



ROHDE & SCHWARZ

Test and Measurement
Division

Release Notes

3G FDD BTS/3GPP HSDPA BTS/ 3GPP HSPA+ BTS

Application Firmware

R&S FS-K72/FS-K74/FS-K74+

Release 4.70 with Service Pack 3

for R&S FSP, FSU, FSQ, FSG, FSMR, FSUP, FMU
Analyzer Firmware 4.7x

New Features:

- **Time Alignment Error measurement for multi carrier scenarios for R&S FSQ and R&S FSG.**
- **Multi Standard Radio Measurement Extension.**

Release Note Revision: 4

Contents

History	2
General Topics	2
Hardware Requirements	2
Compatibility of R&S FS-K72/K74/K74+	3
Firmware Update of R&S FS-K72/K74/K74+	4
Enabling the Application Firmware via License Key Code Entry	4
New Functions in Version 4.70	5
Improvements	5
Improvements with Service Pack 1	5
Improvements with Service Pack 2	5
Improvements with Service Pack 3	5
Known Issues	6
Modified Functions	6
Modifications to the Operating Manual	8
Modified Chapters	9
Modified Chapters for remote operation	9
MMEMory subsystem	9
Customer Support	11
Technical support – where and when you need it	11
Up-to-date information and upgrades	11

History

Date	Rel Note Rev	Changes
29 April 2011	1	First revision for R&S FS-K72/R&S FS-K74/R&S FS-K74+ version 4.70.
25 October 2011	2	New function with Service Pack 1 added.
8 August 2012	3	New function with Service Pack 2 added.
10 March 2016	4	Support for 4.7x SP7 with Service Pack 3 added.

General Topics

Hardware Requirements

Please note that R&S FS-K72/K74/K74+ requires options R&S FSP-B15 and R&S FSP-B70 in order to run on an R&S FSP. If either of the required hardware options is not installed the unit will not accept the license key for the corresponding firmware application.

Compatibility of R&S FS-K72/K74/K74+

The following table shows the compatible versions of the basic analyzer firmware and the 3G FDD BTS Application Firmware R&S FS-K72, the 3GPP Application Firmware R&S FS-K74 (FS-K74 is supported since version 2.28/3.28) and the 3GPP Application Firmware R&S FS-K74+ (FS-K74+ is supported since version 4.30):

Table of compatible versions:

R&S FS-K72/K74 Application Firmware	R&S FSP Basic Firmware	R&S FSU Basic Firmware	R&S FSQ Basic Firmware	R&S FSMR Basic Firmware	R&S FSUP Basic Firmware	R&S FMU Basic Firmware	R&S FSG Basic Firmware
4.70 SP3	-	-	4.75 SP7				-
4.70 SP2	-	4.71 SP5 4.71 SP4	4.75 SP5 4.75 SP4				4.79 SP5 4.79 SP4
4.70 SP1	-	4.71 SP2	4.75 SP2				4.79 SP2
4.70	-	4.71	4.75				4.79
4.61	-	4.61 SP1	4.65 SP1				4.69 SP1
4.60	-	4.61	4.65		4.67		4.69
4.50 SP1	4.50	4.51	4.55 SP2				4.59 SP1
4.50	-	-	4.55				4.59
4.40 SP1	-	-	-	-	4.47	-	-
4.40	4.40	4.41	4.45	-	-	-	4.49
4.30	4.30	4.31	4.35	4.36	4.3	4.38	4.39
4.20 SP1	4.20	4.21	4.25	4.26	4.27	-	4.29
4.20	4.20	4.21	4.25	-	-	-	4.29
4.17	-	-	-	-	4.17	-	-
4.10	4.10	4.11	4.15	4.16	-	-	-
4.01	-	-	-	-	-	4.08	-
4.00	4.00	4.01	4.05	4.06	-	-	-
3.90 SP1	3.90	3.91	3.95	3.96	3.99	-	-
3.90	3.90	3.91	3.95	3.96	-	-	-
3.80	3.80	3.81	3.85	3.86	-	-	-
3.70	3.70	3.71	3.75	3.76 SP1	-	-	-
3.60	3.60	3.61	3.65	3.66 SP1	-	-	-
3.50	3.50	3.51	3.55	-	-	-	-
3.40	3.40	3.41	3.45	-	-	-	-
3.35	-	-	3.35	-	-	-	-
3.30	3.30	3.31	-	-	-	-	-
3.28	3.20	3.21	3.25	-	-	-	-
3.24	3.10	3.11	3.15	-	-	-	-
3.20	3.00	-	3.05	-	-	-	-
2.60	2.60	2.61	-	-	-	-	-
2.40	2.40	2.41	2.45	-	-	-	-
2.35	-	-	2.35	-	-	-	-
2.30	2.30	2.31	-	-	-	-	-
2.28	2.20	2.21	2.25	-	-	-	-
2.24	2.10	2.11	2.15	-	-	-	-

R&S FS-K72/K74 Application Firmware	R&S FSP Basic Firmware	R&S FSU Basic Firmware	R&S FSQ Basic Firmware	R&S FSMR Basic Firmware	R&S FSUP Basic Firmware	R&S FMU Basic Firmware	R&S FSG Basic Firmware
1.21	-	-	2.05	-	-	-	-
1.20	1.80	1.81	1.85	-	-	-	-
1.12	1.70	1.71	1.75	-	-	-	-
1.11	1.60	1.61	1.65	-	-	-	-
1.10	1.50	1.51	-	-	-	-	-
1.00	-	1.41	-	-	-	-	-

Application firmware versions 3.xx are running on R&S FSPs with order # 1164.4391.xx or R&S FSU with order # 1166.1660.xx or R&S FSQ with operating system XP.

Application firmware version 2.xx are running on R&S FSPs with order # 1093.4495.xx or R&S FSU with order # 1129.9003.xx or R&S FSQ with operating system NT.

Firmware Update of R&S FS-K72/K74/K74+

Since 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 FSU 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 Application Firmware via License Key Code Entry

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

After installing the application firmware package a license key for validation must be entered. The license key is printed either on a label on the rear panel of the instrument or delivered as a part of the R&S FS-K72 3G FDD BTS, R&S FS-K74 HSDPA BTS and R&S FS-K74+ HSPA+ BTS application firmware package.

The key sequence for entering the license key is:

SETUP - GENERAL SETUP – OPTIONS - INSTALL OPTION

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

- Each application firmware R&S FS-K72 3G FDD BTS, R&S FS-K74 HSDPA BTS and R&S FS-K74+ HSPA+ BTS has its own option key. The K72 3G FDD BTS is a prerequisite for installing the K74 HSDPA BTS and the K74+ HSPA+ BTS application firmware
- Installing FS-K72: option key for FS-K72 must be entered
- Installing FS-K74: option key for FS-K72 **and** option key for FS-K74 must be entered
- Installing FS-K74+: option key for FS-K72 **and** option key for FS-K74+ must be entered **or** option keys for FS-K72, FS-K74 **and** FS-K74+ must be entered
- On a successful validation the message 'option key valid' will appear.
- If the validation failed, the application firmware is not installed.

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

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

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

New Functions in Version 4.70

- Time Alignment Error measurement for multi carrier scenarios for R&S FSQ and R&S FSG
- Multi Standard Radio Measurement Extension (with Service Pack 1)
- Support for base system version 4.7x SP4 (with Service Pack 2)
- Support for base system version 4.7x SP7 (with Service Pack 3)

Improvements

1. (V4.60) The sign of the result of single carrier Time Alignment Error measurement has not been in line with 3GPP specifications.

The sign has been changed according to 3GPP specifications for V4.70.

2. (V4.60) Improvements of the synchronization algorithm for single carrier Time Alignment Error measurement.

Improvements with Service Pack 1

None.

Improvements with Service Pack 2

None.

Improvements with Service Pack 3

None.

Known Issues

1. (V4.20) Auto detection of channels with low data rate:

If a data channel contains a large number of suppressed symbols (DTX), the channel can not be detected. This is caused by an inherent modulation type analyzer. If the sent symbol constellation does not match a constellation according to 3GPP (QPSK, 16QAM), the channel is marked as invalid channel.

2. (V4.50) HS-SCCH channel 9.128 coded (test model 5 - 6 DPCH - 2 HS-PDSCH) sometimes gets lost.

Work around: Switch the automatic search algorithm off by using the Predefined Channel feature.

Modified Functions

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

1. [V1.11] **New functions: Antenna Diversity, Sync Type CPICH / SCH**
2. [V1.12] **Carrier Frequency Error now determined on per slot basis**
3. [V1.12] **New result display types: Composite Constellation, Power vs. Symbol**
4. [V1.12] **New: Support for Compressed Mode signals**
5. [V1.20] **Margin check of x dB margin below Spectrum Emission Mask Limit Lines**
6. [V3.20/V1.20] **Output of frequency and response value if margin check failed**
7. [V3.20/V1.21] **Improved sensitivity for code channels with low SN ratio (6dB SNR of a code class 8 channel is sufficient to detect the channel in auto search mode)**
8. [V3.20/V1.21] **Pilot symbol check added.**
9. [V3.20/V1.21] **For signalling a detection of a pilot symbol that is different from that of the 3GPP standard the 5th Bit of the status register is used.**
10. [V3.24/V2.24] **Code Domain Error Power measurement is now available.**
11. [V3.24/V2.24] **Improved Resolution of Trigger to Frame measurement**
12. [V3.24/V2.24] **Improved absolute accuracy of Trigger to Frame measurement**
13. [V3.24/V2.24] **Trace statistic available on result summary parameters (MIN Hold, MAX Hold, Averaging)**
14. [V3.24/V2.24] **Improved compressed mode handling**
15. [V3.28/V2.28] **Support of FS-K74 HSDPA BTS Test including automatic channel search**
16. [V3.28/V2.28] **Unit circle display in constellation diagrams**
17. [V3.28] **Option FS-K9 power sensor support for RF measurement**
18. [V3.30/V2.30] **New function: Multi-Frame Evaluation**
19. [V3.30/V2.30] **Detection of SCCPCH is now available**
20. [V3.30/V2.30] **Improved detection sensitivity for HSDPA channels**
21. [V3.30/V2.30] **Spectrum emission mask – IEC readout of worst fail position**
22. [V3.30/V2.30] **Auto channel detection of compressed mode channels**
23. [V3.40/V2.40] **IEC readout of frame bit-stream**
24. [V3.40/V2.40] **Slot power difference of power versus slot measurement**
25. [V3.40/V2.40] **Adjacent channel leakage power ratio (ACLR) for multi carrier signals**
26. [V3.40/V2.40] **Peak list evaluation of spectrum emission mask**
27. [V3.40/V2.40] **Advanced auto level adjust of multi carrier signals**
28. [V3.40/V2.40] **Auto Level Adjust for channel power measurement and statistic measurement**

- 29. [V3.50/V2.60] Extended scrambling code range
- 30. [V3.50/V2.60] Advanced channel type estimation for compressed mode
- 31. [V3.50/V2.60] Display of slot format type A and type B
- 32. [V3.50/V2.60] Display of TPC Symbols in the first slot of a compressed gap
- 33. [V3.50/V2.60] Constellation re-arrangement for 16 QAM in dependence on constellation parameter B
- 34. [V3.50/V2.60] Absolute and relative slot power display and differential slot power display added
- 35. [V3.50/V2.60] Extended trigger range
- 36. [V3.50/V2.60] RF combination measurement (RF Combi)
- 37. [V3.60/V2.60] Display of frequency error versus slot, phase discontinuity versus slot, symbol magnitude error and symbol phase error
- 38. [V3.60/V2.60] Result Summary: added value RHO
- 39. [V3.60/V2.60] Scrambling code input in hex and also in decimal
- 40. [V3.60/V2.60] HSDPA mode can be switched OFF / ON
- 41. [V3.60/V2.60] Measurement of timing offset in predefined channel mode
- 42. [V3.60/V2.60] Multi carrier ACP measurement with independent inter carrier spacing support
- 43. [V3.60/V2.60] SEM: Extended range definition for peak list and adjustable transition frequency
- 44. [V3.60/V2.60] External trigger level adjustable from 0.5 to 3.5 V
- 45. [V3.60/V2.60] Carrier frequency step size softkey available
- 46. [V3.70/V2.80] Scrambling code auto search
- 47. [V3.70/V2.80] Channel table compare mode
- 48. [V3.70/V2.80] Remote command to read out total power versus slot
- 49. [V3.70/V2.80] ACLR/MCACL: number of adjacent channels increased to 12, power mode to max hold the power results
- 50. [V3.70/V2.80] RF COMBI: noise correction mode
- 51. [V3.80/V2.80] Support for HSUPA within R&S FS-K74
- 52. [V3.80/V2.80] Trace view available within code domain analyzer
- 53. [V3.90] List result of scrambling code search
- 54. [V4.00] Vector error of Error Vector Magnitude (EVM) versus chip
- 55. [V4.00] Magnitude error of Error Vector Magnitude (EVM) versus chip
- 56. [V4.00] Phase error of Error Vector Magnitude (EVM) versus chip
- 57. [V4.00] Spectrum emission mask: List evaluation in lower screen now supported
- 58. [V4.00SP1] New remote command TRACe:DATA? ATRACE2
- 59. [V4.10] New remote command CALC:MARK:FUNC:WCDP:RES? PSYMBol | ACHannels
- 60. [V4.20] Support for instrument R&S FSG.
- 61. [V4.20] Soft key REF VALUE Y AXIS available for CDP measurements.
- 62. [V4.30] New option R&S FS-K74+ with support of 64QAM.
- 63. [V4.30] Relative Code Domain Error (RCDE) display available.
- 64. [V4.30] User definable CPICH code number and pattern.
- 65. [V4.30] Average power of inactive channels display
- 66. [V4.40] Average RCDE display
- 67. [V4.50] Single antenna MIMO measurement
- 68. [V4.50] Time Alignment Error measurement
- 69. [V4.50] RRC receiver filter switch
- 70. [V4.60] Single-stream MIMO for single antenna MIMO measurements is now supported.

- 71. [V4.60] MIMO modulation patterns on both antennas for single antenna MIMO measurements are now supported.
- 72. [V4.60] Separate scaling setting for result Symbol Constellation diagram using MIMO.
- 73. [V4.61] Support of data-aided 64QAM single antenna MIMO measurements.
- 74. [V4.70] Time Alignment Error measurement for multi carrier scenarios for R&S FSQ and R&S FSG.
- 75. [V4.70] Single carrier Time Alignment Error : Sign of result changed to be in line with 3GPP specifications.
- 75. [V4.70 SP1] Multi Standard Radio Measurement Extension.
New remote command MMEM:LOAD:IQ:STAT supported

Modifications to the Operating Manual

The R&S FS-K72/K74/K74+ 3G FDD BTS analyzer functions are included in a separate manual set. Please refer to the following order numbers:

- 1154.7023.42-10 English
- 1154.7023.44-10 German

Modified Chapters

Modified Chapters for remote operation

MMEMory subsystem

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'

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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?"

```

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

Example:	<pre> "*RST" "SENS:FREQ:CENT 1GHz" "SENS:FREQ:SPAN 0Hz" "TRAC:Y:RLEV -20.0dBm" "TRAC:IQ:STAT ON" "TRAC:IQ:DATA:FORM IQP" "TRAC:IQ:SET NORM,50MHz,81.6MHz,IMM,POS,0,1850000" "INIT:IMM;*OPC? " "MMEM:STOR:IQ:STAT 1, 'D:\RAWIQ' " "MMEM:CONV:IQ 'D:\RAWIQ', 1, 2.5MHz, 'D:\WCDMA_P25' "MMEM:CONV:IQ 'D:\RAWIQ', 1, -2.5MHz, 'D:\WCDMA_N25' "INST:SEL WCDP;*OPC? " "INIT:CONT OFF" "MMEM:LOAD:IQ:STAT 1, 'D:\WCDMA_P25'" "MMEM:LOAD:IQ:STAT 1, 'D:\WCDMA_N25'" "INST:SEL SAN;*OPC?" </pre>	<pre> ' STEP1: ' set Center Freq./Ref Level/... ' ' set Center / Ref Level ' Zerospan ' STEP2: ' Capture data with extended I/Q Bandwidth ' activate I/Q capture mode ' I/Q Format I/Q Pair ' Trigger Free Run ' Sample Rate 81.6 MHz ' Pre Trigger 0 samples ' Number of Samples: ' to capture for 22.7ms ' perform the I/Q measurement ' STEP3: ' Store I/Q Data into IQ.TAR file ' Store data to file ' D:\RAWIQ.IQ.TAR ' STEP4: ' Resample IQ Data ' WCDMA, Offset +2.5MHz ' WCDMA, Offset -2.5MHz ' STEP5: ' Analyse I/Q data ' STEP5: ' analyse the WCDMA signals at ' offset +2.5 MHz / -2.5 MHz ' enter K72 ' set to single sweep ' load and analyse ' Offset+2.5MHz file ' now query required results ' load and analyse ' Offset-2.5MHz file ' now query required results ' leave K72 </pre>
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Characteristics: *RST value: -
 SCPI: device-specific

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

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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