

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.

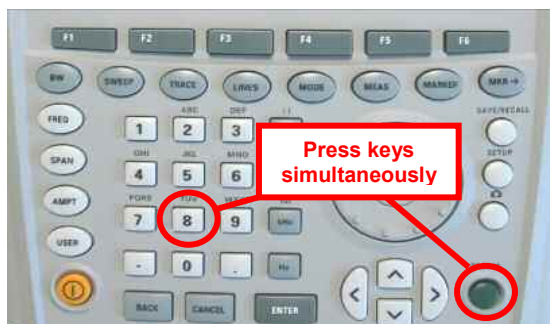
Prepare the instrument

- 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.

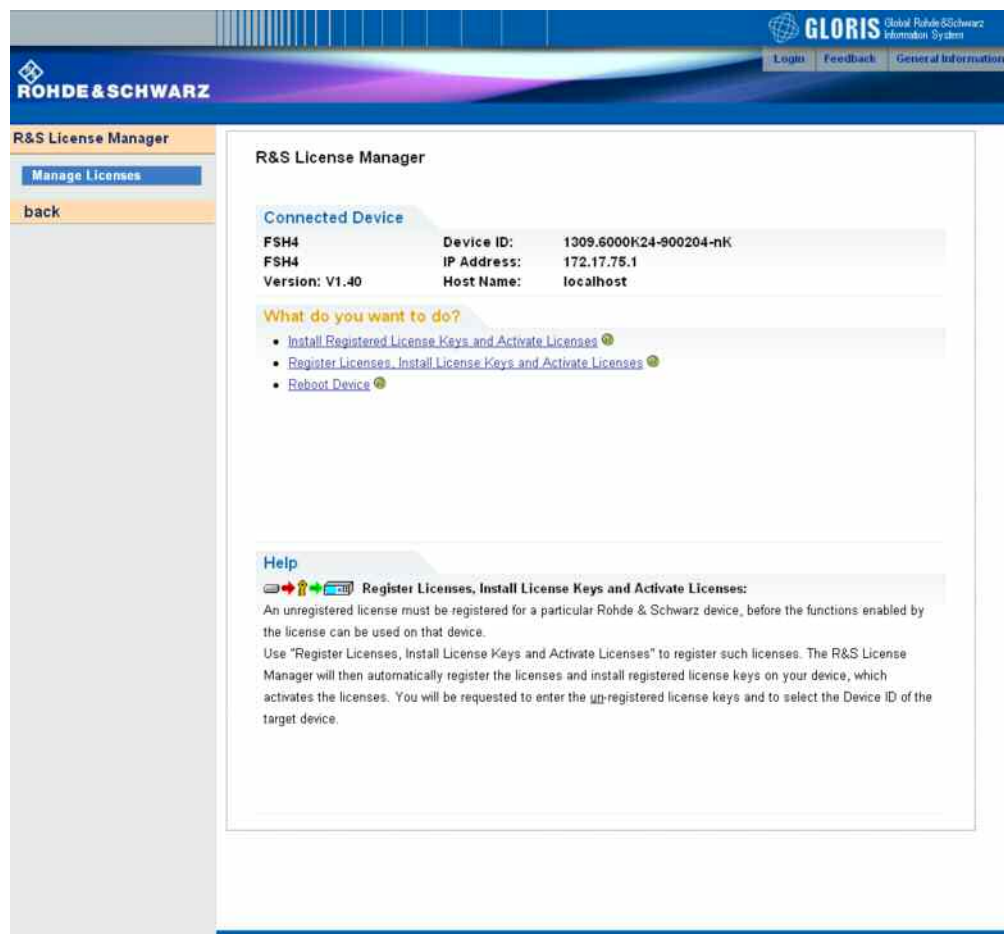


1.3.2 Enabling Options via the R&S License Manager

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, 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 registering 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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