable measurement results
V1.56	LTE (R&S@FSH-K50/-K51/-K50E/-K51E): OFDM Symbol TX Power (OSTP) measurement
V1.54	Support for the LTE FDD Downlink Extended Channel and Modulation Measurement Application R&S@FSH-K50E

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V1.54	Support for the LTE TDD Downlink Extended Channel and Modulation Measurement Application R&S®FSH-K51E
V1.54	Support for the 3GPP WCDMA BTS / Node B Code Domain Power and EVM Measurement Application and HSDPA / HSPA+ Analyzer R&S®FSH-K44E
V1.54	WCDMA: Support of Isotropic Antenna measurements with transducers
V1.54	Remote Control: Support for LTE measurement applications K50 and K51
V1.54	Remote Control: Support for WCDMA measurement application K44
V1.54	Level adjustment for WCDMA, CDMA2000, 1xEvDO and LTE measurement applications

3 Modified Functions

The following table lists the functions modified in V1.59 SP1:

Version	Function
V1.59 SP1	Product relevant extension for new production site

The following table lists modifications, which were introduced in earlier versions, and indicates the version in which the modification was introduced:

Version	Function
V1.59	Display of WCDMA composite EVM for recently calibrated 10 MHz front ends
V1.59	LTE Constellation Display Show Allocations menu has been modified/improved
V1.58	Optimized synthesizer setup table
V1.55	Optimized synthesizer setup table
V1.53	Optimized synthesizer setup table
V1.53	Optimized 1 MHz resolution filter shape for instruments with serial number <105000
V1.52	Optimized synthesizer setup table
V1.50	New synthesizer setup table
V1.50	Spectrum Analyzer: Explicit display of IF Overload condition
V1.50	Network Analyzer: Minimum value for Reference is -200 dB

4 Improvements

The following table lists the issues eliminated or features improved in V1.59 SP1:

Version	Function
V1.59 SP1	None

The following table lists the issues already eliminated in earlier versions and indicates the version in which the issues were eliminated:

Version	Function
V1.59	For the digital modulation measurements, the level adjust algorithm has been optimized
V1.59	WCDMA customized channel table entries did not increment (this works now)
V1.59	1xEV-DO Measurements have been optimized with a known PN offset
V1.59	Spectral inversion in cdma2000 and 1xEV-DO spectrum overview displays (has been eliminated)
V1.59	DC offset in Digital Modulation spectrum overview displays (has been eliminated)
V1.59	Display of Constellation Diagram in LTE has been optimized (speed up)
V1.59	LTE over-the-air performance has been improved
V1.58	Improved speed on marker frequency change with active Marker Demod function.
V1.58	Network Analyzer: Improved full two port calibration accuracy
V1.58	SCPI command for Electrical Cable length did not work
V1.58	SCPI command for Detector Auto on Trace 2 did not work
V1.58	FSH4View: Improved import of limit lines in .csv format if values contain digits behind the decimal point
V1.58	FSH4View: Improved display of measurements with active transducer in unit V/m
V1.57	Save/Recall: Instrument datasets stored with firmware releases < 1.56 from the WCDMA options K44/K44E could not be loaded in V1.56. This was fixed.
V1.56	WCDMA: The Result Display RESULT SUMMARY allows switching off the channel search in order to shorten the sweep time. When the Result Display is changed to one of the displays CODE DOMAIN POWER or CODE DOMAIN CHANNEL TABLE, the channel search has always to be turned on manually by the user by setting Display Settings _ Result Summary mode to Channel Search On – Normal.
V1.56	Reintroduced missing remote control commands “:TRACe1?” and “:TRACe1:DATA?”.
V1.55	Network Analyzer: External trigger supported with two active traces on screen.
V1.55	Minimum display backlight brightness adjusted
V1.53	Distance To Fault: Extension of predefined Cable Models to higher frequencies
V1.52	Spectrum Analyzer: Random fails of Isotropic Antenna control
V1.52	Distance To Fault: Update of predefined Cable Models
V1.50	Spectrum Analyzer: Improved level adjust routine for multicarrier signals

Version	Function
V1.59	For the digital modulation measurements, the level adjust algorithm has been optimized
V1.59	WCDMA customized channel table entries did not increment (this works now)
V1.59	1xEV-DO Measurements have been optimized with a known PN offset
V1.59	Spectral inversion in cdma2000 and 1xEV-DO spectrum overview displays (has been eliminated)
V1.59	DC offset in Digital Modulation spectrum overview displays (has been eliminated)
V1.59	Display of Constellation Diagram in LTE has been optimized (speed up)
V1.59	LTE over-the-air performance has been improved
V1.50	Spectrum Analyzer: Delta Markers are displayed with values down to 1 Hz

5 Known Issues

The following table lists the known issues in V1.59 SP1:

Version	Function
V1.59	In 1xEV-DO a memory trace saved in the Spectrum Overview display will show up in the Burst Power display
V1.59	In all of the Digital Modulation Spectrum Overview displays, the memory trace can not be saved in continuous mode, only in single sweep mode

6 Modifications to the Documentation

The latest manual can be downloaded from the R&S FSH4/8 spectrum analyzer product web page under: <http://www.rohde-schwarz.com>. Select "DOWNLOADS" and "MANUALS".

Appendix: Contacting our Hotline

Any questions or ideas concerning the instrument are welcome by our hotline:

USA & Canada

Monday to Friday (except US public holidays)

8:00 AM – 8:00 PM Eastern Standard Time (EST)

Tel. from USA 888-test-rsa (888-837-8772) (opt 2)

From outside USA +1 410 910 7800 (opt 2)

Fax +1 410 910 7801

E-Mail Customer.Support@rsa.rohde-schwarz.com

East Asia

Monday to Friday (except Singaporean public holidays)

8:30 AM – 6:00 PM Singapore Time (SGT)

Tel. +65 6 513 0488

Fax +65 6 846 1090

E-Mail Customersupport.asia@rohde-schwarz.com

Rest of the World

Monday to Friday (except German public holidays)

08:00 – 17:00 Central European Time (CET)

Tel. +49 (0) 89 4129 13776

Fax +49 (0) 89 41 29 637 78

E-mail CustomerSupport@rohde-schwarz.com