

R&S®FSWP

Release Notes

Firmware Version V3.00

These Release Notes are for following models of the R&S®FSWP Phase Noise Analyzer:

R&S® FSWP8, part number 1322.8003K08,
R&S® FSWP26, part number 1322.8003K26,
R&S® FSWP50, part number 1322.8003K50.

R&S® FSWP8, part number 1322.8003K09,
R&S® FSWP26, part number 1322.8003K27,
R&S® FSWP50, part number 1322.8003K51.

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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®FSWP is abbreviated as R&SFSWP.

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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 functions of firmware V3.00:

Version	Function
V3.00	Supports R&S FSWP8, part number 1322.8003K09, R&S FSWP26, part number 1322.8003K27, R&S FSWP50, part number 1322.8003K51.
V3.00	User interface: New look and feel compatible to R&S FSW.
V3.00	Supports SCPI recorder.
V3.00	Phase Noise: Automatic optimization of level setting. This is the default after preset. Available via auto search dialog, and via remote command '[SENSe:]POWer:RLEVel:MODE AUTO'.
V3.00	Phase Noise: Added noise diagram with preconfigured AM noise traces. Available via "AM Noise Spectrum" display, and via remote command e.g. LAY:ADD? '1', RIGHT, AMNoise
V3.00	Phase Noise: Adjustable trigger level in Phase Noise CW, and for external pulse gating in pulsed measurements.
V3.00	Phase Noise: Extended compatibility to R&S FSUP, R&S FSW-K40, and R&S FSMR3 without B60 with remote command 'SWE:MOD FAST AVERaged'.
V3.00	PN transient measurements: Support settling time of phase. Results can be queried via remote command '[:CALC]:SETTling:TIME:RESult?'. Note: selection of correct window/trace is required beforehand via remote commands '[:CALC]:SETTling:TIME:DIAG'/'[:CALC]:SETTling:TIME:TRACe' due to remote compatibility with previous firmware releases.
V3.00	New command ':LAYout:WINDow<n>:TYPE?' to query window type.
V3.00	R&S FSWP-K7: New function: settling time measurements.
V3.00	R&S FSWP-K30: Added SCPI command for frequency readout.
V3.00	R&S FSWP-K30: Trace export now supports .csv format. Loss tables support .s2p format: Files of .s2p format can be loaded and converted into a loss table that can be used for K30
V3.00	R&S FSWP-K60P: Transient phase noise measurements.

Version	Function
V3.00	R&S FSWP-K70: Support for DVB-S2X super frame measurement added in DVB-S2(X) configuration tool.
V3.00	R&S FSWP-K70: Configuration tool for DVB-RCS2 measurements available (linear modulation reference waveforms).
V3.00	R&S FSWP-K70: New "DVB_RCS2" mappings for $\pi/2$ -BPSK, QPSK, 8PSK and 16QAM.
V3.00	R&S FSWP-K70: LSB first bit ordering is now supported as demodulation parameter.
V3.00	R&S FSWP-B1: IQ Analyzer: High resolution time trigger available (1 ps).
V3.00	R&S FSWP-B1: Fixed frequency offset between marker and delta marker is now supported using the link to marker function.
V3.00	R&S FSWP-B1: I/Q data import supports AMMOS intermediate frequency data format (*.aid).
V3.00	R&S FSWP-B1: New result window "Phase vs Time" (unit rad) in I/Q Analyzer available.
V3.00	R&S FSWP-B1: Additional 6 MHz 3 dB Gauss filter available for spectrum analyzer mode. The bandwidth can only be selected by entering the numeric value directly.
V3.00	R&S FSWP-B1: Additional unit "dBm/Hz (Power)" available in amplitude dialog.
V3.00	R&S FSWP-B1: Trace colors of active traces are indicated in the trace config dialog.
V3.00	R&S FSWP-K980: Support of custom utilizations and custom device history entries.
V3.00	Colors are used to improve the readability of self-test and self-alignment results.

New functions of firmware V2.00SP2:

Version	Function
V2.00SP2	Supports reference board, part number 1325.2193.12.
V2.00SP2	DC Output: Increased voltage resolution to 1 mV.
V2.00SP2	VCO Measurements: Support up to 38001 measurement points.

New functions of firmware V2.00SP1:

Version	Function
V2.00SP1	Supports CPU board, part number 1206.3974.00.

New functions of firmware V2.00:

Version	Function
V2.00	R&S FSWP-K980: Health and Utilization Monitoring Service.
V2.00	Basic instruments: Last service date, last calibration date, next calibration due date and recommended calibration interval are indicated in the R&S support dialog.
V2.00	Support for Three-Path Diode Power Sensor R&S NRP67SN-V, part number 1424.6415.02.
V2.00	Support for R&S®FS-SNS67: Smart noise sources for noise figure and gain measurement.

New functions of firmware V1.92:

Version	Function
V1.92	Phase Noise: Support for external trigger to start phase noise measurement.
V1.92	Phase Noise: Introduced possibility to change color of spur lines.
V1.92	Phase Noise: Introduced Capture Range 40 MHz to measure DUTs swept from -40 MHz to +40 MHz relative to center frequency.
V1.92	Phase Noise: Support for ultra-small resolution bandwidths down to 0.0003%. Using ultra-small RBWs goes along with very long measurement times, which may be wrongly interpreted as freezing of the instrument.
V1.92	Support for R&S FSWP-K19 Noise Power Ratio (NPR) measurement.
V1.92	R&S FSWP-K6: Increased numerical resolution of marker display for Parameter Trend and Parameter Distribution displays.
V1.92	R&S FSWP-K30: ENR measurements inside the option.
V1.92	R&S FSWP-K30: Saving and recalling calibration results.
V1.92	R&S FSWP-K50: Supports saving predicted spurs list.
V1.92	R&S FSWP-K50: Supports user defined tolerance for frequency plan.
V1.92	R&S FSWP-K70: Support for R&S FSWP-K70M Multi-Modulation Analysis.
V1.92	R&S FSWP-K70: Support for R&S FSWP-K70P BER PRBS Measurements.
V1.92	R&S FSWP-K70: New predefined digital standard: DMR (Digital Mobile Radio).
V1.92	R&S FSWP-K70: Support of "RF Power"-Trigger.
V1.92	R&S FSWP-K70: Improved burst search for low reference levels.
V1.92	R&S FSWP-K70: Improved coarse synchronization for 64APSKs.
V1.92	Support for Thermal Power Sensor R&S NRP90T, part number 1424.6473.02. Thermal Power Sensor R&S NRP90TN, part number 1424.6480.02. Three-Path Diode Power Sensor R&S NRP67S, part number 1424.6396.02. Three-Path Diode Power Sensor R&S NRP67SN, part number 1424.6409.02.

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 V3.00:

Version	Function
V3.00	Correlation algorithm modified to address the cross-spectral collapse phenomenon.
V3.00	Phase Noise: Modified spur suppression.
V3.00	Phase Noise: For FSWP26 and FSWP50, lower sideband is now used for signal frequency between 7 and 8 GHz and stop offsets up to 1 GHz.
V3.00	Phase Noise: Up to 100 kHz additional frequency range below minimum device frequency allowed.
V3.00	Phase Noise: The noise diagram with preconfigured PN traces was renamed to "PN Noise Spectrum" in the evaluation bar of the SmartGrid mode.
V3.00	PN transient measurements: Changed color of upper/lower settling time limits to red, in accordance with R&S FSWP-K7 settling time measurements.
V3.00	PN transient measurements: Markers indicate the settling time in each window, and the settling time is displayed in the marker table. Previously, the settling time was displayed in the global info bar.
V3.00	PN transient measurements: If no settling time can be determined, '---' is displayed instead of '0' and '-400: Query Error' is returned via remote command.
V3.00	RF attenuation is set to 75 dB during shutdown. Not available for FSWP8 without option B1.
V3.00	Modified the sweep settings to increase the dynamic range for span = 100 MHz and resolution bandwidth = 100 kHz.
V3.00	R&S FSWP-K50: Increased numerical resolution of exported table results to 14 decimal digits.
V3.00	R&S FSWP-K70: Predefined digital standards for Bluetooth now set the bit ordering to LSB first.

Modifications of firmware V2.00SP2:

Version	Function
V2.00SP2	R&S FSWP-B21: The phase noise trace showed a step at 10 MHz offset. This step was eliminated.

Modifications of firmware V2.00:

Version	Function
V2.00	Phase noise trace alignment for offsets > 10 MHz available for Signal Level Low and for R&S FSWP-B21.
V2.00	R&S FSWP-B1: MSRA: "MSRA Master" renamed to "MSRA Primary".
V2.00	R&S FSWP-B1: Optimized FFT synthesizer setup algorithm.
V2.00	R&S FSWP-K50: Harmonics of the carrier are now identified and marked in the result summary.

Modifications of firmware V1.92SP1:

Version	Function
V1.92SP1	VCO Characterization: Smoothing added for frequencies below 8 GHz.

1.3 Improvements

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

Improvements of firmware V3.00:

Version	Function
V3.00	Phase Noise: Supports remote commands 'INIT:CONT 0' and 'INIT:CONT 1' as described in the user manual.
V3.00	VCO measurements: In rare cases, the measurement time was unnecessarily long. This issue is solved.
V3.00	Baseband Noise: With baseband input, RF input coupling was displayed in the overview dialog. This issue is solved.
V3.00	In rare cases, recall of certain savesets caused a firmware lockup. This issue is solved.

Improvements of firmware V2.00SP1:

Version	Function
V2.00SP1	Phase Noise: Increased measurement speed of ultra-small resolution bandwidths.
V2.00SP1	Phase Noise: Optimized IF frequency setting.

Improvements of firmware V2.00:

Version	Function
V2.00	Phase Noise: Optimized IF frequency setting.
V2.00	R&S FSWP-B21: With a very high number of cross correlations, sometimes the Phase Noise measurement did not finish. The issue is solved.

Improvements of firmware V1.92:

Version	Function
V1.92	Phase Noise: Trace smoothing is now disabled for integrated measurements.
V1.92	Phase Noise: Optimized IF frequency setting at RF 52 MHz.
V1.92	Phase Noise: Improvements to Keysight E5052 compatibility mode.
V1.92	Phase Noise: Improved leveling during auto search.
V1.92	Baseband Noise: Units dBV/Hz and dBμV/Hz are renamed to dBV/√Hz and dBμV/√Hz, respectively. For compatibility, old units are used in SCPI, Limit Line files and Trace Export files.

Version	Function
V1.92	R&S FSWP-B21: In Phase Noise, improved sideband selection.
V1.92	Baseband Noise: Remote Control: Resolution increased for unit $V/\sqrt{\text{Hz}}$.
V1.92	PN Transient Measurement: In rare cases, the frequency deviation marker was invalid. This issue is solved.

1.4 Known issues

The following tables list the known issues, including their unique reference to the appropriate change management system, and indicate since which version the issue could be observed:

since	Function
-	<p>For devices including the patch "Apply MS17-010 to prevent WannaCrypt attacks" – Microsoft Patch KB4012212:</p> <p>When starting the self-alignment or self-test, the corresponding result dialog is hidden. The measurements themselves are performed correctly in the background.</p> <p>Workaround:</p> <p>Select the orange colored "Alignment" or "Service+Support" softkeys or simply touch the screen. The result dialogs appear again.</p>
V3.00	<p>Phase Noise: Switching the capture range to "40 MHz" does not set the level setting to "high" if the level setting was "auto" before, and a low signal was measured.</p> <p>Workaround: Set the level setting to "high" before you set the capture range to "40 MHz" (remote command 'POW:RLEV:MODE HIGH').</p>
V3.00	<p>Phase Noise: Switching the level setting to "auto" does not deactivate the "40 MHz" capture range.</p> <p>Workaround: Deactivate the "40 MHz" capture range manually (remote command 'SWE:CAPT:RANG NORM').</p>
V2.00	<p>R&S FSWP-K980: For very large HUMS database sizes, the remote commands 'DIAGnostic:HUMS[:ALL]?' and 'DIAGnostic:HUMS:SAVE' can fail.</p> <p>In this case, use SNMP and REST.</p>
V1.92	<p>Phase Noise: Ultra-small resolution bandwidths:</p> <ul style="list-style-type: none"> • If function is enabled, and function is enabled in an instrument saveset, recall of the saveset fails. • If function is enabled in saveset used for startup recall, every second preset acts as if startup recall had been disabled.
V1.80	<p>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.</p>

since	Function
V1.70	R&S FSWP-K6P Pulse Stability measurements: Bandwidths below 400 kHz (Gauss) and 2 MHz (Flat) are not supported with the Low Noise digitizer mode.
V1.70	The persistence trace is cleared when the diagram y-axis scaling parameters change. This can happen in diagram scale mode "auto". To prevent this behavior, set the diagram scale mode to "manual".
V1.20	R&S FSWP-K6: <ul style="list-style-type: none"> • After recalling a Pulse channel that was saved after a RUN SINGLE operation, the RUN SINGLE button is lit but no measurement is running. • The "view" trace behaves like a "clear write" trace. • After aborting a measurement via SCPI (:ABORT), the status bar still shows "Measuring...".

1.5 “Missing smartcard” message

For R&S FSWP phase noise analyzers produced since November 2017, the message “Missing smartcard or smartcard not initialized” can appear after starting the device.

This message only appears if a firmware before V1.60 is used. Either because a downgrade to a version before V1.60 was performed, or the solid state drive was exchanged with a version before V1.60.

Solution: Install firmware V1.60 or later. The device will boot correctly.

2 Modifications to the documentation

The current documentation is up-to-date.

3 Firmware update

The firmware update file for the R&S®FSWP is one file including the firmware version number, e.g. `FSWPSetup_V3.00.exe`. It will be referred to as `FSWPSetup.exe` later in the text. The file can be found on the Rohde & Schwarz web page at:

<https://www.rohde-schwarz.com/firmware/fswp>

3.1 Providing access to the firmware update file

There are three ways to provide access to the `FSWPSetup.exe` for the R&S FSWP.

Using a USB storage device:

1. Copy the file to a directory of the storage device.
2. Insert the storage device in one of the USB connectors of the R&S FSWP.

Using the remote desktop:

1. Connect the R&S FSWP to your LAN.
2. Start the remote desktop on your PC (`C:\winnt\system32\mstsc.exe`).
3. Enter the required connection settings:
 - TCP/IP address of the instrument you want to update.
To get the TCP/IP address of the R&S FSWP, select [Setup] > "Network + Remote". The IP address consists of 4 numbers between 0 and 255.
 - Enable the "local resources" > "drives" option.
4. Select "Connect".
5. Log in to the instrument using the user name: "instrument" and the default password "894129".
6. Copy the `FSWPSetup.exe` from your PC to a new folder, e.g. `C:\FWUpdate`.
7. You can now access this directory with the `FSWPSetup.exe` from the R&S FSWP firmware.

Using a network drive:

1. Connect the R&S FSWP to your LAN.
2. Establish a connection to one of your servers. (Ask the local IT administrator for support).
3. Copy the `FSWPSetup.exe` from your PC to a directory on this server.
4. You can now access the directory with the `FSWPSetup.exe` from the R&S FSWP firmware.

3.2 Performing the firmware update on the instrument

1. Switch on the instrument and wait until the analyzer is ready for operation.
2. If a measurement is running, stop it by pressing the highlighted [Run Cont] or [Run Single] key. Do not update the firmware during a running measurement.
3. Select [Setup] > "System Config" > "Firmware Update" tab.
4. In the file selection dialog box, select the `FSWPSetup*.exe` file from the prepared storage location.
"File Explorer": Instead of using the file manager of the R&S FSWP firmware, you can also use the Microsoft Windows File Explorer to manage files.
5. Select "Install".
6. Select "Next".
A selection list of the available firmware packages is displayed.
7. By default, all applications are installed. Make sure the required applications are selected.
8. Select "Install" to start the update.

After the firmware update, the R&S FSWP reboots automatically.

Depending on the previous firmware version, a reconfiguration of the hardware can be required during the first startup of the firmware. The reconfiguration starts automatically, and a message box informs you about the process. When the reconfiguration has finished, the instrument again reboots automatically.

Note: Do not switch off the instrument during the reconfiguration process!

Now the firmware update is complete.

9. After the firmware update, the "UNCAL" status is displayed in the status bar. Perform a self-alignment ([SETUP] > "Alignment" > "Start Self Alignment").

3.3 Performing the firmware update from a Windows PC

You can also update the firmware using a LAN connection between the instrument and a Windows PC.

Note for firewall users



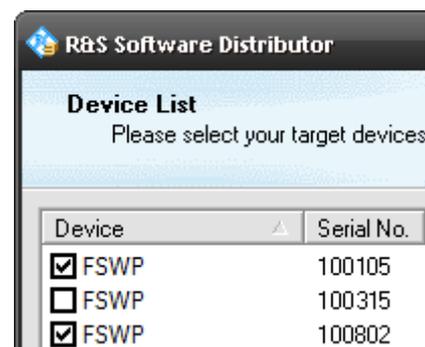
The `FSWPSetup.exe` communicates with the instrument via LAN. Therefore, the `FSWPSetup.exe` must pass the firewall. If necessary, add it to the firewall rules.

1. Run `FSWPSetup.exe` on your PC.
2. Select "Remote Installation".



3. Select "Next".
4. Select the packages to install.
5. Select "Next".

Your LAN subnet is scanned to find all available instruments. If the required instrument is not found, check your firewall settings. After adding the `FSWPSetup.exe` to the firewall rules, restart the scan by selecting "Rescan".



6. Select the instruments you want to update.
You can select up to 5 instruments to update in parallel.
7. If necessary, select "Help" to display additional help.
8. If necessary, select "Options" for further options.
9. Select "Install" to start the installation.
10. Confirm the message to reboot the instrument to activate the firmware update.
The instrument restarts automatically.

3.4 Operation with and without administrator rights

You can operate the analyzer with or without administrator rights. Some administrative tasks (e.g. network configuration) require administrator rights. Updating the firmware 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 is predefined with the user name "NormalUser" and the default password "894129". Use standard Windows functionality to deactivate the auto-login mechanism and activate the "NormalUser" account. Also refer to the R&S FSWP Getting Started manual.

3.5 Installing firmware options

3.5.1 Firmware options included in basic instrument

The R&S FSWP-K4, R&S FSWP-K7, R&S FSWP-K19, R&S FSWP-K33 and R&S FSWP-K980 application software packages are included in the basic instrument firmware. Therefore, they do not have a separate item in the installer to be selected.

3.5.2 Other firmware options within the FSWPSetup.exe file

The following optional application software packages have their own installation items and are therefore added to the selection list during the firmware update. Ensure that the checkbox is checked if you want to install them.

- FSWP-K6 Pulse measurements (with additional suboptions FSWP-K6P and FSWP-K6S)
- FSWP-K30 Noise figure measurements
- FSWP-K50 Spurious measurements
- FSWP-K60 Transient measurements (with additional suboptions FSWP-K60C, FSWP-K60H and FSWP-K60P)
- FSWP-K70 Vector signal analysis (with additional suboptions FSWP-K70M and FSWP-K70P)

3.5.3 Enabling Options by Entering Option Key Codes

To activate application software packages, you must enter a license key for validation. You only have to enter the option key once per option.

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

The license key is in the device certificate or delivered as a part of the software package.

To enable an option using an option key

1. Select [SETUP] > "System Config" > "Versions + Options" tab.
2. Select "Install Option".
A dialog box is displayed.
3. Enter the option key number using the keypad.
4. Press [ENTER].
After a successful validation, the "Option Key valid" message is displayed. If the validation fails, the option software is not installed.
5. Repeat the activation process for all options you want to install.
6. Reboot the device.
7. Check whether the options are available on the instrument ([SETUP] > "System Config" > "Versions + Options" tab).

To enable options via an XML-file

1. Select [SETUP] > "System Config" > "Versions + Options" tab.
2. Select "Install Option by XML".
A file browser is displayed.
3. Select the path to the XML file (e.g. network drive or USB storage device).
4. Press "Select".
After a successful validation, the "Option Key valid" message is displayed. If the validation fails, the option software is not installed.
5. Repeat the activation process for all options you want to install.
6. Reboot the device.

Check whether the options are available on the instrument ([SETUP] > “System Config” > “Versions + Options” tab).

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 or follow this QR code:



Figure 4-1: QR code to the Rohde & Schwarz support page