ROHDE&SCHWARZ

Test and Measurement
Division

# Release Notes

# Wireless LAN Test

## Application Firmware

## R&S FSQ-K90/K91/K91n

## Release 4.62

## with Service Pack 1

for R&S FSQ, FSG, FMU Analyzer Firmware V4.6x

**New Features:**

- **Simultaneous analysis of up to 2 Tx antennas for IEEE 802.11n MIMO capable devices.**

**Release Note Revision: 3**

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# History

| Date | Rel Note Rev | Changes |
|---|---|---|
| 17 December 2010 | 1 | First revision for Wireless LAN Application Firmware 4.62. |
| 17 January 2011 | 2 | Improvements with Service Pack 1 added. |
| 07 March 2011 | 3 | New chapter "Customer Support". |

# General Topics

## Compatibility of the R&S FSQ-K90/K91/K91n Wireless LAN Application Firmware with other Firmware Releases

The following table shows the compatible versions of the basic analyzer firmware and the Wireless LAN Application Firmware:

**Table of compatible versions:**

| R&S FSQ-K90 Application Firmware | R&S FSQ-K91 Application Firmware | R&S FSQ-K91n Application Firmware | R&S FSQ Basic Firmware | R&S FMU Basic Firmware | R&S FSG Basic Firmware |
|---|---|---|---|---|---|
| 4.62 SP1 | 4.62 SP1 | 4.62 SP1 | 4.65 SP1 | | 4.69 SP1 |
| 4.62 | 4.62 | 4.62 | 4.65 SP1 | | 4.69 SP1 |
| 4.61 | 4.61 | 4.61 | 4.65 SP1 | | 4.69 SP1 |
| 4.60 | 4.60 | 4.60 | 4.65 | | 4.69 |
| 4.51 | 4.51 | 4.51 | 4.55 SP2 | | 4.59 SP1 |
| 4.50 | 4.50 | 4.50 | 4.55 SP1 | - | 4.59 |
| 4.40 SP1 | 4.40 SP1 | 4.40 SP1 | 4.45 SP1 | - | 4.49 SP1 |
| 4.40 | 4.40 | 4.40 | 4.45 | - | 4.49 |
| 4.30 SP1 | 4.30 | 4.30 | 4.35 | 4.38 | 4.39 |
| 4.30 | 4.30 | 4.30 | 4.35 | | 4.39 |
| 4.21 | 4.21 | - | 4.25 | - | 4.29 SP2 |
| 4.20 | 4.20 | - | - | - | 4.29 |
| 4.10 | 4.10 | - | 4.15 | - | - |
| 4.00 | 4.00 | - | 4.05 | - | - |
| 3.90 SP1 | 3.90 SP1 | - | 3.95 SP1 | - | - |
| 3.90 | 3.90 | - | 3.95 | - | - |
| 3.80 | 3.80 | - | 3.85 | - | - |
| 3.70 | 3.70 | - | 3.75 | - | - |

| R&S FSQ-K90 Application Firmware | R&S FSQ-K91 Application Firmware | R&S FSQ-K91n Application Firmware | R&S FSQ Basic Firmware | R&S FMU Basic Firmware | R&S FSG Basic Firmware |
|---|---|---|---|---|---|
| 3.60 SP1 | 3.60 SP1 | - | 3.65 | - | - |
| 3.60 | 3.60 | - | 3.65 | - | - |
| 3.52 | 3.52 | - | 3.55 SP1<br>3.55 | - | - |
| 3.50 SP1 | 3.50 SP1 | - | 3.55 SP1<br>3.55 | - | - |
| 3.50 | 3.50 | - | 3.55 | - | - |
| 3.42 | 3.42 | - | 3.45 SP4 | - | - |
| 3.40 | 3.40 | - | 3.45 | - | - |
| 3.31 | 3.31 | - | 3.35 SP1 | - | - |
| 3.30 | 3.30 | - | 3.35 | - | - |
| 3.28 | - | - | 3.25 | - | - |
| 3.24 | - | - | 3.15 | - | - |
| 3.20 | - | - | 3.05 | - | - |

## Firmware Update of the R&S FSQ-K90/K91/K91n Wireless LAN Application Firmware

Since basic firmware version 4.2x a ZIP file with the update sets of the basic system firmware and all available applications is provided. This ZIP file is available in the instruments FIRMWARE section, e.g. R&S FSQ of the Service Board on GLORIS.

Please follow the steps described in the instrument's basic firmware release note to perform a complete firmware update.

## Enabling the Application Firmware via License Key Code Entry

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

After installing the application firmware package a license key for validation must be entered. The license key is printed either on a label on the rear panel of the instrument or delivered as a part of the R&S FSQ-K90/K91/K91n Wireless LAN application firmware package.

The key sequence for entering the license key is:

SETUP - GENERAL SETUP – OPTIONS - INSTALL OPTION

Use the numeric keypad to input the license key number and press ENTER.

- On a successful validation the message 'option key valid‘ will appear. The instrument will perform an automatic reboot.
- If the validation failed, the application firmware is not installed.

The most probable reason will be that the instrument is not equipped with the correct basic firmware version. Therefore a messagebox will appear asking for installation of the correct basic firmware version.

If the application firmware package was not installed prior to entering the license key code, a message will appear asking for installation of the application firmware package.

**In any case please make sure that the correct basic firmware version and the application firmware package is installed prior to entering the license key code.**

If upgrading to FSQ-K91 from FSQ-K90 then an upgrade key is supplied. This key needs to be entered (as described above) in addition to the existing FSQ-K90 key-code. Similarly if upgrading FSQ-K91 to include IEEE 802.11n then an additional upgrade key is required

# System Memory Requirements

For FSQ-K90 Wireless LAN Application Firmware, an installed system memory of 512MByte is recommended. For FSQ-K91 Wireless LAN Application Firmware, an installed system memory of 512MByte is essential. The FSQ-K90/K1 will generate an error message during activation, if available system memory does not meet the requirements. This may happen for FS-K90, if FS-K30 or FSQ-K70 was active before starting WLAN.


For instruments, shipped with 256MByte system memory, a memory extension FSQ-B512, order number 1157.1590.02, is available.

A reboot of the instrument after using NOISE (FS-K30) or VSA (FSQ-K70), will allow FSQ-K90 to be activated without memory extension.

The system memory size can be easily checked by pressing SETUP – SYSTEM INFO – STATISTICS, item "Memory size". This item is available since version 3.25 of the base system firmware.

# New Functions in version 4.62

- **Simultaneous analysis of up to 2 Tx antennas for IEEE 802.11n MIMO capable devices.**

# Improvements with option R&S FSQ-K90/K91/K91n Wireless LAN Application Firmware

The version numbers in brackets indicate the version in which the issue was observed for the first time.

**1. (V4.60) Application error when analyzing specific 802.11g signals:**

In some situations an application error could occur when analyzing some specific 802.11g signals.

**2. (V4.60) Digital baseband signal level entry not displayed correctly:**

The entry for the digital baseband signal level in the general settings dialog was not displayed correctly.

**3. (V4.60) Wrong units for reference level when returning to spectrum analyzer:**

When returning to the spectrum analyzer mode on instruments with a digital baseband option installed, the units for the refence level were incorrectly set to mV.

# Improvements with Service Pack 1

The version numbers in brackets indicate the version in which the issue was observed for the first time.

**1. (V4.62) The application is not able to measure with 802.11n being selected..**
This issue is caused by an installation problem and depends on the update sets previously installed.

# Known Issues with option R&S FSQ-K90/K91/K91n Wireless LAN Application Firmware

The version numbers in brackets indicate the version in which the error was observed for the first time. Unless otherwise stated all errors apply to be FSQ-K90 and FSQ-K91

## Manual Operation and IEC/IEEE Bus

**1. (K90 V3.40) Memory usage on instrument with 256 Mbytes of memory**
Performing combinations of calibration, activating and using the VSA (K70) option and activating and using FSQ-K90 on an instrument with 256 Mbytes of memory may lead to the FSQ-K90 option no longer being able to be activated due to insufficient memory.

**Workaround:** Ensure no other applications are running. Restarting the firmware after performing calibration also improves memory usage. Using Preset also releases memory.

**2. (K90/K91 V3.50) Gating and negative trigger offset values**
With the FSQ gating and negative trigger offset values can not be used together. Any negative trigger offset will internally be set to 0s.

**3. (K90/K91 V3.60) Analysis times**
In some cases with low powered signals measurement can take a long time to complete.

**Workaround:** Use auto-level or adjust the reference level to improve analysis speed. Reducing the amount of data to analyze by reducing the capture time can also help.

## IEC/IEEE Bus only

**1. (K90 V3.28) Selecting screen A/B**
For selecting screen A or B, DISPlay:<WINDow[1|2]>:SELect command does not work correctly.

**Workaround:** Instead of this command, an alias command is provided, which is:
DISPlay:<WINDow[1|2]>:**SSELect**.

# Modified Functions

The behaviour of the following functions changed compared to earlier versions (the number in brackets indicates the firmware version that introduced the individual change):

**1. (V3.30) Limit values in table of results can now be modified whilst a measurement is running.**

**2. (V3.30) Spectrum Mask according to ETSI.**

**3. (V3.30) EVM Trace results can now be displayed in % of dB (User selectable).**

**4. (V3.40) Baseband board version VAR03 with baseband impendence of 1 MOhm supported**

**5. (V3.42) Single auto-level sequence can now be activated via SCPI (CONFigure:POWer:AUTO ONCE)**

**6. (V3.42) The STATus:QUEStionable:SYNC and STATus:QUEStionable:ACPLimit registers are provided.**

**7. (V3.42) Marker to peak and to minimum functions are supported for the Spectrum Flatness measurement.**

**8. (V3.42) EVM Vs Symbol display: The boundaries of bursts are now highlighted with verticle lines.**

**9. (V3.42) Support for wideband extension (B72).**

**10. (V3.42) Support for preamplifier B23 & B25 options.**

**11. (V3.42) Error Vs Preamble measurements are provided for all standards. The results can be displayed in Phase or Frequency error Vs preamble.**

**12. (V3.42) Advanced settings for mechanical and electronic attenuators, YIG filter and baseband settings.**

**13. (V3.42) Support for IEEE 802.11g and 802.11 OFDM Turbo Mode standards added.**

**14. (V3.42) Gating support for Spectrum Mask and Spectrum ACP measurements).**

**15. (V3.42) The sample rate can be modified for IEEE 802.11a measurements.**

**16. (V3.42) IF Power trigger disabled for Spectrum Mask (ETSI) measurement**

**17. (V3.42) Minimum and Maximum payload length can now also be specified in time**

**18. (V3.42) The calculation for the rise and fall time results for IEEE 802.11b signals has been changed**

**19. (V3.42) List mode results accessible from frequency sweep measurements**

**20. (V3.60) IQ Data Export & Import available.**

**21. (V3.60) Sample rates between 20.4 MHz and 40.8 MHz now supported without the use of option B72.**

**22. (V3.70) Bursts analyzed with errors now marked in yellow.**

**23. (V3.70) Number of analyzed bursts available via IEC/IEEE Bus (FETCh:BURSt:COUNt?).**

**24. (V3.70) Number of symbols in each analyzed burst available via IEC/IEEE Bus (FETCh:SYMBol:COUNt?).**

**25. (V3.70) Sweep time for auto-level can be specified using the Auto Level Time setting in the Advanced Settings of the General Settings view.**

**26. (V3.80) Digital Down Converter available for low carrier frequency with Baseband input.**

**27. (V3.80) External trigger level can now be specified.**

**28. (V3.80) REFRESH hot-key for recalculation of results after data capture.**

**29. (V3.80) The new SUPPORT softkey has been provided to allow detailed information about the FS-K90/91 option to be saved to file.**

**30. (V3.90) New SCPI command CONFigure:BURSt:PREamble:SELect PHASe | FREQuency.**

**31. (V4.10) The SEM measurement and SPECTRUM MASK softkey replaces the Spectrum ETSI / IEEE measurements.**

**32. (V4.20) Support for new instrument model R&S FSG.**

**33. (V4.20) Trace data now available via remote control in binary format for all traces.**

**34. (V4.30) The IEEE 802.11n standard is now supported**

**35. (V4.30) Option B17 is now supported.**

**36. (V4.30) Option FSU-B24 supported**

**37. (V4.30) Support for Application Recovery**

**38. (V4.50) Setting FFT Start Offset provided to allow improved EVM results.**

**39. (V4.60) FETCh:BURSt:COUNt:ALL? Command added to obtain complete number of analyzed bursts for a measurement, including bursts from multiple seeps.**

**40. (V4.60) CONFigure:WLAN:PVERror:MRANge Command added. This command specifies whether the Peak Error Vector results are calculated over the complete burst or just over the PSDU.**

**41. (V4.61) Support files now stored in option specific folder.**

**42. (V4.62) New parameter PEAK was added to the command [SENSe:]DEMod:FFT:OFFSet.**

# Modifications to the Operating Manual

The R&S FSQ-K90/K91/K91n analyzer functions are included in a separate manual set. Please refer to the following order numbers:

- 1157.3135.42-07 (English)

## Modified Chapters for manual operation

None.

## Modified Chapters for remote operation

None.

# Customer Support

## Technical support – where and when you need it

For quick, expert help with any Rohde & Schwarz equipment, contact one of our Customer Support Centers. A team of highly qualified engineers provides telephone support and will work with you to find a solution to your query on any aspect of the operation, programming or applications of Rohde & Schwarz equipment.

## Up-to-date information and upgrades

To keep your instrument up-to-date and to be informed about new application notes related to your instrument, please send an e-mail to the Customer Support Center stating your instrument and your wish.
We will take care that you will get the right information.

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