

R&S®ESW Test Receiver Release Notes

Firmware Version V3.20

These Release Notes are for following models of the R&S® ESW EMI Test Receiver:

R&S® ESW8, part no. 1328.4100K08
R&S® ESW26, part no. 1328.4100K26
R&S® ESW44, part no. 1328.4100K44

R&S® ESW8, part no. 1328.4100K09
R&S® ESW26, part no. 1328.4100K27
R&S® ESW44, part no. 1328.4100K45

We highly recommend that you upgrade instruments with firmware 1.31 to 1.31 SP1 or higher

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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®ESW is abbreviated as R&SESW.



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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 V3.20:

Version	Function
V3.20	Support for R&S® ESW-K59, Click Rate Analysis.
V3.20	New SCPI commands for real-time export of up to four traces. This allows trace exporting while the receiver continuously measures.
V3.20	New SCPI command to switch global limit check.
V3.20	State of input 2 pulse limiter is shown in channel bar.
V3.20	In the I/Q Analyzer I/Q data export, the following additional data formats are supported: .iqw, .csv, .mat (Matlab v4 and Matlab v7.3), .aid.
V3.20	I/Q data import supports AMMOS intermediate frequency data format (.aid).
V3.20	PSA emulation: The command "[SENS:]CORR:CSET:All" is now accepted.
V3.20	This is the last firmware version that supports devices with operating system Win 7.

New function of firmware V3.10:

Version	Function
V3.10	Support for: R&S® ESW-B350, part no. 1345.0438.02 R&S® ESW-B1000, part no. 1345.0421.02 R&S® ESW-U1000, part no. 1351.0836.02 R&S® ESW-B350R, part no. 1351.1184.02 R&S® ESW-B1000R, part no. 1351.1178.02 R&S® ESW-U1000R, part no. 1351.1103.02
V3.10	Support for R&S® ESW-K55E and R&S® ESW-K55R.
V3.10	Support for CPU board, part no. 1206.3874.00.
V3.10	Analog output can now be used during Spectrum Analyzer Sweep.

New function of firmware V3.00:

Version	Function
V3.00	Support for continuous gating in Spectrum Analyzer Mode.

New function of firmware V2.20:

Version	Function
V2.20	R&S ESW-K980 supported.

New function of firmware V2.10SP1:

Version	Function
V2.10SP1	Support for CPU board, part no.1206.3974.00

New function of firmware V2.10:

Version	Function
V2.10	Support for Preselector 1, part no. 1345.0509.02 Preselector 2 Unit, part no. 1345.0450.02
V2.10	Last service date, last calibration date, next calibration due date and recommended calibration interval are indicated in the R&S support dialog.

New function of firmware V2.00:

Version	Function
V2.00	Support for R&S® ESW8, part no. 1328.4100.09 R&S® ESW26, part no. 1328.4100.27 R&S® ESW44, part no. 1328.4100.45
V2.00	Self-alignment scheduler to perform self-alignments regularly at specific days and times.
V2.00	Support for multi-touch gestures (needs ESW with part no. 1328.4100.09/27/45): <ul style="list-style-type: none"> Pinching and spreading with two fingers to adjust the traces in a diagram is now possible. Support for dragging in x and y direction to adjust the traces in a diagram is now possible for all ESW part numbers: Traces can be comfortably shifted in a diagram in x- and y-axis by simply dragging to the new position.

Besides the "graphical zoom", the new zoom mode "measurement zoom" is supported. In contrast to the graphical zoom, which is merely a visual tool, the measurement zoom adapts the measurement settings (e.g. reference level, level range, frequency span) such that the data is measured in the required detail. The "measurement zoom" is the default zoom mode for Receiver and Spectrum Mode, I/Q analyzer and K7. The context menu of the "measurement zoom" toolbar icon can be opened with a long touch. Level-

Lock (default on), X-Lock and Y-Lock can be used to prevent changing specific settings by the zoom operations.

V2.00	The toolbar is now configurable by the user.
V2.00	Support of 3D Spectrogram Display in Receiver Mode, Spectrum Mode, I/Q Analyzer and K7 AM/FM/PM Modulation Analysis.

New function of firmware V1.72:

Version	Function
V1.72	Receiver Mode now supports trace averaging.

New function of firmware V1.70:

Version	Function
V1.70	R&S ESW-K58 supported.
V1.70	Supports enhanced Fast Time Domain Scan.
V1.70	Supports RBW up to 40 MHz with R&S ESW-B8E option.
V1.70	Adjustable recording interval for the IF spectrogram in Receiver Mode.

New function of firmware V1.61:

Version	Function
V1.61	New button to turn off the limit check without having to deselect the checked traces.
V1.61	Right click on the quick save button to activate a write protection.
V1.61	User definable storage path for the reporting data allows you to store raw data anywhere on a hard drive or removable storage device.
V1.61	New display to write user notes and add them to the report.
V1.61	File dialogs have a new button to open the Microsoft Windows File Explorer.
V1.61	Display lines in receiver and analog demodulation show the delta value between line 1 and 2 if both are active.
V1.61	Manual user port control is now available in the input/output menu.
V1.61	New button available in frequency dialog to activate coupling of the bargraph settings at the current frequency to the corresponding scan table settings.

New function of firmware V1.51:

Version	Function
V1.51	In the time domain scan, the maximum resolution bandwidth for start frequencies below 100 kHz was limited to 5 kHz (3 dB) and 9 kHz (6 dB). This upper limit has been increased to 10 kHz resolution bandwidth.

New function of firmware V1.50 SP2:

Version	Function
V1.50SP2	CISPR 16-1-1 Ed. 4 Ready. The Hardware Info dialog shows a "CISPR EDITION 4 READY" message if your device has the required calibration data. Otherwise, contact the Rohde & Schwarz service otherwise
V1.50SP2	New limit lines and transducers have been added to address the replacement of EN 55022 and EN 55013 by EN 55032, as well as for testing high voltage power supply systems in vehicles in accordance with latest EN 55025.

New function of firmware V1.50:

Version	Function
V1.50	A warning message is displayed when a transducer is active and the measurement frequency is set to values outside of the transducer range.
V1.50	The fast access knobs can now be used to cycle through the peaks in a peak list and to adjust the positions of display lines. .
V1.50	The rotary wheel can now be locked in order to prevent accidental changing of the measurement frequency.
V1.50	New self-alignment features: "Await warm-up operation" and "Shutdown after Alignment" supported, which can also be selected from the ESWSetup.exe installation program. Display of remaining time for self-alignment and warning if alignment is started and the warming up message is still shown in the status bar.
V1.50	Supports transducer and limit line import and export using CSV (comma separated) files.
V1.50	Remote Mode: In order to prevent the screen from being switched on manually using the "Display Update On/Off" softkey, the remote command <code>SYSTem:DISPlay:LOCK <on/off></code> can now be used to lock this softkey.
V1.50	Remote trace query and I/Q trace query now support 64 bit (more precise) or 16 bit (faster). Select the format with the commands <code>FORMat REAL, 64</code> or <code>FORMat REAL, 16</code> before querying the trace data.
V1.50	A touch on the LXI logo at the bottom right of the screen now opens the LXI Configuration Dialog which also shows the IP address and computer name of the device.

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 V3.20:

Version	Function
V3.20	As of Version V3.20, not only the Setup EXE file is signed, but also the individual MSI files inside the Setup EXE file, making the firmware installer even more secure.
V3.20	If the last self-alignment is older than [X] days (default: 30), an info message is shown. A SCPI command and status bit was added accordingly.

Modifications of firmware V3.10SP1:

Version	Function
V1.00	Modified scan range setup algorithm for time domain scan when using low noise amplifier.

Modifications of firmware V3.00:

Version	Function
V3.00	RF attenuation is set to 75 dB during shutdown.
V3.00	Updated NGINX to version 1.20.2.
V3.00	Modified signal path settings in Receiver Mode above 39 GHz to reduce noise floor.

Modifications of firmware V2.20 SP1:

Version	Function
V2.20SP1	Production related changes.

Modifications of firmware V2.10 SP2:

Version	Function
V2.10SP1	Production related changes.

Modifications of firmware V2.00 SP1:

Version	Function
V2.00SP1	Modified selection algorithm for preselection filters in analyzer sweep.

Modifications of firmware V2.00:

Version	Function
V2.00	K7: Option renamed to AM/FM/PM Modulation Analysis.
V2.00	New, Windows10-like, user interface design (industrial design theme) for all ESW part numbers
V2.00	The RBW can be set to a maximum of 1 MHz for start frequencies ≥ 1 MHz in Time Domain Scan.
V2.00	Modified self-alignment algorithm
V2.00	Modified hardware segmentation in Spectrum Analyzer Mode.

Modifications of firmware V1.72 SP1:

Version	Function
V1.72SP1	For FFT sweeps with optimization = speed, preselector = off, and start frequency < 50 MHz, the maximum width of the FFT segments is reduced.

Modifications of firmware V1.70 SP1:

Version	Function
V1.70SP1	Zero span: the same x-axis scaling algorithm is now used for traces and diagram graticule.

Modifications of firmware V1.70:

Version	Function
V1.70	The IF spectrogram display is no longer reset when changing the center frequency.

Modifications of firmware V1.61:

Version	Function
V1.61	Scrolling the scan trace when using the zoom function in the Receiver Mode now starts when getting close to the diagram border instead of exactly at the border.
V1.61	Grid annotations displayed semi-transparent in front of traces to enhance the readability of the annotation values.
V1.61	Vertical display lines now show their current value in the diagram.
V1.61	Changing the preamplifier value via remote control will now automatically activate the preamplifier.
V1.61	CISPR 16-1-1 Ed. 4 Ready. The Hardware Info dialog shows now "CISPR 16-1-1 EDITION 4 READY", if your device has the required calibration data.

Modifications of firmware V1.51:

Version	Function
V1.51	The synthesizer setup algorithm was modified to increase the dynamic range at specific frequencies.
V1.51	The maximum resolution bandwidth was limited to 100 Hz for a receiver frequency of 100 Hz in both the receiver bargraph and the receiver scan. This limit has been increased to 200 Hz resolution bandwidth.
V1.51	Improved auto range algorithm in conjunction with EMC32.

Modifications of firmware V1.50 SP3:

Version	Function
V1.50SP3	The synthesizer setup algorithm was modified to increase the dynamic range at specific frequencies.

Modifications of firmware V1.50:

Version	Function
V1.50	The synthesizer setup algorithm was modified to increase the dynamic range at specific frequencies.
V1.50	In Time Domain Scan, the average detector with 200 Hz RBW can now be used with a minimum measurement time of 20 ms.
V1.50	If a self-alignment is started in an aligned instrument state and this alignment is aborted upon user request, the previous alignment data is now restored.

1.3 Improvements

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

Improvements of firmware V3.20:

since	Function
V3.10	Spurious suppression in TDS optimization modes "Max Speed" and "Automatic" with wideband options R&S®ESW-B350/-B350R/-B1000/-B1000R by software enabled hardware optimization.
V3.00	Rohde & Schwarz web control file upload failed for file sizes > 8 MB. This issue is solved.
V3.00	Firmware did not restart with previous settings after shutting down with remote command SYSTem:SHUTdown. This issue is solved.

Improvements of firmware V3.10 SP1:

since	Function
V3.10	Modification for production internal reasons only.

Improvements of firmware V3.10:

since	Function
V1.10	Remote Command "[SENSe:]SWEep:COUNT:CURRent?" did not work in Receiver Mode. This issue is solved.

Improvements of firmware V3.00:

since	Function
V1.10	After Auto Ranging at the start of a scan, the previous attenuation value was displayed during the scan. This issue is solved.
V1.51	An incorrect message for the connection state of the RF inputs could appear after loading a save set. This issue is solved.
V2.00	Using a logarithmic x-axis in Spectrum Analyzer Mode could lead to a firmware crash. This issue is solved.

Improvements of firmware V2.20:

since	Function
V2.00	Transducer switch control did not work in Spectrum Analyzer Mode. This issue is solved.
V2.00	Limit lines in Spectrum Analyzer Mode were not displayed on screen when activated via SCPI. This issue is solved.

Improvements of firmware V2.10:

since	Function
V2.00	Choosing decimal separator "comma" for ASCII trace export in Receiver Mode did not work. This issue is solved.
V1.10	Text entry fields in Transducer Switch Control dialog were enlarged and the character '@' can now be entered.
V1.10	Text entry fields in Reporting Measurement Information support more characters now.
V1.10	The resolution for the frequency response correction is increased for narrow spans around the preselector boundary at 2 MHz in Receiver Scan.
V1.10	In combination with active transducer factors the Bargraph measurement could show increased measurement values for RMS and Average detectors when measuring near to noise signals in the frequency range 150 kHz to 30 MHz. This issue is solved.

Improvements of firmware V2.00:

since	Function
V1.70	Activation of trace math could lead to incomplete traces. This issue is solved.
V1.10	Improved signal path settings for better S/N ratio in Spectrum Analyzer Mode with preselector on and frequency > 8 GHz.

Improvements of firmware V1.72:

since	Function
V1.61	The alignment of hardware segments was optimized to improve measurements on wideband signals.

Improvements of firmware V1.70 SP1:

since	Function
V1.20	The Report Generation sometimes didn't include all channels in Multi View Mode when using "Screen Colors". This issue is solved.
V1.10	The AVG Detector showed some quantization effects when looking at noise in Time Domain Scan. This issue is solved.

Improvements of firmware V1.70:

since	Function
V1.61	Report Generation locked up in rare cases after loading a save set. This issue is solved.
V1.60	The IF spectrogram display could stop updating in rare cases. This issue is solved.
V1.60	The reporting toolbar button needed to be pressed twice to open the reporting menu. This issue is solved.
V1.60	Analog Modulation Analysis: The button "Current Focus" didn't switch the analog output to the corresponding modulation in case a spectrum display was selected. This issue is solved.
V1.50	Limit lines in Receiver Mode could not be switched off via SCPI. This issue is solved.
V1.50	The Trace export SCPI command (:MMEMory:STORe1:TRACe 0,...) in Receiver Mode used the wrong trace indexing, 0-5 instead of 1-6. This issue is solved.
V1.10	"YIG filter limits bandwidth" message was shown in cases when this warning was not applicable. This issue is solved.
V1.10	Marker to Peak in the IF-Analysis Spectrum would lead to the wrong Center Frequency for center frequencies above 14 GHz. This issue is solved.

Improvements of firmware V1.61 SP1:

since	Function
V1.61	Modification for production internal reasons only.

Improvements of firmware V1.61:

since	Function
V1.50	Editing transducer values with an external keyboard: Using the shortcut "G" + "Enter" to enter the unit GHz didn't work. This issue is solved.
V1.50	The reporting functionality represented the unit μ as μ . This issue is solved
V1.50	Using the IF analysis display in Receiver Mode caused a firmware lockup. This issue is solved.
V1.30	The "Trigger" "Run Sgl" and "Run Cont" hardkeys were not always illuminated correctly. This issue is solved.
V1.10	When taking a screenshot with file name "ng", the extension was also set to ".ng", and the file was not recognized as a .png file. This issue is solved.
V1.40	"RF Disconnected" was not restored after instrument shutdown. This issue is solved.
V1.50	In some cases the application locked up, if the start- / stop- frequency of the receiver scan display was changed with previous data. This issue is solved.

Improvements of firmware V1.50 SP2:

since	Function
V1.50	Loading a Fast Access configuration file from a version prior to 1.50 did not work. This issue is solved.
V1.50	External switch control via GPIB wasn't possible. This issue is solved.
V1.50	The report template configuration dialog could show empty buttons. This issue is solved.

Improvements of firmware V1.50 SP1:

since	Function
V1.50	ESW44 with B24 showed an increase in noise floor above 43.5 GHz after firmware upgrade. This issue is solved.

Improvements of firmware V1.50:

since	Function
V1.40	Some diagrams were not included during report generation. This issue is solved.
V1.40	Under certain conditions, zero-span traces did not show all measured points. This issue is solved.
V1.40	When controlling the ESW from EMC32 while using an external mixer, a sweep sometimes did not finish. This issue is solved.
V1.40	There were sporadic issues with the printing of multiple graphs. These issues are solved.
V1.00	When using the quasi-peak detector in Spectrum Analyzer sweep mode, a glitch was displayed at 30 MHz. 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
V1.10	When continuously measuring in Real Time Mode, the message "Instrument warming up" remains on the display even after the device has warmed up.
V1.10	When using the RMS detector in time domain scan the noise floor may show small quantization effects. Note: the AVG, CISPR-AV and CISPR-RMS detectors do not show this behavior.
V2.20	R&S ESW-K980: For very large HUMS database sizes, the remote commands DIAGnostic:HUMS[:ALL]? and DIAGnostic:HUMS:UTILization:HISTory? may fail. In this case, use SNMP and REST (Representational State Transfer).

2 Modifications to the documentation

The current documentation is up-to-date.

3 Firmware update

3.1 Update information

The firmware update file for the R&S® ESW is one file including the main firmware version number, e.g. `ESWSetup_V2.10.exe`. It will be referred to as `ESWSetup.exe` later in the text. The file can be found on the Rohde & Schwarz web page at <https://www.rohde-schwarz.com/de/firmware/esw>.

3.2 Providing access to the firmware update file

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

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 ESW.

Using the remote desktop:

1. Connect the R&S ESW 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 ESW, 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 `ESWSetup.exe` from your PC to a new folder, e.g. `C:\FWUpdate`.
7. You can now access this directory with the `ESWSetup.exe` from the R&S ESW firmware.

Using a network drive:

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

3.3 Performing the 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 `ESWSetup*.exe` file from the prepared storage location.
"File Explorer": Instead of using the file manager of the R&S ESW 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 ESW 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").

3.4 Performing the Firmware Update from a Windows PC

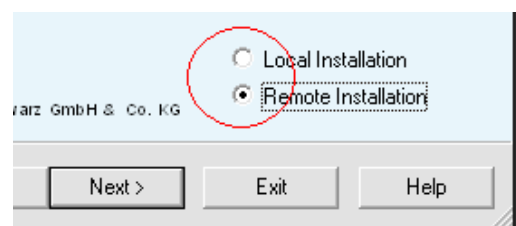
You can also update the firmware using a LAN connection between the instrument and a Windows PC.



Note for firewall users

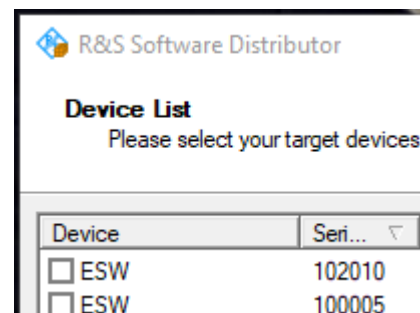
The `ESWSetup.exe` communicates with the instrument via LAN. Therefore, the `ESWSetup.exe` must pass the firewall. If necessary, add it to the firewall rules.

1. Run `ESWSetup.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 `ESWSetup.exe` to the firewall rules, restart the scan by selecting "Rescan".

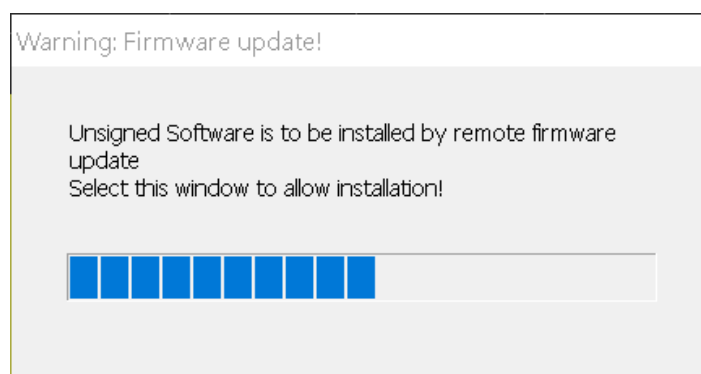


6. Select the instruments you want to update.
You can select up to 5 instruments to update in parallel.
7. If necessary, select "Help" to display additional help.
8. If necessary, select "Options" for further options.
9. Select "Install" to start the installation.

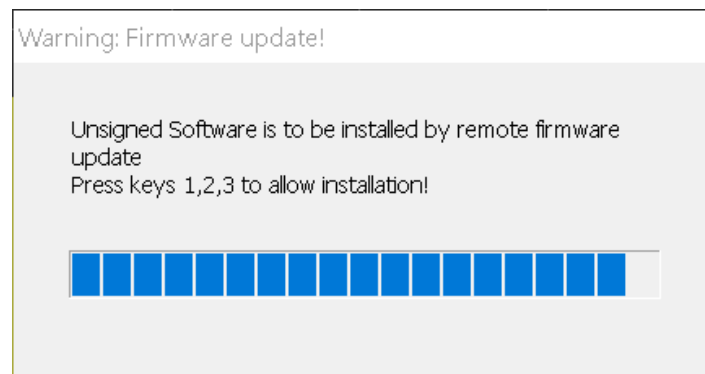
Note on package signing

MSI package signing of setups is a security feature that was added as of firmware version V3.20. It prevents man-in-the-middle attacks with manipulated MSIs during remote firmware installation. After installing a setup file with signed MSI files, installing a setup file whose MSI files are not signed requires an additional step, if you perform the installation from a remote PC. For example, when you downgrade the firmware to a version prior to 3.20. In this case, you must confirm the less secure installation on the device.

After starting the remote installation, the following message is shown on the device.



- a) Tap the message box on the device, or click on it via Remote Desktop. The following message is shown on the device.



- b) Press the keys 1,2,3.
If you do not confirm the installation on the device, it is aborted.
10. Confirm the message to reboot the instrument to activate the firmware update.
The instrument restarts automatically.

3.5 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 ESW Getting Started manual.

3.6 Installing Firmware Options

3.6.1 Firmware options included in basic instrument

The R&S ESW-K7 and ESW-K33 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 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.
7. 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