

# R&S®FSW

## Signal and Spectrum Analyzer

### Release Notes

#### Firmware Version V4.90

These Release Notes are for following models of the R&S®FSW Signal and Spectrum Analyzer:

R&S® FSW8,	order no. 1331.5003K08,	R&S® FSW13,	order no. 1331.5003K13,
R&S® FSW26,	order no. 1331.5003K26,	R&S® FSW43	order no. 1331.5003K43,
R&S® FSW50,	order no. 1331.5003K50,	R&S® FSW67,	order no. 1331.5003K67,
R&S® FSW85,	order no. 1331.5003K85		

R&S® FSW8,	order no. 1312.8000K08,	R&S® FSW13,	order no. 1312.8000K13,
R&S® FSW26,	order no. 1312.8000K26,	R&S® FSW43	order no. 1312.8000K43,
R&S® FSW50,	order no. 1312.8000K50,	R&S® FSW67,	order no. 1312.8000K67,
R&S® FSW85,	order no. 1312.8000K85		

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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®FSW is abbreviated as R&SFSW



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# 1 Information on the current version and history

## 1.1 New functions

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

New function of firmware V4.90:

Version	Function
V4.90	R&S FSW-B1017: DIG I/Q 40G Streaming Out Interface with maximum of 1000 MHz I/Q bandwidth supported in I/Q Analyzer for R&S FSW-B1200/-B2001/-B800R.
V4.90	R&S FSW-K18M: Memory Polynomial DPD.
V4.90	R&S FSW-K91BE: IEEE 802.11be EHT MU OFDMA/non-OFDMA measurements. For this release, the user has to provide the PPDU configuration.
V4.90	R&S FSW-K149: IEEE 802.15.4z HRP UWB Ultra-Wideband.
V4.90	R&S FSW-K980: Health and Utilization Monitoring Service.
V4.90	R&S FSW-B24: Support of new preamplifier boards (order numbers 1313.4967.64/72/86/87) with two gain stages (15/30 dB) for R&S FSW43, R&S FSW50 and R&S FSW67.
V4.90	Parameter coupling between R&S FSW and a connected R&S SMW is supported.
V4.90	I/Q data import supports AMMOS intermediate frequency data format (*.aid).
V4.90	Fixed frequency offset between marker and delta marker supported using the link to marker function.
V4.90	Last service date, last calibration date, next calibration due date and recommended calibration interval are indicated in the R&S support dialog.
V4.90	R&S FSW-T0: Support of R&S FSW-K18D/-K18M/-K60C/-K60H/-K70M/-K70P.
V4.90	R&S FSW-B2000: Supports R&S RTO1014 with R&S RTO-B204 option.
V4.90	R&S FSW-K6: Supports memory extension R&S FSW-B124.
V4.90	R&S FSW-K6: Supports segmented capture with R&S FSW-B4001/-B6001/-B8001.
V4.90	R&S FSW-K17/-K17S: Increased maximum number of carriers from 160.001 to 250.001.

V4.90	R&S FSW-K17/-K17S: New parameters for convenient configuration of doppler shift compensation (max clock offset is calculated from relative velocity). See dialog tab "Carrier Estimation" in dialog "Advanced Measurement Configuration".
V4.90	R&S FSW-K17/-K17S: New GUI dialog tab structure for better overview of parameters. This applies to dialogs "Multi Carrier Measurement Configuration" and "Advanced Measurement Configuration".
V4.90	R&S FSW-K50: Harmonics of the carrier are now identified and marked in the result summary.
V4.90	R&S FSW-K544: Added refresh button to parse files while the dialog is open.
V4.90	R&S FSW-B800R/-K800RE/-B512R/-K512RE: DIG I/Q 40G Streaming Out Interface with maximum of 600 Msample/s supported in real-time mode with R&S FSW-B517.
V4.90	R&S FSW-B800R/-B512R: Support for new "Mark Only" trigger mode to trigger with no blind time with DIG I/Q 40G Streaming Out interface.
V4.90	R&S FSW-K144/-K145/-K147/-K148: Signal demodulation and analysis in line with TS38.211 V16.4.0. Time Alignment, Transmit On/Off Power, ACLR, SEM measurements in line with TS38.141-1/2 V16.6.0 and TS38.521-1/2 V16.6.0. Test models in line with TS38.141-1/2 V16.6.0. K147: Support Uplink. K147: Import of custom ACLR/SEM settings. RS Magnitude display. Frequency Error vs. Subframe display. Result summary display for UL in-band emission. Extension of Beamforming Summary for Average RS Weights and rel. Power results. 5G ACLR supports power unit dBm/MHz. CORESET reference data verification according to NR-TM PN23. Additional settings to ease the configuration of multi-carrier setups. Custom definition of symbol time position. Extension of Bitstream for total number of bits and bit errors of PDSCH/PUSCH.

### New function of firmware V4.80:

Version	Function
V4.80	FSW-K148: 5G NR R16 Extension for Uplink / Downlink.
V4.80	Support for Thermal Power Sensor R&S NRP90T, order no. 1424.6473.02. Thermal Power Sensor R&S NRP90TN, order no. 1424.6480.02. Three-Path Diode Power Sensor R&S NRP67S, order no. 1424.6396.02. Three-Path Diode Power Sensor R&S NRP67SN, order no. 1424.6409.02.
V4.80	Self alignment scheduler to perform self alignments regularly at specific days and times.
V4.80	New self alignment function "align all" that performs an extended self alignment as performed in the factory.
V4.80	R&S FSW-B10: Source calibration data can be stored and loaded in configuration files.
V4.80	R&S FSW-B10: Supports R&S SMCV100B vector signal generator.
V4.80	R&S FSW-B124: Capture lengths of up to 6.44 billion samples provided.

V4.80	R&S FSW-B4001/-B6001/-B8001: Support of RF, IQ and IF power trigger.
V4.80	R&S FSW-K6: Support for absolute timestamps on table export with sweep count > 1 and after aborting RUN CONT.
V4.80	R&S FSW-K6: Increased numerical resolution of marker display for Parameter Trend and Parameter Distribution displays.
V4.80	R&S FSW-K6/-K7: Support for Gauss filter bandwidths up to 3 GHz with R&S FSW-B4001/-B6001 and up to 5 GHz with R&S FSW-B8001.
V4.80	R&S FSW-K17/-K17S: Supports Carrier Table for Multicarrier Group Delay measurements.
V4.80	R&S FSW-K18: Trace statistics now available for all traces.
V4.80	R&S FSW-K18: ACLR result table shows selected RBW in diagram header.
V4.80	R&S FSW-K50: Supports saving predicted spurs list.
V4.80	R&S FSW-K50: Supports user defined tolerance for frequency plan.
V4.80	R&S FSW-K70: New predefined digital standard: DMR (Digital Mobile Radio).
V4.80	R&S FSW-K144/-K145/-K147/-K148: Signal demodulation and analysis in line with TS38.211 V16.2.0. Time Alignment, Transmit On/Off Power, ACLR, SEM measurements in line with TS38.141-1/2 V16.4.0 and TS38.521-1/2 V16.4.0. Test models in line with TS38.141-1/2 V16.4.0. Generator to Analyzer settings transfer (requires generator 5G application version 20.12 or higher). Major enhancement of DL auto detection and support of auto detection in UL. Support parsing of DCI parameters (all DCI formats). Auto Demod Once functionality. Auto detection of cell IDs in the range of 0 to 10 for downlink. Intraslot frequency hopping for PUCCH format 2. UL frequency hopping. Extension of results summary for All CC results in multi carrier scenarios. Slot / allocation copying for eased signal configuration. Faster Auto EVM speed via additional Auto Set configuration settings.
V4.80	R&S FSW-K161R/-B512R/-B800R: Marker search operations are now available for the common markers on the Persistence Spectrum.
V4.80	R&S FSW-K161R/-B512R/-B800R: Delta markers in the persistence spectrum display now work with fixed reference.

### New function of firmware V4.70:

Version	Function
V4.70	R&S FSW-B124: extension to 24 GB I/Q memory for R&S FSW-B4001, B6001 or B8001. I/Q Analyzer supports R&S FSW-B124, providing a capture length of up to 4.2 billion samples.
V4.70	FSW-K17S: Frequency subspan measurements for Multicarrier Group Delay measurements.

V4.70	FSW-K147: 5G-NR combined EVM / SEM / ACLR measurements.
V4.70	Support of R&S®FS-SNS18: Smart noise sources for noise figure and gain measurement.
V4.70	Application starter functions: Allows starting any external application directly from R&S FSW firmware.
V4.70	Event-based actions: Allows capturing a particular state of the device under test.
V4.70	An extended digit-based data entry mode allows editing individual digits and changing the unit quickly.
V4.70	ASCII trace export function has been extended by a selectable column separator in spectrum mode, I/Q analyzer and R&S FSW-K7/-B160R/-B512R/-B800R/-K160R/-K160RE/-K161R/-K512RE/-K800RE.
V4.70	On R&S FSW85 models with two RF input connectors the external preamplifier data correction can be enabled for both RF inputs separately.
V4.70	Maximum number of peaks of marker peak list has been increased to 500.
V4.70	Switchable x-axis value distribution in frequency domain.
V4.70	R&S FSW-B1200/-B2001: Minimum IF power trigger level can be set to -25 dB below reference level.
V4.70	R&S FSW-K10: Supports Parameter Coupling.
V4.70	R&S FSW-K18: Trace detectors and configurable number of trace points now available for all traces. "Force ARB Mode" now uses peak power as the reference point. New GUI layout in Reference Signal dialog. Crest Factor Reduction (SMx-K548) now supports enhanced mode. Frequency span now configurable for all K18F displays (magnitude, phase and group delay). New statistical evaluation of results including a Statistics Table display.
V4.70	R&S FSW-K19: New Power Result Mode selection: Values can be displayed either as power density or as integrated power.
V4.70	R&S FSW-K30: ENR measurements inside the option.
V4.70	R&S FSW-K30: Saving and recalling calibration results.
V4.70	R&S FSW-K54: Added reporting functionality for spectrum mode.
V4.70	R&S FSW-K70: Time trigger and RF Power trigger.
V4.70	R&S FSW-K100: Suppress Interferer for Synchronization.
V4.70	R&S FSW-K100: Multi-Carrier SEM (MSEM) supports up to 5 component carriers.
V4.70	R&S FSW-K144/-K145: Signal demodulation and analysis in line with TS38.211 V15.8.0. Test models in line with TS38.141-1/2 V15.5.0. Time alignment, Transmit on/off power, ACLR, SEM measurements in line with TS38.141-1/2 V15.4.0 and TS38.521-1/2 V15.3.0. Frequency error limit check in line with 38.141-1/2 V15.4.0 and 38.521-1/2 V15.3.0. Extended cyclic prefix. 3D display view for Alloc ID / Power / EVM vs. Symb X carrier displays.

Event based actions within the 5G application.  
 Extended frequency lock range.  
 PRB bundling combining PDSCH allocations with same user ID.  
 Dynamic spectrum sharing for 30kHz/60kHz SCS (improved synchronization robustness).  
 Half-frame offset for synchronization signals.  
 PDSCH reference data "All 0" or "NR-TM PN23".  
 Fixed CC offset for easier multicomponent carrier configuration.  
 CSI periodicities greater than one frame.  
 Analysis of multiple CSI RS resources.  
 Transport block scaling factor.  
 MBSFN subframe input for LTE-CRS coexistence.  
 Timing position EVM\_h and EVM\_L as EVM calculation method.

V4.70 R&S FSW-K161R/-B512R/-B800R: Markers on the Persistence Display can follow trace 1 via Marker to Trace.

### New function of firmware V4.61:

Version	Function
V4.61	Support for R&S FSW-B4001: 4400 MHz Analysis Bandwidth R&S FSW-B6001: 6400 MHz Analysis Bandwidth R&S FSW-B8001: 8312 MHz Analysis Bandwidth for FSW67/85 with order no. 1331.5003.67/85.

## 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 V4.90:

Version	Function
V4.90	R&S FSW67: The sweep settings for frequencies > 46 GHz with active YIG-preselector were modified.
V4.90	MSRA/MSRT: "MSRA Master" and "MSRT Master" renamed to "MSRA Primary" and "MSRT Primary".
V4.90	R&S FSW-B21: Deactivated an internal local oscillator output to improve dynamic.
V4.90	R&S FSW-K30: If an R&S SNS is connected to the device, the data of this SNS is shown in the ENR/Temp settings dialog.
V4.90	R&S FSW-K70: In order to better visualize the symbol transitions, the sample points are now connected in the density trace mode for result type 'Vector I/Q'.
V4.90	R&S FSW-K144: The frequency error limit check result is now also indicated for the Min and Max in the result summary.
V4.90	R&S FSW-K144: Frequency error limit check can be switched off.
V4.90	R&S FSW-K144/K145: In ACLR mode, the gated trigger is not activated automatically anymore when a trigger is activated.
V4.90	R&S FSW-K145: Improved precision of frame start offset in uplink.

### Modifications of firmware V4.80:

Version	Function
V4.80	ACLR measurement: ACLR power bars shown as transparent bars for better readability.
V4.80	The settings for sweep mode FFT were optimized.
V4.80	R&S FSW-B21: The settings for sweep mode sweep were optimized.
V4.80	R&S FSW-B2001: Revised the IF attenuation calculation for active preamplifier.
V4.80	R&S FSW-K7: Option renamed to AM/FM/PM Modulation Analysis.
V4.80	R&S FSW-K7: Resolution of modulation frequency in Result Summary table improved.
V4.80	R&S FSW-K144: Relative and absolute limit check in 5G ACLR according to TS38.141-1/2.
V4.80	R&S FSW-K144: For a specific LTE-CRS coexistence scenario, I1 is now 12 instead of 11 for MBSFN subframes according to R1-1909800.



V4.80	R&S FSW-K145: The PTRS rel. power is now calculated automatically for UL TP.
V4.80	R&S FSW-K145: N_ID <sup>RS</sup> can now be configured explicitly for UL TP.
V4.80	R&S FSW-K144/-K145: One Micro Service file is now exported for each component carrier

### Modifications of firmware V4.70SP1:

Version	Function
V4.70	R&S FSW-B21: The overlap area at local oscillator transition frequencies was modified.

### Modifications of firmware V4.70:

Version	Function
V4.70	The synthesizer setup algorithm was modified to increase the dynamic range at specific frequencies.
V4.70	The auto level routine for ACLR measurements was optimized for devices with preamplifier.
V4.70	Zero span: The same x-axis scaling algorithm is now used for traces and diagram grid.
V4.70	The FFT sweep algorithm was optimized for active RMS trace detectors to prevent small noise level differences between sweep and FFT mode.
V4.70	R&S FSW-K30: Option renamed to Noise Figure in Mode dialog.
V4.70	R&S FSW-K50: Option renamed to Fast Spur Search in Mode dialog.
V4.70	R&S FSW-K144: The symbol offset of the CORESET was restricted to 3. It can now be set in the range 0-13.
V4.70	R&S FSW-K144: On/Off Power: After changing the Reference Level offset with activated noise cancellation, the noise cancellation is automatically reconfigured.

## 1.3 Improvements

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

### Improvements of firmware 4.90:

since	Function
V4.90	Channel Power ACLR: Continuous gating trigger speed improvement in sweep type FFT.
V4.90	Revised warning "YIG Filter Limits Bandwidth" in spectrum mode and I/Q analyzer.
V4.90	Save/Recall: A marker list window being part of a save set, may sometimes be hidden after recall. This issue is solved.
V4.90	FSW-K18: Improved algorithm for compression point measurement.
V4.90	FSW-K18D: New default value for power linearity tradeoff and modified algorithm. The new default value of 50% provides same results as previous versions with 100%.
V4.90	FSW-K91AC/AX: Supports VHT160/HE160 signals with R&S FSW-B8001.
V4.40	R&S FSW-B800R/-K800RE: Replay Zoom signaling was corrected. This issue is solved.
V4.70	R&S FSW-K161R/-B512R/-B800R/-K512RE/-K800RE: Persistence max hold was always enabled on recall. This issue is solved.

### Improvements of firmware V4.80SP1:

since	Function
V4.80	Production related changes.

### Improvements of firmware V4.80:

since	Function
V2.10	R&S FSW-B17: For operation with R&S FSW-K161R/B512R/B800R/K512RE/K800RE the signaling was corrected. This issue is solved.
V4.60	R&S FSW-K30: Loading loss tables was slow when one file was loaded multiple times. This issue is solved.
V4.40	R&S FSW-K145: The sequence generation of the PTRS for UL TP was adapted according to TS38.211 with respect to m and m'.
V4.40	R&S FSW-K144: For test model 3.2 and 3.3, the user ID (RNTI) was switched for different PDSCH allocations. The issue is solved.
V4.60	R&S FSW-K144: For dynamic spectrum sharing and TM2, there could be a decreased EVM at the edge subcarrier of PDSCH allocations. The issue is solved.
V4.60	R&S FSW-K144: For dynamic spectrum sharing, the LTE CRS were not excluded when calculating the OSTP. The issue is solved.

V4.50	R&S FSW-K144: When loading an I/Q file via I/Q import instead of I/Q input, the frame start offset could differ in specific scenarios. The issue is solved.
V4.50	R&S FSW-K144: When switching from EVM to On/Off power measurement mode, the settings were not transferred in certain scenarios. The issue is solved.
V4.70	R&S FSW-K161R/B512R/B800R/K512RE/K800RE: In some situations, changing the trigger offset caused the power vs. time trace to be shifted incorrectly. This issue is solved.
V4.60	R&S FSW-K161R/B512R/B800R/K512RE/K800RE: Spectrogram showed a graphical artifact (black line) when zoom mode was active. This issue is solved.
V4.30	R&S FSW-K161R/B512R/B800R/K512RE/K800RE: For multiple replay zoom operations, shifted zoom areas were SCPI-recorded. This issue is solved.
V4.70	R&S FSW-K544: Adjust ref level influenced the RF attenuation settings. This issue is solved.

### Improvements of firmware V4.70:

since	Function
V4.61	In rare cases, CALCulate<n>:MARKer<m>:FUNCTION:FPEaks:Y? returned a query error. This issue is solved.
V4.30	License key installation via the R&S License Manager webpage often shows a red error message in the last line. Nevertheless, the license key is properly installed on the device, which can be seen after the reboot. This issue is solved.
V4.60	R&S FSW-B800R: Spectrum trace was rendered incorrectly when FFT length was 512 in certain cases. This issue is solved.
V4.60	R&S FSW-B2000: Oscilloscope LAN connection failed sometimes when using savesets with active TRACE:IQ[:STATe] mode. This issue is solved.
V2.70	R&S FSW-K6/K60 with FSW-B512/B1200/B2001: When using an external trigger or IF power trigger, the segmented capture timing can become inaccurate for short segment lengths (under 400 ns) or small amounts of pre-trigger samples (under 100 ns). This issue is solved.
V4.30	R&S FSW-K18: Due to an unintended correction mechanism, Baseband I input voltage and Baseband Q input voltage influence each other if there is a frequency error or a sample rate error. To avoid this, the external references of R&S SMW and R&S FSW need to be coupled. This issue is solved.
V4.30	R&S FSW-K18: On instruments equipped with analog baseband inputs, the displayed capture time is sometimes not updated when reducing the capture length. This issue is solved.
V2.70	R&S FSW-K18: Selecting the "Update DPD Tables on Generator" softkey directly after starting the application can lead to a lock-up of the instrument. This issue is solved.
V4.60	R&S FSW-K70: When a trace in the constellation result window is set to "view" and afterwards a second trace for the same window is activated, the "view" trace was reset. This issue is solved.
V4.50	R&S FSW-K144: CSI-RS with antenna ports other than 3000 could not be analyzed. The issue is solved.

V4.60	R&S FSW-K144: Under certain conditions, a signal configured for TM2 showed a measurement to measurement variation of the EVM and frame start offset. The issue is solved.
V4.60	R&S FSW-K144: In certain scenarios, individual symbols with high phase rotation affected the EVM of other symbols in the same slot. The issue is solved.
V4.60	R&S FSW-K144: No time alignment results were shown in certain scenarios with multiple PDSCH allocations. The issue is solved.
V4.50	R&S FSW-K161R/-B512R/-B800R: Focus could shift from the frame entry to the frequency entry while using Replay Zoom. This issue is solved.

#### Improvements of firmware V4.61:

since	Function
V4.60	The trace average algorithm did not always work with active transducer and number of sweep points >1001. This issue is solved.
V4.30	R&S FSW-K97: The K97 crashed sometimes for random Signal Field Data with correct CRC. This issue is solved.

## 1.4 Known issues

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

since	Function
V4.20	The "measurement zoom" button in the toolbar is always available although some options are not intended to support this feature and the button should be unavailable.
V4.20	Touch gestures with a y-scaling in "linear percent" or "linear with unit" do not always work.
V4.20	MSRA mode in I/Q Analyzer or K7: Dragging x-axes which reflect a time unit has no effect.
V4.60	R&S FSW-B160R/-B512R/-B800R/-K160R/-K160RE/-K161R/-K512RE/-K800RE: Real-Time's Trigger Mode is not saved when recalling a saveset from before V4.60.
V2.40	R&S FSW-B512R: For some resolution bandwidths, a single sweep shows artifacts in the spectrum that are caused by the instrument itself.
V2.40	R&S FSW-B160R/-B512R/-B800R/-K160R/-K160RE/-K161R/-K512RE/-K800RE: Kaiser window not supported. If selected, a Blackmann Harris window is applied instead.
V1.90	R&S FSW-B160R/-B512R/-B800R/-K160R/-K160RE/-K161R/-K512RE/-K800RE: Auto Adjust functions are not available in MSRT mode.
V1.80	R&S FSW-B160R/-B512R/-B800R/-K160R/-K160RE/-K161R/-K512RE/-K800RE: No full support of trigger outputs. "Device Triggered" mode for "Frequency Mask Trigger" is available for trigger output 3 only.
V2.20	R&S FSW-B2000: In some situations, after recalling a file with active B2000 configuration, the connection to the R&S RTO is not established. Workaround: After the recall, switching the B2000 state off and on again should solve the problem.
V4.90	<p>R&amp;S FSW-K6 with FSW-B4001/-B6001/-B8001: When using segmented capture, the pre-trigger samples can be invalidated in the following case:</p> <p>Pre-trigger time smaller than <math>512 \times 48</math> samples AND trigger event occurs within a time window (marked gray below) of <math>512 \times 48</math> samples, beginning at time T before the segment end. T is 80.5 ns for external trigger, 1.05 <math>\mu</math>s for power trigger.</p>
V3.20	R&S FSW-K6 with FSW-B512/-B1200/-B2001: First sweep with Gauss filter at 200 MHz can stop. Changing the bandwidth, then back to 200 MHz resumes operation.
V2.90	R&S FSW-K6: When using B2000 or B5000 with segmented capture mode, the timestamps and PRI values may not be shown correctly.

V2.80	R&S FSW-K6: Segmented capture with FSW-B512R can produce incorrect segment lengths.
V2.40	R&S FSW-K6: Using FSW-B2000, you can set a larger amount of segmented data than is actually possible with certain RTO configurations. In this case, the lower number of available segments is analyzed and a warning displayed in the status bar.
V2.20	R&S FSW-K6: The "view" trace behaves like a "clear write" trace.
V1.51	R&S FSW-K6: After recalling a Pulse channel which was saved after a RUN SINGLE operation, the RUN SINGLE button is lit but no measurement is running.
V1.41	R&S FSW-K6: After aborting a measurement via SCPI (:ABORT) the status bar still shows "Measuring...".
V1.41	R&S FSW-K6: The following command is not available: [SENSe:]FREQuency:CENTer:STEP
V1.60	R&S FSW-K10: Cumulating Modulation Spectrum limits of carriers of a multicarrier BTS is not supported if the outermost carrier has a frequency offsets under 1.8 MHz.
V2.70	R&S FSW-K17/-K17S: In specific cases user-defined frequency response correction data (FSW-K544) can cause an error message "FRCORR: (...) Demod BW (...) not covered completely by Combined Frequency Range (...)". As a workaround, use user-defined frequency response correction data that covers a larger bandwidth than the span configured in the FSW-K17/-K17S.
V3.20	R&S FSW-K18: The crest factor of signals created by the "Generate Own Reference Signal"-functionality lies in a range between about 9.5 dB and 10.5 dB even if higher or lower values were selected in the dialog. Since version 4.30 it is no longer possible to select values lower than 9.5 dB or higher than 10.5 dB.
V2.90	R&S FSW-K18: Markers are not available for Parameter Sweep measurements.
V2.60	R&S FSW-K60: Adding a marker to the spectrum resets the selected frame in the spectrogram.
V2.60	R&S FSW-K91N: For specific 802.11n antenna 2, 3, .. signals with cyclic shift delay the EVM might drop by approximately 1 dB.
V2.60	R&S FSW-K91AX HE Trigger-based PPDU analysis: In some cases, the auto bandwidth detection can fail. A work-around: Set the bandwidth of the signal to be measured manually. R&S FSW-K91AX HE Trigger-based PPDU analysis: For 40MHz signals with short GI/HE-LTF size, the auto detection can fail. A work-around: Set the GI/HE-LTF size of the signal to be measured manually. R&S FSW-K91AX HE MU PPDU: Only manual PPDU configuration is supported R&S FSW-K91AX Ext Range SU PPDU: Only RU242 size is supported. No MIMO is supported.
V2.50	R&S FSW-K91/-192/-K193: In some cases (using FSW-B512), auto level might not produce optimal results. Manual adjustments of the amplitude settings may be required in these cases.
V2.00	R&S FSW-K91: Use no more than three FSW-K91 channels at maximum capture time - to ensure that the memory of the application is not exceeded.
V1.90	R&S FSW-K91: When measuring MIMO and recalling a save set containing the same IP-addresses of the connected devices the measurement stops working. Delete the

	shutdown file 'C:\R_S\Instr\results\Shutdown.dfl' and switch the FSW off and on again using the main power switch at the rear of the instrument.
V1.42	R&S FSW-K91, -K91N, -K91AC: In case the instrument is waiting for a trigger, no message is displayed in the status bar.
V2.90	R&S FSW-K95: When loading an I/Q file, an incorrect warning is displayed occasionally. The warning states that the sample rate of the file is different from the sample rate of the application, even though the sample rate of the file is equal to the application sample rate. Changing the sample rate back and forth causes the message to disappear.
V4.90	FSW-K800RE: For spans larger than 480 MHz, frequency domain measurements in Real-Time Spectrum and MSRT mode may stop occasionally. Workaround: Switch to IQ Analyzer, set Analysis Bandwidth to 513 MHz, then switch back to Real-Time Spectrum mode.

## 1.5 Windows 10

The R&S FSW uses the Windows 10 IoT Enterprise LTSC operating system. (IoT stands for Internet of Things and is the embedded version of Windows 10. LTSC stands for Long Term Servicing Branch which means a long support period of Windows patches.)

## 1.6 Exchanging Solid State Disks Between Different Types of CPU Boards

For the R&S FSW spectrum analyzer, different CPU boards are in use: IPC10 with order no. 1206.0223 and IPC11 with order no. 1206.3216.

If the solid state disk is exchanged between R&S FSWs with different types of CPU boards, the screen resolution is only 800x600 and a "Drive Access Error" is displayed by the firmware. Switch off the device and change back to the solid state drive which fits to the CPU board. The device will boot as usual.

## 1.7 "Missing smartcard" Message

For R&S FSW spectrum analyzers produced July 2017 or later, the message "Missing smartcard or smartcard not initialized" may appear after starting the device. This only happens if a firmware below V2.60 is used. Either because a downgrade to a version below V2.60 was performed, or the solid state drive was exchanged with a version below V2.60.

Solution: Please install firmware V2.60 or higher. The device will boot as usual.



## 2 Modifications to the documentation

The latest documentation is available for download from the Rohde & Schwarz website at:

<http://www.rohde-schwarz.com/manual/FSW>

## 3 Firmware update

### 3.1 Validity information

The R&S® FSW Signal and Spectrum installer is valid for following models:

Device	Order Number
R&S® FSW8	1331.5003K08 or 1312.8000K08
R&S® FSW13	1331.5003K13 or 1312.8000K13
R&S® FSW26	1331.5003K26 or 1312.8000K26
R&S® FSW43	1331.5003K43 or 1312.8000K43
R&S® FSW50	1331.5003K50 or 1312.8000K50
R&S® FSW67	1331.5003K67 or 1312.8000K67
R&S® FSW85	1331.5003K85 or 1312.8000K85

### 3.2 Update information

The firmware update file for the R&S® FSW is one file including the main firmware version number, e.g. FSWSetup\_V1.60.exe. It will be referred to as FSWSetup.exe later in the text. The file can be found on the Rohde & Schwarz web page at <https://www.rohde-schwarz.com/de/firmware/fsw>.

### 3.3 Performing the Firmware Update on the Instrument

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

#### Using a memory stick:

1. Copy the file to a directory of the memory stick and insert the memory stick into one of the USB sockets of the R&S FSW.

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

1. Connect the R&S FSW to your LAN.
2. Start the remote desktop on your PC (C:\winnt\system32\mstsc.exe).
3. Enter the TCP/IP address of the instrument you want to update. Ensure that the "local resources" > "drives" option is selected and press the "Connect" button. (To get the TCP/IP address of the R&S FSW, press the "Setup" key and then "Network + Remote". The IP address consists of 4 numbers between 0 and 255.)
4. Log in to the instrument (user name: "instrument" and default password "894129").

5. Copy the FSWSSetup.exe from your PC to a new folder, e.g. C:\FWUpdate.  
You can now access this directory with the FSWSSetup.exe from the R&S FSW analyzer firmware.

**Using a network drive:**

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

**Performing the update on the instrument:**

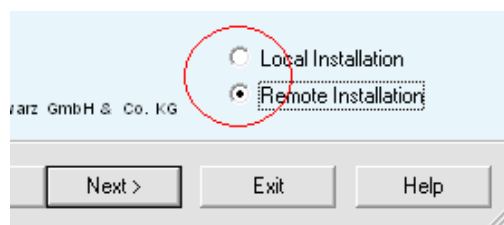
The firmware update process is performed by the following steps:

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

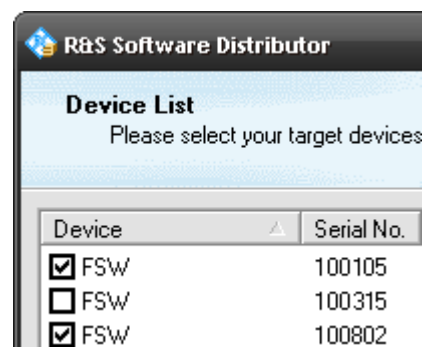
### 3.4 Performing the Firmware Update from a Windows PC

If the firmware version 1.10 or newer is installed on the instrument the new firmware can also be uploaded without using a memory stick or a network drive. Just a LAN connection from the instrument and a Windows PC is necessary.

1. Run FSWSSetup.exe on your PC.
2. Select "Remote Installation" and then "Next".



3. Select the packages to install and then “Next”.  
HINT FOR FIRE WALL USERS: The FSWSetup.exe communicates with the instruments via LAN. Therefore it is necessary that the FSWSetup.exe may pass the fire wall. After adding it to the fire wall rules, restart the scan by clicking on “Rescan”.



4. After scanning your LAN subnet all found instruments are listed. Select the instruments you want to update.  
It is possible to select up to 5 instruments for updating in parallel.

### NOTICE

Be careful and check twice if you have selected the correct instruments. Depending on your company's network structure, also instruments of other departments will show up!

5. Select “Help” to display additional help.  
Select “Options” for further options.
6. Select “Install” to start the installation.
7. Confirm that you want to reboot the instrument in order to activate the firmware update (the instrument then restarts automatically)

## 3.5 Operation with and without Administrator Rights

With firmware version V1.41 or later, you can operate the analyzer with or without administrator rights. Some administrative tasks (e.g. LXI functions or network configuration) do require administrator rights. Since firmware V1.60, a firmware update is also possible without administrator rights.

In the default configuration, auto-login is enabled, and the “Instrument” account with administrator rights is active. This means that no password is required, and the full functionality of the analyzer is available. An additional user account (user name “NormalUser” with default password “894129”) is pre-defined. Use standard Windows functionality if you wish to deactivate the auto-login mechanism and activate the “NormalUser” account. Also refer to the R&S FSW Getting Started Manual.

## 3.6 Installing Firmware Options

### 3.6.1 Firmware Options Included in the Basic Instrument

The R&S FSW-K7, R&S FSW-K19, R&S FSW-K33, R&S FSW-K54, R&S FSW-K512RE, FSW-K800RE and R&S FSW-K544 application software packages are included in the basic instrument firmware. Therefore, they do not have a separate item in the installer to be selected.

### 3.6.2 Other Firmware Options within the FSWSetup.exe File

The R&S FSW-K6, R&S FSW-K10, R&S FSW-K15, R&S FSW-K17, R&S FSW-K18, R&S FSW-K30, R&S FSW-K40, R&S FSW-K50, R&S FSW-K60, R&S FSW-K70, R&S FSW-K72/73, R&S FSW-K76/77, R&S FSW-K82/83, R&S FSW-K84/85, R&S FSW-K91, R&S FSW-K95, R&S FSW-K97, R&S FSW-K100/101/102/104/105, R&S FSW-K106, R&S FSW-K118/K119, R&S FSW-K144/K145, R&S FSW-K161R, R&S FSW-K192/193 and R&S FSW-K201 application software packages have their own installation item and are therefore added to the selection list during the firmware update. Ensure that the checkbox is checked  if the installation is requested.

Note: The functionality of FSW-K6S is integrated within FSW-K6 and is activated by its own key code. The functionality of FSW-K18D is integrated within FSW-K18 and is activated by its own key code. The functionality of FSW-K70P is integrated within FSW-K70 and is activated by its own key code. The functionality of the FSW-K91p, FSW-K91n, FSW-K91ac and FSW-K91ax are integrated within FSW-K91 and are activated by their own key code. The functionality of the FSW-K60C and FSW-K60H are integrated within FSW-K60 and are activated by their own key code.

### 3.6.3 Enabling Options by Entering Option Key Codes

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#### **NOTICE**

This section can be skipped if the option key was entered once.

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

If a XML-file with an option key was sent to you see the install description below.

The license key is in the device certificate or delivered as a part of the software package. The process is performed in the following steps:

1. Press the "SETUP" key.
2. Go to the "Versions + Options" tab.
3. Press the "Install Option" button.  
A dialog box is displayed.
4. Enter the option key number using the keypad.

5. Press "ENTER".  
After a successful validation, the "Option Key valid" message is displayed. If the validation failed, the option software is not installed.
6. Reboot the device.

#### **Installation of options via XML-file**

1. Press the "SETUP" key.
2. Go to the "Versions + Options" tab.
3. Press the "Install Option by XML" button.  
A file browser is displayed.
4. Select the path to the XML file (e.g. network drive or USB stick)
5. Press "Select".  
After a successful validation, the "Option Key valid" message is displayed. If the validation failed, the option software is not installed.
6. Reboot the device.

## 4 Customer support

### Technical support – where and when you need it

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

### Contact information

Contact our customer support center at [www.rohde-schwarz.com/support](http://www.rohde-schwarz.com/support) or follow this QR code:



QR code to the Rohde & Schwarz support page