R&S®FSH Handheld Spectrum Analyzer Release Notes

Firmware Version V3.50

These Release Notes are for following models of the R&S®FSH Spectrum Analyzer:
R&S®FSH4,   order nos. 1309.6000.04, 1309.6000.14, 1309.6000.24
R&S®FSH8,   order nos. 1309.6000.08, 1309.6000.18, 1309.6000.28
R&S®FSH13, order nos. 1314.2000.13, 1314.2000.23
R&S®FSH20, order nos. 1314.2000.20, 1314.2000.30

1320.8893.00 | Version 04 | R&S®FSH |

The software makes use of several valuable open source software packages. For information, see the "Open Source Acknowledgment" provided with the product.

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

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Contents

1 Information on the current version and history

1.1 New functions

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

New functions of firmware V3.50:

There are no new functions in this release

New functions of earlier firmware versions:

Version	Functions
V3.40	Support of R&S®FSH-K20 Segmented Sweep Application
V3.30	In Spectrum Analyzer mode the maximum RBW is extended to 5 MHz for instruments with serial numbers ≥ 105000
V3.30	Support of gated trigger in Map Mode
V3.20	Support for saving dataset in csv format (in Spectrum Analyzer mode only)
V3.20	SCPI command to export memory trace
V3.20	SCPI command to check status of FSH-Z114
V3.10	Support of waveguide calibration and DTF measurements with waveguides
V3.10	AM/FM demodulation in Maps and Spectrogram applications
V3.00	Support for R&S® ZN-Z103
V3.00	SCPI command to retrieve IQ data
V3.00	EMF Analysis Option Quick Scan mode (scan for signals above a threshold line) Spectrum: check acquisition settings validity with a connected instrument (live edit)
V3.00	Spectrum Analyzer: FFT based SEM & ACLR for NB-IoT
V2.90	EMF Analysis Application (R&S®FSH-K105) added: New Option to perform EMF Analysis together with R&S®InstrumentView
V2.81	Support of 256 QAM Modulation for LTE
V2.81	FDD LTE NB-IoT BTS Application (R&S®FSH-K56) added: New Option Narrowband IoT for FDD LTE Basestation Test

V2.80	Support of HE400 antenna
V2.80	Support of optical power sensor UPM100 from ODM Inc.
V2.80	Display S21 & S11 or S21 & S22 measurements in one screen
V2.80	Support of Declassification procedures according to DoD 5220.22-M (see Instrument Security Procedures for more details)
V2.80	Added switch to force either sweep mode or FFT mode
V2.71	Support of FSH-K14 for long time recording
V2.71	Measuring the frame offset based on 1sec pulse in LTE SEM
V2.71	Unit dBuV in FSH-K15, FSH-K16 and FSH-K17
V2.71	Frequency Offset in Network Analyzer mode
V2.70	FSH-K15 extended to 72 hours of recording
V2.70	Support FSH-Z14 with USB-Adapter FSH-Z144
V2.70	Added tone feature to the spectrogram and spectrum analyzer.
V2.70	Support for new USB power sensors R&S®NRPxxS/SNseries
V2.61	CW source operation was added to the tracking generator configuration in Network Analyzer mode. This is helpful for applications where a CW signal is needed for stimulating a DUT or for emulating an interfering signal.
V2.61	In Network Analyzer and DTF mode the tracking generator output power can be set directly in dBm (instead of using the parameter TG Att).
V2.61	In Network Analyzer and DTF mode a new parameter "tracking generator offset" was added to take external attenuators/amplifiers into account when setting the output power.
V2.61	New SCPI command added for the LTE options: FETCh:SUMMary:TAE
V2.60	new measurement application: R&S®FSH-K17 Indoor mapping
V2.60	New measurement application: R&S®FSH-K29 Pulse Measurements with Power Sensor (using the NRP-Z81, NRP-Z85 or NRP-Z86 power sensors). This feature is supported for instruments starting at serial number 105000. Instruments with serial numbers < 121000 require an R&S®FSH-Z129 adapter cable.
V2.60	Internal periodic trigger with selectable trigger cycle frequency added for instruments with serial # > 121000 to support spectrum measurements on pulsed signals (like e.g. TD-LTE).
V2.60	Frequency counter resolution is now selectable between 0.1 Hz (low) and 0.1 mHz (high)
V2.60	Limit lines in VSWR and Cable Loss measurement are now supported
V2.60	Limit lines can now be selected during Wizard execution
V2.60	R&S HL300 antenna transducer file added

V2.60	R&S ZCAN calibration data file added
V2.60	OBW was added to the Result Summary in the CDMA2000 and 1xEVDO measurement applications
V2.51	3GPP WCDMA BTS Application (R&S®FSH-K44): Enabled the automatic scrambling code selection if the antenna diversity is set to Over-The-Air
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): 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
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

1.2 Modified functions

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

Modifications of firmware V3.50:

Version	Function
V3.50	Updates to EMC limit lines and transducers
V3.50	FDD LTE now supports command TRACe[:DATA]? ALL to retrieve all FDD LTE results

Modifications of earlier firmware versions:

Version	Function
V3.30	ICNIRP Limit Lines are added as predefined limit lines for EMF measurements
V3.30	ZN-Z135 and ZN-Z170 calibration kits are added as default kits
V3.30	SCPI Command to set the Frequency Counter Resolution added

V3.30	Entry field for the user name is added to the preferences
V3.10	Supports ZN-Z103 calibration up to 6 GHz
V3.10	Added SCPI support to acquire compass information
V3.00	Support of limit lines for the DTF measurement
V3.00	Compass: Update World Magnetic Model coefficients to 2015-2020
V2.81	TD-LTE & FDD LTE: Resource Allocation display: axis labelling starts now with zero
V2.80	Removed the limitation to 3 points for triangulation
V2.80	MIMO configuration per carrier within LTE Carrier aggregation
V2.71	Decrease minimum sweep time for Zero span to 100 us
V2.70	New setting for manually defining the amplitude range in Pulse Peak Power Measurement
V2.70	Increased max number of channels in channel table to 1000000
V2.70	Added LTE channel table 66
V2.70	Spectrogram Viewer (long time recording) in FSH4View improvements
V2.70	FSH4View now supports saving all traces from spectrogram file to CSV
V2.70	Added "+" and "-" to the alpha numeric keyboard (SMS mode)
V2.70	Optimized synthesizer setup table for frequency of 160 MHz
V2.61	The minimum measurement time in Pulse Peak Power measurements was adjusted to better reflect the capabilities of the power sensor.
V2.61	Optimized synthesizer setup table for FSH13/20 for frequencies 1.2 GHz and 6.981 GHz
V2.60	An indicator "(IA)" was added to the title bar in Interference Analyzer measurement mode
V2.51	3GPP WCDMA BTS Application (R&S®FSH-K44): The default span in the Spectrum Overview display is now 5 MHz
V2.50	Optimized synthesizer setup table

1.3 Improvements

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

Improvements of firmware V3.50:

Version	Function
V3.50	Improved Spur performance

Improvements of earlier firmware versions:

since	Function
V3.30	In some cases, Indoor Mapping was unable to capture more than 1 position. This issue is fixed
V3.30	With the command SCPI:TRAC:DATA? TRACE2 incorrect data values were transferred when a transducer factor was used. This issue is fixed
V3.20	Improved spur performance
V3.10	Added "Waiting for Trigger" indication
V3.10	Enabled support for Rosenberger cables
V3.10	Improved Japanese translations for antenna settings
V3.10	Improved Spur performance
V3.10	Improved power level in zero span measurements with large RBW and small VBW
V3.00	NB-IoT Standalone - Offset frequency display corrected
V2.90	Extended support for additional HE400 antenna variants
V2.80	Extension of carrier aggregation to 5 carriers
V2.80	Extended support for LTE band 65 (FSH8 only)
V2.80	Digital Demodulation: Improvements on isotropic antenna handling
V2.80	Improved trigger offset and marker display accuracy
V2.80	Improvements on gated trigger for small RBWs
V2.71	Increase maximum Reference Level from 30dB to 50dB in Network Analyzer mode
V2.70	Power Meter: Different improvements

V2.70	Receiver mode: Added coupling between RBW and Sweep Time.
V2.70	1xEVDO: power of data and the preamble is aligned
V2.70	Added the missing red dot displayed before label SWT in parameter view on setting manual Sweep time
V2.70	Make use of manual range when Spectrogram coupled to Spectrum
V2.70	Network Analyzer: Unit Menu options fixed for Magnitude + Phase measurement format
V2.70	Spectrogram: Settings improvements with spectrogram playback
V2.70	Spectrogram: Threshold selection improvements
V2.70	Network Analyzer: Fix on the switching frequency of the high/low band coupler
V2.70	FSH4View: Frequency Count accuracy included in report generator
V2.70	Transducer problem after shutdown and reboot is fixed
V2.70	Wizard hang issue after loading an invalid dataset is fixed
V2.61	1xEVDO measurements: Depending on the channel combination in the input signal the pilot power showed higher results than the RF channel total power.
V2.61	The synchronization algorithm for WCDMA signals was improved
V2.61	WCDMA measurements: The SCPI command that returns the value for CPICH power of antenna 2 was corrected
V2.61	Dependent on the hardware revision of the FSH-Z18 power sensor the FSH-Z18 was not recognized reliably. This has been fixed
V2.61	Some Japanese and Chinese language translation improvements were applied
V2.60	Channel numbers in LTE channel tables corrected. Channel tables for missing LTE and GSM frequency bands added
V2.60	Channel Power Meter: the RF attenuation was not touched when automatically adjusting the measurement range
V2.60	Communication errors with GPS receiver R&S FSH-Z240 after it was linked to an R&S PR100
V2.60	Misleading messages during Easy 1-Port calibration were removed
V2.60	User Preferences: new setting "Use Instrument Calibration Data" added. If set to ON, the current calibration data in Network Analyzer mode will be maintained when loading a dataset. If set to OFF, the calibration data stored in the dataset will be loaded (default behaviour).
V2.60	The SCPI command SWE:POIN? for Spectrum Analyzer and DTF was not working
V2.60	WCDMA channel detection needed improvement with special channel configurations
V2.60	SCPI commands for WCDMA Analysis Length and Carrier Frequency Error Meas Range were missing

V2.60	The power indicator in the interferer search map display sometimes showed different values to spectrum or receiver mode.
V2.60	Receiver Mode sometimes locks up when activating AM Marker Demodulation
V2.60	FSH4View: the Marker values were not correctly aligned for Digital Modulation applications when 1 marker is disabled
V2.60	FSH4View: the Preamp status in a dataset was not displayed
V2.60	FSH4View: GPS Position menu in Maps application didn't work
V2.60	FSH4View: invisible traces cannot be set to visible anymore
V2.60	FSH4View: With active MaxHold function inactive scrambling codes were not displayed in the scrambling code search overview
V2.51	3GPP WCDMA BTS Application (R&S®FSH-K44): The state of the antenna diversity setting was lost with active Over-The-Air measurement when switching between the Result Summary and Spectrum Overview display. This has been fixed. Increased the number of decimal digits when querying the carrier frequency error using Remote Control
V1.50	Improved display in VNA mode when interference suppression is switched off
V1.50	Fixed various bugs concerning SCPI commands
V1.50	Corrected instrument ID via USB: R&S®InstrumentView V2.00 required for USB connection
V1.41	Improved handling of special measurement settings
V1.41	Improved sweep control
V1.40	Fixed various bugs concerning SCPI commands
V1.30	Performance improvements
V1.30	Fixed a bug where the last WiFi password was not remembered
V1.30	Fixed a bug where the time markers did not jump over each other
V1.30	Hardware Options are correctly returned when querying via SCPI on *OPT?
V1.20	Performance improvements
V1.20	Show WiFi MAC address in Instrument Setup Screen
V1.20	Support special characters for WiFi passphrase

1.4 Known issues

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

since	Function
none	none

2 Modifications to the documentation

The current documentation is up-to-date.

3 Firmware update

3.1 Validity information

Device	Order Number
R&S® FSH4	1309.6000.04, 1309.6000.14, 1309.6000.24
R&S® FSH8	1309.6000.08, 1309.6000.18, 1309.6000.28
R&S® FSH13	1314.2000.13, 1314.2000.23
R&S® FSH20	1314.2000.20, 1314.2000.30

3.2 Update information

Before you update the firmware, it is recommended to make a backup of the stored data on the R&S®FSH Handheld Spectrum Analyzer (datasets, screenshots, transducer factors etc.). You can make a backup with the tools available in the R&S®InstrumentView software package.

3.3 Updating the firmware

The firmware update itself does not delete or modify that data. However, it is recommended to perform a factory reset after the firmware update. This will update predefined limit lines, channel tables etc. but will delete user data.

New firmware versions usually contain new features, improvements of existing functionality, bug fixes etc. When a new firmware version is available, it is recommended to replace the old firmware with the new one.

The latest installation file is can be found on the Rohde & Schwarz web page at http://www.rohde-schwarz.com/firmware/fsh

The steps for the installation of the firmware update are the following:

1. Download the firmware installation file `FSH4_<version>.exe` from the internet.
2. The firmware comes in a single `.exe` file.
3. Save the file to the root directory of a memory stick or SD-card.
4. Run the `.exe` file to unpack the self-extracting zip archive. The installation files are automatically extracted.
5. Make sure that only the extracted files are present in the root directory of the memory stick.
6. Turn off the R&S®FSH Handheld Spectrum Analyzer.
7. Connect the R&S FSH Handheld Spectrum Analyzer to AC mains via its power adapter. The instrument firmware will refuse to perform the update if the instrument runs on battery.
8. Put the memory stick or SD-card into respective slot of the instrument.

9. Press the "Preset" key and the number "8" key simultaneously.

10. Turn on the R&S®FSH Handheld Spectrum Analyzer and keep pressing the two keys for at least 5 seconds after the startup screen appears.

11. Release the keys.

12. The booting process continues. After a couple of seconds, the R&S®FSH Handheld Spectrum Analyzer asks you if you really want to update the firmware.

13. Press the ENTER key to update the firmware. You can cancel the firmware update with the CANCEL key.
    The firmware update takes several minutes. The R&S®FSH Handheld Spectrum Analyzer shows a message when the firmware update is done. **Note**: Do not turn off the R&S®FSH Handheld Spectrum Analyzer during the firmware update.

14. Turn off the R&S®FSH Handheld Spectrum Analyzer.

15. Turn on the R&S®FSH Handheld Spectrum Analyzer.

16. The R&S®FSH Handheld Spectrum Analyzer boots with the new firmware version.

17. Optional: It is recommended to perform a **factory reset** after a firmware update to replace the predefined limit lines, channel tables and other data with the latest updates.
    Note: Before you start a factory reset, make sure to make a backup of your data that you have saved on the R&S®FSH Handheld Spectrum Analyzer. Otherwise that data is deleted.

18. 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.

3.4 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 firmware version > 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:

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.

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

6. Press softkey YES.

7. 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.

8. Follow the instructions until the instrument reports "Self Alignment Done!".

9. Press softkey EXIT to return to the measurement screen.

4 Firmware options

You can equip the R&S®FSH Handheld Spectrum Analyzer with optional functionality or firmware options. These firmware options expand the functionality of R&S®FSH Handheld Spectrum Analyzer with new measurement functions settings etc.

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

To install a new firmware option, you have to enter a license key for validation. The license key is included in the delivery of the firmware option.

The steps for the installation of the firmware options are the following:

1. Press the "Setup" key to enter the instrument setup menu.

2. Select the "Installed Options" menu item.
    The R&S®FSH Handheld Spectrum Analyzer shows a list of all options that are currently installed on your R&S®FSH Handheld Spectrum Analyzer.

3. Select the "Install Option" button and press the ENTER key.
    The R&S®FSH Handheld Spectrum Analyzer opens an input field.

4. The license key is a 30-digit number. Enter the license key with the alphanumeric keys and confirm the entry with the ENTER key.

5. The R&S®FSH Handheld Spectrum Analyzer confirms a successful installation.
    If the R&S®FSH Handheld Spectrum Analyzer shows an "Invalid Key Code" message, try to enter the license key again.

5 Customer support

Technical support – where and when you need it

For quick, expert help with any Rohde & Schwarz product, contact our customer support center. A team of highly qualified engineers provides support and works with you to find a solution to your query on any aspect of the operation, programming or applications of Rohde & Schwarz products.

Contact information

Contact our customer support center at www.rohde-schwarz.com/support or follow this QR code:

Bild 5-1: QR code to the Rohde & Schwarz support page