ROHDE&SCHWARZ

Test and Measurement
Division

Release Notes

GSM / EDGE / EDGE Evolution
Measurement Application
R&S FS-K10
Release 4.70
with Service Pack 2

for R&S FSQ, FSG Analyzer Firmware V4.7x

New Features:

- **New SCPI commands for file export and import of I/Q data**
- **Support for auto detection of frame configuration on imported I/Q data**
- **New REFRESH hotkey**
- **New SCPI command to query the current statistic count**
- **Support for 100 kHz RBW/VBW at 1800 kHz offset freq. in Mod. spectrum**
- **Maximum offset freq. in Wide Mod. spectrum measurement can be selected**

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Contents

History

Date	Rel Note Rev	Changes
5 May 2011	1	First revision of K10 Measurement Application for V4.70.
27 June 2011	2	Improvement added.
17 October 2011	3	Revision of K10 Measurement Application V4.70 with Service Pack 1.
8 August 2012	4	Revision of K10 Measurement Application V4.70 with Service Pack 2.

General Topics

Compatibility of the R&S FS-K10 with other Firmware Releases

The following table shows the compatible versions of the basic analyzer firmware and the GSM / EDGE / EDGE Evolution Measurement Application.

Note:

The FS-K5U fully upgrades an installed GSM/EDGE Application Firmware R&S FS-K5 to the FS-K10. The FS-K5 remains still available.

Table of compatible versions:

R&S FS-K10 Measurement Application	R&S FSQ Basic Firmware	R&S FSG Basic Firmware
4.70 SP2	4.75 SP4	4.79 SP4
4.70 SP1	4.75 SP2	4.79 SP2
4.70	4.75	4.79
4.61	4.65 SP1	4.69 SP1
4.60	4.65	4.69
4.51	4.55 SP2	4.59 SP1
4.50 SP1	4.55 SP1	4.59
4.50	4.55	-
4.40	4.45 SP2	4.49 SP2

Firmware Update of the R&S FS-K10

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

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

Enabling the Measurement Application via License Key Code Entry

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

After installing the measurement application package a license key code for validation must be entered. The license key code is printed either on a label on the rear panel of the instrument or delivered as a part of the R&S FS-K10 GSM / EDGE / EDGE Evolution Measurement Application package.

The key sequence for entering the license key code is:

SETUP - GENERAL SETUP – OPTIONS - INSTALL OPTION

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

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

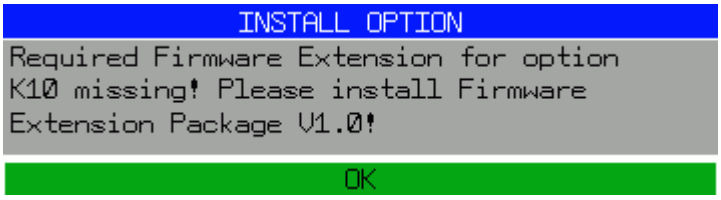
  The most probable reason will be that the instrument is not equipped with the correct basic firmware version. Therefore a message box will appear asking for installation of the correct basic firmware version.

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

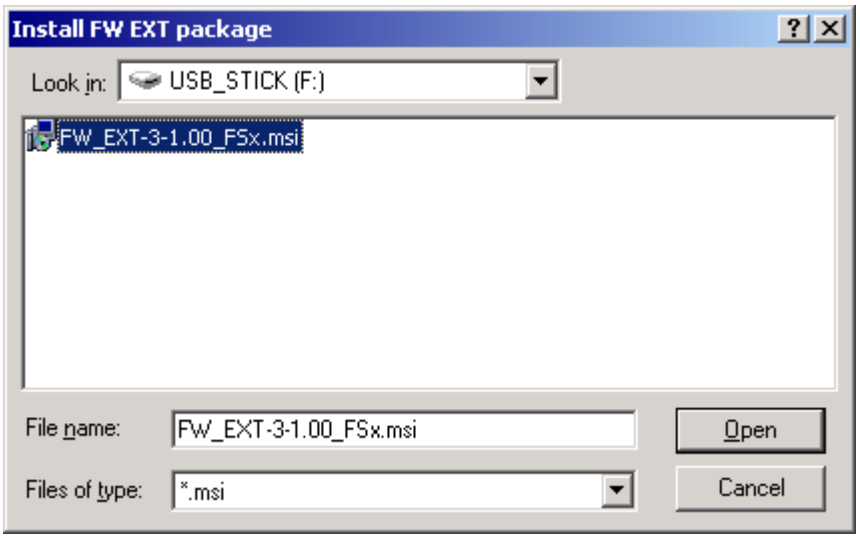
  In any case please make sure that the correct basic firmware version and the measurement application package are installed prior to entering the license key code.

If upgrading to FS-K10 from FS-K5 then an FS-K5U upgrade key code is supplied. This key code needs to be entered (as described above) in addition to the existing FS-K5 key code.

The K10 GSM / EDGE / EDGE Evolution Measurement Application requires an *FW_EXT_Vx.xx_FSx.msi* firmware extension package. If this package is already available on your instrument, the package will be installed after entering the valid K10 option key code. If this package is not available on your instrument the following message will appear after entering the valid K10 option key code:



Please visit the Rohde & Schwarz web site and go to DOWNLOAD SEARCH. Select FSQ as product. Then choose FIRMWARE FOR WINDOWS XP and press OK. Download the *R&S® Firmware Extension Installer* and transfer the *FW_EXT-x-x.xx_FSx.msi* file (e.g. *FW_EXT-3-1.00_FSx.msi*) either via USB memory stick or LAN to the instrument. The valid K10 (or K5U) option key code enabled an INSTALL FW EXT softkey in the SETUP - GENERAL SETUP - OPTIONS menu. This softkey will bring up the *Install Fw EXT package* dialog.



Use the roll key, up/down/left/right keys to navigate to the directory in which the *FW_EXT-x-x.xx_FSx.msi* package is located. Select it and press *Open*. This will install the required software on the instrument.

Enter the K10 (or K5U) option key code again in order to complete enabling the GSM / EDGE / EDGE Evolution Measurement Application.

Finally switch the instrument off, wait until the shut down is finished and switch the instrument on again.

Important Note: Due to the installer package size it is not permitted to install the FW Extension package on instruments with option FSQ-B18 (Removable hard disk) and therefore the INSTALL FW EXT softkey is not available in that case.

System Memory Requirements

For the FS-K10 GSM / EDGE / EDGE Evolution Measurement Application an installed system memory of 512 MByte is essential. The FS-K10 firmware will generate an error message during activation, if available system memory does not meet the requirements. In some rare cases this may happen for FS-K10 if FSQ-K92/K93/K94, FS-K30, FS-K40, FSQ-K70, FSQ-K90/91, or FS-K110 was active before starting FS-K10.

A reboot of the instrument after using NOISE (FS-K30), PHASE NOISE (FS-K40), VSA (FSQ-K70), WLAN (FSQ-K90/91), WIMAX (FSQ-K92/K93/K94), or TETRA II (FS-K110) will allow FS-K10 to be activated without memory extension.

The system memory size can be easily checked by pressing SETUP – SYSTEM INFO – STATISTICS, item "Memory size".

GSM / EDGE / EDGE Evolution Measurement Application R&S FS-K10

New Functions in Version V4.70

- **New SCPI commands for file export and import of I/Q data**
  New SCPI commands:
  MMEMory:STORe:IQ:STATe 1,'C:\gsm.iqw'
  MMEMory:LOAD:IQ:STATe 1,'C:\gsm.iqw'
- **Support for auto detection of frame configuration on imported I/Q data**
- **New REFRESH hotkey**
  Repeats evaluation without capturing new I/Q data.
  New SCPI command: INITiate:REFMeas[:IMMediate]
- **New SCPI command to query the current statistic count (with Service Pack 1)**
  SENSe1:SWEep:COUNt:CURRent?
- **Support for 100 kHz RBW/VBW at 1800 kHz offset freq. in Mod. Spectrum (with Service Pack 1)**
  CONFigure:SPECtrum:MODulation:LIST:BANDwidth:RESolution 1800000,100000
- **Maximum offset frequency in Wide Mod. spectrum measurement can be selected (with Service Pack 1)**
  CONFigure:WSPectrum:MODulation:LIST:SELect NARRow

Improvements

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

1. **[V4.61] Multi Carrier parameters do not affect (Wide) Modulation Spectrum limit lines yet**
   The parameters "No. of active Carriers" and "BTS Class" are not taken into account for the limit line calculation yet.
   This issue is solved.
2. **[V4.61] Absolute Wide Modulation Spectrum list results could not be queried via SCPI**
   The command CONFigure:WSPectrum:MODulation:LIMit ABSolute had no effect.
   This issue is solved.
3. **[V4.61] Use user defined colors for printing**
4. **[V4.61] Improved Power vs. Time limit line positioning**
   with synchronization "per slot" when measuring frame configurations with multiple slots, identical modulation type and TSC for each slot.

Improvements with Service Pack 1

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

1. **[V4.70] Setting** TRACe:IQ:FATA:FORMat **via remote in spectrum mode could cause K10 to fail.**
   This issue is solved.
2. **[V4.70] The command** FETCh:BURSt:EVM:RMS:AVERage? **sometimes could cause an error.**
   This issue is solved.
3. **[V4.70] Switching the RF attenuation from manual to auto could cause a hang-up situation.**
   This issue is solved.

Improvements with Service Pack 2

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

1. **[V4.70 SP1] Limit lines for Wide Transient Spectrum measurement corrected.**
   The Wide Transient Spectrum measurement sometimes used the limit lines of GMSK instead of those of the modulation set for the “Slot to measure”. This issue is solved.
2. **[V4.70 SP1]** FETCh **commands sporadically did not return any results**
   if Measure only on Sync was activated. This issue is solved.
3. **[V4.70 SP1] Power vs Time limit lines for AQPSK corrected**
   The limits have been upated according to 3GPP TS 45.005 V10.3.0, Figure B.10.
   This issue is solved.

Known Issues

None

Modified Functions

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

1. [V4.50] New SCPI command for parameter "Equal Timeslot Length":

CONFigure:MS:CHANnel:FRAMe:EQUal ON

2. [V4.50] New parameter "Capture Time" and SCPI command:

SENSe1:SWEep:TIME 100 MS

3. [V4.50] Demodulation of several frames / slots in the capture buffer:

Seemless analysis of up to 200 frames (1 s capture time).

4. [V4.50] New parameter "Synchronization" added to General Settings dialog.

Choose one of the following synchronization modes to time-align the GSM signal: "Burst + TSC", "TSC", "Burst" or "None". New SCPI command CONFigure:MS:SYNC:MODE ALL.
For FS-K5 backwards compatibility the following commands are provided:
CONFigure:MS:BSEarch ON (burst search) and
CONFigure:MS:SSEarch ON (TSC search).

5. [V4.50] New parameter "Measure only on Sync" added to General Settings dialog.

If activated, only results from frames (slots) where the "Slot to measure" was found are displayed and taken into account in the averaging of the results. The behavior of this option depends on the value of the Synchronization parameter.
New SCPI command CONFigure:MS:SYNC:ONLY ON

6. [V4.50] New parameter "PvT Filter" in the Advanced tab of the Measurement Settings dialog.

to select a pre-filter for Power vs Time measurements on single carrier signals.
The SCPI command CONFigure:BURSt:PTEMplate:FILTer G500 now provides FS-K5 backwards compatibility.

7. [V4.50] New parameter "Enable Left / Right Limit" + SCPI command added.

These parameters control the left / rigth limit check of the spectrum trace (spectrum graph measurement) and which offset frequencies in the table (spectrum list measurement) are checked against the limit. These parameters effect the Modulation Spectrum and Transient Spectrum measurements and are intended to measure the left- / right-most channel in a multi carrier scenario.
New SCPI commands:
CONFigure:SPECtrum:LIMit:LEFT ON
CONFigure:SPECtrum:LIMit:RIGHt ON

8. [V4.50] New support for measurements on multi carrier GSM base stations:

Multi Carrier tab added to the Measurement Settings dialog, providing the following parameters and SCPI commands:

- "Multi Carrier BTS": Activate this parameters for measurements on multi carrier base stations. An additional multi carrier filter is switched into the demodulation path of the K10. This filter can, for example, suppress up to six adjacent channels with a channel spacing of 600 kHz from the measured channel and 30 dB higher power compared to the measured channel.
  CONFigure:MS:MCARrier:MCBTs ON
- "No. of active Carriers": Total number of active carriers.
  CONFigure:MS:MCARrier:ACTCarriers 1
- "BTS Class": Base station class.
  CONFigure:MS:MCARrier:BTSClass 1
- "PvT Filter": Special multi carrier pre-filter for the Power vs Time measurement.
  CONFigure:MS:MCARrier:FILTer MC400
- Support of FS-K5 backwards compatible command
  CONFigure:MS:MCARrier ON

9. [V4.50] Parameter PCL Attenuation removed from the burst dialog.

The corresponding SCPI command CONF:MS:CHAN:SLOT0:PCL:ATT is not supported any more.

10. **[V4.50] SCPI conflict of SCPI commands to query the burst power of all slots (PvT measurement) and the burst power of the 'Slot to measure' (Modulation Accuracy measurement) solved**.

    Now, the following commands to measure burst power are provided:
    FETCh:BURSt:SPOWer:SLOT<s>:ALL:AVERage? measures slot <s> in PvT
    READ:BURSt:SPOWer:SLOT<s>:ALL:AVERage? measures slot <s> in PvT
    FETCh:BURSt:MACCuracy:BPOWer:AVERage? measures 'Slot to measure' in ModAcc.
    READ:BURSt:MACCuracy:BPOWer:AVERage? measures 'Slot to measure' in ModAcc.

11. **[V4.50 SP1] New parameter: "Swap IQ" + SCPI command added (with Service Pack 1).**

    Swaps the I and Q signals., SCPI command SENSe1:SWAPiq ON

12. **[V4.51] New SCPI command to determine the gating interval for modulation spectrum:**

    READ:SPECtrum:WMODulation:GATing?
    Use the FS-K10 to determine the gating interval and the spectrum analyzer mode to perform modulation spectrum list measurements at user-definable offset frequencies (e.g. at a 5.8 MHz offset frequency).

13. **[V4.51] New SCPI command to select the spectrum meas. mode (Softkey: Display Graph/List):**

    CONFigure:MS:SPECtrum:SELect

14. **[V4.51] New parameter "Limit Time Alignment" + SCPI command added**

    Limit lines of the Power vs Time measurement can be either time-aligned "Per Slot" or the slot centers are derived from the "Slot to measure" only.
    CONFigure:BURSt:PTEMplate:TALign PSLot

15. **[V4.60] Restricted availability of PCL / Dynamic PCL SCPI command**

    Issuing the SCPI command CONFigure:MS:CHANnel:SLOT0:PCL? requires the slot to be active. Otherwise an error is returned. Please use the following workaround to query the PCL / Dynamic PCL of an inactive slot:
    CONFigure:MS:CHANnel:SLOT0:STATe ON
    CONFigure:MS:CHANnel:SLOT0:PCL?
    CONFigure:MS:CHANnel:SLOT0:STATe OFF
    This issue is solved.

16. **[V4.60] Slow-down caused by mode change**

    Switching from spectrum mode to K10 and back slows down switching time.
    This issue is solved.

17. **[V4.60] Modulation Spectrum measurement at offset frequencies up to 5.8 MHz**

    New Wide Modulation spectrum list measurement and new SCPI commands:
    CONFigure:WSPectrum:MODulation[:IMMediate]
    READ:WSPectrum:MODulation[:ALL]?

18. **[V4.60] Support for R&S FSQ-B71 Baseband Inputs**

    New SCPI commands:
    INPut:SELect AIQ
    DISPlay:WINDow:TRACe:Y:SCALe:RLEVel:IQ 1
    INPut:IQ:IMPedance LOW
    INPut:IQ:BALanced:STATe ON
    SENSe:IQ:DITHer:STATe ON
    SENSe:IQ:LPASs:STATe ON

19. **[V4.60] New parameter "Filter Type" for spectrum list measurements**

    Either a "Normal" (Gauss 3 dB) or a 5 pole filter can be selected as resolution filter.
    SCPI: SENSe1:BANDwidth:RESolution:TYPE P5

20. **[V4.60] New parameter "IQ Correlation Threshold" to control "sync failed" sensitivity**

    SCPI: CONFigure:MS:SYNC:IQCThreshold 85

21. **[V4.60] New parameter "Symbol Decision" in Measurement Settings**

    Improved demodulator performance by the use of a sequence estimator.
    SCPI: CONFigure:MS:DEMod:DECision AUTO | LINear | SEQuence

22. [V4.60] New parameter "Tail & TSC Bits" in Measurement Settings

Use standard or detected Tail and TSC bits for the generation of the ideal signal.
SCPI: CONFigure:MS:DEMod:STDBits STD | DETected

23. [V4.61] New support for measurements of VAMOS signals

Voice services over Adaptive Multi-user Channels on One Slot (VAMOS)
New support for TSCs (Set 1/2) for GMSK modulation.
New support for Adaptive QPSK (AQPSK) modulation,
Sub-Channel Power Imbalance Ratio (SCPIR),
TSCs (Set 1/2) and User TSCs for sub-channel 1 / 2.
SCPI commands:
CONFigure:MS:CHANnel:SLOT<0-7>:TSC <0-7>,<1|2> | USER
CONFigure:MS:CHANnel:SLOT<0-7>:SCPir 4
CONFigure:MS:CHANnel:SLOT<0-7>:SUBChannel<1|2>:TSC <0-7>,<1|2> | USER
CONFigure:MS:CHANnel:SLOT<0-7>:SUBChannel<1|2>:TSC:USER '00100101110000100010010111'

24. [V4.61] New support for multiple measurement mode for fast measurements

Perform Power vs Time, Modulation Accuracy, EVM / Phase Err. / Mag. Err. vs Time,
Modulation and Transient Spectrum measurements in parallel on same I/Q capture data.
SCPI commands:
CONFigure:MS:MULTi:STATe ON | OFF
CONFigure:MS:MULTi:BURSt:CONStell ON | OFF
CONFigure:MS:MULTi:BURSt:DEModulation ON | OFF
CONFigure:MS:MULTi:BURSt:PTEMplate ON | OFF
CONFigure:MS:MULTi:SPECtrum:MODulation ON | OFF
CONFigure:MS:MULTi:SPECtrum:SWITching ON | OFF

25. [V4.61] New support for user-definable TSCs

User TSCs can be set in the burst dialog.
SCPI commands:
CONFigure:MS:CHANnel:SLOT<0-7>:TSC USER
CONFigure:MS:CHANnel:SLOT<0-7>:TSC:USER '00100101110000100010010111'

26. [V4.61] New Wide Transient Spectrum measurement

New spectrum list measurement for spectrum due to switching with improved dynamic due to gated measurements in zero-span mode.
New SCPI commands:
CONFigure:WSPectrum:SWITching:IMMediate
CONFigure:WSPectrum:SWITching:LIMit ABSolute | RELative
FETCh:WSPectrum:MODulation:REFerence?
READ:WSPectrum:SWITching:REFerence:IMMediate?
FETCh:WSPectrum:SWITching:ALL?
READ:WSPectrum:SWITching:ALL?

27. [V4.61] New commands for abs/rel unit of power limit results for spectrum list measurements

CONFigure:SPECtrum:SWITching:LIMit ABSolute | RELative
CONFigure:WSPectrum:MODulation:LIMit ABSolute | RELative

28. [V4.61] New SCPI commands to query reference power for spectrum measurements

FETCh:SPECtrum:MODulation:REFerence?
FETCh:SPECtrum:SWITching:REFerence?
FETCh:WSPectrum:MODulation:REFerence?
READ:SPECtrum:MODulation:REFerence:IMMediate?
READ:SPECtrum:SWITching:REFerence:IMMediate?
READ:WSPectrum:MODulation:REFerence:IMMediate?

29. [V4.61] New maker zoom support in Power vs Time full burst view

New SCPI command: CALCulate1:MARKer1:ZOOM 2

30. [V4.61] New PvT List measurement including slot powers and "delta to sync" values

New result table in Power vs Time measurement.
Display of average and maximum slot powers and crest factors per slot.
Display of "delta to sync" values to check timeslot lengths.
New SCPI commands:

FETCh:BURSt:SPOWer:SLOT<0-7>:DELTatosync?
READ:BURSt:SPOWer:SLOT<0-7>:DELTatosync?

31. [V4.61] New pure "rising" and pure "falling" views in Power vs Time measurement

32. [V4.61] New auto set buttons for Level, Frame Configuration and Trigger

added to the Auto Set tab of the Measurement Settings dialog.

33. [V4.61] Default screen layout of Power vs Time measurement is now split screen

(PvT Graph and PvT List). In older versions only PvT Graph was displayed.

34. [V4.61] Dynamic / Static PCL parameters removed

These parameter had no effect on the limit lines.
The SCPI commands are retained for compatibility reasons.

35. [V4.61] Improved Auto Frame Configuration (VAMOS / Speed)

Detection of VAMOS / Normal Burst / GMSK and TSCs of Set 1 and 2.
Detection of VAMOS / Normal Burst / AQPSK, SCPIR and TSCs of subchannels.

36. [V4.61] New Modulation Spectrum limits for HSR Wide Pulse

according to 3GPP TS 45.005, §4.2.1.3.

37. [V4.61] Modulation spectrum measurement limit changed

The limit value at 400 kHz now depends on the modulation,
see 3GPP TS 45.005, §4.2.1.3, tables ax), bx), cx), NOTE *.

38. [V4.61] Printing of all offset frequencies of Wide Modulation Spectrum list results

The entire Wide Modulation Spectrum list results can be saved as bmp file using the print functionality.

39. [V4.61] Progress bar for Wide Modulation Spectrum measurement

Now the progress bar is updated while a Wide Modulation Spectrum measurement is running.

40. [V4.70] New SCPI commands for file export and import of I/Q data

New SCPI commands:

MMEMory:STORe:IQ:STATe 1,'C:\gsm.iqw'
MMEMory:LOAD:IQ:STATe 1,'C:\gsm.iqw'

41. [V4.70] Support for auto detection of frame configuration on imported I/Q data

42. [V4.70] New REFRESH hotkey

Repeats evaluation without capturing new I/Q data.
New SCPI command: INITiate:REFMeas[:IMMediate]

43. [V4.70] Use user defined colors for printing

44. [V4.70 SP1] Issuing INITiate1:CONTinuous ON now automatically starts a measurement

45. [V4.70 SP1] The following query remote commands now return the short form

CONFigure:MS:CHANnel:SLOT1:FILTer?
DISPlay:WINDow1:TRACe1:MODE?
CONFigure:BURSt:PTEMplate:TALign?
CONFigure:MS:DEMod:DECision?
CONFigure:MS:DEMod:STDBits?
CONFigure:SPECtrum:SELect?

46. [V4.70 SP1] Remote command for marker supports time and frequency units

SCPI command: CALCulate1:MARKer1:X 1 MS

47. [V4.70 SP1] New SCPI command to query the current statistic count

New SCPI command: SENSe1:SWEep:COUNt:CURRent?

48. [V4.70 SP1] Support for 100 kHz RBW/VBW at 1800 kHz offset freq. in Mod. spectrum

New SCPI command: CONFigure:SPECtrum:MODulation:LIST:BANDwidth:RESolution 1800000,100000

49. [V4.70 SP1] Maximum offset frequency in Wide Mod. spectrum measurement can be selected

New SCPI command: CONFigure:WSPectrum:MODulation:LIST:SELect NARRow

50. [V4.70 SP2] The following query remote command now returns the short form.

CONFigure:MS:CHANnel:SLOT6:MTYPe?

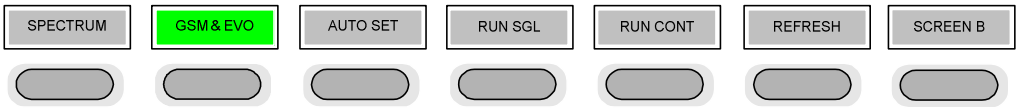
Operating Manual

The R&S FS-K10 GSM / EDGE / EDGE Evolution is described in the operating manual with the order number

- 1309.9722.42-07 (English)

Modified Chapters for manual operation

Hotkeys



REFRESH Hotkey

The REFRESH hotkey repeats the evaluation of the data currently in the capture buffer without capturing new data. This is useful after changing settings, for example the Statistic Count. Averaging is performed according to the "Statistic Count" and automatically stops when the defined "Statistic Count" or the end of the captured data is reached.

Remote: INITiate:REFMeas:IMMediate

Import

Opens the "Choose the file to import" dialog box.

Select the IQ data file you want to import and press ENTER. The extension of data files is *.iqw.

This function is not available while a measurement is running.

I/Q data is imported into the capture buffer. Then evaluation of the data including averaging (according to Statistic Count) is started. Averaging automatically stops when the defined "Statistic Count" or the end of the captured data is reached.

To automatically detect the frame/slot configuration of the imported I/Q data, press the

AUTO SET hotkey after import (see also "Frame Configuration").

Remote: MMEMory:LOAD:IQ:STATe 1,'C:\gsm.iqw'

Export

Opens the "Choose the file to export" dialog box.

Enter the path and the name of the IQ data file you want to export and press ENTER. The extension of data files is *.iqw. If the file cannot be created or there is no valid IQ data to export an error message is displayed.

This function is not available while a measurement is running.

Remote: MMEMory:STORe:IQ:STATe 1,'C:\gsm.iqw'

Mod. RBW @ 1800 kHz ← Advanced tab ← Meas Settings

The Mod. RBW @ 1800 kHz controls the resolution bandwidth (RBW) and video bandwidth (VBW) used n the Mod. Spectrum List and Wide Mod. Spectrum measurements at offset frequencies of +/- 1800 kHz from the carrier.

- **30 kHz** (default): RBW and VBW are set to 30 kHz for offset frequencies at +/- 1800 kHz from the carrier.
- **100 kHz**: RBW and VBW are set to 100 kHz for offset frequencies at +/- 1800 kHz from the carrier.

Remote: CONFigure:SPECtrum:MODulation:LIST:RESolution:BW 1800000,100000

Wide Mod. Freq. List ← Advanced tab ← Meas Settings

Wide Mod. Freq. List controls in the Wide Modulation Spectrum measurement whether offset frequencies are measured up to 1800 kHz or 5800 kHz.

- **Narrow**: The measurement is performed for offset frequencies up to 1800 kHz from the carrier.
- **Wide** (default): The measurement is performed for offset frequencies up to 5800 kHz from the carrier.

Note: Select "Narrow" to improve measurement speed.

Remote: CONFigure:WSPectrum:MODulation:LIST:SELect NARRow

Modified Chapters for remote operation

INITiate:REFMeas[:IMMediate]

Repeats the evaluation of the data currently in the capture buffer without capturing new data. This is useful after changing settings, for example the Statistic Count. Averaging is performed according to the "Statistic Count" and automatically stops when the defined "Statistic Count" or the end of the captured data is reached.

Example

```
// Preset the instrument
*RST
// Enter the GSM option K10
INSTrument:SELect GSM
// Switch to single sweep mode and do one measurement
INITiate:CONTinuous OFF
// Set capture time to 1 s
SENSe1:SWEep:TIME 1 S
// Activate power vs time measurement
CONFigure:BURSt:PTEMplate:IMMediate
// Run a (blocking) single sweep
INITiate:IMMediate;*WAI
// Export captured I/Q data to file
MMEMory:STORe:IQ:STATe 1,'C:\gsm_1.iqw'
// Run a (blocking) single sweep
INITiate:IMMediate;*WAI
// Export captured I/Q data to file
MMEMory:STORe:IQ:STATe 1,'C:\gsm_2.iqw'
// Now we want to analyze the first capture again
// Import I/Q data from file
MMEMory:LOAD:IQ:STATe 1,'C:\gsm_1.iqw'
// Instead of 1 slots 8 slots should be analyzed
CONFigure:MS:CHANnel:MSLots:NOFSlots 8
// Refresh to apply the changed setting
INITiate:REFMeas:IMMediate
```

MMEMory:LOAD:IQ:STATe 1, <FileName>

This command loads the I/Q data from the specified .iqw file.

I/Q data is imported into the capture buffer. Then evaluation of the data including averaging (according to Statistic Count) is started. Averaging automatically stops when the defined "Statistic Count" or the end of the captured data is reached.

Parameters

1,<FileName>

Example

```
// Preset the instrument
*RST
// Enter the GSM option K10
INSTrument:SELect GSM
// Switch to single sweep mode and do one measurement
INITiate1:CONTinuous OFF
// Set capture time to 1 s
SENSe1:SWEep:TIME 1 S
// Activate power vs time measurement
CONFigure:BURSt:PTEMplate:IMMediate
// Run a (blocking) single sweep
INITiate:IMMediate;*WAI
// Export captured I/Q data to file
MMEMory:STORe:IQ:STATe 1,'C:\gsm_1.iqw'
// Run a (blocking) single sweep
INITiate:IMMediate;*WAI
// Export captured I/Q data to file
MMEMory:STORe:IQ:STATe 1,'C:\gsm_2.iqw'
// Now we want to analyze the first capture again
// Import I/Q data from file
MMEMory:LOAD:IQ:STATe 1,'C:\gsm_1.iqw'
// Instead of 1 slots 8 slots should be analyzed
CONFigure:MS:CHANnel:MSLots:NOFSlots 8
// Refresh to apply the changed setting
INITiate:REFMeas:IMMediate
```

MMEMory:STORe:IQ:STATe 1, <FileName>

This command stores the I/Q data to the specified .iqw file.

Parameters

1,<FileName>

Example

```
// Preset the instrument
*RST
// Enter the GSM option K10
INSTrument:SELect GSM
// Switch to single sweep mode and do one measurement
INITiate1:CONTinuous OFF
// Set capture time to 1 s
SENSe1:SWEep:TIME 1 S
// Activate power vs time measurement
CONFigure:BURSt:PTEMplate:IMMediate
// Run a (blocking) single sweep
INITiate:IMMediate;*WAI
// Export captured I/Q data to file
MMEMory:STORe:IQ:STATe 1,'C:\gsm_1.iqw'
// Run a (blocking) single sweep
INITiate:IMMediate;*WAI
// Export captured I/Q data to file
MMEMory:STORe:IQ:STATe 1,'C:\gsm_2.iqw'
// Now we want to analyze the first capture again
// Import I/Q data from file
MMEMory:LOAD:IQ:STATe 1,'C:\gsm_1.iqw'
// Instead of 1 slots 8 slots should be analyzed
CONFigure:MS:CHANnel:MSLots:NOFSlots 8
// Refresh to apply the changed setting
INITiate:REFMeas:IMMediate
```

[SENSe]:SWEep:COUNt:CURRent?

This command returns the currnet statistic count. It can be used to track the progress of the averaging progress until it reaches the set 'Statistic Count' (see SENSe:SWEep:COUNt).

Return values

<Count> Current statistic count

Example

```
// Query current statistic count
SENSe1:SWEep:COUNt:CURRent?
STATus Subsystem
```

CONFigure:SPECtrum:MODulation:LIST:BANDwidth:RESolution

This command controls the resolution bandwidth (RBW) and video bandwidth (VBW) used in the Mod. Spectrum List and Wide Mod. Spectrum measurements at offset frequencies of +/-1800 kHz from the carrier.

Parameters (for setting only)

<OffsetFrequency> Offset frequency in Hz, only 1800000 is supported.

<RBW_VBW> RBW and VBW in Hz at the given offset frequency,
only 30000 and 100000 are supported.

Parameters (for query only)

<OffsetFrequency> Offset frequency in Hz, only 1800000 is supported

Return values

<RBW_VBW> Returns the set RBW (VBW) at the offset frequency specified.

Example

```
// Preset the instrument
*RST

// Enter the GSM option K10
INSTrument:SELect GSM

// Switch to single sweep mode and stop sweep
INITiate:CONTinuous OFF;:ABORt

// Activate IF power trigger mode
TRIGger1:SEQuence:SOURce IFPower
// Auto-dectect trigger offset and level
CONFigure:MS:AUTO:TRIGger ONCE;*WAI

// --- Mod. Spectrum measurement ---
// (measurement on captured I/Q data)
CONFigure:SPECtrum:MODulation:IMMediate
// Only list results are required
CONFigure:SPECtrum:SELect LIST
// RBW = 100 kHz @ 1800 kHz offset freq.
CONFigure:SPECtrum:MODulation:LIST:BANDwidth:RESolution 1800000,100000
// Check set value
CONFigure:SPECtrum:MODulation:LIST:BANDwidth:RESolution? 1800000
// -> 100000
// Run a (blocking) single sweep
INITiate:IMMediate;*WAI
// Fetch list results (table)
FETCh:SPECtrum:MODulation:ALL?

// --- Wide Mod. Spectrum measurement ---
// (gated zero span measurement)
CONFigure:WSPectrum:MODulation:IMMediate
// Measure offset freqs. up to 1800 kHz only
CONFigure:WSPectrum:MODulation:LIST:SELect NARRow
// RBW = 100 kHz @ 1800 kHz offset freq.
CONFigure:SPECtrum:MODulation:LIST:BANDwidth:RESolution 1800000,100000
// Check set value
CONFigure:SPECtrum:MODulation:LIST:BANDwidth:RESolution? 1800000
// -> 100000
// Run a (blocking) single sweep
INITiate:IMMediate;*WAI
// Fetch list results (table)
FETCh:WSPectrum:MODulation:ALL?
```

CONFigure:WSPectrum:MODulation:LIST:SELect <Mode>

This command controls in the Wide Modulation Spectrum measurement whether offset frequencies are measured up to 1800 kHz or 5800 kHz.
Note: Select 'NARRow' to improve measurement speed.

Parameters

<Mode> NARRow | WIDE

Selects the maximum offset frequency.

RST value: WIDE

NARRow The measurement is performed for offset frequencies up to 1800 kHz from the carrier.

WIDE The measurement is performed for offset frequencies up to 5800 kHz from the carrier.

Example

```
// Preset the instrument
*RST

// Enter the GSM option K10
INSTrument:SELect GSM

// Switch to single sweep mode and stop sweep
INITiate:CONTinuous OFF;:ABORt

// Activate IF power trigger mode
TRIGger1:SEQuence:SOURce IFPower
// Auto-dectect trigger offset and level
CONFigure:MS:AUTO:TRIGger ONCE;*WAI

// Select Wide Modulation Spectrum measurement
// (gated zero span measurement)
CONFigure:WSPectrum:MODulation:IMMediate
// Measure offset freqs. up to 1800 kHz only
CONFigure:WSPectrum:MODulation:LIST:SELect NARRow
// RBW = 100 kHz @ 1800 kHz offset freq.
CONFigure:SPECtrum:MODulation:LIST:BANDwidth:RESolution 1800000,100000
// Run a (blocking) single sweep
INITiate:IMMediate;*WAI
// Fetch list results (table)
FETCh:WSPectrum:MODulation:ALL?
CONFigure:WSPectrum:SWITching Subsystem
```

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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.

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