ROHDE&SCHWARZ

Test and Measurement
Division

Release Notes

Wireless LAN Test

Application Firmware R&S FSQ-K90/K91

Release 4.20

for R&S FSQ, FSG Analyzer Firmware V4.2x

New Features:

- **Support for new instrument model R&S FSG**
- **Trace data via remote control available in binary format.**

Release Note Revision: 2

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History

Date	Rel Note Rev	Changes
20 July 2007	1	First revision for Wireless LAN Application Firmware 4.20.
16 August 2007	2	FSQ added.

General Topics

Compatibility of the R&S FSQ-K90/K91 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 Basic Firmware	R&S FSG Basic Firmware
4.20	4.20	4.25	4.29
4.10	4.10	4.15	-
4.00	4.00	4.05	-
3.90SP1	3.90SP1	3.95SP1 3.95	-
3.90	3.90	3.95	-
3.80	3.80	3.85	-
3.70	3.70	3.75	-
3.60 SP1	3.60 SP1	3.65	-
3.60	3.60	3.65	-
3.52	3.52	3.55 SP1 3.55	-
3.50 SP1	3.50 SP1	3.55 SP1 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 Wireless LAN Application Firmware

The R&S FSQ-K90/K91 Wireless LAN Application Firmware package is available with its own version number. This application firmware package requires an appropriate basic instrument firmware version. Compatible revisions are shown in the table above.

Please make sure to have the correct basic firmware version installed prior to installing the R&S FSQ-K90/K91 Wireless LAN Application Firmware. Please refer to the basic firmware version release notes for firmware update information of the basic firmware.

Generation of the update disk set for R&S FSQ-K90/K91 Wireless LAN Application Firmware

The files needed for the R&S FSQ-K90/K91 Wireless LAN Application Firmware update are available in the FIRMWARE section of the Service Board on GLORIS (R&S FSQ-K90 and R&S FSQ-K91).

If you already have the update disk set you can skip this paragraph.

They are grouped according to the disk contents:

Disk 1:	disk1.bin	(self-extracting ZIP file)
Disk 2:	data3.cab	(packed contents of disk 2, will be automatically unpacked by FW update)
Disk 3:	data4.cab	(packed contents of disk 3, will be automatically unpacked by FW update)
Disk 4:	data5.cab	(packed contents of disk 4, will be automatically unpacked by FW update)
Disk 5:	data6.cab	(packed contents of disk 6, will be automatically unpacked by FW update)

The contents of disk 1 are packed in a self-extracting ZIP file and need to be unzipped. For this purpose the following steps are necessary:

1. Create a temporary directory on your local PC (e.g. MyTemp\Extensions\K90 on drive C:)
2. Copy disk1.bin into that directory and rename it to disk1.exe
3. Execute disk1.exe. Under Windows XP this is done best using the following sequence:

   <CTRL><ESC> - RUN – C:\MyTemp\Extensions\K90\DISK1 - <ENTER> or

   <CTRL><ESC> - AUSFÜHREN – C:\MyTemp\Extensions\K90\DISK1 - <ENTER> for a German version.

   The files will be unzipped.
4. Delete disk1.exe from the temporary directory.

   The temporary directory will now contain the following files:

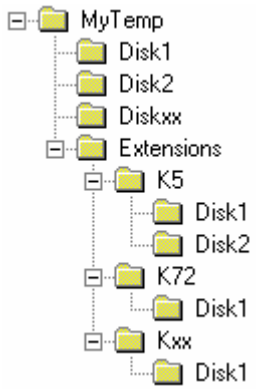
data1.cab	data1.hdr	data2.cab	DAX1_6.TXT	ExecCtrl.exe	id.txt
ikernel.ex_	ISSetup.exe	layout.bin	RestInst.exe	Setup.exe	Setup.ini
setup.inx					

   Please make sure that all the filenames are spelt correctly on your disks before you try to use them for the firmware update. Especially the trailing underscore ('_') as used in ikernel.ex_ is essential for correct operation of the update program.

5. Copy the contents of the temporary directory onto update disk #1.

The contents of the other disks are already packed in the format required by the firmware update program and need no further processing. The files only need to be copied onto disks #2, #3 and #4, the number in the filename (minus 1) indicating the corresponding disk number (data3.cab => disk #2, data4.cab => disk #3 and data5.cab => disk #4 etc).

Preparing installation via LAN or USB stick:



If the installation shall be done via LAN or USB stick please set up the following directory structure:

Copy all files as mentioned in the previous section in the directories ..\MyTemp\Extensions\K90\Disk1 – Disk4.

Other files (e.g. release rotes) shall not be stored in these directories. This files would be copied on harddisk and may cause a disk full problem on drive E:.

Since version 3.40 the directory path can contain more the 64 characters.

Performing the Application Firmware Update on the Instrument

The Application Firmware update process is performed in the following steps:

- Switch the instrument on and wait until the Analyzer has resumed operation.
- For updates from LAN or USB use the SETUP | NEXT | FIRMWARE UPDATE | UPDATE PATH softkey to specify any path for the location of the Disk1 directory (e.g. F:\MyTemp\Extensions\K90). For floppy usage the default A:\ must not be changed
- Press SETUP → NEXT → FIRMWARE UPDATE
- Confirm the query "Do you really want to update the firmware?" with OK
- Insert update disk #1 to #5 as requested (for LAN or USB just confirm the copy process)
- The instrument will perform several automatic shutdowns, until the new firmware is installed properly. **Do not switch the instrument off until the update process has been finished completely.**

After switching on the instrument for the first time after a successful firmware update it is necessary to execute the instument's self alignment process by pressing CAL and softkey CAL TOTAL.

Note: *A simplified update process is available if base system firmware 4.1x or newer is installed. More details are described in the release note of the base system firmware.*

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 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.

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 4.20

1. Support for new instrument model R&S FSG.
2. Trace data now available via remote control in binary format for all traces

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

Problems eliminated with option R&S FSQ-K90/K91 Wireless LAN Application Firmware

None

Known problems with option R&S FSQ-K90/K91 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 V3.30) Save files for one option cannot be recalled in another option
A save file saved under FSQ-K90 cannot be recalled into the upgraded FSQ-K91 option.

Workaround: None

3. (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.

4. (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.

5. (K91 V3.80) Values in table of results update correctly when number of bursts selected.
When the number of bursts parameter is selected and the number specified requires multiple sweeps then the table of results now updates to such that the min, mean and max value are calculated over all bursts and sweeps, not just the bursts contained in the last sweep.

6. (K90/K91 V3.80) External attenuation not correctly applied to Spectrum ACP results

The external attenuation is incorrectly applied to the relative channel power results in the Spectrum ACP (Relative) measurement. The external attenuation is correctly applied to the Spectrum ACP (Absolute) measurement results.

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**.

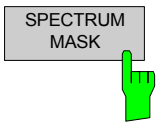
Modifications to the Operating Manual

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

- 1157.3135.42-04 (German and English)

Modified Chapters for manual operation

Spectrum Emission Mask



The Spectrum Emission Mask measurement results are selected by pressing the *SPECTRUM* softkey in the main measurement softkey menu followed by the *SPECTRUM MASK* softkey.

Fig. 2-21 Spectrum Emission Mask Results

The Spectrum Mask results display shows power against frequency. The span of the results is related to the specified sample rate. A limit line representing the spectrum mask specified for the selected standard is displayed and an overall pass/fail status is displayed for the obtained results against this limit line. If the *Sweep Count (Mask/ACP)* parameter in the General Settings view is set to any value other than 1 then the measurement is performed over the specified number of sweeps. When the measurement is performed over multiple sweeps a max hold trace is displayed as well as an average trace.

The Spectrum Emission Mask measurement can be configured from the SEM settings view:

The *SEM SETTINGS* softkey brings up the SEM Settings view.

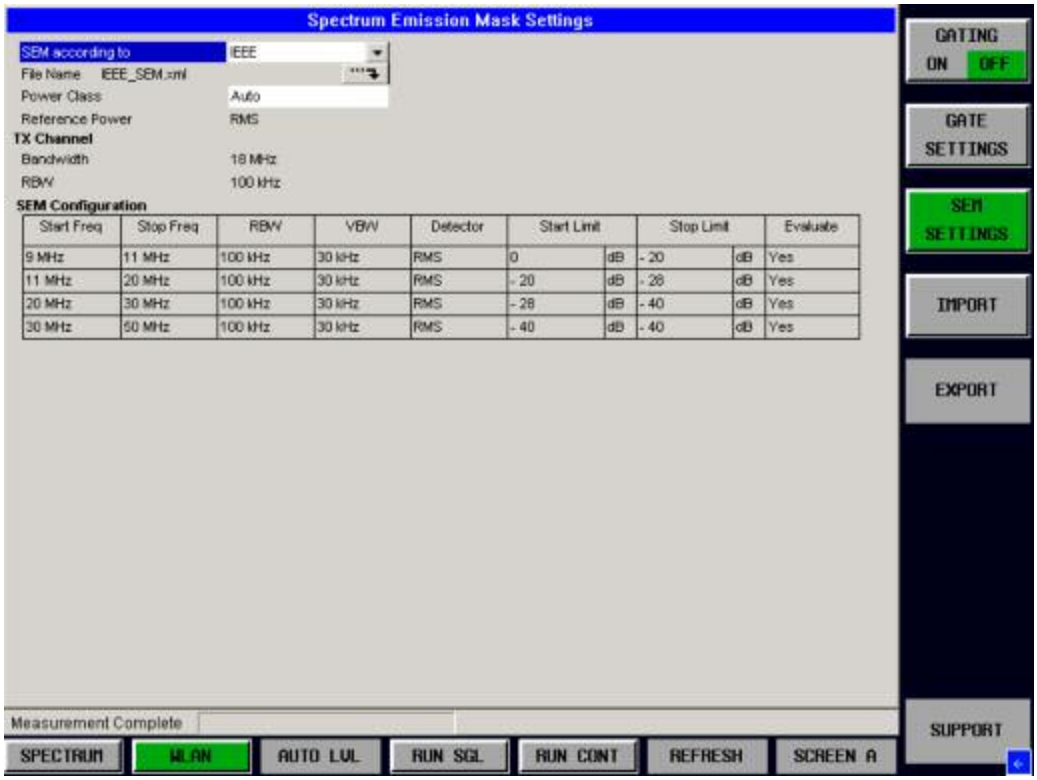


Fig. 2-22 ACP Settings view

IEC/IEEE-bus command: `SENS:POW:SEM USER|IEEE|ETSI`
`SENS:POW:SEM:CLASs`

SEM according to

SEM according to specifies how the Spectrum Emission Mask settings and limits are applied. This parameter provides the following settings:

ETSI – Settings and limits are as specified in the standard

IEEE – Settings and limits are as specified in the standard

User – Settings and limits are configured via an XML file

File Name

When **User** settings are specified, *File Name* shows the name of the loaded XML file. Clicking the arrow switches to the File Manager to locate an XML file, and automatically selects *SEM According To:* **User.**

When using TTA/ETSI/IEEE standards, *File Name* reflects the name of the built-in configuration.

SEM Configuration

The SEM configuration shows the settings and limits applied over specified frequency ranges around the TX channel. The settings displayed are dependent on the selected *Link Direction* and *Power Class*

SEM Configuration

Start Freq	Stop Freq	RBW	VBW	Detector	Start Limit		Stop Limit		Evaluate
9 MHz	11 MHz	100 kHz	30 kHz	RMS	0	dB	- 20	dB	Yes
11 MHz	20 MHz	100 kHz	30 kHz	RMS	- 20	dB	- 28	dB	Yes
20 MHz	30 MHz	100 kHz	30 kHz	RMS	- 28	dB	- 40	dB	Yes
30 MHz	50 MHz	100 kHz	30 kHz	RMS	- 40	dB	- 40	dB	Yes

Fig. 2-23 SEM Configuration

Modified Chapters for remote operation

MMEMory Subsystem

COMMAND	PARAMETERS	UNIT	COMMENT
:MMEMory			
:LOAD			
:IQ			
:STATe	1,<file_name>		
:SEM			
:STATe	1,<file_name>		
:STORe			
:IQ	1,<file_name>		
:STATe			

MMEMory:LOAD:IQ:STATe

The remote control command is used to load IQ data from the specified .iqw file.

Example: "MMEM:LOAD:IQ:STAT 'D:\USER\DATA.iqw'" loads IQ data from the specified file

Characteristics: *RST value: -
SCPI: device specific

Mode: K91

MMEMory:LOAD:SEM:STATe

The remote control command is used to load a K91 spectrum emission mask setup from an xml file

Example: "MMEM:LOAD:SEM:STAT 1,'D:\USER\ETSI_SEM.xml'"

Characteristics: *RST value: –
SCPI: device-specific

Mode: K91

MMEMory:STORe:IQ:STATe

The remote control command is used to store IQ data to the specified .iqw file.

Example: "MMEM:STOR:IQ:STAT 'D:\USER\DATA.iqw'" stores IQ data to the specified file

Characteristics: *RST value: -
SCPI: device specific

Mode: K91

[SENSe:]POWer:SEM:CLASs

This command sets the Spectrum Emission Mask (SEM) power class index. The index represents the power classes to be applied. The index is directly related to the entries displayed in the power class drop down combo box, within the SEM settings configuration page.

Example: "POW:SEM:CLASs 0" set SEM power class to automatic

Characteristics: *RST value: 0
SCPI: device-specific

Mode: K91

[SENSe:]POWer:SEM

This command sets the Spectrum Emission Mask (SEM) measurement type. This is either IEEE, ETSI Spectrum mask or a user defined file

Example: "POW:SEM ETSI" sets the SEM ETSI measurement type

Characteristics: *RST value: IEEE
SCPI: device-specific

Mode: K91

TRACe Subsystem

The TRACe subsystem controls access to the instrument's internal trace memory.

COMMAND	PARAMETERS	UNIT	COMMENT
TRACe			
[:DATA]	TRACE1 | TRACE2 | TRACE3 | TRACE4 | TRACE5 | TRACE6 | LIST		Query only
:IQ			
:DATA:			
:MEMory?	<numeric_value>,<numeric_value>		Query only
:SRATe	<numeric_value>	Hz	Query only

Spectrum Mask

Result data will be returned as 625 trace points in floating point format. These trace points are obtained directly from the base system via the measurement API and the quantity is therefore a fixed value. Only an array of Y data will be returned.

TRACE1 – Clear write values

TRACE2 – Max hold values

LIST – Spectrum Emission Mask (SEM) summary results.

SEM summary results format:

1st Value -Index into table of results (1 – 50)
2nd Value -Start frequency band (Hz)
3rd Value -Stop frequency band (Hz)
4th Value -RBW (Hz)
5th Value -limit fail frequency (Hz)
6th Value -Power absolute (dBm)
7th Value -Power relative (dBc)
8th Value -Limit distance (dB)
9th Value -Failure flag (1 = fail, 0 = pass)

Appendix: Contact to our hotline

Any questions or ideas concerning the instrument are welcome by our hotline:

USA & Canada

Monday to Friday (except US public holidays)
8:00 AM – 8:00 PM Eastern Standard Time (EST)

Tel. from USA	888-test-rsa (888-837-8772) (opt 2)
From outside USA	+1 410 910 7800 (opt 2)
Fax	+1 410 910 7801
E-mail	Customer.Support@rsa.rohde-schwarz.com

East Asia

Monday to Friday (except Singaporean public holidays)
8:30 AM – 6:00 PM Singapore Time (SGT)

Tel.	+65 6 513 0488
Fax +	65 6 846 1090
E-mail	Customersupport.asia@rohde-schwarz.com

Rest of the World

Monday to Friday (except German public holidays)
08:00 – 17:00 Central European Time (CET)

Tel. from Europe	+49 (0) 180 512 42 42
From outside Europe	+49 89 4129 13776
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E-mail	CustomerSupport@rohde-schwarz.com