

# Release Notes

Revision: 02

## R&S<sup>®</sup> FSH4/FSH8/FSH13/FSH20 Handheld Spectrum Analyzer

### Firmware Release 2.50

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

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

#### New features in V2.50:

- LTE FDD Downlink Application (R&S<sup>®</sup>FSH-K50) and LTE TDD Downlink Application (R&S<sup>®</sup>FSH-K51): Added Carrier Aggregation measurement for measuring two or three carriers
- Power Meter Application: Added Channel Power Meter measurement for performing power measurements without a power sensor
- Support of power sensor R&S<sup>®</sup>NRP-Z52
- 3GPP WCDMA BTS Application (R&S<sup>®</sup>FSH-K44):
  - Added Tx diversity for measuring CPICH power and frequency error of two antennas
  - Carrier frequency error can be measured either of a single slot or for all slots of one frame at one go
  - Added possibility to analyze the entire frame without performing a channel search
- Occupied Bandwidth added to the Result Summary display in the LTE FDD, LTE TDD and WCDMA Application
- Network Analyzer: Enabled zero span measurements

#### 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 V2.50:

Version	Function
V2.50	LTE FDD Downlink Application (R&S@FSH-K50) and LTE TDD Downlink Application (R&S@FSH-K51): Added Carrier Aggregation measurement for measuring two or three carriers
V2.50	Power Meter Application: Added Channel Power Meter measurement for performing power measurements without a power sensor
V2.50	Support of power sensor R&S@NRP-Z52
V2.50	3GPP WCDMA BTS Application (R&S@FSH-K44): <ul style="list-style-type: none"> <li>- Added Tx diversity for measuring CPICH power and frequency error of two antennas</li> <li>- Carrier frequency error can be measured either of a single slot or for all slots of one frame at one go</li> <li>- Added possibility to analyze the entire frame without performing a channel search</li> </ul>
V2.50	Occupied Bandwidth added to the Result Summary display in the LTE FDD, LTE TDD and WCDMA Application
V2.50	Network Analyzer: Enabled zero span measurements

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

Version	Function
V2.40	Interference Analysis Measurement Application (R&S@FSH-K15): <ul style="list-style-type: none"> <li>- Carrier-to-Noise measurement</li> <li>- Carrier-to-Interference measurement</li> <li>- Diff Mode for immediate calculation of trace mathematics</li> <li>- Added the possibility to manually enter an Azimuth value when storing a GPS position</li> </ul>
V2.40	Geotagging Measurement Application (R&S@FSH-K16): <ul style="list-style-type: none"> <li>- Colors can be specified for indicating the field strength measured at stored positions</li> <li>- Added limits check</li> </ul>
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"> <li>- Define the number of measurements to perform</li> <li>- Skip measurements</li> <li>- Finish Wizard execution on demand</li> </ul>
V2.40	FSH4View: Support of Microsoft Windows 8
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
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"> <li>- RSRP (Reference Signal Received Power)</li> <li>- RSSI (Received Signal Strength Indicator)</li> <li>- RSRQ (Reference Signal Received Quality)</li> <li>- SINR (Signal to Interference and Noise Ratio)</li> <li>- Time Alignment between transmitter branches</li> </ul>
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 V2.50:

Version	Function
V2.50	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
V2.40	Spectrum Analyzer: modified the default display position of trace mathematics results
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 V2.50:

Version	Function
V2.50	Indicating the preamplifier status of the R&S®HE300 antenna
V2.50	FSH4View: Display pass/fail information contained in ACLR datasets
V2.50	FSH4View: Removed an unnecessary increase of the size of stored files when using the multiple transfers function

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

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
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 V2.50:

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 V2.50 corresponds to FSH4View V2.50, 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 V2.50, an update of FSH4View is highly recommended, as older FSH4View versions might not support all functions included in the new firmware release.
- FSH4View V2.50 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\_50.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\_50.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<sup>®</sup> has identified the SD card as a new volume (e.g. D:)
2. Copy FSH4\_V2\_50.EXE into the root directory of the SD card, e.g. D:\

Execute FSH4\_V2\_50.EXE. The self-extracting .ZIP file will be unpacked.

The SD card should now contain the following files:

bootloader\_SA\_V2\_50.bin  
osimage\_SA\_V2\_50.bin  
updater\_SA\_V2\_50.bin  
splashscreen\_SA.bmp  
FSH4\_V2\_50.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\_50) 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 6.2.3.

## 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\_50.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\_50.EXE into the root directory of the USB stick, e.g. D:\

Execute FSH4\_V2\_50.EXE. The self-extracting .ZIP file will be unpacked.

The SD card should now contain the following files:

bootloader\_SA\_V2\_50.bin  
 osimage\_SA\_V2\_50.bin  
 updater\_SA\_V2\_50.bin  
 splashscreen\_SA.bmp  
 FSH4\_V2\_50.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\_50) in the root directory and abort the update later on.

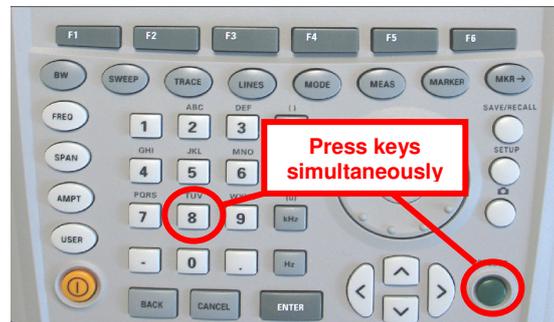
**Prepare the instrument**

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\_50.bin  
...OK  
Checking updater\_SA\_V2\_50.bin: ... OK

---

Update instrument to software version V2.50  
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 V2.50 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 with links for Login, Feedback, and General Information. 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

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 at the bottom 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.

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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