



ROHDE & SCHWARZ

Test and Measurement
Division

Release Notes

GSM / EDGE / EDGE Evolution Measurement Application

R&S FS-K10

Release 4.70

with Service Pack 3

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

Release Note Revision: 6

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History

Date	Rel Note Rev	Changes
05 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.
08 August 2012	4	Revision of K10 Measurement Application V4.70 with Service Pack 2.
29 October 2012	5	Revision of K10 Measurement Application V4.70 with Service Pack 3.
06 February 2014	6	Update according to new operating manual revision.

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 SP3	4.75 SP5	4.79 SP5
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.

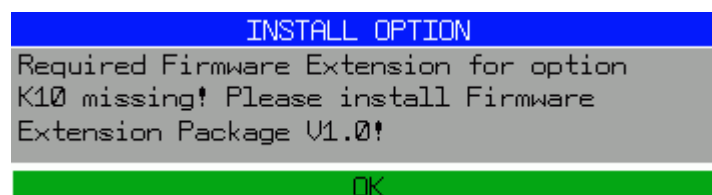
- On a successful validation the message "option key valid" will appear. The instrument will perform an automatic reboot.
- If the validation failed, the measurement application is not installed.
The most probable reason will be that the instrument is not equipped with the correct basic firmware version. 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.

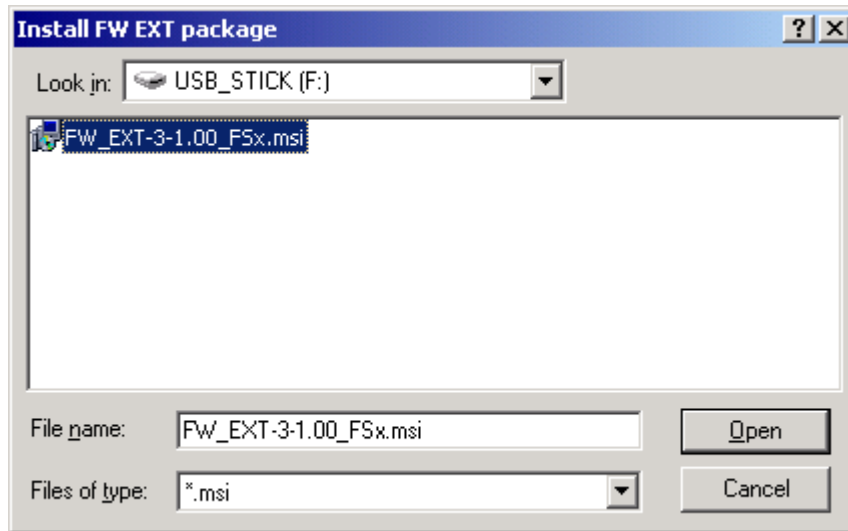
In any case please make sure that the correct basic firmware version and the measurement application package are installed prior to entering the license key code.

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](http://www.rohde-schwarz.com) 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.

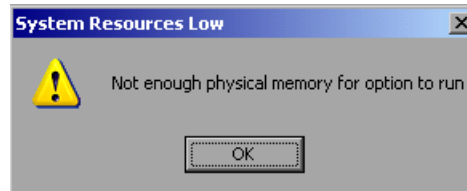
Enter the K10 (or K5U) option key code again in order to complete enabling the GSM / EDGE / EDGE Evolution Measurement Application.

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:WSPpectrum: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 updated according to 3GPP TS 45.005 V10.3.0, Figure B.10.
This issue is solved.

Improvements with Service Pack 3

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

1. **[V4.70 SP2] Modulation spectrum limits selected by the power level derived from the slot power.**
Previous versions used the reference power measured with a resolution bandwidth of 30 kHz. This leads to stricter limits for offset frequencies greater than or equal than 600 kHz. See 4GPP TS 45.005 §4.2.1.3.

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":

[CONFfigure: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:

Seamless 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 [CONFfigure:MS:SYNC:MODE ALL](#).

For FS-K5 backwards compatibility the following commands are provided:

[CONFfigure:MS:BSearch ON](#) (burst search) and

[CONFfigure: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 [CONFfigure: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 [CONFfigure: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 / right 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:

[CONFfigure:SPECTrum:LiMit:LEfT ON](#)

[CONFfigure: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.

[CONFfigure:MS:MCARrier:MCBTs ON](#)

- "No. of active Carriers": Total number of active carriers.

[CONFfigure:MS:MCARrier:ACTCarriers 1](#)

- "BTS Class": Base station class.

[CONFfigure:MS:MCARrier:BTSClass 1](#)

- "PvT Filter": Special multi carrier pre-filter for the Power vs Time measurement.

[CONFfigure:MS:MCARrier:FiLTer MC400](#)

- Support of FS-K5 backwards compatible command

[CONFfigure: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:WSPpectrum:MODulation\[:IMMEDIATE\]](#)

[READ:WSPpectrum: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:IQThreshold 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:PTEmpLte 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:WSPpectrum:SWITching:IMMediate`

`CONFigure:WSPpectrum:SWITching:LIMit ABSolute | RELative`

`FETCh:WSPpectrum:MODulation:REFerence?`

`READ:WSPpectrum:SWITching:REFerence:IMMediate?`

`FETCh:WSPpectrum:SWITching:ALL?`

`READ:WSPpectrum: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:WSPpectrum: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:WSPpectrum:MODulation:REFerence?`

`READ:SPECTrum:MODulation:REFerence:IMMediate?`

`READ:SPECTrum:SWITching:REFerence:IMMediate?`

`READ:WSPpectrum: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:WSPpectrum:MODulation:LIST:SElect NARRow](#)

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

[CONFigure:MS:CHANnel:SLOT6:MTYPE?](#)

51. [V4.70 SP3] Modulation spectrum limits selected by the power level derived from the slot power.

Previous versions used the reference power measured with a resolution bandwidth of 30 kHz. This leads to stricter limits for offset frequencies greater than or equal than 600 kHz. See 4GPP TS 45.005 §4.2.1.3.

Operating Manual

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

- 1309.9722.42-08 (English)

The current documentation is up-to-date.

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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