

New Instrument
Password
"894129"



ROHDE & SCHWARZ

Test and Measurement
Division

Release Notes

Firmware Release 4.69 (XP)

with Service Pack 3

for FSG Spectrum Analyzers (Windows XP embedded)

New Features:

- Auto Login Password for user INSTRUMENT is changed to "894129" for security reasons
- Resolution Bandwidth 6.25 kHz supported
- Support for Noise Correction outside of ACP measurement
- Multi Carrier ACP with up to 18 TX Channels
- Multi Carrier ACP now supports save/recall of user standards
- Spurious Emissions Measurement now supports save/recall of user standards
- SEM measurement: Supports for save/recall of user defined standards
- SEM measurement: Ref Level dialog available to adjust the sweep list's level settings
- SEM measurement: Additional WIMAX configuration files available
- Extended Marker Peak List function includes automatic peak list update
- FS-K7: New Fundamental Frequency AUTO/MANUAL setting for SINAD and THD measurement
- FS-K9: Indication of the power meter's model and serial number
- FS-K9: Support for Power Sensor NRP-Z86
- PSA / 89600 Emulation available
- Remote Control: Support for Status Operation Register Bits MEASuring / SWEeping

Release Note Revision: 8

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History

Date	Rel Note Rev	Changes
29 July 2010	1	First revision for V4.69.
19 October 2010	2	Hot line phone number for calls from Europe modified. Improvements with Service Pack 1 added.
25 November 2010	3	Additional improvement for FSQ-K70 with Service Pack 1.
17 January 2011	5	K91 Version modified and known issue added.
30 January 2011	6	New functions and improvements with Service Pack 2 added. Known issue concerning FS-K8 added.
09 February 2011	7	Extended remote command description for TRACE? LIST for SEM Measurement.
11 March 2011	8	Improvements with Service Pack 3 and a known issue added, new chapter "Customer Support".

General Topics

Firmware Update

Generation of the update set folder

A complete Update Set ZIP File with base system firmware and all applications is provided on the FSG internet download page.

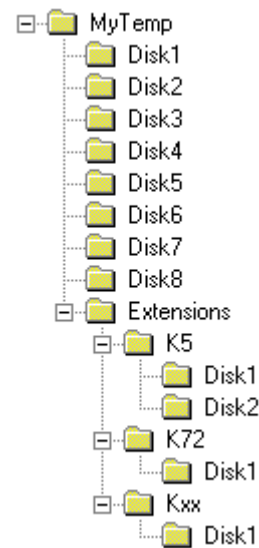
- Load this ZIP file on a temporary folder on your PC, e.g. MyTemp
- Extract the contents of the ZIP file to this sub folder

The folder structure of MyTemp should now look like this:

The application update sets are located in following sub folders:

- K5
- K10
- K30
- K40
- K70
- K72 (includes K73, K74, K74+)
- K76 (includes K77)
- K82 (includes K83)
- K84 (includes K85)
- K90 (includes K91)
- K92 (includes K93, K94)
- K100 (includes K101, K104, K105)

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

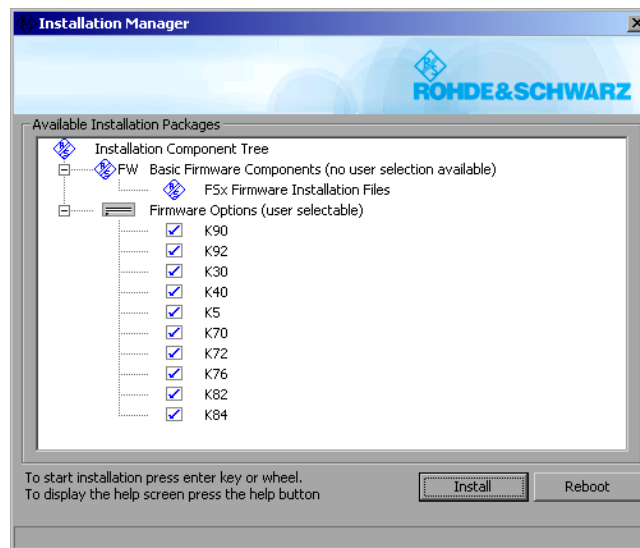


- Delete the download ZIP file from MyTemp.
- Now copy MyTemp and all sub folders to an USB stick.

Performing the firmware update on the instrument

- Use the SETUP | NEXT | FIRMWARE UPDATE | UPDATE PATH softkey to specify any path for the location of the disk directory (e.g. F:\MyTemp).
- Press SETUP → NEXT → FIRMWARE UPDATE
- Confirm the query "Do you really want to update the firmware?" with OK

The *Installation Manager* will terminate the analyzer application, search for available application update set and will show a selection list.



- Deselect applications, not to be installed and start the installation process with INSTALL. REBOOT will abort the update and restart the analyzer application without any changes.
- The instrument will perform several automatic shutdowns, until the new firmware and all applications are installed properly.

Do not switch the instrument off until the update process has been finished completely.

After a successful firmware update it is necessary to execute the instrument's self alignment process by pressing CAL and softkey CAL TOTAL.

Known problems during firmware update

Messagebox: Can't open front panel driver, errorcode=0x2

For some constellations this messagebox occurs after the last reboot of the device. In that case:

- Switch the instrument off by pressing the ON/standby switch at the front panel.
- Switch the power off at the rear panel.
- Wait until the Standby LED on the front panel turns from yellow to black (off).
- Switch the power on at the rear panel.
- Switch the instrument on by pressing the ON/standby switch at the front panel.

If the message box still appears, connect an external keyboard and select the "Instrument Driver Actuator" from the Windows Start Menu.

Firmware installation of the R&S FS-K7 FM demodulator, R&S FS-K8 BLUETOOTH Analyzer software and R&S FS-K9 power sensor measurement

The R&S FS-K7, R&S FS-K8 and R&S FS-K9 application software package are included in the basic instrument firmware. It therefore needs no separate firmware update procedure.

Enabling these options via option key code entry

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

For activation of these application software packages a license key for validation must be entered. The license key is printed either on a label on the rear panel of the R&S FSQ or delivered as a part of the software package.

The key sequence for entering the license key for every option is:

SETUP - GENERAL SETUP – OPTIONS - INSTALL OPTION

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

- On a successful validation the message 'option key valid' will appear.
- If the validation failed, the option software is not installed.

Compatibility to other Firmware Option Packages

The following firmware option packages are available with their own disks and they must be installed separately. Please refer to their release notes.

R&S FSG V4.69 SP3 is compatible to the following firmware option releases:

R&S FS-K5	R&S FS-K10	R&S FS-K30	R&S FS-K40	R&S FSQ-K70	R&S FS-K72 FS-K73 FS-K74 FS-K74+
4.60	4.61	4.60 SP2	4.60	4.60	4.61

R&S FS-K76 FS-K77	R&S FS-K82 FS-K83	R&S FS-K84 FS-K85	R&S FSQ-K90 FSQ-K91	R&S FSQ-K92 FSQ-K93 FSQ-K94	R&S FSQ-K100 FSQ-K101 FSQ-K104 FSQ-K105
4.60	4.60 SP1	4.60	4.62 SP1	4.61	4.61 SP1

New Functions in Version 4.69

- Auto Login Password for user INSTRUMENT is changed to "894129" for security reasons
- Support for Noise Correction outside of ACP measurement
- Multi Carrier ACP with up to 18 TX Channels
- Multi Carrier ACP: Support for save/recall of user defined standards
- Spurious Emissions Measurement: Supports for save/recall of user defined standards
- SEM measurement: Supports for save/recall of user defined standards
- SEM measurement: Ref Level dialog available to adjust the sweep list's level settings
- SEM measurement: Additional WIMAX configuration files available for Downlink ETSI (5MHz / 10MHz)
- Extended Marker Peak List function includes automatic peak list update
- FS-K7: New Fundamental Frequency AUTO/MANUAL setting for SINAD and THD measurement
- FS-K9: Indication of the power meter's serial number
- Resolution Bandwidth 6.25 kHz supported (with Service Pack 2)
- FS-K9: Support for Power Sensor NRP-Z86 available (with Service Pack 2).
- PSA / 89600 Emulation available (with Service Pack 2)
- Support for the Status Operation Register Bits MEASuring/SWEeping (with Service Pack 2)

Improvements

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

1. (V4.59) Option Key "FS-K5 Upgrade" does not enable the option FS-K10.

Note: This issue is already fixed in V4.55 SP1

2. (V4.49) The remote command "MMEM:DATA" ignores the default folder, set by "MMEM:CDIR".

The following command sequence should store data in the file 'filename' in folder d:\user\settings:

```
MMEM:MDIR 'd:\user\settings'
MMEM:CDIR 'd:\user\settings';*opc?
MMEM:DATA 'filename',#<Blockdaten>
```

The file is created in folder "d:\r_s.fw\instr" instead. The command to change the path had no effect.

Using a filename with path included, works fine, e.g.

```
MMEM:DATA 'd:\user\settings\filename',#<Blockdaten>.
```

Note: This issue is already fixed in V4.59 SP1

3. (V4.59) Option Key disabled after reboot.

The option key was manually enabled in the SETUP – GENERAL SETUP – OPTIONS list. After reboot of the instrument, the option is disabled again.

Note: This issue is already fixed in V4.59 SP1

4. (V4.59) The operating hour is set to 100.000 hours.

Note: This issue is already fixed in V4.59 SP1

5. (V4.59) Spurious Signal at 758.12 MHz eliminated (with Center Frequency 620 MHz).

The spurious appears with a Center Frequency of 620 MHz, a Resolution Bandwidth of 50 kHz, a Video Bandwidth of 300 kHz, a Sweptime of 5 sec and 10001 Sweep Points.

Note: This issue is already fixed in V4.59 SP1

6. (V4.49) Switching back to the internal LCD display does not work if the single display "MONITOR" is configured during power on and no external monitor is connected.

This problem only occurs for certain display revisions. Press SETUP –SYSTEM INFO – HW INFO. The HWC in line FSQ indicates 01 if this display revision is installed.

Note: This issue is already fixed in V4.59 SP1

7. (V4.59) The analyzer application crashes if the external tracking generator (FSP-B10) is switched on, the Gated Sweep is active and the Gate Adjust softkey is pressed.

Note: This issue is already fixed in V4.59 SP1

8. (V4.59) ACP Measurement: Wrong power measurement values are displayed if the recall of a save set with active noise correction is performed and the noise correction is switched off afterwards.

Note: This issue is already fixed in V4.59 SP1

9. (V4.59) ACP Measurement: Wrong unit indication for absolute power results with more than 3 adjacent channels

The measured ACP powers are indicated with unit dB instead of unit dBm, if following settings are used:

- CP/ACP ABS
- Number of Adjacent Channels > 3

The numerical results are not affected.

10. (V4.59) Spurious Emission Measurement: The electronic attenuator is not switched off

The Spurious Emission Measurement configuration does not support the electronic attenuator (FSU-B25) but is not automatically switched off. This is now corrected.

11. (V4.59) SEM Measurement: The required Number of Sweep Points is not set.

The following configuration files for EUTRA/LTE Uplink needs 30001 sweep points to be set:

- BW_01_4_MHz.xml
- BW_03_0_MHz.xml
- BW_05_0_MHz.xml

The number of sweep points is now automatically adjusted to this value. This has now been corrected.

Note: The number of sweep points is not set to its previous value if the SEM measurement is switched off or another SEM standard file is loaded.

12. (V4.59) Gated Statistics Measurement: Warning "Gate period exceeds I/Q capture time" is indicated.

The validation of the gate settings range is now corrected and the size of the available statistics I/Q capture buffer is increased.

13. (V4.59) FSQ-B17: Instrument firmware locks up using Digital Baseband Input with a connected Ex-IQ-Box.

Note: This issue is already fixed in V4.59 SP1

14. (V4.59) FSQ-B17: The remote command to configure the digital input sample rate does not automatically switch the AUTO SET mode of this parameter to OFF.

Note: This issue is already fixed in V4.59 SP1

15. (V4.59) FSQ-B17: The Level Auto Adjust functions are available with Digital Base Band input.

Note: This issue is already fixed in V4.59 SP1

16. (V4.49) FS-K7: The analyzer application crashes if MC Phase measurement is active and traces are read via remote control with certain combinations of instrument settings.

Note: This issue is already fixed in V4.55 SP2

17. (V4.59) FS-K7: Wrong X Scaling indication (grid and marker) using Digital Baseband Input and result RF Spectrum.

Improvements with Service Pack 1

Service Pack 1 corrects the following issues. The version numbers in brackets indicate the version in which the issue was observed for the first time.

1. (V4.69) **Noise Correction: Setting the TRACE mode to VIEW deactivates the noise correction.**
2. (V4.69) **A frequency domain sweep does not terminate.**
This issue may happen for certain combinations of Center Frequency, Span, Resolution Bandwidth, Video Bandwidth and Sweeptime and is now fixed.
3. (V4.69) **FSQ-K70: Modulation Accuracy – FSK DEV ERROR Peak evaluation does not ignore the sign of the current value.**

As a result negative values are not correctly taken into account.

Improvements with Service Pack 2

Service Pack 2 corrects the following issues. All previous service packs are included.

1. (V4.39) **Marker Function Reference Fixed can not be switched off.**
It is not possible to switch off the marker function REFERENCE FIXED after following order of key strokes:
 - MARKER – REFERENCE FIXED (activates Reference Fixed)
 - MKR FCTN – NOISE MEAS (activates Noise Marker)
 - MKR FCTN – NOISE MEAS (de activates Noise Marker)
2. (V4.69) **The Option Key (de)activation state change is lost after reboot.**
Once installed, it is possible to enable/disable an option key in dialog SETUP – GENERAL SETUP - OPTIONS. A reboot is required for a few options. The message box "The system must be rebooted to effect the changes. Reboot now?" will be indicated in that case. With versions 4.69/4.69 SP1 the state change will get lost after reboot.

Improvements with Service Pack 3

Service Pack 3 corrects the following issues. All previous service packs are included.

1. (V4.65 SP2) **A measurement in frequency domain does not reach the end of sweep for certain instrument settings:**
 - Filter Type FFT
 - large Number of Sweep Points (e.g. 30001)
 - small Bandwidth (e.g. 100 Hz)
 - large Span (above 3 GHz)
2. (V4.65 SP2) **Reduced execution speed for Center Frequency/Span changes if a lot of transducer set files exist on the instruments harddisk,**
3. (V4.65 SP2) **B10: A GPIB address change for the external signal generator is ignored.**
The analyzer application is using the previous address until the external source is switch off and on again.
4. (V4.65 SP1) **FSQ-B71: The softkey LOW PASS 36 MHz of menu SETUP – SIGNAL SOURCE – ANALOG BASEBAND is not visible.**
5. (V4.65 SP2) **FS-K5: An IF Overload condition is indicated after performing the Level & Time Auto Adjust with certain EDGE signals.**

6. (V4.55) **FS-K8: Some results in EDR Spurious Emissions measurement do not include the Reference Level Offset.**

Known Issues

This chapter includes issues related to the basic instrument firmware.

For issues related to option packages R&S FS-Kxx please refer to the corresponding release notes of the individual option package.

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

1. (V4.29) Wrong SELECT ITEMS TO SAVE/RECALL selection names with FSQ-K90/91 installed.

For option FSQ-K90/K91 (WLAN), it is possible to select FSQ-K90/K91 specific items to save or recall:

- WLAN Results
- WLAN IQ Data
- WLAN User Limits

2. (V4.49) The Network Configuration dialogs (menu SETUP – GENERAL SETUP – CONFIGURE NETWORK) seem to lock up if no LAN is connected.

A timeout of 60s is effective in some cases if no LAN is connected to the instrument and therefore the firmware seems to lock up.

Work around: Connect the instrument to a local network before modification of the LAN configuration.

3. (V4.49) FSQ-B17: Continuous Digital Baseband output data stream is halted after configuration of the Ex-IQ-Box.

The analyzer stops to send digital baseband data to the FSQ-B17 output (MEAS - IQ MODE switched on and DIG IQ OUTSTREAM active) and the Ex-IQ-Box configuration is changed after activation of the Digital IQ Output Stream.

Work around: Reactivate the IQ MODE and the DIG IQ OUTSTREAM by pressing the related softkeys after leaving the EXIQ configuration dialog.

4. (V4.49) FSQ-B17: The EX IQ Box is not recognized when connected during firmware update.

Work around: Disconnect and reconnect the USB cable of the EX IQ Box.

5. (V4.59) FSQ-B17 with Ex-IQ-Box: Sample Rate AUTO SET does not work for Logic Type SSI.

The DUTs I/Q data sample rate depends on the SSI clock signal from the Device under Test and therefore the Ex-IQ-Box is not able to transfer the Digital Input Sample Rate to the analyzer.

Work around: Do not use the default AUTO SET mode and configure the Digital Input Sample Rate to the input data rate (e.g. menu SETUP – SIGNAL SOURCE – DIGITAL IN SAMPLE RATE).

6. (V4.59) FSQ-B17 with Ex-IQ-Box No additional warning is indicated to update the EX-IQ-Box firmware.

Firmware 4.59 includes a new Ex-IQ-Box firmware (00-00-13-155). An update of the Ex-IQ-Box firmware to this version is required. This is indicated only by an enabled softkey FIRMWARE UPDATE of the EX-IQ-Box configuration menu. No additional warning is visible.

Work around: Check the softkey FIRMWARE UPDATE of menu EX-IQ-BOX and perform the update if the softkey is enabled. The EX-IQ-Box has to be connected to the instrument before.

7. (V4.69 SP2) A reduced display update speed occurs in remote operation for certain application changes if the display update is switched on.

Changing from mobile applications K5/K7x/K8x to K10/K9x/K10x several times leads to a reduced display update speed in remote operation if the display update is switched on ("SYST:DISP:UPD ON"). The manual operation is not affected.

Work around: Switch back to analyzer before activation of the next application.

Example:

*RST;;SYST:DISP:UPD ON

INST:SEL BWCD

... do some measurements in K72

INST:SEL SAN

' activate K72

' back to analyzer first, before entering K40 as

' a work around

INST:SEL PNO	'activate K40
... do some measurements in K40	
INST:SEL SAN	' back to analyzer

Modified Functions

The version numbers in brackets indicate the version in which the function was modified.

1. (V4.29 SP2) Option FSU-B24 supported.
2. (V4.29 SP2) New function IF SHIFT AUTO.
3. (V4.29 SP3) Function TRACE:IQ:FILTer NORMal | WIDE changed.
Since version 4.29 SP3 the extension of the filter flatness is possible for the sample rate range $10.2 \text{ MHz} < \text{sample rate} \leq 20.4 \text{ MHz}$.
4. (V4.29 SP3) For local lockout the alias remote command SYSTem:KLOCK ON | OFF is provided.
5. (V4.39) International keyboard driver package supported (German, Spanish, French, Italian and Portuguese).
6. (V4.39) New dialogs available for file/path selection (e.g. for Trace Export, Firmware Update Path).
7. (V4.39) New filter types CHANNEL FILTER and 5-POLE DIGITAL for Analyzer Mode available.
8. (V4.39) Resolution Bandwidth up to 50 MHz available in Time Domain.
This function is only supported if the related hardware extension is available.
Note: To check the availability, press SETUP – SYSTEM INFO – HARDWARE INFO:
Component MOTHERBOARD, row HWC (hardware code)
00: not available, $\text{RBW} \leq 10\text{MHz}$ (Analyzer, Zeropsan)
01: available, $\text{RBW} \leq 50\text{MHz}$ (Analyzer, Zeropsan)
9. (V4.39) ACP: Extended upper limits for Channel Bandwidth (5GHz) and Channel Spacing (20GHz).
10. (V4.39) ACP: Overlapping Adjacent Channels allowed now for parallel measurements.
It is now possible to configure overlapping adjacent channels. Based on a common carrier channel setting, it is now possible to measure with two slightly different ADJ channel settings with one measurement.
Example: TX Channel / TX Bandwidth (common for both measurement A and B)
ADJ used for measurement A
ALT1 used for measurement A

ALT2 used as ADJ for measurement B
ALT3 used as ALT1 for measurement B
11. (V4.39) ACP Measurement: Result output format changed for number of ADJ channels > 3 .
12. (V4.39) Additional soft keys available to change the LAN configuration.
13. (V4.39) Save dialog reports a warning, if no item to save is selected.
14. (V4.39) The increment behaviour of the step keys for parameter SWEEP POINTS is changed.
The behaviour of the knob wheel still has the highest possible resolution.
15. (V4.39) Dummy Video Bandwidth 0 Hz returned for active FFT filter.
16. (V4.39) Availability changed for Spurious Measurement.
The Spurious Measurement is not available if the ACP measurement is active.
17. (V4.39) HP emulation: Additional remote commands are supported.

The following commands are supported: ML, MEAS, SUM, LIMIPURGE, EDITLIML, LIMIREL, SDEL, SADD, LIMF, LIMU, LIML, LIMM, LIMD, LIMTFL, LIMTSL, SDON, EDITDONE, LIMISAV, LIMIRCL, LIMITEST, LIMIFAIL

18. (V4.39) HP emulation: A new softkey **COUPLING FSP/HP** is now available to change the Span/RBW and RBW/VBW default coupling.
19. (V4.39) HP emulation: The default for Sweep Repeat is now OFF for 856x and 859x.
20. (V4.39) FSQ-B17: Digital Baseband Input supports resampling for TRACE:IQ sub system.
21. (V4.39) FSQ-B17: R&S Ex-IQ-Box Control provided.
22. (V4.39) FS-K7: New measurement function MC PHASE RESPONSE.
23. (V4.39) FS-K7 and FSQ-K70: Digital Baseband Input supported.
24. (V4.39) FS-K7: Deemphasis is now additionally supported for active Weighting AF Filter CCTTT and CCIR.
25. (V4.39) Support for option 3GPP HSPA+ Application Firmware R&S FS-K74+ added.
26. (V4.39 SP1) Support for option FSQ-K94.
27. (V4.39 SP1) Support for option FSQ-K91n.
28. (V4.39 SP1) Application Setup Recovery restores previous settings after application exit.
29. (V4.49) Configurable Spectrum Emission Mask measurement is now available in analyzer mode.
30. (V4.49) ACP measurement: User definable standards available.
31. (V4.49) ACP measurement: New standards for E-UTRA / LTE.
32. (V4.49) External Reference: Selectable PLL bandwidth and new "Fall Back to Internal" mode EXT [INT].
33. (V4.49) TOI Measurement: New TOI marker search function added (TOI MKR CALC/SRCH).
34. (V4.49) Additional overload indication OVTRC added.
35. (V4.49) Auto Login Password changed for user instrument to "123456".
It is now possible to enter the password after remote desktop connection by the front panel.
36. (V4.49) General Setup: Baudrate 19200 for the serial COM interface is now selectable.
37. (V4.49) Harmonic Measurement: Additional remote command to get the used resolution bandwidth settings:
CALCulate1:MARKer1:FUNCtion:HARMonics:BANDwidth[:LIST]?
38. (V4.49) FS-K9: Support for Power Sensors NRP-Z56, NRP-Z57 and NRP-Z92.
39. (V4.49) Support for FS-K73+.
40. (V4.49) Support added for options R&S FSQ-K100, K101, K102, K104, K105, K106 (E-UTRA / LTE) (as external or internal application).
41. (V4.49) HP emulation
 - command OL expanded
 - no difference between local and remote sweep points
42. (V4.49) HP emulation for 8560E, 8561E, 8562E, 8563E, 8564E, 8565E
 - Spurious Measurement: threshold line is take into account for calculating of resolution bandwidth and noise level, message box "RBW/VBW coupling adjusted" suppressed
 - Harmonic Measurement: modified algorithm for finding harmonics
 - Phase Noise Measurement: some minor adjustments
 - Support of 4 markers
 - Corrections of RBW calculation if FFT-Filter is switched on
 - Command MKNOISE, MKTRACK: correction of return value

- Sweep time adjusted for gated sweep (command GATE)
- 43. (V4.49) **HP emulation for 8566A/B, 8568A/B**
 - Support of 4 markers
- 44. (V4.49) **HP emulation for 8591E, 8594E**
 - sweep time adjusted for gated sweep (command GATE)
- 45. (V4.49 SP1) **Support for new board revisions of Wideband Detector Unit.**
 The presence of these boards can be checked by pressing *SETUP – SYSTEM INFO – HARDWARE*. A certain bit of the hardware code, listed in column *HWC* indicates the new board revision:

WBDET (Wideband Detector Board)	with HWC Bit 1 = 1^{*)}
--	--

^{*)} HWC value divided by 2 is odd.
Warning: A backgrade to earlier firmware versions is not possible if a new WBDET and Digital Baseband Input/Output (FSQ-B17) is installed.
- 46. (V4.49 SP2) **Support for new GSM/EDGE/EDGE Evolution Measurement Application R&S FS-K10.**
- 47. (V4.59) **New functions to temporary disable/enable option license keys.**
- 48. (V4.59) **New remote command "SYSTem:SHUTdown" to shutdown the instrument.**
- 49. (V4.59) **New Status Bit for Overload Trace (OVTRC) in the STATus:QUEStionable:POWer Register.**
- 50. (V4.59) **New function EXPORT/IMPORT DEV DATA to export and import device specific data (e.g. option licence keys).**
- 51. (V4.59) **New Channel Filter 7.5 kHz available.**
- 52. (V4.59) **ACP/Multi Carrier ACP with selectable Weighting Filter for TX, ACP and ALT channels supported.**
 Since version 4.5x the following remote commands to not ignore the numeric suffix at CHAN or ALT accordingly.
 SENS:POW:ACH:FILT:STAT:CHAN<1 to 12>
 SENS:POW:ACH:FILT:STAT:ALT<1 to 11>
 SENS:POW:ACH:FILT:ALPH:CHAN<1 to 12>
 SENS:POW:ACH:FILT:ALPH:ALT<1 to 11>
- 53. (V4.59) **Occupied Bandwidth measurement: New command ":CALC:MARK:FUNC:POW:RES? AOB | AOBW" returns the position and level of marker T1 and T2.**
- 54. (V4.59) **Transducer: New function VIEW TRANSDUCER available**
- 55. (V4.59) **Trace Export: Additional ASCII File entries "Preamplifier" and "Transducer"**
- 56. (V4.59) **HP emulation: New command "SER?" available to query the serial number**
- 57. (V4.59) **New "Instrument Driver Actuator" in the Windows Start menu**
- 58. (V4.59) **FSQ-B17: Remote command ":OUTPut<1|2>:DIQ[:STATe]" is only available now with TRACE:IQ:STAT ON.**
- 59. (V4.59) **FSQ-B17: The softkey DIG OUT ON/OFF is visible in several applications without being fully supported.**
 The generation of a continuous digital baseband output stream is only supported using the I/Q Measurement mode (menu MEAS – IQ MODE, remote sub system TRACE:IQ). But the softkey DIG OUT ON/OFF was available in other operating modes as well (e.g. K7, K70).
- 60. (V4.59) **FS-K7: Maximum Meas Time increased by factor 8 for instruments with a system memory size of ≥ 1GByte.**

61. (V4.59) **FS-K8: EDR Spuriuos: Remote Control read access allowed for Span, Start- and Stopfrequency.**
62. (V4.59) **Gated Statistics Measurement: Additional settings checks added (e.g. if the period time does not fit to the I/Q capture length).**
63. (V4.59) **Direct Ex-IQ-Box Configuration Dialog access via SETUP – SIGNAL SOURCE.**
The remote command "INST:SEL EXIQ", required in earlier versions to configure the EX-IQ-Box, is ignored.
64. (V4.59) **New sub menus available for signal path dependent softkeys with options FSQ-B17 (Digital Baseband) and FSQ-B71 (Analog Baseband).**
65. (V4.59) **LXI Class C Support is now integral part of the base system firmware.**
66. (V4.59SP1) **Ex-IQ-Box: The Word Alignment Default has been modified from MSB to LSB.**
This change allows to connect an Ex-IQ-Box 1409.5505.02 (with 20 bit) to an Ex-IQ-Box 1409.5505K04 (with 18 bit) using the new default settings.
67. (V4.69) **Auto Login Password for user INSTRUMENT is changed to "894129" for security reasons.**
68. (V4.69) **CONFIGURE NETWORK: An error message pops up if no LAN cable is connected.**
"NOT CONNECTED" is now visible.
69. (V4.69) **Support for Noise Correction outside of ACP measurement .**
70. (V4.69) **Multi Carrier ACP: Number of TX channels increased from 12 to 18.**
71. (V4.69) **Multi Carrier ACP: Support for save/recall of user defined standards.**
72. (V4.69) **SEM measurement: Supports for save/recall of user defined standards.**
73. (V4.69) **SEM Measurement: Required Number of Sweep Points is not set.**
The follow configuration for EUTRA/LTE Uplink needs 30001 sweep points to be set.
- BW_01_4_MHz.xml
- BW_03_0_MHz.xml
- BW_05_0_MHz.xml
The number of sweep points is no automatically adjusted to this value.
Note: The number of sweep points is not set to it's previous value if the SEM measurement is switched off or another SEM standard file is loaded.
74. (V4.69) **SEM measurement: Ref Level dialog available to adjust the sweep list's level settings.**
75. (V4.69) **SEM measurement: Additional WIMAX configuration files available for DL ETSI (5MHz / 10MHz).**
76. (V4.69) **Extended Marker Peak List function including automatic peak list update.**
77. (V4.69) **HP emulation: new commands available**
 - Command SYSTem:REVisiOn[:STRing] <new REV? response> to modify the response for the remote command REV?
 - Command SYSTem:REVisiOn:FACTory to select the default response for the remote command REV?
 - Plotter commands PA, PD and PU
78. (V4.69) **FS-K7: New Fundamental Frequency AUTO/MANUAL setting for SINAD and THD measurement.**
79. (V4.69) **FS-K9: Indication of the power meter's serial number.**
80. (V4.69 SP1) **Support for new board revisions of Wideband Detector Unit.**
The presence of these boards can be checked by pressing *SETUP – SYSTEM INFO – HARDWARE*. A certain bit of the hardware code, listed in column *HWC* indicates the new board revision:

WBDET (Wideband Detector Board) with HWC Bit 2 = 1 *)

*) HWC value divided by 4 is odd.

Warning: A backgrade to earlier firmware versions is not possible in that case.

- 81. (V4.69SP2) Resolution Bandwidth 6.25 kHz supported.
- 82. (V4.69SP2) FS-K9: Support for Power Sensor NRP-Z86 available.
- 83. (V4.69SP2) PSA / 89600 Emulation available.
- 84. (V4.69SP2) Support for the Status Operation Register Bits MEASuring/SWEeping.

Modifications to the Operating Manual

The order numbers for the manual sets are:

Operating Manual "Signal Analyzer FSG8/13":

- 1309.0090.12-05 (English).

The corresponding PDF-File is available on the service board.

Last minute changes to the operating manual

Manual Operation

Quick Start Guide – Login

Windows XP requires that users identify themselves by entering a user name and password in a login window. The instrument provides a factory-installed auto login function, i.e. login is carried out automatically in the background. The ID used for auto login has administrator rights. As user name *instrument* (lowercase) is set. The valid password depends on the firmware version installed.

User:	"instrument" (lower case)	
Password:	"instrument" (lower case)	< V4.45
	"123456"	V4.45, V4.55
	"894129"	≥ V4.65

Note: The default password is modified by performing a firmware upgrade. A backgrade to an older firmware version will not restore the old password as it is not known to this firmware version. A password differing from the default value will not be modified during firmware update.

Quick Start Guide – Operating System Properties – Special Links

The windows start menu includes following special links

- *"Instrument Driver Actuator"*
This link forces Windows XP to reload all instrument specific drivers.
Use this link if a new hardware is not recognized or a problem with the frontpanel keyboard is reported.
- *"LXI Configuration"*
This link opens a dialog to enable/disable LXI.
- *"R&S Analyzer Interface"*
This link starts the analyzer application.
- *"Start – Program – Accessories – Sytem Tools – Activate Registry Readonly"*
This link activates function REGISTRY READONLY. Handle this function with care!
This function is only available if the Registry Write Filter package is installed. The installation package is available for Windows XP SP2 or SP3.
More details see chapter SETUP – GENERAL SETUP.
- *"Start – Program – Accessories – Sytem Tools – Dectivate Registry Readonly"*
This link deactivates function REGISTRY READONLY.
This function is only available if the Registry Write Filter package is installed. The installation package is available for Windows XP SP2 or SP3.
More details see chapter SETUP – GENERAL SETUP.

Menu SETUP – GENERAL SETUP - NEXT

REGISTRY
READ ONLY

The softkey *REGISTRY READ ONLY* activates/deactivates a write protection for the Windows XP registry. Any modification in the windows registry is cashed into RAM and will get lost after reboot if *REGISTRY READ ONLY* is active.

This function is only available if the Registry Write Filter package is installed. The installation package is available for Windows XP SP2 or SP3.

The active write protection is also indicated in dialog SETUP – SYSTEM INFO – STATISTICS.

Hint: In addition, it is possible to deactivate/activate the function with the following links:
 Start – Programs – Accessories – System Tools
 Activate Registry Readonly
 Deactivate Registry Readonly

Warning: Do not perform any firmware/driver installation if the **REGISTRY READONLY** function is active! This will result in an incomplete installation.

Remote command: ---

Remote Control – Description of the Status Registers

STATus:OPERation Register

In the CONDition part, this register contains information on which actions the instrument is being executing or, in the EVENT part, information on which actions the instrument has executed since the last reading. It can be read using commands "STATus:OPERation:CONDition?" or "STATus:OPERation[:EVENT]?".

Bit No.	Meaning
0	CALibrating This bit is set as long as the instrument is performing a calibration.
1 to 2	These bits are not used
3	SWEeping This bit is set while the instrument performs a sweep. It is supported in analyzer mode only (Full Screen, frequency domain and time domain).
4	MEASuring This bit is set while the instrument performs a measurement. It is supported in analyzer mode only (Full Screen, frequency domain and time domain).
5 to 7	These bits are not used
8	HardCOPy in progress This bit is set while the instrument is printing a hardcopy.
9	This bit is not used
10	Sweep Break This bit is set when end of sweep range is reached (spurious measurement, mode analyzer). Command "INIT:CONM" has to be used to proceed.
11 to 14	These bits are not used
15	This bit is always 0

Remote Control – Description of Commands

TRACe subsystem

:TRACe<1|2>:DATA TRACE1 | TRACE2 | TRACE3 | LIST | SPURious | ABITstream | PWCDp | CTABLE, <block> | <numeric_value>

This command transfers trace data from the control computer to the instrument, the query reads trace data out of the instrument.

The numeric suffix at TRACe<1|2> selects the measurement window.

Parameter: TRACE1 to TRACE3 selects trace 1 to 3.

LIST reads the peak list in the spurious measurement [LIST EVALUATION](#) (for details on this measurement see page 220) or in the spectrum emission mask measurement.

The suffix at TRACe<1|2> is irrelevant.

As results a list of <result of range 1>,< result of range 2>,...< result of range n> are returned.

Every single range has following format:

<No>,<Start>,<Stop>,<rbw>,<freq>,<Levelabs>,<Levelrel>,<Delta>,<Limitcheck>,<unused1>,<unused2>

Where:

No	Range number
Start Range	start frequency
Stop Range	stop frequency
Rbw	Resolution bandwidth
Freq	Frequency of the peak in the range
Levelabs	Absolute peak power of the range in dBm
Levelrel	Reserved (0.0)
Delta	Delta of the peak power to the limit line in dB
Limitcheck	Limit check state (0 = PASSED, 1 = FAILED)
Unused1	Reserved (0.0)
Unused2	Reserved (0.0)

These values are defined via the [SENSe<1|2>:]LIST:RANGe<1...20> subsystem (spurious measurement) or the [SENSe<1|2>:]ESpectrum:RANGe<1...20> subsystem (spectrum emission mask measurement).

SPURious reads the peak list in the spurious measurement. As results a list of frequency, level and delta to limit line values is returned. A delta limit of +200dB indicates no limit check is active.

ABITstream reads the bit streams of all 15 slots one after another.

PWCDp can be set for base station tests only if CODE PWR ABSOLUTE / RELATIVE , CHANNEL TABLE is selected for Trace 1. The pilot length is transmitted in addition to the same five values as transmitted for TRACE1. The pilot length is specified in symbols.

Six values are transmitted for each assigned channel: <class>,<channel number>,<absolute level>,<relative level>,<timing offset> (R&S FS-K72) or <I/Q mapping> (R&S FS-K73), <pilot length>,... The pilot length is specified in bit.

CATable can be set only if CODE PWR ABSOLUTE / RELATIVE , CHANNEL TABLE is selected for Trace 1. The same data as for TRACE1 are output. In addition, the pilot length as the 6th value and active/inactive (1/0) as the 7th value are output for option R&S FS-K72. With option R&S FS-K73, active/inactive (1/0) is output as the 6th value. For R&S FS-K72 seven values are transmitted for each assigned channel: <class>,<channel number>,<absolute level>,<relative level>,<timing offset>,<pilot length>,<active/inactive>,...

R&S FS-K73 six values are transmitted for each assigned channel:

<class>,<channel number>,<absolute level>,<relative level>,
<IQ mapping>,<active/inactive>,...

Return value: The returned values are scaled in the current level unit. Returned FM-modulated measurement values (activated option R&S FS-K7) are scaled in Hz.

Example: "TRAC TRACE1,"+A\$ (A\$: data list in the current format)
"TRAC? TRACE1"

Characteristics: *RST-Wert:
SCPI: conforming

PSA Emulation with commands especially for the Agilent 89600 Software

Supported 89600 commands	Status
*CAL?	available in V4.69 SP2 and above
*CLS	available in V4.69 SP2 and above
*ESE	available in V4.69 SP2 and above
*ESR?	available in V4.69 SP2 and above
*IDN?	available in V4.69 SP2 and above
*IST?	available in V4.69 SP2 and above
*OPC	available in V4.69 SP2 and above
*OPT?	available in V4.69 SP2 and above
*PCB	available in V4.69 SP2 and above
*PRE	available in V4.69 SP2 and above
*PSC	available in V4.69 SP2 and above
*RST	available in V4.69 SP2 and above
*SRE	available in V4.69 SP2 and above
*STB?	available in V4.69 SP2 and above
*TRG	available in V4.69 SP2 and above
*TST?	available in V4.69 SP2 and above
*WAI	available in V4.69 SP2 and above
:CALibration:AUTO OFF ON ALERT	available in V4.69 SP2 and above

Supported 89600 commands	Status
:CALibration:TCORrections AUTO ON OFF	available in V4.69 SP2 and above
:CONFigure:WAVEform	available in V4.69 SP2 and above
:DIAGnostic:EABY ON OFF	available in V4.69 SP2 and above
:DIAGnostic:LATCh:VALue <numeric>	available in V4.69 SP2 and above
:DIAGnostic:LATCh:SElect <string>	available in V4.69 SP2 and above
:DISPlay:ANNOtation:TITLe:DATA <string>	available in V4.69 SP2 and above
:DISPlay:ENABle OFF ON	available in V4.69 SP2 and above
:DISPlay:WINDow:TRACe:Y:[SCALE]:PDIVision <numeric>	available in V4.69 SP2 and above
:DISPlay:WINDow:TRACe:Y:[SCALE]:RLEVel <numeric>	available in V4.69 SP2 and above
:DISPlay:WINDow:TRACe:Y:[SCALE]:RLEVel:OFFSet <numeric>	available in V4.69 SP2 and above
:FORMat:BORDER NORMAl SWAPped	available in V4.69 SP2 and above
:FORMat[:DATA] ASCii REAL UINT MATLAB,<numeric>	available in V4.69 SP2 and above
:INITiate:CONTInuous OFF ON	available in V4.69 SP2 and above
:INITiate[:IMMediate]	available in V4.69 SP2 and above
:INSTrument:CATalog?	available in V4.69 SP2 and above
:INSTrument:NSElect <numeric>	available in V4.69 SP2 and above
:MMEMory:CATalog? <dir_name>	available in V4.69 SP2 and above
:MMEMory:COpy <'file_name1'>,<'file_name2'>	available in V4.69 SP2 and above
:MMEMory:DATA <'file_name'>,<definite_length_block>	available in V4.69 SP2 and above
:MMEMory:DELeTe <'file_name'>	available in V4.69 SP2 and above
:MMEMory:LOAD:STATe 1,<'file_name'>	available in V4.69 SP2 and above
:MMEMory:LOAD:TRACe 1,<'file_name'>	available in V4.69 SP2 and above
:MMEMory:MDIRectory <'dir_name'>	available in V4.69 SP2 and above
:MMEMory:MOVE <'file_name1'>,<'file_name2'>	available in V4.69 SP2 and above
:MMEMory:STORE:STATe 1,<'file_name'>	available in V4.69 SP2 and above
:MMEMory:STORE:TRACe <numeric>,<'file_name'>	available in V4.69 SP2 and above

Supported 89600 commands	Status
:READ:WAVform?	available in V4.69 SP2 and above
[[:SENSe]:FREQuency:CENTer <numeric>	available in V4.69 SP2 and above
[[:SENSe]:FREQuency:STARt <numeric>	available in V4.69 SP2 and above
[[:SENSe]:FREQuency:STOP <numeric>	available in V4.69 SP2 and above
[[:SENSe]:FREQuency:SPAN <numeric>	available in V4.69 SP2 and above
[[:SENSe]:POWer:ATTenuation <numeric>	available in V4.69 SP2 and above
[[:SENSe]:ROSCillator:EXTernal:FREQuency <numeric>	available in V4.69 SP2 and above
[[:SENSe]:ROSCillator:OUTPut OFF ON	available in V4.69 SP2 and above
[[:SENSe]:ROSCillator:SOURce INTernal EXTernal EAUTO	available in V4.69 SP2 and above
[[:SENSe]:SPECtrum:TRIGger:SOURce EXTernal<1 2> IF IMMediate	available in V4.69 SP2 and above
[[:SENSe]:WAVeform:ADC:RANGe P6	available in V4.69 SP2 and above
[[:SENSe]:WAVeform:APER?	available in V4.69 SP2 and above
[[:SENSe]:WAVeform:AVERage:TACount <numeric>	available in V4.69 SP2 and above
[[:SENSe]:WAVeform:BWIDth:ACTive?	available in V4.69 SP2 and above
[[:SENSe]:WAVeform:BWIDth:TYPE FLAT GAUSSian	available in V4.69 SP2 and above
[[:SENSe]:WAVeform:IFGain <numeric>	available in V4.69 SP2 and above
[[:SENSe]:WAVeform:IFPath NARRow WIDE	available in V4.69 SP2 and above
[[:SENSe]:WAVeform:NCPTTrace ON OFF	available in V4.69 SP2 and above
[[:SENSe]:WAVeform:PDIT ON OFF	available in V4.69 SP2 and above
[[:SENSe]:WAVeform:SRATe <numeric>	available in V4.69 SP2 and above
[[:SENSe]:WAVeform:SWEep:TIME <numeric>	available in V4.69 SP2 and above
[[:SENSe]:WAVeform:TRIGger:EOffset?	available in V4.69 SP2 and above
[[:SENSe]:WAVeform:TRIGger:INTerpolation ON OFF	available in V4.69 SP2 and above
[[:SENSe]:WAVeform:TRIGger:SOURce EXTernal<1 2> IF IMMediate	available in V4.69 SP2 and above
:STATus:QUESTionable:CONDition?	available in V4.69 SP2 and above
:STATus:QUESTionable:ENABLE <number>	available in V4.69 SP2 and above

Supported 89600 commands	Status
:STATus:QUESTionable:NTRansition <number>	available in V4.69 SP2 and above
:STATus:QUESTionable:PTRansition <number>	available in V4.69 SP2 and above
:STATus:QUESTionable[:EVENT]?	available in V4.69 SP2 and above
:STATus:QUESTionable:CALibration:CONDition?	available in V4.69 SP2 and above
:STATus:QUESTionable:CALibration:ENABLE <number>	available in V4.69 SP2 and above
:STATus:QUESTionable:CALibration:NTRansition <number>	available in V4.69 SP2 and above
:STATus:QUESTionable:CALibration:PTRansition <number>	available in V4.69 SP2 and above
:STATus:QUESTionable:CALibration[:EVENT]?	available in V4.69 SP2 and above
:STATus:QUESTionable:FREQuency:CONDition?	available in V4.69 SP2 and above
:STATus:QUESTionable:FREQuency:ENABLE <number>	available in V4.69 SP2 and above
:STATus:QUESTionable:FREQuency:NTRansition <number>	available in V4.69 SP2 and above
:STATus:QUESTionable:FREQuency:PTRansition <number>	available in V4.69 SP2 and above
:STATus:QUESTionable:FREQuency[:EVENT]?	available in V4.69 SP2 and above
:STATus:QUESTionable:INTegrity:CONDition?	available in V4.69 SP2 and above
:STATus:QUESTionable:INTegrity:ENABLE <number>	available in V4.69 SP2 and above
:STATus:QUESTionable:INTegrity:NTRansition <number>	available in V4.69 SP2 and above
:STATus:QUESTionable:INTegrity:PTRansition <number>	available in V4.69 SP2 and above
:STATus:QUESTionable:INTegrity[:EVENT]?	available in V4.69 SP2 and above
:STATus:OPERation:CONDition?	available in V4.69 SP2 and above
:STATus:OPERation:ENABLE <integer>	available in V4.69 SP2 and above
:STATus:OPERation:NTRansition <integer>	available in V4.69 SP2 and above
:STATus:OPERation:PTRansition <integer>	available in V4.69 SP2 and above
:STATus:OPERation[:EVENT]?	available in V4.69 SP2 and above
:SYSTem:COMMunicate:GPIB[:SELF]:ADDRESS <integer>	available in V4.69 SP2 and above
:SYSTem:DATE <year>,<month>,<day>	available in V4.69 SP2 and above
:SYSTem:ERRor[:NEXT]?	available in V4.69 SP2 and above

Supported 89600 commands	Status
:SYSTem:KLOCK?	available in V4.69 SP2 and above
:SYSTem:MESSAge <string>	available in V4.69 SP2 and above
:SYSTem:PRESet	available in V4.69 SP2 and above
:SYSTem:TIME <hour>,<minute>,<second>	available in V4.69 SP2 and above
:SYSTem:VERSion?	available in V4.69 SP2 and above
:TRACe:COpy <src_trace>,<dest_trace>	available in V4.69 SP2 and above
:TRACe[:DATA] TRACE1 TRACE2 TRACE3 TRACE4 TRACE5 TRACE6, <define_length_block> <comma_separated_ASCII_data>	available in V4.69 SP2 and above
:TRACe:MODE WRITe MAXHold MINHold VIEW BLANK	available in V4.69 SP2 and above
:TRIGger[:SEQuence]:DELay <numeric>	available in V4.69 SP2 and above
:TRIGger[:SEQuence]:DELay:STATe OFF ON 0 1	available in V4.69 SP2 and above
:TRIGger[:SEQuence]:EXTernal:DELay <numeric>	available in V4.69 SP2 and above
:TRIGger[:SEQuence]:EXTernal:LEVel <numeric>	available in V4.69 SP2 and above
:TRIGger[:SEQuence]:EXTernal:SLOPe POSitive NEGative	available in V4.69 SP2 and above
:TRIGger[:SEQuence]:HOLDoff <numeric>	available in V4.69 SP2 and above
:TRIGger[:SEQuence]:IF:DELay <numeric>	available in V4.69 SP2 and above
:TRIGger[:SEQuence]:IF:LEVel <numeric>	available in V4.69 SP2 and above
:TRIGger[:SEQuence]:IF:SLOPe POSitive NEGative	available in V4.69 SP2 and above
:TRIGger[:SEQuence]:SLOPe POSitive NEGative	available in V4.69 SP2 and above
:TRIGger[:SEQuence]:SOURce IMMEDIATE VIDeo EXTernal<1 2>	available in V4.69 SP2 and above
:TRIGger[:SEQuence]:VIDeo:LEVel <numeric>	available in V4.69 SP2 and above
:TRIGger[:SEQuence]:VIDeo:LEVel:FREQuency <freq>	available in V4.69 SP2 and above

R&S FS-K7 Extensions

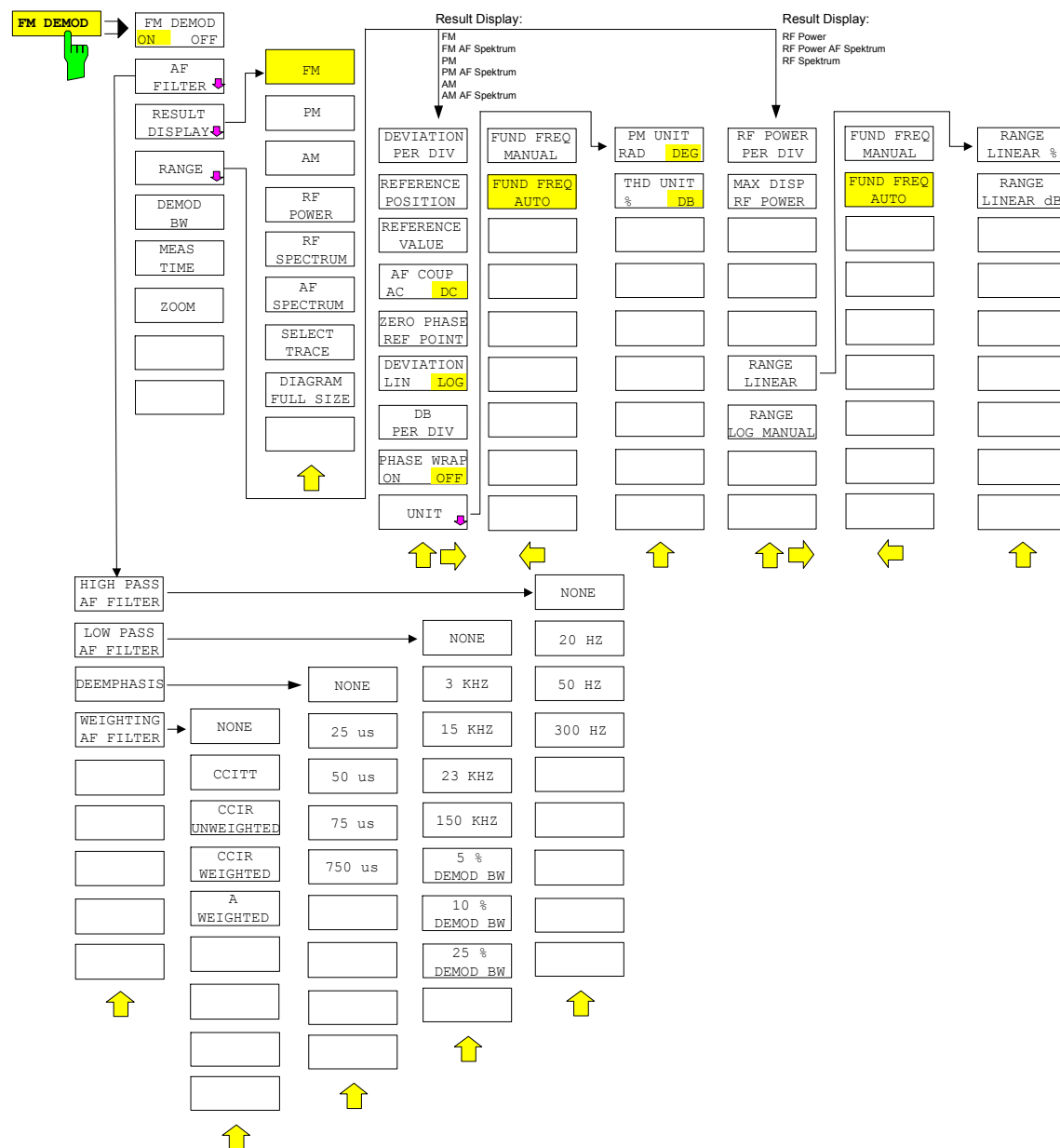
Operating Manual "FM Measurement Demodulator R&S FS-K7":

- 1141.1821.42-06 (English). and
- 1141.1821.41-06 (German)

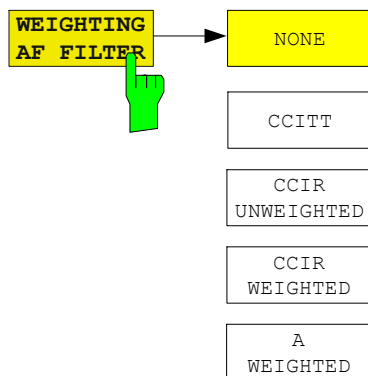
The corresponding PDF-Files are separately available on the service board.

Last minute changes to the R&S FS-K7 operating manual

FM Demodulator Main Menu



Selection of Filter and Deemphasis – AF FILTER Menu



The *WEIGHTING AF FILTER* softkey opens the submenu for selecting the weighting filter.

NONE: Deactivates the weighting filter. This is the default setting.

CCITT: Switches on a CCIT P.53 weighting filter. The weighting filter is active in the following demodulation bandwidth range:

$$20 \text{ kHz} \leq \text{demodulation bandwidth} \leq 3 \text{ MHz}$$

CCIR UNWEIGHTED: Switches on the CCIR unweighted filter, which is the combination of the 20 Hz highpass and 23 kHz low pass filter. The weighting filter is active in the following demodulation bandwidth range:

$$50 \text{ kHz} \leq \text{demodulation bandwidth} \leq 1.6 \text{ MHz}$$

CCIR WEIGHTED: Switches on the CCIR weighted filter. The weighting filter is active in the following demodulation bandwidth range:

$$100 \text{ kHz} \leq \text{demodulation bandwidth} \leq 3 \text{ MHz}$$

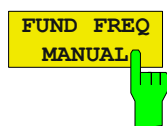
A WEIGHTED: Switches on the A weighted filter. The weighting filter is active in the following demodulation bandwidth range:

$$100 \text{ kHz} \leq \text{demodulation bandwidth} \leq 800 \text{ kHz}$$

Remote commands:

```
:SENSe:FILTer:CCIR[:UNWeighted][:STATe] ON | OFF
:SENSe:FILTer:CCIR:WEIGHted[:STATe] ON | OFF
:SENSe:FILTer:CCITt[:STATe] ON | OFF
:SENSe:FILTer:AWeighted[:STATe] ON | OFF
```

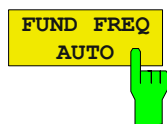
Menu RANGE – NEXT



The *FUND FREQ MANUAL* / *FUND FREQ AUTO* softkeys switches between automatic or manual selection of the fundamental frequency used for the SINAD and THD calculations. With automatic selection the peak in the AF spectrum is used as the fundamental frequency.

When switching from AUTO to MANUAL the current modulation frequency result is used as a default if the measurement result is available at this time.

These softkeys are available, if result *AF SPECTRUM* is switched on.



Remote commands:

```
:CALC:ADEM:THD:FREQ:FUND:AUTO ON | OFF
:CALC:ADEM:THD:FREQ:FUND:VALue <numeric value>
```

Remote Control – Description of Commands

CALCulate<1|2>:ADEMod:THD:FREQuency:FUNDamental:AUTO[:STATe] ON | OFF

This command switches between automatic or manual selection of the fundamental frequency used for the SINAD and THD calculations. With automatic selection the peak in the AF spectrum is used as the fundamental frequency.

When switching the auto state off, the current modulation frequency result is used as a default for CALC:ADEM:THD:FREQ if the measurement result is available at this time.

This command is available, if Result *AF SPECTRUM* is switched on.

Example: "CALC:ADEM:THD:FREQ:FUND:AUTO OFF" ' deactivates the auto se
' lection and uses the
' current Modulation Freq.
' as fundamental frequency.
"CALC:ADEM:THD:FREQ:FUND:VAL 1kHz" ' set the fundamental
' frequency.

Characteristics: *RST-Wert: ON
SCPI: device-specific

CALCulate<1|2>:ADEMod:THD:FREQuency:FUNDamental:VALue ON | OFF

This command sets the fundamental frequency used for the SINAD and THD calculations.

The query command is available only with "CALC:ADEM:THD:FREQ:FUND:AUTO OFF".

Example: "CALC:ADEM:THD:FREQ:FUND:AUTO OFF" ' deactivates the auto se
' lection and uses the
' current Modulation Freq.
' as fundamental frequency.

Characteristics: *RST-Wert: ON
SCPI: device-specific

The numeric suffix <1 to 4> at marker is irrelevant with this command.

:SENSe<1|2>:FILTer:AWeighted[:STATe] ON | OFF

This command activates/deactivates the A weighted filter. The weighting filter is active in the following demodulation bandwidth range:

$100 \text{ kHz} \leq \text{demodulation bandwidth} \leq 800 \text{ kHz}$

Example: ":SENS:FILT:AW ON" ' activates the A weighted filter

Characteristics: *RST-Wert: OFF
SCPI: device-specific

The numeric suffix <1|2> is irrelevant with this command.

:SENSe<1|2>:FILTer:CCIR[:UNWeighted][:STATe] ON | OFF

This command activates/deactivates the CCIR unweighted filter which is the combination of the 20 Hz highpass and 23 kHz low pass filter. The filter is active in the following demodulation bandwidth range:

$50 \text{ kHz} \leq \text{demodulation bandwidth} \leq 1.6 \text{ MHz}$

Example: "SENS:FILT:CCIR ON" ' activates the unweighted CCIR filter

Characteristics: *RST-Wert: OFF
SCPI: device-specific

The numeric suffix <1|2> is irrelevant with this command.

:SENSe<1|2>:FILTer:CCIR:WEIGhted[:STATe] ON | OFF

This command activates/deactivates the CCIR weighted filter. The filter is active in the following demodulation bandwidth range:

$100 \text{ kHz} \leq \text{demodulation bandwidth} \leq 3 \text{ MHz}$

Example: "SENS:FILT:CCIR:WEIG ON" ' activates the weighted CCIR filter

Characteristics: *RST-Wert: OFF
SCPI: device-specific

The numeric suffix <1|2> is irrelevant with this command.

R&S FS-K8 Extensions

The additional Enhanced Data Rate functions are described in a new revision of the operating manual.

Operating Manual "Application Firmware for Bluetooth Measurements R&S FS-K8":

- 1157.2597.42-03 (English). and
- 1157.2597.41-03 (German)

The corresponding PDF-Files are separately available on the service board.

Last minute changes to the R&S FS-K8 operating manual

None.

R&S FS-K9 Extensions

In addition to the normal function of *MEAS->REF* and *REFERENCE VALUE* softkeys the unit of the power sensor display is changed from the absolute unit dBm or Watt to the relative unit dB or %. Use the *UNIT/SCALE* key if absolute units are required again.

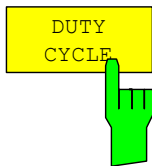
Software Manual "Measurements with Power Sensors, Application Firmware R&S FS-K9":

- 1157.3029.42-04 (English). and
- 1157.3029.44-04 (German)

The corresponding PDF-Files are separately available on the service board.

Last minute changes to the R&S FS-K9 operating manual

Menu PWR METER - NEXT

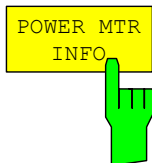


The DUTY CYCLE softkey opens a dialog to set the duty cycle to a percent value for the correction of pulsemulated signals. With the correction activated, the sensor calculates the signal pulse power from this value and the mean power. The softkey is highlighted if the correction is switched on. Press the softkey again to switch the Duty Cycle correction off.

Valid entries are from 0.001 % to 99.999%; the stepsize is 0.1 %; the maximum resolution for numerical entries is 0.001 dB. The default setting is 99.999%

Remote command:

```
SENSe1:PMETer:DCYCLE:STATE ON | OFF
SENSe1:PMETer:DCYCLE:VALue 0.001 ... 99.999 PCT
```



The POWER MTR INFO softkey open a list showing details of the power sensor:

POWER METER INFO	
Type	NRP-Z11
Serial Number	100057
Order Number	1138.3004.02

Remote command: -

Remote Control Commands

:**[SENSe<1|2>:]PMETer:DCYClE:STATe** ON | OFF

This command controls the calculation of the signal pulse power from the mean power. The duty cycle has to be set by SENS:PMET:DCYC:VAL according to characteristics of the input signal if the calculation is switched on.

Example:

" : SENS : PMET : STAT ON "	' activate power meter
" : SENS : PMET : DCYC : STAT ON "	' switch the correction on
" : SENS : PMET : DCYC : VAL 50.0 "	' set the duty cycle to 50 %

Properties:

*RST value:	OFF
SCPI:	device-specific

:**[SENSe<1|2>:]PMETer:DCYClE:VALue** 0.001 ... 99.999

This command sets the duty cycle to a percent value for the correction of pulsemodulated signals. With the correction activated (SENS:PMET:DCYC:STAT ON), the sensor calculates the signal pulse power from this value and the mean power. Valid entries are from 0.001% to 99.999%; the stepsize is 0.1%; the maximum resolution for numeral entries is 0.001%. The default setting is 99.999%

Example:

" : SENS : PMET : STAT ON "	' activate power meter
" : SENS : PMET : DCYC : STAT ON "	' switch the correction on
" : SENS : PMET : DCYC : VAL 50.0 "	' set the duty cycle to 50 %

Properties:

*RST value:	99.999 PCT
SCPI:	device-specific

R&S FSQ-B17 Extensions

General Hints

Using R&S AMU and R&S SMU as a signal source/sink for Digital Baseband Input/Output

To directly connect the signal generator R&S AMU or R&S SMU to the digital baseband input of the analyzer with option FSQ-B17 a minimum generator firmware version is required:

R&S AMU	2.10.111.53 (or newer)
R&S SMU	2.10.111.53 (or newer)

Last minute changes to the R&S FSQ-B17 operating manual

Operating Manual "Digital Baseband Interface R&S FSQ-B17":

- 1303.4098.12-01 (English)

The corresponding PDF-Files are separately available on the service board.

Operation of the R&S FSQ-B17 I/Q Input

The signal processing of the digital IQ data is split into an online section and a post processing section. Within the online section, the R&S FSQ-B17 receives the LVDS data stream from the channel link interface. A FIFO separates the LVDS clock domain from the analyzers clock domain. The enabled data values are stored in the IQ memory block.

The post processing part contains a lowpass filter, a resampler and a level adjustment block to convert the data to the desired target sample rate and to adapt the reference level. The following table lists the different clock and data rates and their valid frequency ranges.

f_{clk}	$66 \text{ MHz} \leq f_{clk} \leq 90 \text{ MHz}$	Clock rate of the LVDS interface
f_{sys}	$f_{sys} = 81.6 \text{ MHz}$	System frequency of the analyzer
f_{en}	$f_{en} \leq \min(f_{clk}, f_{sys})$	Average rate of enabled data words within the LVDS stream
$f_{s,in}$	$f_{s,in} = f_{en}$ for realtime systems, otherwise arbitrary	Digital input sample rate
$f_{s,out}$	$\frac{f_{s,in}}{4080} \leq f_{s,out} \leq 254 \cdot f_{s,in}$	Target sample rate after resampling

The lowpass filter preceding the resampler prevents aliasing from the resampling process. It restricts the useful bandwidth of the digital signal to

$$B = 0.76 \cdot f_{s,in}$$

From the analyzers point of view, the digital IQ data is just a stream containing numbers which is stored for further processing. To perform actual measurements on this data, a time and magnitude grid has to be imposed on the data vector by the following two parameters:

Manual Control	Remote Control	Unit	
DIGITAL IN SAMPLERATE	:INPut<1 2>:DIQ:SRATe <numeric_value>	Hz	Sample rate of the digital signal, i.e. the reciprocal of the time between two successive samples
DIGITAL IN FULL SCALE	:INPut<1 2>:DIQ:RANGe[:UPPer] <numeric_value>	Volt	Voltage of a digital full scale value

On the other hand, a measurement application within the analyzer expects a specific target sample rate and a reference level, by which the amplitudes are normalized. The necessary conversion is done by the resampler and the level adjustment in the post processing step:

$$\text{ResamplingFactor} = \frac{f_{s,out}}{f_{s,in}} = \frac{\text{Target Sample Rate}}{\text{Digital In Sample Rate}},$$

$$\text{Gain Factor} = \frac{A_{out}}{A_{in}} = \frac{1/\text{Reference Voltage}}{1/\text{Full Scale Voltage}} = \frac{\text{Full Scale Voltage}}{\text{Reference Voltage}}.$$

Menu SETUP – SIGNAL SOURCE

SETUP	SIGNAL SOURCE ↓	RF PATH	
		BASEBAND DIGITAL ↓	DIGITAL IN FULL SCALE
			DIGITAL IN SAMPLE RATE
			FULL SCALE AUTO SET
			SAMPLE RATE AUTO SET
			DIGITAL BB INFO
			EX-IQ-Box
		DIGITAL BB INFO	
		EX-IQ-Box	

RF PATH

The softkey RF PATH selects the RF Input Path of the analyzer. This softkey is not available for the FFT analyzer mode.

Note: This softkey is only available with option FSQ-B17 or FSQ-B71.

Remote command: INPut<1|2>:SElect AIQ | DIQ | RF

BASEBAND DIGITAL

The softkey BASEBAND DIGITAL opens a menu to configure the digital baseband input.

Note: This softkey is only available with option FSQ-B17

Remote command: INPut<1|2>:SElect DIQ | RF

DIGITAL BB INFO

The softkey DIGITAL BB INFO opens a window to display the status information of the connected digital baseband device (input or output).

Dependent on the capability of the digital base band signal source the I/Q data's sample rate and/or the full scale value are passed to LVDS input interface of the analyzer and displayed in the Digital Baseband Info table. The analyzer automatically adjusts the related input parameters (DIGITAL IN FULL SCALE and DIGITAL IN SAMPLE RATE) if the AUTO SET functions are switched on.

This softkey is only available with option FSQ-B17.

DIGITAL BASEBAND INFO		
	INPUT	OUTPUT
Connected Device	AMU200A	-----
Serial Number	100266	
Port	Out A	
Full Scale	-----	
Sampling Rate	38.7 MHz	
Max Transfer Rate	100 MHz	
Connection Protocol	passed	
PRBS Test Deskewing	not yet started	

Fig. 1: R&S AMU200 used as a Digital Baseband Signal Source

The dialog lists the following items:

- **Connected Device:** The name of the connected device
- **Serial Number:** The serial number of the connected device
- **Port Name:** The port name of the connected device
- **Full Scale Value:** The full scale value of the I/Q data sent by the connected device.
 "----" indicates this information is not sent by the connected device. FULL SCALE AUTO SET can not be used in that case and you have to manually configure this instrument setting.
 "auto" indicates an active AUTO SET function. A warning appears if the value exceeds the allowed range of the analyzer.
- **Sample Rate:** The sample rate of the I/Q data sent by the connected device.
 "----" indicates this information is not sent by the connected device. SAMPLE RATE AUTO SET can not be used in that case and you have to manually configure this instrument setting.
 "auto" indicates an active AUTO SET function. A warning appears if the value exceeds the allowed range of the analyzer.
- **Max Transfer Rate:** The Maximum interface clock rate to transfer the I/Q data using the B17 connection.
- **Connection Protocol:** Indicates the state of the connection protocol. The analyzer is able to communicate with the sending/receiving device.

- PRBS Test Deskewing:** An alignment process is started when the B17 input or output is connected to a digital baseband source/sink. The current state of this process is listed here. Possible indications are "not yet started", "failed" or "passed".

Note: This alignment is only started with operation modes supporting the digital baseband input.

Fig. 1 shows the result of an R&S AMU200A connected to the analyzer's digital baseband input. The sample rate of the I/Q data is 38.7 MHz. The Full Scale Value is not sent by the AMU and therefore the digital input full scale value has to be manually set. The connection protocol was successfully passed and the self alignment process was not yet started (cable connected in analyzer mode).

DIGITAL BASEBAND INFO		
	INPUT	OUTPUT
Connected Device	AMU200A	-----
Serial Number	100266	
Port	Out A	
Full Scale	-----	
Sampling Rate	38.7 MHz	auto
Max Transfer Rate	100 MHz	
Connection Protocol	passed	
PRBS Test Deskewing	passed	

Fig. 2: R&S AMU200, connection with analyzer established

In Fig. 2 the self alignment was successfully finished and indicated with "passed".

DIGITAL BASEBAND INFO		
	INPUT	OUTPUT
Connected Device	ExBox	-----
Serial Number	100064	
Port	IQ OUT	
Full Scale	-----	
Sampling Rate	100 MHz	auto
Max Transfer Rate	-----	
Connection Protocol	passed	
PRBS Test Deskewing	passed	
ExIQ-Box PLL	locked	

Fig. 3: The R&S Ex-IQ-Box connected to the digital baseband input

An additional PLL status line is available, if an Ex-IQ-Box is connected (see Fig. 3).

DIGITAL BASEBAND INFO		
	INPUT	OUTPUT
Connected Device	-----	ExBox
Serial Number		100064
Port		IQ IN
Full Scale		0.223607 V
Sampling Rate		100 MHz
Max Transfer Rate		-----
Connection Protocol		passed
PRBS Test Deskewing		done
EX-IQ-Box PLL		locked

Fig. 4: The R&S Ex-IQ-Box connected to the digital baseband output

Remote command:

:INPut<1|2>:DIQ:CDEvice?

:OUTPut<1|2>:DIQ:CDEvice?

:STAT:QUES:DIQ:COND?

EX-IQ-BOX

The softkey EXIQ BOX opens a dialog to configure an R&S EX-IQ-Box connected to the digital baseband Input or Output.

This softkey is only available with option FSQ-B17.

Note: In earlier firmware versions this dialog was open with a hotkey and you therefore had to leave the current application to configure the Ex-IQ-Box. Since V4.5x a new softkey is supported in the SETUP – SIGNAL SOURCE menu and/or in other application specific menus like VSA HOME (Vector Signal Analyzer Mode).

**DIGITAL IN
FULL SCALE**

The softkey DIGITAL IN FULL SCALE opens a dialog to define the voltage corresponding to the maximum input value of the digital baseband input (value 7FFF hex). The default is 1 Volt.

The FULL SCALE AUTO SET function is switched off if the full scale value is manually configured.

This softkey is only available with option FSQ-B17.

Remote command: INPut<1|2>:DIQ:RANGe:UPPer <numeric value>

**DIGITAL IN
SAMPLE RATE**

The softkey DIGITAL IN SAMPLE RATE defines the input data sample rate read by the digital baseband input. The default value is 81.6 MHz.

The SAMPLE RATE AUTO SET function is switched off if the input data sample rate is manually configured.

This softkey is only available with option FSQ-B17.

Remote command: INPut<1|2>:DIQ:SRATe <numeric value>

**FULL SCALE
AUTO SET****SAMPLE RATE
AUTO SET**

Dependent on the capability of the digital base band signal source the I/Q data's sample rate and/or the full scale value are passed to LVDS input interface of the analyzer. The analyzer automatically adjusts the related input parameters (DIGITAL IN FULL SCALE and DIGITAL IN SAMPLE RATE) if the AUTO SET functions for the Digital Input Full Scale Value or the Digital Input Sample Rate are active.

A conflict between the received values (full scale, sample rate) and the instrument's allowed ranges is indicated by a red colored "BDI" enhancement label at the right side of the grid.

The same happens if the AUTO SET function is active but the sending device does not support this feature. The related AUTO SET function has to be switched off and the parameter has to be manually configured in that case.

These softkeys are only available with option FSQ-B17.

Remote command: INPut<1|2>:DIQ:RANGe:AUTO ON | OFF
INPut<1|2>:DIQ:SRATe:AUTO ON | OFF

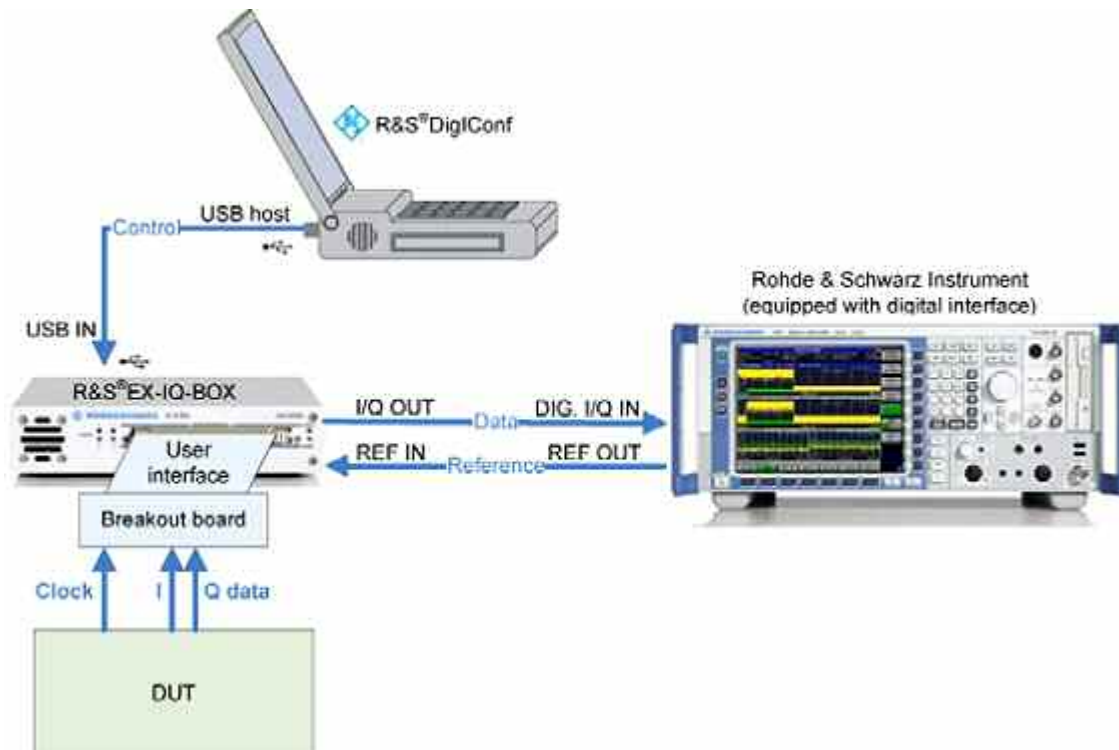
R&S EX-IQ-Box Extensions

The Ex-IQ-Box is now available in two models:

- **1409.5505.02**
- **1409.5505K04**

The R&S FSQ currently supports the build-in configuration of the Ex-IQ-Box for model 02 only (menu SETUP – SIGNAL SOURCE – EX-IQ-BOX).

The configuration of model K04 requires the software R&S DigiConv to be installed on a separate PC (see below).



Last minute changes to the EX-IQ-Box operating manual

Operating Manual "External Signal Interface Module R&S EX-IQ-Box":

- 1409.5505.32-04 (English)

The corresponding PDF-File is separately available on the service board.

The EX-IQ-Box configuration is now part of the application specific menus and it is therefore not required to leave the application to configure the EX-IQ-Box.

FSx/FMU Settings – Menu EX-IQ-Box - NEXT

SUPPORT

This section of the user manual describes the Support function, which stores necessary data files to be sent to Rohde & Schwarz support center.

On pressing the *Support* softkey a popup dialog box is displayed and the following data is stored on the harddisk, D:\USER\SUPPORT\KEXIQ*.*:

- *.reg Registry file
- *.bin, *.bak instrument configuration files
- *.txt EX-IQ-Box Database Setting

Note: Attach all the files under D:\USER\SUPPORT\KEXIQ *.* to an email and send to our hotline.

Remote command: --

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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