

Instrument
Password
"894129"



ROHDE & SCHWARZ

Test and Measurement
Division

Release Notes

Firmware Release 4.79 (XP)

with Service Pack 4

for FSG Spectrum Analyzers (Windows XP embedded)

New Features:

- New application FFT Analyzer available (with option R&S FSQ-B17).
- ACP Measurement: Improved dynamic range with activated noise correction and detector RMS.
- New 6 kHz RRC Filter available.
- Spectrum Emission Mask measurement:
Additional customized configuration files for CDMA 2000.
- New remote command "DIAG:SERV:VERS?" available to query all the measurement application versions.
- New Remote Status Bits supported:
Status Operation Register Bit 4: "Wait for TRIGger"
Questionable Power Register Bit 7: "Input Overload"
- New Remote command ":TRAC:DATA:MEM?" to read a part of the trace data.
- Multi Standard Radio Measurement Extensions

Release Note Revision: 7

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Contents

| | |
|--|-----------|
| History | 4 |
| General Topics | 5 |
| Firmware Update | 5 |
| Generation of the update set folder | 5 |
| Performing the firmware update on the instrument | 5 |
| Known problems during firmware update | 6 |
| 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 | 7 |
| Enabling these options via option key code entry | 7 |
| Compatibility to other Firmware Option Packages | 7 |
| New Functions in Version 4.79 | 8 |
| Improvements | 8 |
| Improvements with Service Pack 1 | 10 |
| Improvements with Service Pack 2 | 10 |
| Improvements with Service Pack 3 | 11 |
| Improvements with Service Pack 4 | 11 |
| Known Issues | 11 |
| Modified Functions | 12 |
| Modifications to the Operating Manual | 17 |
| Last minute changes to the operating manual | 17 |
| Manual Operation | 17 |
| Quick Start Guide – Login | 17 |
| Quick Start Guide – Operating System Properties – Special Links | 17 |
| Menu SETUP – GENERAL SETUP - NEXT | 18 |
| Remote Control – Description of the Status Registers | 19 |

| | |
|---|-----------|
| STATus:OPERation Register | 19 |
| STATus:QUES:POWer Register | 20 |
| Remote Control – Description of Commands | 21 |
| DIAGnostic subsystem | 21 |
| MMEMory subsystem (option FS-K72) | 21 |
| MMEMory subsystem | 22 |
| TRACe subsystem | 22 |
| TRACe:IQ subsystem | 23 |
| PSA Emulation with commands especially for the Agilent 89600 Software | 25 |
| R&S FS-K7 Extensions | 30 |
| Last minute changes to the R&S FS-K7 operating manual..... | 30 |
| FM Demodulator Main Menu | 30 |
| Selection of Filter and Deemphasis – AF FILTER Menu | 31 |
| Menu RANGE – NEXT | 31 |
| Remote Control – Description of Commands | 32 |
| R&S FS-K8 Extensions | 33 |
| Last minute changes to the R&S FS-K8 operating manual..... | 33 |
| R&S FS-K9 Extensions | 34 |
| Last minute changes to the R&S FS-K9 operating manual..... | 34 |
| Menu PWR METER - NEXT | 34 |
| Remote Control Commands | 35 |
| R&S FSQ-B17 Extensions..... | 36 |
| General Hints | 36 |
| Using R&S AMU and R&S SMU as a signal source/sink for Digital Baseband Input/Output | 36 |
| Last minute changes to the R&S FSQ-B17 operating manual..... | 36 |
| Operation of the R&S FSQ-B17 I/Q Input | 37 |
| Hotkey FFT | 38 |
| Menu SETUP – SIGNAL SOURCE | 39 |
| R&S EX-IQ-Box Extensions | 43 |

| | |
|--|-----------|
| Last minute changes to the EX-IQ-Box operating manual..... | 43 |
| FSx/FMU Settings – Menu EX-IQ-Box - NEXT..... | 44 |
| Customer Support..... | 44 |
| Technical support – where and when you need it | 44 |
| Up-to-date information and upgrades | 44 |

History

| Date | Rel Note Rev | Changes |
|------------------|--------------|--|
| 04 April 2011 | 1 | First revision for V4.79. |
| 18 August 2011 | 2 | New function and improvements with Service Pack 1 added. |
| 25 October 2011 | 3 | New functions and improvements with Service Pack 2 added. |
| 02 November 2011 | 4 | Minor correction. |
| 20 December 2011 | 5 | New functions and improvements with Service Pack 3 added, Example for remote command ":TRAC:IQ:CONV" corrected. |
| 02 August 2012 | 6 | Improvements with Service Pack 4 added. |
| 16 August 2012 | 7 | Version number corrected. |

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.

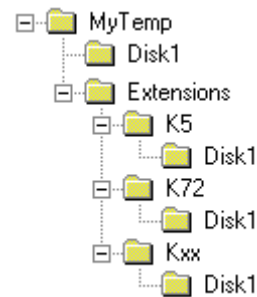
Since Version V4.79 the base system firmware is distributed in a single disk1 folder.

- 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)



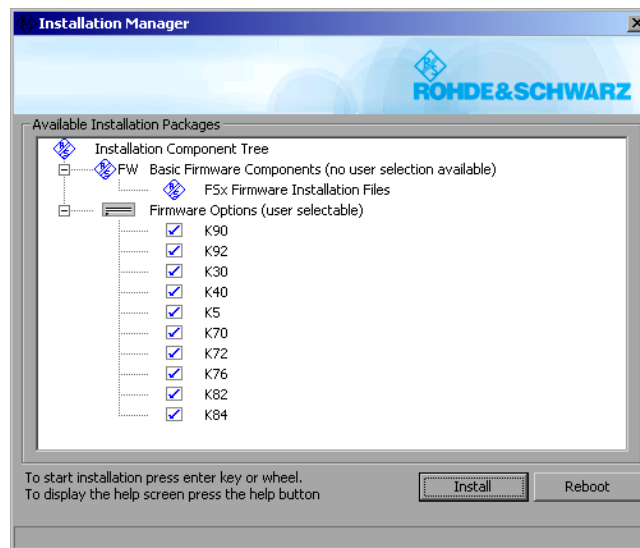
Other files (e.g. release notes) shall not be stored in these directories. These files would be copied on harddisk and may cause a disk full problem on drive E:.

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

A measurement application is not available after firmware update

The analyzer firmware checks the memory usage of all active measurement applications, e.g. K30, K72 against the available system memory. All measurement applications are disabled as default if the required system memory exceeds the available memory space. Please check/modify the activation state of the available option key(s) in dialog SETUP – GENERAL SETUP – OPTIONS in that case.

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 V4.79 SP4 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+ |
|--------------|---------------|---------------|---------------|----------------|--|
| 4.70 SP1 | 4.70 SP2 | 4.70 SP1 | 4.70 SP1 | 4.72 | 4.70 SP2 |

| 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 |
|-------------------------|-------------------------|-------------------------|---------------------------|--------------------------------------|---|
| 4.70 SP1 | 4.70 SP1 | 4.70 SP1 | 4.71 SP3 | 4.70 | 4.72 |

New Functions in Version 4.79

- New application FFT Analyzer available (with option R&S FSQ-B17).
- ACP Measurement: Improved dynamic range with activated noise correction and detector RMS.
- New 6 kHz RRC Filter available.
- Spectrum Emission Mask measurement: Additional customized configuration files for CDMA 2000.
- New remote command "DIAG:SERV:VERS?" available to query all the measurement application versions.
- Support for Status Questionable Power Register Bit "Input Overload".
- New Status Operation Register Bit "Wait for TRIGger" supported for I/Q measurements using TRACE:IQ sub system.
- New Remote command ":TRAC:DATA:MEM?" to read a part of the trace data (with Service Pack 1).
- Multi Standard Radio Measurement Support by new remote commands (with Service Pack 2).

| | |
|-------------------|----------------------------------|
| MMEM:LOAD:IQ:STAT | Load IQW file (with FS-K72) |
| MMEM:STOR:IQ:STAT | Store IQ.TAR file |
| TRAC:IQ:CONV | Resample IQ.TAR file to IQW file |

Improvements

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

1. (V4.69) **Menu Setup – GENERAL SETUP – OPTIONS:** The dialog FIRMWARE OPTIONS indicates a wrong value for Available Memory in certain combinations of option keys.

As a result, an option may be marked as active but the related hot key is not visible.

2. (V4.69) **Noise Correction: Setting the TRACE mode to VIEW deactivates the noise correction.**

Note: This issue is already fixed in V4.69 SP1.

3. (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 Swepttime and is now fixed.

Note: This issue is already fixed in V4.69 SP3.

4. (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)

Note: This issue is already fixed in V4.69 SP2.

5. (V4.69 SP2) **Reduced execution speed for Center Frequency/Span changes if a lot of transducer set files exist on the instruments harddisk,**

Note: This issue is already fixed in V4.69 SP2.

6. (V4.69) The AUTO RECALL button is named as "CANCEL" instead of "OK".

7. (V4.69) SETUP – TRANSDUCER: The transducer factor table list indicates a wrong transducer unit dBm.

This happens only if a scroll down was required to activate the transducer and the dialog is reopened by SETUP – TRANSDUCER. The measurement with the selected transducer is not affected.

8. (V4.69 SP2) SEM Measurement: The analyzer application crashes in some cases if a SEM standard configuration is loaded with LOAD STANDARD.

This happens only if a scroll down was required to activate the transducer and the dialog is reopened by SETUP – TRANSDUCER. The measurement with the selected transducer was not affected.

9. (V4.69 SP2) Spurious Emissions Measurement: A spurious signal appears when the marker position is modified.

This issue does not affect the measurement results (e.g. the trace or the marker readout).

10. (V4.69) ACP Measurement: The ACLR limit according to 3GPP TS 36.104 (Core Requirements) are used instead of the limits according to 3GPP TS 36.141 (Test Requirements).

As a result the limit is changed from -45.0 dBc to -44.2 dBc.

11. (V4.69) ACP Measurement: The Power Mode selection has no effect for a number of ADJ channels of 0.

12. (V4.69) HP Emulation: Marker resolution corrected for command MKF?.

13. (V4.69) An error message "Undefined header" is reported in remote operation, but the command is correct.

This issue only occurs with a sequence using nested commands, e.g.

"DISP:WIND:TRAC:Y 100 DB;;FREQ:CENT 28E+6;SPAN 3E+3".

14. (V4.69) Remote command TRAC:IQ:DATA:MEM? returns wrong Q values in some cases.

This issue only occurs if the format IQBlock is selected and the number of samples exceeds 523776 samples.

15. (V4.69) The rotary knob direction is changed for File Manager, Save/Recall and Hardcopy dialogs.

16. (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.

Note: This issue is already fixed in V4.69 SP2.

17. (V4.69 SP2) FS-K5: An IF Overload condition is indicated after performing the Level & Time Auto Adjust with certain EDGE signals.

Note: This issue is already fixed in V4.69 SP3.

18. (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.

19. (V4.59) FS-K8: Some results in EDR Spurious Emissions measurement do not include the Reference Level Offset.

Note: This issue is already fixed in V4.69 SP2.

20. (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.

Note: This issue is already fixed in V4.69 SP1.

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) **The deactivation of the screen saver with remote command "DISP:PSAV:STAT OFF" does not switch on the display.**

The display will remain dark until a key stroke is performed in local mode. This has now been corrected.

2. (V4.79) **The remote command "TRAC:IQ:FORM?" returns the wrong settings as long as TRACE:IQ:STAT is not switched on.**

This has now been corrected.

3. (V4.79) **Menu MEAS – IQ Mode: The softkey DIG IQ OUT DEFAULT now indicates the usage of the DIG IQ OUT Default Settings.**

Pressing the softkey sets the I/Q settings to following defaults:

- IF Filter Bandwidth: 50 MHz
- Sample Rate: 81.6 MHz
- Trigger Source: EXTERN
- Trigger Slope: POSITIVE
- Pretrigger Samples: 0
- Data Format: PAIR

The softkey is now highlighted as long as one of these parameters is modified.

4. (V4.79) **ACP measurement: The CP/ACP measurement at Center Frequency 2.31 GHz (RBW 30kHz) uses a wrong internal bandwidth.**

As a result, the indicated CP/ACP power results are about 1dB too high. This has now been corrected.

5. (V4.79) **Option Upgrade keys K90U and K92U do not enable K91 or k93 in version V4.75.**

This has now been corrected.

6. (V4.79) **Remote control: Bit 8 of the remote status register STATus:QUESTionable (UNCAL) is set now if the self alignment correction data usage is switched off with CAL:STAT OFF.**

7. (V4.79) **Function NOISE CORR does not support TRACE AVERAGE MODE LOG but the softkey was available.**

Improvements with Service Pack 2

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

1. (V4.79) **The Resolution Bandwidth 6.25kHz is not supported for filter type FFT.**

A Gauss filter was used instead. This has now been corrected.

2. (V4.79 SP1) **The Noise Correction does not support an active transducer factor.**

The calibration measurement locks up when the noise correction is activated and if a transducer factor is switched on at that time. This has now been corrected.

3. (V4.71) **HP-Emulation: Correction of Limit Line check result (command "LIMIFAIL?").**

4. (V4.71) **A Marker Count at 1031MHz with Center Frequency 1031MHz/Span 5MHz may stop the sweep.**

This has now been corrected.

Improvements with Service Pack 3

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

1. (V4.79) Several minimum peaks values below the noise floor are visible in some cases.

This issue may occur in certain combinations of instrument settings:

- a huge Frequency Span (>> 1GHz)
- a huge number of Sweep Points (>> 1000)

This has now been corrected.

2. (V4.79) FSP-B10: Maximum allowed frequency for SMB100A12 extended to 12.75 GHz.

Improvements with Service Pack 4

Service Pack 4 corrects the following issues. All previous service packs are included.

1. (V4.79 SP3) A resource leak is visible on creation of a transducer file.

This has now been corrected.

2. (V4.79 SP3) Hardcopy configuration: The list of selectable printer devices is empty but a printer driver is installed.

This has now been corrected.

3. (V4.79 SP3) SEM measurement: The configuration file EUTRA-LTE\DL\CategoryA\BW_03_0_MHz__CFhigher1GHz.xml does not use Auto Sweeptime coupling.

This has now been corrected.

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 DUT's 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. (V4.79) Remote Control: An additional "*OPC?" synchronization may be required for the remote commands INST:SEL and MMEM:LOAD:STAT.

When the analyzer receives a sequence of sequential commands, the execution of the previous command is finished before the current command is processed. An additional synchronization should not be required. In some cases the commands INST:SEL and MMEM:LOAD:STAT need an additional *OPC? Before sending the next command.

Example:

```
...
"INST:SEL WLAN;*OPC?"           ' enter WLAN application and wait for the
                                '  OPC? Response before sending the next
                                command.
...
"MMEM:LOAD:STAT 1,'WLAN_EVM.FSP';*OPC?" load a save set (K91_EVM.FSP in this example)
                                ' and wait for the' OPC? Response before sending
                                ' the next command.
...
```

8. (V4.79) Spurious Measurement: The Trace Mode Average is currently not supported.

The Spurious Measurement does not support trace averaging but the related softkey is available.

Work around: Use an increased sweep time and the RMS or Average Detector instead.

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, RBW \leq 10MHz (Analyzer, Zeropsan)

01: available, RBW \leq 50MHz (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 ≥ 1 GByte.**
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. (V4.69SP1) 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.****85. (V4.79) New application FFT Analyzer available (with option R&S FSQ-B17).****86. (V4.79) ACP Measurement: Improved dynamic range with activated noise correction and detector RMS.****87. (V4.79) New 6 kHz RRC Filter available.****88. (V4.79) Spectrum Emission Mask measurement: Additional customized configuration files for CDMA 2000.****89. (V4.79) New remote command "DIAG:SERV:VERS?" available to query all the measurement application versions.****90. (V4.79) Support for Status Questionable Power Register Bit "Input Overload".****91. (V4.79) New Status Operation Register Bit "Wait for TRIGger" supported for I/Q measurements using TRACE:IQ sub system.****92. (V4.79) New remote command ":TRAC:IQ:TPIS?" available.****93. (V4.79SP1) New remote command ":TRAC:DATA:MEM? " available with analyzer mode.**

94. (V4.79SP2) Multi Standard Radio Measurement Support by new remote commands.

| | |
|-------------------|----------------------------------|
| MMEM:LOAD:IQ:STAT | Load IQW file (for FS-K72) |
| MMEM:STOR:IQ:STAT | Store IQ.TAR file |
| TRAC:IQ:CONV | Resample IQ.TAR file to IQW file |

95. (V4.79SP2) Spectrum Emission Mask measurement: Standard settings modified for LTE UL, 1.4 MHz and 3 MHz.

The frequency span of the first and the last range is increased.

Modifications to the Operating Manual

The order numbers for the manual sets are:

Operating Manual "Signal Analyzer FSG8/13":

- 1309.0090.12-06 (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 | Waiting for TRIGger This bit is set while the instrument is waiting for a trigger. It is supported for I/Q measurements only (TRACE:IQ state activated). |
| 6 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 |

STATus:QUES:POWer Register

This register comprises all information about possible overloads of the unit. It can be queried with commands STATus:QUESTionable:POWer:CONDition? and STATus:QUESTionable:POWer[:EVENT]?

| Bit No. | Meaning |
|----------|--|
| 0 | OVERload (Screen A) This bit is set if the RF input is overloaded. 'OVLD' will then be displayed. |
| 1 | UNDerload (Screen A) This bit is set if the RF input is underloaded. 'UNLD' will then be displayed. |
| 2 | IF_OVERload (Screen A) This bit is set if the IF path is overloaded. 'IFOVL' will then be displayed. |
| 3 | Overload Trace (Screen A) This bit is set if the input is overloaded (OVLD or IFOVL) and the Trace Modes AVERAGE , MAXHOLD or MINHOLD are active. 'OVTRC' will then be displayed. This bit only clears if the sweep is started again. A temporary overload will therefore be detected, e.g. if the overload condition occurs only on sweep number 10 of 1000 during the average process. |
| 4 to 6 | These bits are not used |
| 7 | Input Overload This bit is set if the RF input Overload detection becomes active. Use command "INP:ATT:PROT:RES" to re-connect the RF input with the input mixer. |
| 8 | OVERload (Screen B) This bit is set if the RF input is overloaded. 'OVLD' will then be displayed. |
| 9 | UNDerload (Screen B) This bit is set if the RF input is underloaded. 'UNLD' will then be displayed. |
| 10 | IF_OVERload (Screen B) This bit is set if the IF path is overloaded. 'IFOVL' will then be displayed. |
| 11 | Overload Trace (Screen B) This bit is set if the input is overloaded (OVLD or IFOVL) and the Trace Modes AVERAGE , MAXHOLD or MINHOLD are active. 'OVTRC' will then be displayed. This bit only clears if the sweep is started again. A temporary overload will therefore be detected, e.g. if the overload condition occurs only on sweep number 10 of 1000 during the average process. |
| 12 to 14 | These bits are not used |
| 15 | This bit is always 0 |

Remote Control – Description of Commands

DIAGnostic subsystem

:DIAGnostic:SERVICE:VERSInfo?

This command queries the version information of all available measurement applications.

Example: "DIAG:SERV:VERS?" queries the version information.

Response:

```
Instrument Firmware|4.79,
BIOS|V2.1-20-1,
Image|01.21,
Data Sheet|01.01,
GSM K5 ANALYZER K5|4.70|permanent,
FM DEMODULATOR K7||permanent,
BLUETOOTH K8||permanent,
NOISE MEASURE K30|4.70|permanent,
PHASE NOISE MEASURE K40|4.70|permanent,
VECTOR SIGNAL ANALYSIS K70|4.70|permanent,
WCDMA BTS ANALYZER K72|4.70|permanent,
WCDMA HSDPA BTS K74|4.70|permanent,
TD-SCDMA BTS ANALYZER K76|4.70|permanent,
TD-SCDMA MS ANALYZER K77|4.70|permanent,
CDMA2000 BTS K82|4.70|permanent,
CDMA2000 MS K83|4.70|permanent,
1X EV DATA ONLY BTS K84|4.70|permanent,
1X EV DATA ONLY MS K85|4.70|permanent,
WLAN ABG K91|4.70|permanent,
FSQ 802_16E K93|4.70|permanent,
FSQ 802_16 MIMO UPGRADE K94|4.70|permanent,
LTE FDD DOWNLINK K100|4.70|permanent
```

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

MMEMory subsystem (option FS-K72)

MMEMory:LOAD<1|2>:IQ:STATe, 1,<file_name>

This command loads an I/Q data file with format IQW and performs the data analysis. "IQW" is the default extension.

Change to single sweep (INIT:CONT OFF) before loading the file.

Missing samples are filled with 0. As a result a sync error may occur if the IQW file's number of samples is not sufficient. Increase the number of samples for the I/Q capturing in that case.

As soon as a sweep is restarted with "INIT:IMM" the loaded I/Q data are overwritten by the new measurement.

Note: This function is available for remote operation only with R&S FSQ and R&S FSG. It requires base system firmware V4.7x SP2 or newer.

Parameter: <file_name> ' path/filename

Example: "INST:SEL WCDP;*WAI" ' change to 3G FDD BS mode
 "INIT:CONT OFF " ' single sweep
 ' now load IQW file
 "MMEM:LOAD:IQ:STAT 1, 'D:\WCDMA0_P25';*OPC?"

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

This command is an event and therefore has no *RST value and no query.

MMEMory subsystem

MMEMory:STORe<1|2>:IQ:STATe, 1,<file_name>

This command stores measured I/Q data in the specified file with format "IQ.TAR". It is required to perform an I/Q measurement before saving the data.

This command is available only for I/Q measurements with the TRACE:IQ sub system.

Use TRAC:IQ:CONV to perform a resampling (in terms of sample rate / frequency offset) and create IQW files to be used in other applications (e.g. K10, K72 or K100).

More details see description of command TRAC:IQ:CONV.

Parameter: <file_name> ' path/filename without extension

Example: "TRAC:IQ:STAT ON" ' activate I/Q capture mode
 "TRAC:IQ:DATA:FORM IQP" ' I/Q Format I/Q Pair
 "TRAC:IQ:SET NORM,50MHz,81.6MHz,IMM,POS,0,10000"
 ' Trigger Free Run
 ' Sample Rate 81.6 MHz
 ' Pre Trigger 0 samples
 "INIT:IMM;*OPC?" ' perform the I/Q measurement
 "MMEM:STOR:IQ:STAT 1, 'D:\RAWIQ' "
 ' Save the I/Q Data into file
 ' D:\RAWIQ.IQ.TAR

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

This command is an event and therefore has no *RST value and no query.

TRACe subsystem

:TRACE<1|2>[:DATA]:MEMory? TRACE1 | TRACE2 | TRACE3, <offset>, <number_of_points>

This query command reads a part of the trace data out of the instrument. <offset> defines the start of the readout. <number_of_points> defines the number of points to be read.

This command is only available in analyzer mode (frequency- and time domain). In case of I/Q capturing with TRACE:IQ state ON, use TRAC:IQ:DATA:MEM? instead.

Example: "**RST" ' preset analyzer
 "INIT:CONT OFF" ' set to single sweep
 "SENS:SWE:POIN 1001" ' set number of points to 1001
 "INIT:IMM;*WAI" ' perform a sweep and wait for sweep end

"TRAC:MEM? TRACE1, 0, 100"
 ' read out the first 100 points (index 0 ..99)

"TRAC:MEM? TRACE1, 901,100"
' read out the last 100 points (index 901 .1000)

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

TRACe:IQ subsystem

:TRACe<1|2>:IQ:TPISample?

This command determines the time offset of the trigger in the sample (trigger position in sample = TPIS). This value can only be determined in triggered I/Q measurements using external or IFPower triggers, otherwise the value is 0. The value is not user-definable.

Example: "**RST"
 "TRAC:IQ:STAT ON" ' activate I/Q capture mode
 "TRAC:IQ:DATA:FORM IQP" ' format I/Q pairs
 "TRAC:IQ:SET NORM,10MHz,32MHz,EXT,POS,100,1024"
 ' EXT Trigger
 ' Sample Rate 32 MHz
 ' 100 Pre Trigger samples
 "TRAC:IQ:DATA?" ' perform the measurement and read I/Q data
 "TRAC:IQ:TPIS?" ' read the timing correction value

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

:TRACe<1|2>:IQ:CONVert <source_file>, <standard>, <delta freq>, <dest_file>

This command performs a resampling of previously measured and save I/Q data and creates an IQW file to be loaded by the measurement applications FS-K10, FS-K72 or FSQ-K10x.

The command is only available in analyzer mode.

To analyze a Multi Standard Radio Signal (a mixed GSM/WCDMA and/or LTE signal) perform the following steps:

- Capture the I/Q data using TRACe:IQ subsystem with the required bandwidth / sample rate / pre trigger time (= pre trigger samples) / measurement time (= number of samples). The pre trigger time must be at least 2.9 ms.
- Store the I/Q data as IQ.TAR file
- Resample the I/Q data (for certain standard(s)/signal frequency offset(s)) to IQW file(s)
- Activate the related application, load the I/Q data file and perform the analysis of the signal(s)
- Repeat the analysis with the next application (for mixed standard signals)

Parameter: <source_file> Data source path/filename with format "IQ.TAR"
 <standard> Type of signal
 0 - GSM K10
 1 - WCDMA K72
 2 - LTE K10X BW 1.4 MHz
 3 - LTE K10X BW 3 MHz
 4 - LTE K10X BW 5 MHz
 5 - LTE K10X BW 10 MHz
 6 - LTE K10X BW 15 MHz
 7 - LTE K10X BW 20 MHz'
 <delta freq> Signal frequency offset (in relation to analyzer center frequency used to capture the IQ data)
 <dest_file> Destination path/file name with file format "IQW"

The example below shows a measurement for 2 WCDMA signals at -2.5MHz and +2.5MHz frequency offset.

```

Example:      "*RST"
                  ' STEP1:
                  ' set Center Freq./Ref Level/...
                  '
                  "SENS:FREQ:CEN 1GHz"      ' set Center / Ref Level
                  "SENS:FREQ:SPAN 0Hz"      ' Zerospan
                  "TRAC:Y:RLEV -20.0dBm"

                  ' STEP2:
                  ' Capture data with extended I/Q Bandwidth
                  "TRAC:IQ:STAT ON"          ' activate I/Q capture mode
                  "TRAC:IQ:DATA:FORM IQP"    ' I/Q Format I/Q Pair
                  "TRAC:IQ:SET NORM,50MHz,81.6MHz,IMM,POS,240000,1870000"
                  ' Trigger Free Run
                  ' Sample Rate 81.6 MHz
                  ' Pre Trigger Samples:
                  ' for 2.9 ms pretrigger time
                  "INIT:IMM;*OPC? "          ' Number of Samples:
                  ' to capture for 23ms
                  ' perform the I/Q measurement

                  ' STEP3:
                  ' Store I/Q Data into IQ.TAR file
                  "MMEM:STOR:IQ:STAT 1, 'D:\RAWIQ' "
                  ' Store data to file
                  ' D:\RAWIQ.IQ.TAR

                  ' STEP4:
                  ' Resample IQ Data
                  "MMEM:CONV:IQ 'D:\RAWIQ', 1, 2.5e6, 'D:\WCDMA_P25'
                  ' WCDMA, Offset +2.5MHz
                  "MMEM:CONV:IQ 'D:\RAWIQ', 1, -2.5e6, 'D:\WCDMA_N25'
                  ' WCDMA, Offset -2.5MHz

                  ' STEP5:
                  ' Analyse I/Q data

                  ' analyse the WCDMA signals at
                  ' offset +2.5 MHz / -2.5 MHz
                  "INST:SEL WCDP;*OPC? "      ' enter K72
                  "INIT:CONT OFF"            ' set to single sweep
                  "MMEM:LOAD:IQ:STAT 1, 'D:\WCDMA_P25'"
                  ' load and analyse
                  ' Offset+2.5MHz file
                  ' now query required results
                  "MMEM:LOAD:IQ:STAT 1, 'D:\WCDMA_N25'"
                  ' load and analyse
                  ' Offset-2.5MHz file
                  ' now query required results
                  "INST:SEL SAN;*OPC?"        ' leave K72

```

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

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 |
| :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 |

| Supported 89600 commands | Status |
|---|----------------------------------|
| :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 |
| :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 |

| Supported 89600 commands | Status |
|---|----------------------------------|
| [.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 |
| :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 |

| Supported 89600 commands | Status |
|---|----------------------------------|
| :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 |
| :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 |

| Supported 89600 commands | Status |
|---|----------------------------------|
| :TRACe:COPIY <src_trace>,<dest_trace> | available in V4.69 SP2 and above |
| :TRACe[:DATA] TRACE1 TRACE2 TRACE3 TRACE4 TRACE5 TRACE6, <definite_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

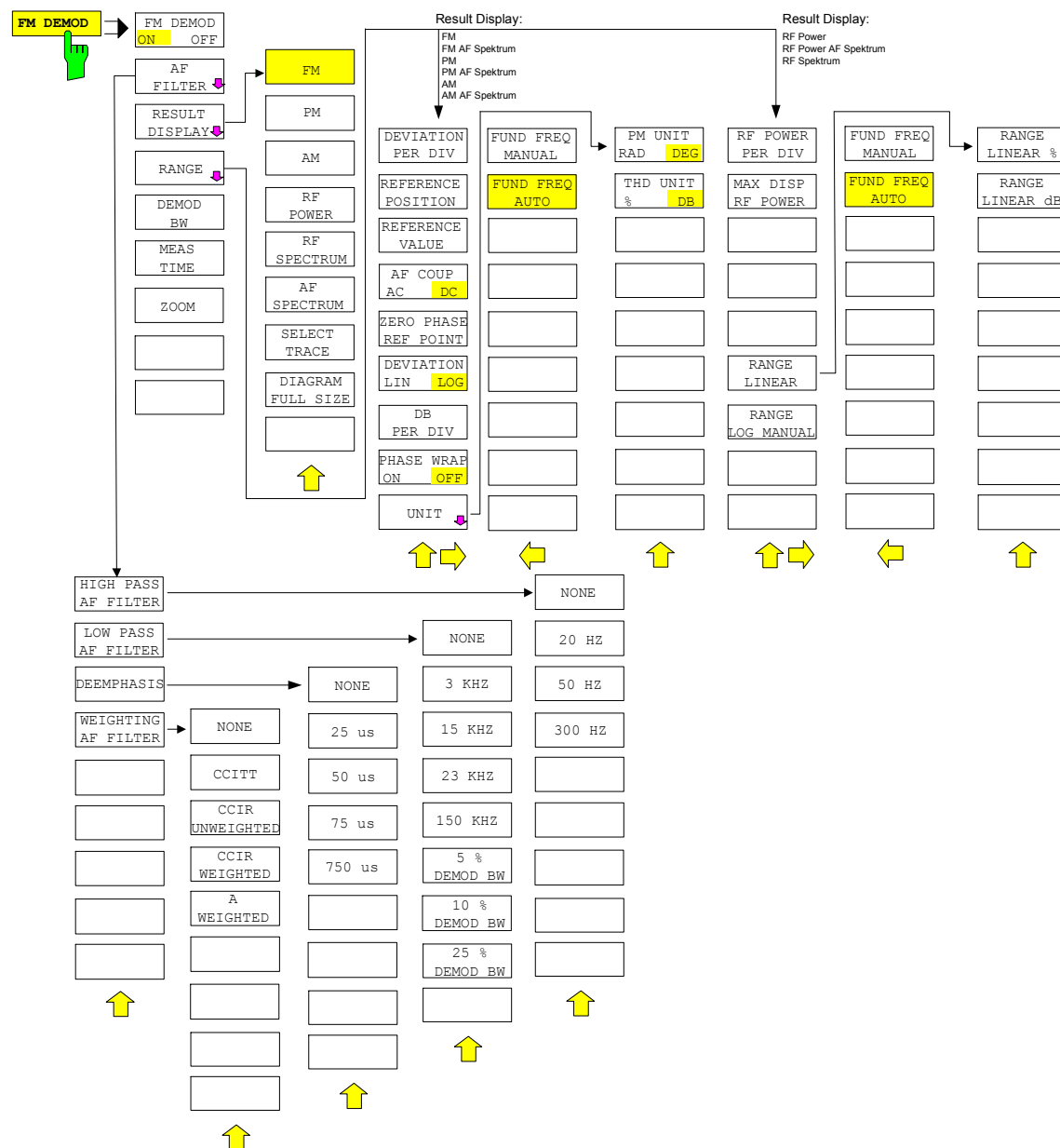
Operating Manual "FM Measurement Demodulator R&S FS-K7":

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

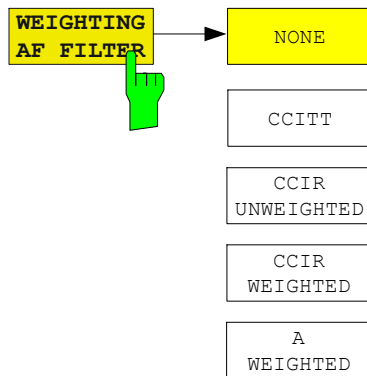
The corresponding PDF-Files are separately available on the service board.

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:

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

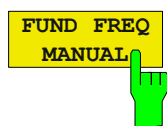
A WEIGHTED: Switches on the A weighted filter. The weighting filter is active in the following demodulation bandwidth range:

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

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
```

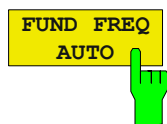
Menu RANGE – NEXT



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.

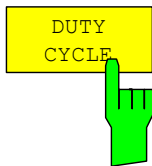
Software Manual "Measurements with Power Sensors, Application Firmware R&S FS-K9":

- 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

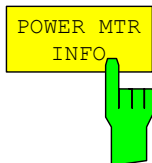


The DUTY CYCLE softkey opens a dialog to set the duty cycle to a percent value for the correction of pulsemulated signals. With the correction activated, the sensor calculates the signal pulse power from this value and the mean power. The softkey is highlighted if the correction is switched on. Press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

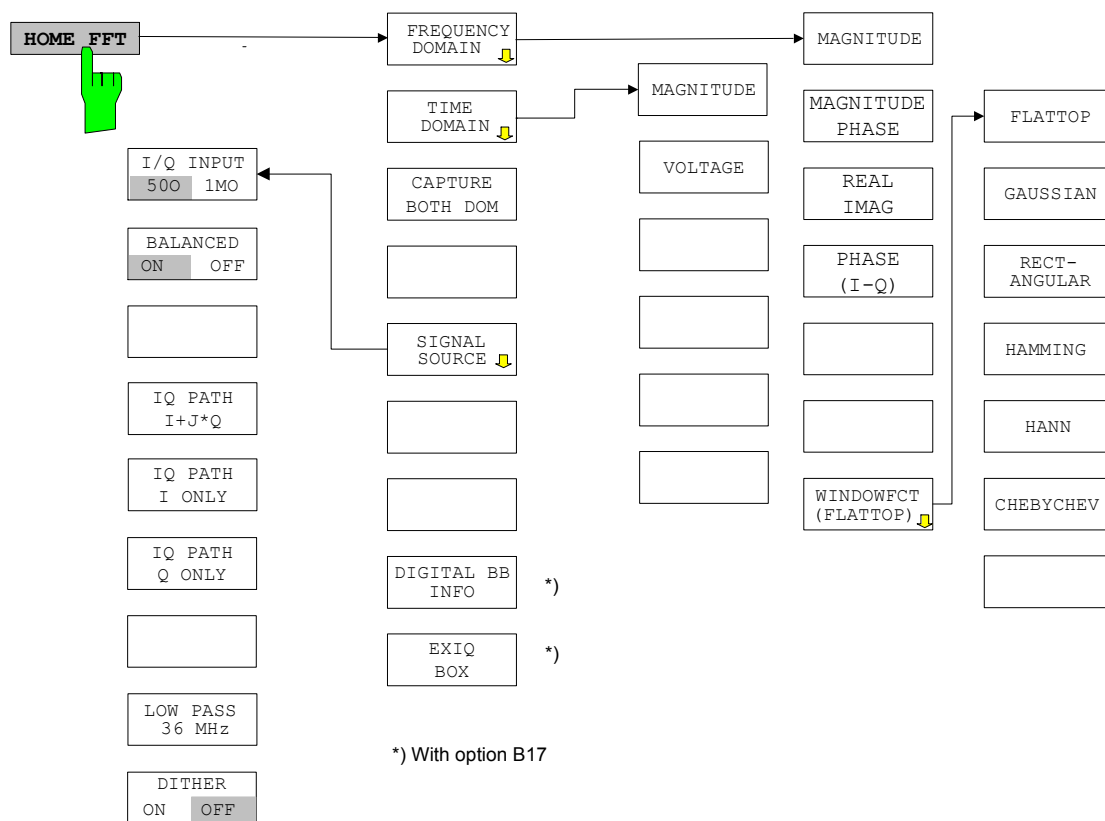
On the other hand, a measurement application within the analyzer expects a specific target sample rate and a reference level, by which the amplitudes are normalized. The necessary conversion is done by the resampler and the level adjustment in the post processing step:

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

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

Hotkey FFT

Since firmware version V4.79 the FFT Analyzer mode is available for Digital Baseband Input (with option R&S FSQ-B17). Please refer to operating manual "Analog Baseband Input R&S FSQ-B71" (order number 1157.0220.52/54 English/German) for the description of the manual and remote user interface.



Using the digital baseband input the following softkeys are not available:

- CAPTURE BOTH DOMAIN ON / OFF (always switched off)
- I/Q INPUT 50Ω / 1MΩ
- BALANCED ON/OFF
- LOW PASS 36MHz
- DITHER ON/OFF

The allowed ranges for Span, Resolution Bandwidth and Sweeptime depend on the Digital Baseband Input Sample Rate.

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

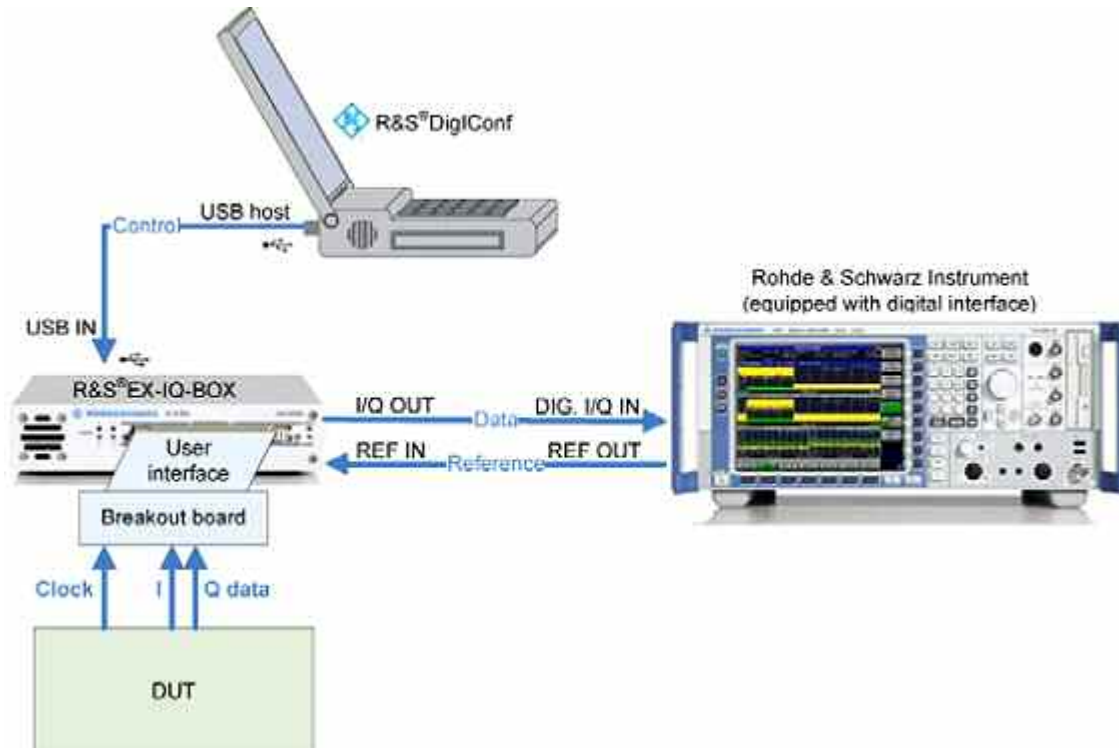
R&S EX-IQ-Box Extensions

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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