ROHDE&SCHWARZ

Test and Measurement
Division

Release Notes

cdma2000/1xEV-DV
Base Station Test
Application Firmware R&S FS-K82

Release 4.10
for R&S FSP, FSU, FSQ, FMU, FSUP Analyzer Firmware 4.1x

Release Note Revision: 2

Printed in the Federal
Republic of Germany

Contents

History

Date	Rel Note Rev	Changes
03. April 2007	1	First revision for R&S FS-K82 Firmware 4.10
06. August 2007	2	Added R&S FSUP 4.17

General Topics

Compatibility of R&S FS-K82 cdma2000 BTS Application Firmware

The following table shows the compatible version of the basic analyzer firmware version and the cdma2000 BTS application firmware:

Table of compatible versions:

R&S FS-K82 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
4.10	4.10	4.11	4.15	-	4.17	4.18
4.00	4.00	4.01	4.05	-	-	-
3.90	3.90	3.91	3.95	3.96	3.99	-
3.80	3.80	3.81	3.85	3.86	-	-
3.70	3.70	3.71	3.75	-	-	-
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	-	-	-
3.30	3.30	3.31	3.35	-	-	-
3.28	3.20	3.21	3.25	-	-	-
3.24	3.10	3.11	3.15	-	-	-
3.20	3.00	-	3.05	-	-	-
2.80	2.80	2.81	-	-	-	-
2.60	2.60	2.61	-	-	-	-
2.40	2.40	2.41	2.45	-	-	-
2.30	2.30	2.31	2.35	-	-	-
2.28	2.20	2.21	2.25	-	-	-
2.24	2.10	2.11	2.15	-	-	-
1.20	1.80	1.81	1.85	-	-	-
1.12	1.70	1.71	-	-	-	-
1.10	1.60	1.61	1.65	-	-	-

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-K82 cdma2000 BTS Application Firmware

The R&S FS-K82 cdma2000 BTS application firmware package is available with its own version number. This application firmware package requires an appropriate basic instrument firmware version. The compatible versions are shown in the table above.
Please make sure to have the correct basic firmware version installed prior to installing the R&S FS-K82 cdma2000 BTS application firmware. Please refer to the basic firmware version release notes for firmware update information of the basic firmware.

Note: *R&S FS-K82 and R&S FS-K83 are using the same update set. It is therefore required to only update one of these applications.*

Generation of an update disk set for R&S FS-K82

The files needed for the R&S FS-K82 cdma2000 BTS Application Firmware update are available in the FIRMWARE section of the Service Board on GLORIS (R&S FS-K82).
If you already have the update disk set you can skip this paragraph.

They are grouped according to the disk contents:

Disk 1: disk1.bin (self-extracting ZIP file)

The contents of disk 1 are packed in a self-extracting ZIP file and need to be unzipped. For this purpose the following steps are necessary:

1. Create a temporary directory on your local PC (e.g. FSK82TEMP on drive C:).
2. Copy disk1.bin into that directory and rename it to disk1.exe.
3. Execute disk1.exe. Under Windows 95/98/NT/XP/2000 this is done best using the following sequence:
   <CTRL><ESC> - RUN – C:\FSK82TEMP\DISK1 - <ENTER>
   or
   <CTRL><ESC> - AUSFÜHREN – C:\FSK82TEMP\DISK1 - <ENTER> for a German Windows version.
   The files will be unzipped.
4. **For Version 2.xx only:**
   Delete disk1.exe from the temporary directory.
   The temporary directory will now contain the following files:

inst32i.ex	_isdel.exe	_setup.dll	_sys1.cab	_user1.cab
Data.tag	data1.cab	id.txt	lang.dat	layout.bin
os.dat	Setup.exe	Setup.ini	setup.ins	setup.lid

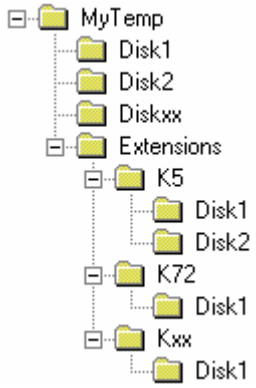
   For Version 3.xx only:
   Delete disk1.exe from the temporary directory.
   The temporary directory will now contain the following files:

data1.cab	data1.hdr	data2.cab	ExecCtrl.exe	id.txt	ikernel.ex_
ISSetup.exe	layout.bin	RestInst.exe	Setup.exe	Setup.ini	setup.inx

   Please make sure that all filenames exactly match with these printed above before you try to use them for the firmware update. Especially the trailing underscore ('_') as used in ikernel.ex_ **or** _inst32i.ex_ **is essential for correct operation of the update program.**

5. Copy the content of the temporary directory onto update disk #1.

Preparing installation via LAN or USB stick:



If the installation shall be done via LAN or USB stick (XP only) please set up the following directory structure:

Copy all files as mentioned in the previous section in the directory ..\MyTemp\Extensions\K82\Disk1.

Performing an Application Firmware Update on the Instrument

The Application Firmware update process is performed in the following steps:

- Switch on the instrument and wait until the Analyzer has resumed operation.
- For updates from LAN or USB (XP only) use the SETUP | NEXT | FIRMWARE UPDATE | UPDATE PATH softkey to specify any path for the location of the Disk1 directory (e.g. F:\MyTemp\Extensions\K82). For floppy usage the default A:\ must not be changed
- Press SETUP → NEXT → FIRMWARE UPDATE
- Confirm the query "Do you really want to update the firmware?" with OK
- Insert update disk #1 as requested (for LAN or USB just confirm the copy process)
  The instrument will perform several automatic shutdowns, until the new firmware is installed properly. **Do not switch off the instrument until the update process has been finished completely.**

After switching on the instrument for the first time after a successful firmware update it is necessary to execute the instument's self alignment process by pressing CAL and softkey CAL TOTAL.

Note: *R&S FS-K82 and R&S FS-K83 are using the same update set. It is therefore required to only update one of these applications.*

A simplified update process is available if base system firmware 4.1x or newer is installed. More details are described in the release note of the base system firmware.

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 analyzer or delivered as a part of the R&S FS-K82 cdma2000 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.

- On a successful validation the message 'option key valid‘ will appear.

- If the validation failed, the application firmware is not installed.
  The most likely reason will be that the instrument is not equipped with the correct basic firmware version. In this case 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.

Modified Functions

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

1. [V1.20] FSQ Baseband Inputs R&S FSQ-B71 supported for Code Domain Analyzer.

2. [V3.20/V1.20] Evaluation Channel Table in conjunction with Time/Phase Offset measurement shows maximum values for Time and Phase Offset.

3. [V3.24/V2.24] Higher resolution of trigger to frame value on display.

4. [V3.24/V2.24] Result summary evaluation allows MIN/MAX and AVERAGE statistics.

5. [V3.24/V2.24] Transducer factors supported also for Code Domain Analyzer.

6. [V3.24/V2.24] Number of Sweep Points selectable in RF measurements.

7. [V3.28/V2.28] Unit circle display in constellation diagrams.

8. [V3.28] option FS-K9 power sensor support for RF measurements.

9. [V3.30/V2.30] Read out of spectrum emission mask worst fail position.

10. [V3.40/V2.40] Support for 1xEV-DV channels PDCCH and PDCH including additional modulation types 8PSK, 16QAM.

11. [V3.40/2.40] Sign change for frequency offset, phase offset and q-inversion for symbol constellation and bitstream.
Due to a correction of the cdma2000 specific –q definition, the mention values had been changed.

12. [V3.50/V2.60] CDP measurement over 2432 consecutive PCGs for R&S FSQ possible (over 3 seconds of IQ data).

13. [V3.50/V2.60] CDP measurement over 64 PCGs in R&S FSU and R&S FSP with B70 possible.

14. [V3.50/V2.60] Maximal capture length is increased to 64 for R&S FSU and R&S FSQ. On R&S FSQ also up to 38 sets of 64 PCGs are possible.

15. [V3.50/V2.60] `:[SENSe:]CDPower:ORDer?` **Delivers now short form** `HAD` **or** `BITR` **as result**.

16. [V3.60/V2.60] Enhanced multicarrier support with improved algorithm for multicarrier and low pass filter.

17. [V3.60/V2.60] External trigger level adjustable from 0.5 to 3.5V.

18. [V3.60/V2.60] Carrier frequency step size softkey available.

19. [V3.60/2.60] Changed SCPI commands
In order to limit to 12 chars the `:CALCulate2:FEED 'XTIMe:CDPower:SYMBol:CONStellation'` and `:CALCulate2:FEED 'XTIMe:CDPower:COMPosite:CONStellation'` are changed to `:CALCulate2:FEED 'XTIMe:CDPower:SYMBol:CONSt'` and `:CALCulate2:FEED 'XTIMe:CDPower:COMPosite:CONSt'`.

20. [V3.70/V2.80] Multi carrier adjacent channel power measurement within application.

21. [V3.70/V2.80] ACP: number of adjacent channels increased to 12.

22. [V3.70/V2.80] ACP: power mode to max holds the power results.

23. [V3.70/V2.80] SEM: configurable transition frequency for RBW change between 30 kHz and 1 MHz.

24. [V3.70/V2.80] Extended configuration of multi carrier filter: Selectable enhanced algorithm and additional filter type (RRC filter with configurable roll off factor and cut off frequency).

25. [V3.80/V2.80] SEM now supports peak list evaluation.

26. [V3.80/V2.80] Trace view available within code domain analyzer.

27. [V4.00] Spectrum emission mask: List evaluation in lower screen now supported.

Problems Eliminated

None

Known Problems

None

Modifications to the Operating Manual

For the R&S FS-K82 cdma2000 BTS Application Firmware manuals please refer to the following order numbers:

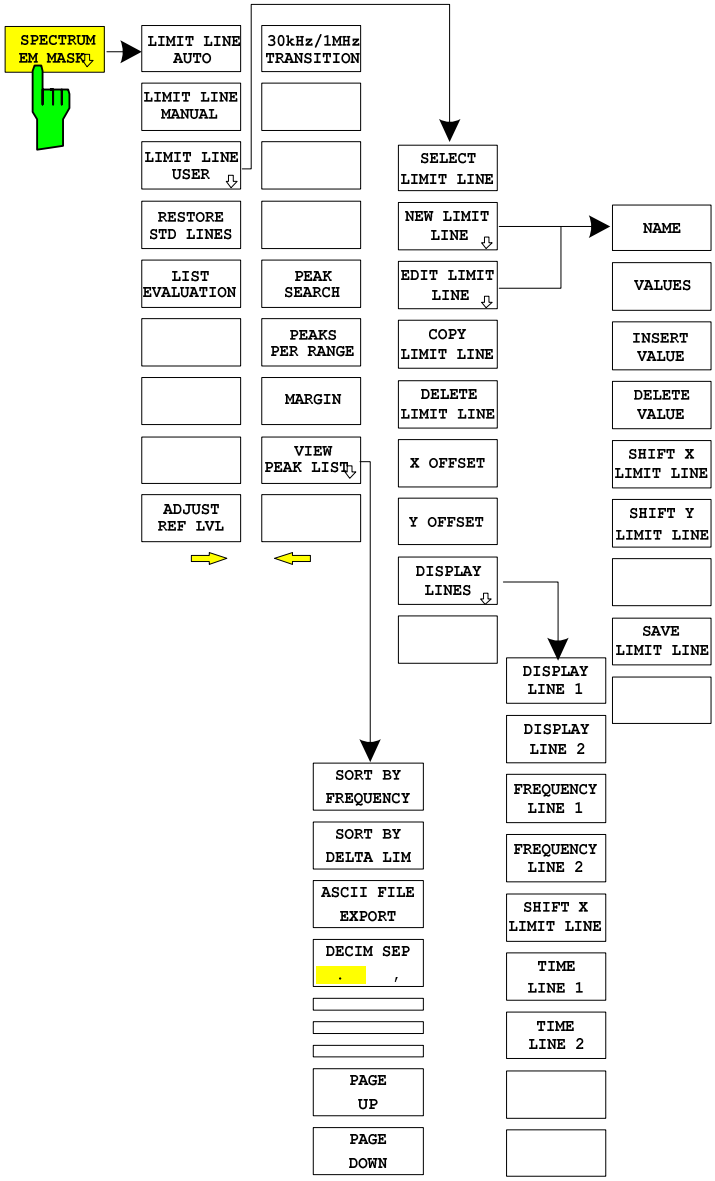
- 1007.9797.44-04 (German/English)

They can be downloaded from R&S internet – search: FS-K82:

http://www.rohde-schwarz.com

Modified Chapters

Menu MEAS – SPECTRUM EM MASK



The *SPECTRUM EM MASK* (Spectrum Emission Mask) softkey measures the signal power in defined offsets from the carrier and compares the power values with the spurious emission mask, specified in the cdma2000 specification, in the near–carrier range from –4 MHz to 4 MHz.

The limits depend on the band class setting (*BAND CLASS* softkey).

The softkey *LIST EVALUATION* reconfigures the SEM output to a split screen. In the upper half the trace with the limit line is shown. In the lower half the peak value list is shown. For every range of the spectrum emission defined by the standard the peak value is listed. For every peak value the frequency, the absolute power, the relative power to the channel power and the delta limit to the limit line is shown. As long as the delta limit is negative, the peak value is below the limit line. A positive delta indicates a failed value. The results are then colored in red, and a star is indicated at the end of the row, for indicating the fail on a black and white printout.
If the list evaluation is active, the peak list function is not available. Since version 4.00 the peak list softkeys are moved to the side menu.

IEC/IEEE-bus command:
`:CALCulate1:PEAKsearch:AUTO ON | OFF`

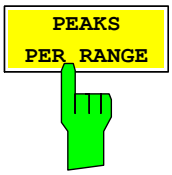
With this command the list evaluation which is by default for backwards compatibility reasons off can be turned on.

`TRACe1:DATA? LIST`
With this command the list evaluation results are queried in the following order:
<no>, <start>, <stop>, <rbw>, <freq>, <power abs>, <power rel>, <delta>, <limit check>, <unused1>, <unused2>
All results are float values.

no	: range number
start	: start frequency
stop	: stop frequency
rbw	: resolution bandwidth of range
freq	: frequency of peak
power abs	: absolute power in dBm of peak
power rel	: relative power in dBc (related to the channel power) of peak
delta	: distance to the limit line in dB (positive indicates value above the limit, fail)
limit check	: limit fail (pass = 0, fail =1)
unused1	: reserved (0.0)
unused2	: reserved (0.0)

The *PEAK SEARCH* softkey activates a single evaluation of spectrum emission mask. The limit mask - reduced by an overall margin - is checked against the trace. The fail positions are marked by crosses as long as not a next sweep is preformed. It is recommended to use single sweep. Every value is added to a peak list which can be opened and saved in ASCII format or read out via an IEC/IEEE command.
The peaks are calculated using the same peak search algorithm like markers do. It is possible to define the peak excursion value via *MKR->NEXT*, softkey *PEAK EXCURSION*. In addition the worst fail of each fail area without a peak is marked and added to the peak list.

IEC/IEEE bus command: `:CALC:PEAK`



The *PEAKS PER RANGE* softkey defines how many peaks are searched for within one range. The ranges are according to the band class setting (SETTINGS -> BAND CLASS) e.g. for BAND CLASS 0, 2, 3, 5, 9, 10, 11 and 12:

- from -4.00 MHz to -1.98 MHz from the carrier,
- from -1.98 MHz to -0.75 MHz from the carrier,

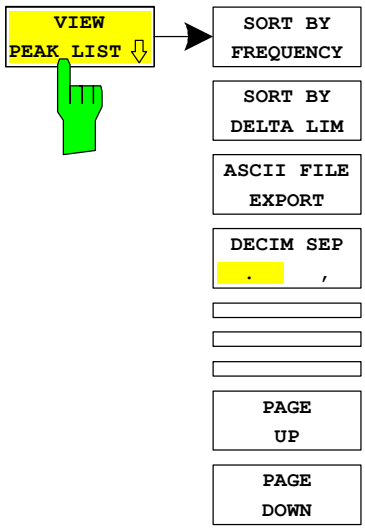
- the area from -0.75 MHz to +0.75 MHz around the carrier,
- from +0.75 to +1.98 MHz from the carrier
- from +1.98 MHz to +4.00 MHz from the carrier.

The default value of *PEAKS PER RANGE* is 25.

IEC/IEEE bus command: `:CALC:PEAK:SUBR 1...50`

The *MARGIN* softkey defines an overall margin which is subtracted from the limit line to make the peak search more stronger. If the values of the trace are above the limit line minus margin value it will be marked with a cross as shown in the peak list. The DELTA LIMIT of the list will be positive thus indicating that only the margin and not the limit itself is reached. A negative sign would indicate the real fail.
The default value of *MARGIN* is 6 dB.

IEC/IEEE bus command:
`:CALC:PEAK:MARG -200dB...200dB`



The *VIEW PEAK LIST* softkey opens the peak list. The list is empty if either no peak search (see softkey *PEAK SEARCH*) has been done, or if no peaks/fails have been found.
The list shows for every peak value the following entries:

- the range (LOWer side or UPper side from carrier)
- the frequency,
- the level in dBc (relative to the carrier channel power)
- the delta level to the limit (negative deltas indicate a fail).

With a high *MARGIN* of e.g. 200 dB and a *PEAKS PER RANGE* of 1 it is possible to obtain the worst point of each range, which can be sorted after pressing the *VIEW PEAK LIST* softkey in the order of the frequencies with *SORT BY FREQUENCY*.

The following figure shows a peak list:

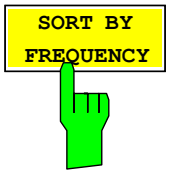
VIEW PEAK LIST			
LOW-UP RANGE /RBW	FREQUENCY	LEVEL dBc	DELTA LIMIT dB
L1.980-4.000M/30k	875.4020 MHz	-54.25	0.74
L0.750-1.980M/30k	876.7620 MHz	-54.41	-9.41
Inner Range /30k	879.2400 MHz	-55.62	-10.62
U0.750-1.980M/30k	880.2180 MHz	-54.07	-9.07
U1.980-4.000M/30k	881.1460 MHz	-53.66	1.33

Fig. 0-1 Peak list of spectrum emission mask

IEC/IEEE bus command: `:TRAC? FINal1`

The comma separated values are :

```
<freq1>, <level1>, <delta level 1>,
<freq2>, <level2>, <delta level 2>, ...
```



The *SORT BY FREQUENCY* softkey sorts the list in ascending order according to the column FREQUENCY.

IEC/IEEE bus command: `--`

The *SORT BY DELTA LIM* softkey sorts the list in descending order according to the column DELTA LIMIT.

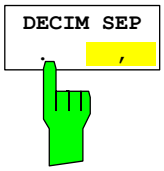
IEC/IEEE bus command: `--`

The *ASCII FILE EXPORT* softkey exports the peak list in ASCII format to a file.
The complete output format is similar to the trace export. The peak values within the file are comma separated in the format:

```
<trace no 1>, <freq1>, <level1>, <delta level 1>,
<trace no 2>, <freq2>, <level2>, <delta level 2>,
...
```

The trace no is always 1.

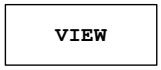
IEC/IEEE bus command: `:MMEM:STOR:FIN 'A:\final.dat'`



Different language versions of evaluation programs may require a different handling of the decimal point. It is therefore possible to select between default separators '.' (decimal point) and ',' (comma) using softkey *DECIM SEP.*

IEC/IEEE bus command: `:FORM:DEXP:DSEP POIN | COMM`

Menu TRACE



The softkey *VIEW* freezes the trace.

IEC-Bus-command:

```
:DISP:WIND:TRAC:MODE VIEW
```

Appendix: Contact to our hotline

Any questions or ideas concerning the instrument are welcome by our hotline:

USA & Canada

Monday to Friday (except US public holidays)
8:00 AM – 8:00 PM Eastern Standard Time (EST)

Tel. from USA	888-test-rsa (888-837-8772) (opt 2)
From outside USA	+1 410 910 7800 (opt 2)
Fax	+1 410 910 7801
E-mail	Customer.Support@rsa.rohde-schwarz.com

East Asia

Monday to Friday (except Singaporean public holidays)
8:30 AM – 6:00 PM Singapore Time (SGT)

Tel.	+65 6 513 0488
Fax	+65 6 846 1090
E-mail	Customersupport.asia@rohde-schwarz.com

Rest of the World

Monday to Friday (except German public holidays)
08:00 – 17:00 Central European Time (CET)

Tel. from Europe	+49 (0) 180 512 42 42
From outside Europe	+49 89 4129 13776
Fax	+49 (0) 89 41 29 637 78
E-mail	CustomerSupport@rohde-schwarz.com