

Instrument
Password
"894 129"



ROHDE & SCHWARZ

Test and Measurement
Division

Release Notes

Firmware Release 4.71 (XP)

with Service Pack 4

for R&S FSU Spectrum Analyzers

with order number: **1166.1660.xx** or
1313.9000.xx

New Features:

- 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" (with option FSU-B73)
Questionable Power Register Bit 7: "Input Overload"
- New Remote command ":TRAC:DATA:MEM?" to read a part of the trace data.
- FSP-B10: Support for SMB100A12, SMB100A20, SMB100A12 and HP83620.
- Support for new instrument models R&S FSU50 VAR49 and R&S FSU67 VAR66

Release Note Revision: 6

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History

Date	Rel Note Rev	Changes
20 May 2011	1	First revision for V4.71.
09 June 2011	2	New Operating Manual order number.
01 July 2011	3	Operating Manual version modified.
25 October 2011	4	Improvements with Service Pack 2 added.
10 November 2011	5	New functions and improvements with Service Pack 3 added.
02 August 2012	6	Improvements with Service Pack 4 added.

General Topics

Firmware Update

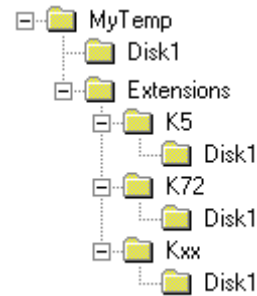
Generation of the update set

Since basic firmware version V4.21 a ZIP file with basic system firmware and the newest available applications is provided. This ZIP file is available in the instruments FIRMWARE section of the Service Board on GLORIS.

Since Version V4.75 the base system firmware is distributed in a single disk1 folder.

Preparing installation via USB stick or LAN:

- Download the update set ZIP file.
- Extract the contents of the ZIP file to a temporary folder, e.g. C:\MyTemp.
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:.
- Now copy the content of the temporary folder including all sub folders to a USB stick.
- The USB stick is now ready to for performing the update.



Following extension's sub folder are used for the instrument's applications:

- K5
- K30
- K40
- K70
- K72 (includes K73, K74, K74+)
- K76 (includes K77)
- K82 (includes K83)
- K84 (includes K85)
- K110

Performing the firmware update on the instrument

A new method to install the base system and all required applications is available, if the installed base system firmware is V4.11 or newer.

For updating to version 4.11 or newer first update the bases system only to get the new update manager. Then update base system and all applications using the new update manager.

Base System Update from version < 4.11 to 4.11 or newer:

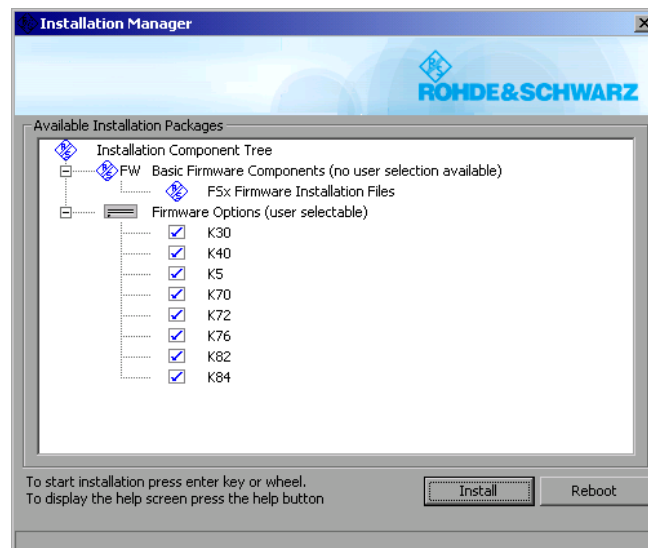
Skip this step, if the installed base system firmware is V4.11 or newer. The firmware update process is performed in the following steps:

- Switch the instrument on and wait until the Analyzer has resumed operation.
 - 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
 - Confirm the copy process.
 - The instrument will perform several automatic shutdowns, until the new firmware is installed properly.
- Do not switch the instrument off until the update process has been finished completely.**

Complete Update with update manager:

- 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

Firmware update with large USB Sticks (≥1GByte)

Older instruments using Windows XP SP1 may have problems to detect the USB memory stick. Use another memory stick if a reboot with connected memory stick does not help.

No measurement applications 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.

This problem mainly affects instruments with 256MB system memory.

It is possible to deactivate this memory checking with SETUP – GENERAL SETUP – OPTIONS. This may help, if the required memory is close to available memory. As this check is done for worst case scenarios, the application will work in most cases.

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 update with FSU-B18/19/20 (flash disks):

At the final step of the setup, backup files are stored for the 'Analyzer Firmware Backup' (option during the start-up of the instrument). This backup is only available for analyzers equipped with hard discs. Therefore an error message "Add folder icon failed" occurs twice if the FSU-B18/B19/B20 are installed.

Workaround: Accept that message via the 'OK' button twice. The firmware update will continue without any problem! -> This problem is solved with version 3.51 or later.

Firmware installation of the R&S FS-K7 FM demodulator, R&S FS-K8 BLUETOOTH Analyzer software, R&S FS-K15 VOR/ILS Avionics Measurements Application and R&S FS-K9 Power Sensor Measurement

The R&S FS-K7, R&S FS-K8, R&S FS-K9 and R&S FS-K15 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 FSU 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 can be installed separately. Please refer to their release notes.

R&S FSU V4.71 SP4 is compatible to the following firmware option releases:

R&S FS-K5	R&S FS-K30	R&S FS-K40	R&S FS-K72 FS-K73 FS-K74 FS-K74+	R&S FS-K76 FS-K77	R&S FS-K82 FS-K83	R&S FS-K84 FS-K85	R&S FS-K110	R&S FSQ-K70
4.70 SP1	4.70 SP1	4.70 SP1	4.70 SP2	4.70 SP1	4.70 SP1	4.70 SP1	4.70	4.72

Hint:

Applications with the version number 3.xx / 4.xx are only compatible with basic firmware 3.yy / 4.yy (see table above).

Do not install application firmware with versions 1.xx or 2.xx on an R&S FSU with basic firmware 3.yy or 4.yy!

New Functions in Version 4.71

- **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 (with option FSU-B73).
- **FSP-B10:** Support for SMB100A12, SMB100A20, SMB100A12 and HP83620 (with Service Pack 2).
- **Support for new instrument models**
R&S FSU50 VAR49 and R&S FSU67 VAR66
(with Service Pack 3).

Improvements

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

- 1. (V4.65) 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. (V4.61) Noise Correction: Setting the TRACE mode to VIEW deactivates the noise correction.**

Note: This issue is already fixed in V4.61 SP1.

- 3. (V4.61) A frequency domain sweep does not terminate.**

This issue may happen for certain combinations of Center Frequency, Span, Resolution Bandwidth, Video Bandwidth and Sweptime and is now fixed.

Note: This issue is already fixed in V4.61 SP3.

- 4. (V4.31) 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 V4.61 SP2.

- 5. (V4.61 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 V4.61 SP2.

6. (V4.61) The AUTO RECALL button is named as "CANCEL" instead of "OK".

7. (V4.61) 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. (V4.61 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. (V4.61 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. (V4.61) 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. (V4.61) ACP Measurement: The Power Mode selection has no effect for a number of ADJ channels of 0.

12. (V4.61) HP Emulation: Marker resolution corrected for command MKF?.

13. (V4.61) 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:CEN 28E+6;SPAN 3E+3".

14. (V4.61) 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. (V4.61) The rotary knob direction is changed for File Manager, Save/Recall and Hardcopy dialogs.

16. (V4.61) 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 4.61/4.61 SP1 the state change will get lost after reboot.

Note: This issue is already fixed in V4.61 SP2.

17. (V4.61 SP2) B10: A GPIB address change for the external signal generator is ignored.

The analyzer application is using the previous address until the external source is switch off and on again.

Note: This issue is already fixed in V4.61 SP2.

18. (V4.61 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 V4.61 SP2.

19. (V4.61 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.

20. (V4.51) FS-K8: Some results in EDR Spurious Emissions measurement do not include the Reference Level Offset.

Note: This issue is already fixed in V4.61 SP2.

21. (V4.61) 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 V4.61 SP1.

Improvements with Service Pack 2

Service Pack 2 corrects the following issues. The version numbers in brackets indicate the version in which the issue was observed for the first time.

Note: Service Pack 1 does not exist. This number is skipped due to internal reasons.

1. (V4.61) **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. (V4.71) **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. (V4.71) **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.

4. (V4.71) **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.**

5. (V4.71) **Function NOISE CORR does not support TRACE AVERAGE MODE LOG but the softkey is available.**

6. (V4.71) **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.

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

8. (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. (V4.71) **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. (V4.71) **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. (V4.15 SP3) A resource leak is visible on creation of a transducer file.

This has now been corrected.

2. (V4.71 SP3) Hardcopy configuration: The list of selectable printer devices is empty but a printer driver is installed.

This has now been corrected.

3. (V4.71 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.

4. (V4.71) No firmware options available after firmware upgrade on instruments with less than 1 GByte system memory.

This has now been corrected.

Known Issues

This chapter includes firmware problems 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 issue was observed for the first time.

1. (V4.41) 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.

2. (V4.71) 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 sweeptime and the RMS or Average Detector instead.

Modified Functions

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

1. (V3.11) Hardcopy screen comment changed to one comment, not one per screen.

2. (V3.31) Change to SMR setting files for external generator control:

This change enables significant improvements in frequency settling with logarithmic frequency step sizes.

3. (V3.41) Active transducer and adjust reference level procedure:

If transducers are active and the adjust reference level procedure (in measurements like ACP, occupied bandwidth, signal statistics, etc.) is invoked, the *REFLVL ADJ AUTO/MANUAL* of the *SETUP|TRANSDUCER* menu is set to AUTO thus the best dynamic performance is obtained.

4. (V3.51) The External reference frequency is not any longer changeable via knob wheel to prevent changing that value by chance.

5. (V3.61) Marker peak list in continuous sweep mode

In continuous sweep mode the marker peak list is not any longer executing a single sweep and then peak list search, but the peak list will immediately work on the current trace. This allows peak list functionality on averaged or max holded traces in continuous sweep mode. The single sweep mode is unchanged.

6. (V3.61) VBW 30 MHz

For analyzers with IF Filter Model 03 or newer a VBW of 30MHz can be selected if the RBW is greater than 10 MHz. The hardware setting is identical to VBW of 10MHz (no VBW usage).

7. (V3.61) RS232 serial remote control

Since version 3.61 the instrument goes in remote mode rather than in local mode when a command is send through the RS232 remote interface. This means the display disappears and the LOCAL softkey appears as when the GPIB bus is used. To change between local and remote mode the commands @LOC and @REM can be send to the instrument.

8. (V3.71) Harmonic measurement

The mixer level within the harmonic measurement is changed to -10 dBm.

The value update in the lower screen happens during the sweep and not only at sweep end.

9. (V3.81) Modifications to HP commands

- Command IP resets format to O3
- Reading a trace with TRA; TRB or TRC is possible even if trace is blank
- Great changes of span (e.g. from 2 GHz to 100 KHz) will not loose signal when marker track is on
- The R&S FSU has now a mixer level of -10dBm instead of -25dBm

10. (V3.91) The CCDF measurement result table is extended by 0.01% value.**11. (V3.91) New marker functions AUTO MAX PEAK and AUTO MIN PEAK.****12. (V3.91) HP emulation: HP Models 71100C, 71200C and 71209A are using 800 sweep points****13. (V4.01) Additional number of sweep points 201, 401, 801 and 1601.****14. (V4.01) HP emulation: Additional HP Models 8568A_DC and 8568B_DC using DC coupling.****15. (V4.01) HP emulation: GENERAL SETTINGS - GPIB menu extended by IF GAIN NORM / PULS****16. (V4.01) New spurious emissions measurement LIST EVALUATION****17. (V4.01) FS-K7: The THD Unit is selectable (dB / %) in the AM signal / AF spectrum result****18. (V4.01) New function MARKER FILE EXPORT.****19. (V4.01) Support for FSU-B73 added.****20. (V4.01) Signal Track: Enhanced sensitivity in marker tracking function.**

The marker is now set to the signal peak after very single sweep. This only occurred in earlier versions if the difference between signal peak and center frequency exceeded 20 % of the Resolution Bandwidth.

21. (V4.01 SP2) HP emulation: Behaviour of KSK and MKPK changed in single sweep mode.

The commands KSK (next peak) and MKPK NHINLINR (next high, next left, next right) do not perform a new sweep in single sweep mode.

22. (V4.01 SP2) IF SHIFT B, additional shift for resolution bandwidth < 200 kHz.**23. (V4.11) Improved Firmware Update.****24. (V4.11) New enhancement label to indicate filter type.**

3DB	Gauss filter 3dB
6DB	EMI filter 6dB
FFT	FFT filter
CHN	Channel filter
RRC	RRC filter

25. (V4.11) New filter Type EMI (6dB).**26. (V4.11) Gated statistics measurements APD, CCDF.****27. (V4.11) FS-K8 Enhanced Data Rate (EDR) supported.****28. (V4.11) Support for Power Sensor NRP-Z81 is available.****29. (V4.11) GPIB: Basic remote control of the signal generator which is connected to the additional FSP-B10 GPIB Interface.****30. (V4.11) GPIB: SCPI format for binary block data extended for byte counts > 999.999.999 bytes.****31. (V4.11) GPIB: New commands available**

: [SENSe<1 2>:]CORRection:TRANsducer:ACTive?	returns active transducer
: CALCulate<1 2>:LIMit<1...8>:ACTive?	returns active limit line(s)

32. (V4.11) Trigger Line for video trigger is now also visible outside of the trigger menu.
33. (V4.11) Extended resolution for the number of sweep points.
In addition to currently allowed values an increment of 100 is possible now for number of points ≥ 201 .
34. (V4.11) HP emulation: The OL command returns the mixer level in byte 23
35. (V4.11) HP emulation: The commands MKPK NH | NL | NR and KSK do not perform a sweep start when marker is already switched on
36. (V4.11) HP emulation: The commands SNGLS and CONTS are setting the command complete bit (bit 4) in STB
37. (V4.11) HP emulation: New softkey SETUP - GENERAL SETUP - GPIB - SWEEP REP ON/OFF"
38. (V4.11) HP emulation: New commands: VARDEF, CTA, ADD, SUB, MPY, DIV
39. (V4.11) HP emulation: New command NORMLIZE for tracking generator
40. (V4.11) HP emulation: The command LF performs a reset
41. (V4.11) LXI Class C support
42. (V4.11) Measurement speed improved for EMI filter available (spectrum mode / frequency domain).
43. (V4.11SP1) New model R&S FSU67 supported.
44. (V4.11SP1) New CPU Board 1091.3104 supported (with the exception of option B73).
45. (V4.11SP2) Option B73 now supported with new CPU Board 1091.3104, too.
46. (V4.21) New Save/Recall menu and dialogs available.
47. (V4.21) An easy access to the Windows XP Start menu is available.
48. (V4.21) The required sweeptime is reduced for video bandwidth < resolution bandwidth.
49. (V4.21) ASCII Export available for Marker Peak List.
50. (V4.21) Adjustable marker position knob stepsize is available.
51. (V4.21) New trace average function Power added.
52. (V4.21) HP emulation: Personality Spurious supported.
53. (V4.21) HP emulation: Personality Phase Noise supported.
54. (V4.21) New Service function 0.6.0 to check installation of option FSU-K51
The function returns 0 / 1 if FSU-K51 is not installed / installed.
Example: "DIAG:SERV:SFUN? '0.6.0' "
55. (V4.21) FSP-B10: Upper frequency limit of SMF100A is now 43.5 GHz .
56. (V4.21) The Aquisition Time (for FFT filter) is now readable with remote command "SENS:SWE:TIME?".
57. (V4.21 SP1) FSP-B10: Support for SMA100, SMB100 (1/2/3/6GHz), SMF (22/43GHz) SMJ (3/6GHz).
58. (V4.21 SP1) FSP-B10: Support for SMF100a - TTL mode.
59. (V4.21 SP1) FSU-B21 with Order Number 1157.1126.03 supported.
60. (V4.21 SP1) For local lockout the alias remote command SYSTem:KLOCK ON | OFF is provided.
61. (V4.31) International keyboard driver package supported (German, Spanish, French, Italian and Portuguese).
62. (V4.31) New dialogs available for file/path selection (e.g. for Trace Export, Firmware Update Path).
63. (V4.31) ACP: Extended upper limits for Channel Bandwidth (5GHz) and Channel Spacing (20GHz).
64. (V4.31) 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 slitley 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
65. (V4.31) **ACP: Result output format changed for number of ADJ channels > 3.**
 66. (V4.31) **Additional soft keys are available to change the LAN configuration.**
 67. (V4.31) **Save dialog reports a warning, if no item to save is selected.**
 68. (V4.31) **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.
 69. (V4.31) **Dummy Video Bandwidth 0 Hz returned for active FFT filter.**
 70. (V4.31) **Availability changed for Spurious Measurement.**
The Spurious Measurement is not available if the ACP measurement is active.
 71. (V4.31) **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
 72. (V4.31) **HP emulation: A new softkey COUPLING FSP/HP is now available to change the Span/RBW and RBW/VBW default coupling.**
 73. (V4.31) **HP emulation: The default for Sweep Repeat is now OFF for 856x and 859x.**
 74. (V4.31) **FSU-B9: The number of sweep points allowed in analyzer mode is now supported in NETWORK mode, too.**
 75. (V4.31) **FS-K7: Deemphasis is now additionally supported for active Weighting AF Filter CCTT and CCIR.**
 76. (V4.31) **Support added for new option VOR/ILS Avionics Measurements Application R&S FS-K15.**
 77. (V4.31) **Support added for new option 3GPP HSPA+ Application Firmware R&S FS-K74+.**
 78. (V4.31) **Application Setup Recovery restores previous settings after application exit.**
 79. (V4.41) **Configurable Spectrum Emission Mask measurement is available in analyzer mode.**
 80. (V4.41) **ACP measurement: User definable standards available.**
 81. (V4.41) **ACP measurement: New standards for E-UTRA / LTE.**
 82. (V4.41) **External Reference: Selectable PLL bandwidth and new "Fall Back to Internal" mode EXT [INT].**
 83. (V4.41) **TOI Measurement: New TOI marker search function added (TOI MKR CALC/SRCH).**
 84. (V4.41) **Additional overload indication OVTRC is available.**
 85. (V4.41) **FSU67 allows 70 GHz Full Span.**
 86. (V4.41) **TRAC:IQ sub system: New remote command TRAC:IQ:DATA:FORMAT.**
 87. (V4.41) **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.
 88. (V4.41) **General Setup: Baudrate 19200 for the serial COM interface is now selectable.**
 89. (V4.41) **Harmonic Measurement: Additional remote command to get the used resolution bandwidth settings:**
CALCulate1:MARKer1:FUNCTION:HARMonics:BANDwidth[:LIST]?
 90. (V4.49) **FS-K9: Support for Power Sensors NRP-Z56, NRP-Z57 and NRP-Z92.**
 91. (V4.41) **FSP-B10: Support for SMBV100a, SMA100a and SMB (TTL mode).**
 92. (V4.41) **Support for FS-K73+.**
 93. (V4.41) **HP emulation**
 - command OL expanded
 - no difference between local and remote sweep points

94. (V4.41) **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)
 95. (V4.41) **HP emulation for 8566A/B, 8568A/B**
 - Support of 4 markers
 96. (V4.41) **HP emulation for 8591E, 8594E**
 - sweep time adjusted for gated sweep (command GATE)
 97. (V4.41 SP1) **Support for new option FS-K110 TETRA II** (requires option FSU-B73).
 98. (V4.51) **New functions to temporary disable/enable option license keys.**
 99. (V4.51) **New remote command "SYSTem:SHUTdown" to shutdown the instrument.**
 100. (V4.51) **New Status Bit for Overload Trace (OVTRC) in the STATus:QUESTionable:POWer Register.**
 101. (V4.51) **New function EXPORT/IMPORT DEV DATA to export and import device specific data (e.g. option licence keys).**
 102. (V4.51) **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>

```
103. (V4.51) **Occupied Bandwidth measurement:**
    - New command ":CALC:MARK:FUNC:POW:RES? AOB | AOBW" returns the position and level of marker T1 and T2.**
  104. (V4.51) **Transducer: New function VIEW TRANSDUCER available**
  105. (V4.51) **Trace Export: Additional ASCII File entries "Preamplifier" and "Transducer"**
  106. (V4.51) **HP emulation: New command "SER?" available to query the serial number**
  107. (V4.51) **New "Instrument Driver Actuator" in the Windows Start menu**
  108. (V4.51) **FSU-B21: User Band Harmonic Numbers up to 100 supported.**
  109. (V4.51) **FSU-B21: Import of conversion loss tables from USB stick supported.**
  110. (V4.51) **FS-K8: EDR Spuriuos: Remote Control read access allowed for Span, Start- and Stop Frequency.**
  111. (V4.51) **Gated Statistics Measurement: Additional settings checks added (e.g. if the period time does not fit to the I/Q capture length).**
  112. (V4.51) **LXI Class C Support is now integral part of the base system firmware.**
  113. (V4.61) **Auto Login Password for user INSTRUMENT is changed to "894129" for security reasons.**
  114. (V4.61) **CONFIGURE NETWORK: An error message pops up if no LAN cable is connected. "NOT CONNECTED" is now visible.**
  115. (V4.61) **Support for Noise Correction outside of ACP measurement .**
  116. (V4.61) **Multi Carrier ACP: Number of TX channels increased from 12 to 18.**
  117. (V4.61) **Multi Carrier ACP: Support for save/recall of user defined standards.**
  118. (V4.61) **SEM measurement: Supports for save/recall of user defined standards.**
  119. (V4.61) **SEM Measurement: Required Number of Sweep Points is not set.**

The following 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 not automatically adjusted to this value.

**Note:** The number of sweep points is not set to its previous value if the SEM measurement is switched off or another SEM standard file is loaded.

**120. (V4.61) SEM measurement: Ref Level dialog available to adjust the sweep list's level settings.**

**121. (V4.61) SEM measurement: Additional WIMAX configuration files available for DL ETSI (5MHz / 10MHz).**

**122. (V4.61) Extended Marker Peak List function including automatic peak list update.**

**123. (V4.61) 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

**124. (V4.61) FS-K7: New Fundamental Frequency AUTO/MANUAL setting for SINAD and THD measurement.**

**125. (V4.61) FS-K9: Indication of the power meter's serial number.**

**126. (V4.61SP1) Support for new board revisions of Wideband Detector Unit (option FSU-B73).**

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 <sup>\*)</sup>**

<sup>\*)</sup> HWC value divided by 4 is odd.

**Warning:** A backgrade to earlier firmware versions is not possible in that case.

**127. (V4.61SP2) Resolution Bandwidth 6.25 kHz supported.**

**128. (V4.61SP2) FS-K9: Support for Power Sensor NRP-Z86 available.**

**129. (V4.61SP2) PSA / 89600 Emulation available.**

**130. (V4.61SP2) Support for the Status Operation Register Bits MEASuring/SWEeping.**

**131. (V4.71) ACP Measurement: Improved dynamic range with activated noise correction and detector RMS.**

**132. (V4.71) New 6 kHz RRC Filter available.**

**133. (V4.71) Spectrum Emission Mask measurement: Additional customized configuration files for CDMA 2000.**

**134. (V4.71) New remote command "DIAG:SERV:VERS?" available to query all the measurement application versions.**

**135. (V4.71) Support for Status Questionable Power Register Bit "Input Overload".**

**136. (V4.71) New Status Operation Register Bit "Wait for TRIGger" supported for I/Q measurements using TRACE:IQ sub system (with option FSU-B73).**

**137. (V4.71SP2) New remote command ":TRAC:DATA:MEM?" available with analyzer mode.**

**138. (V4.71SP2) FSP-B10: Support for SMB100A12, SMB100A20, SMB100A12 and HP83620.**

**139. (V4.71SP2) Support for new instrument models  
R&S FSU50 VAR49 and R&S FSU67 VAR66 added.**

**140. (V4.71SP2) 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 current manual sets are

- 1313.9646.11-01 (German) and
- 1313.9646.12-01 (English).

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

The firmware options FS-Kxx come with their own operating manual and release notes. Please refer to the corresponding release notes for more information on changes to these packages.

## 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) | < V4.41      |
|           | "123456"                  | V4.41, V4.51 |
|           | "894129"                  | ≥ V4.61      |

**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        | <b>CALibrating</b><br>This bit is set as long as the instrument is performing a calibration.                                                                               |
| 1 to 2   | These bits are not used                                                                                                                                                    |
| 3        | <b>SWEeping</b><br>This bit is set while the instrument performs a sweep.<br>It is supported in analyzer mode only (Full Screen, frequency domain and time domain).        |
| 4        | <b>MEASuring</b><br>This bit is set while the instrument performs a measurement.<br>It is supported in analyzer mode only (Full Screen, frequency domain and time domain). |
| 5 to 7   | These bits are not used                                                                                                                                                    |
| 8        | <b>HardCOPy in progress</b><br>This bit is set while the instrument is printing a hardcopy.                                                                                |
| 9        | This bit is not used                                                                                                                                                       |
| 10       | <b>Sweep Break</b><br>This bit is set when end of sweep range is reached (spurious measurement, mode analyzer).<br>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        | <b>OVERload</b> (Screen A)<br>This bit is set if the RF input is overloaded. 'OVLD' will then be displayed.                                                                                                                                                                                                                                                                                              |
| 1        | <b>UNDERload</b> (Screen A)<br>This bit is set if the RF input is underloaded. 'UNLD' will then be displayed.                                                                                                                                                                                                                                                                                            |
| 2        | <b>IF_OVERload</b> (Screen A)<br>This bit is set if the IF path is overloaded. 'IFOVL' will then be displayed.                                                                                                                                                                                                                                                                                           |
| 3        | <b>Overload Trace</b> (Screen A)<br>This bit is set if the input is overloaded (OVLD or IFOVL) and the Trace Modes AVERAGE , MAXHOLD or MINHOLD are active.<br>'OVTRC' will then be displayed.<br>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        | <b>Input Overload</b><br>This bit is set if the RF input Overload detection becomes active.<br>Use command "INP:ATT:PROT:RES" to re-connect the RF input with the input mixer.                                                                                                                                                                                                                           |
| 8        | <b>OVERload</b> (Screen B)<br>This bit is set if the RF input is overloaded. 'OVLD' will then be displayed.                                                                                                                                                                                                                                                                                              |
| 9        | <b>UNDERload</b> (Screen B)<br>This bit is set if the RF input is underloaded. 'UNLD' will then be displayed.                                                                                                                                                                                                                                                                                            |
| 10       | <b>IF_OVERload</b> (Screen B)<br>This bit is set if the IF path is overloaded. 'IFOVL' will then be displayed.                                                                                                                                                                                                                                                                                           |
| 11       | <b>Overload Trace</b> (Screen B)<br>This bit is set if the input is overloaded (OVLD or IFOVL) and the Trace Modes AVERAGE , MAXHOLD or MINHOLD are active.<br>'OVTRC' will then be displayed.<br>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|4.71,  
 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,  
 POWER METER K9||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

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

### 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

## PSA Emulation with commands especially for the Agilent 89600 Software

| Supported 89600 commands              | Status                           |
|---------------------------------------|----------------------------------|
| *CAL?                                 | available in V4.61 SP2 and above |
| *CLS                                  | available in V4.61 SP2 and above |
| *ESE                                  | available in V4.61 SP2 and above |
| *ESR?                                 | available in V4.61 SP2 and above |
| *IDN?                                 | available in V4.61 SP2 and above |
| *IST?                                 | available in V4.61 SP2 and above |
| *OPC                                  | available in V4.61 SP2 and above |
| *OPT?                                 | available in V4.61 SP2 and above |
| *PCB                                  | available in V4.61 SP2 and above |
| *PRE                                  | available in V4.61 SP2 and above |
| *PSC                                  | available in V4.61 SP2 and above |
| *RST                                  | available in V4.61 SP2 and above |
| *SRE                                  | available in V4.61 SP2 and above |
| *STB?                                 | available in V4.61 SP2 and above |
| *TRG                                  | available in V4.61 SP2 and above |
| *TST?                                 | available in V4.61 SP2 and above |
| *WAI                                  | available in V4.61 SP2 and above |
| :CALibration:AUTO OFF ON ALERT        | available in V4.61 SP2 and above |
| :CALibration:TCORrections AUTO ON OFF | available in V4.61 SP2 and above |
| :CONFigure:WAVEform                   | available in V4.61 SP2 and above |
| :DIAGnostic:EABY ON OFF               | available in V4.61 SP2 and above |
| :DIAGnostic:LATCh:VALue <numeric>     | available in V4.61 SP2 and above |
| :DIAGnostic:LATCh:SElect <string>     | available in V4.61 SP2 and above |

| Supported 89600 commands                                | Status                           |
|---------------------------------------------------------|----------------------------------|
|                                                         | above                            |
| :DISPlay:ANNotation:TITLe:DATA <string>                 | available in V4.61 SP2 and above |
| :DISPlay:ENABle OFF ON                                  | available in V4.61 SP2 and above |
| :DISPlay:WINDow:TRACe:Y:[SCALe]:PDIVision <numeric>     | available in V4.61 SP2 and above |
| :DISPlay:WINDow:TRACe:Y:[SCALe]:RLEVel <numeric>        | available in V4.61 SP2 and above |
| :DISPlay:WINDow:TRACe:Y:[SCALe]:RLEVel:OFFSet <numeric> | available in V4.61 SP2 and above |
| :FORMat:BORDER NORMAl SWAPped                           | available in V4.61 SP2 and above |
| :FORMat[:DATA] ASCii REAL UINT MATLAB,<numeric>         | available in V4.61 SP2 and above |
| :INITiate:CONTinuous OFF ON                             | available in V4.61 SP2 and above |
| :INITiate[:IMMediate]                                   | available in V4.61 SP2 and above |
| :INSTrument:CATalog?                                    | available in V4.61 SP2 and above |
| :INSTrument:NSElect <numeric>                           | available in V4.61 SP2 and above |
| :MMEMory:CATalog? <dir_name>                            | available in V4.61 SP2 and above |
| :MMEMory:COpy <'file_name1'>,<'file_name2'>             | available in V4.61 SP2 and above |
| :MMEMory:DATA <'file_name'>,<definite_length_block>     | available in V4.61 SP2 and above |
| :MMEMory:DELeTe <'file_name'>                           | available in V4.61 SP2 and above |
| :MMEMory:LOAD:STATe 1,<'file_name'>                     | available in V4.61 SP2 and above |
| :MMEMory:LOAD:TRACe 1,<'file_name'>                     | available in V4.61 SP2 and above |
| :MMEMory:MDIRectory <'dir_name'>                        | available in V4.61 SP2 and above |
| :MMEMory:MOVE <'file_name1'>,<'file_name2'>             | available in V4.61 SP2 and above |
| :MMEMory:STORE:STATe 1,<'file_name'>                    | available in V4.61 SP2 and above |
| :MMEMory:STORE:TRACe <numeric>,<'file_name'>            | available in V4.61 SP2 and above |
| :READ:WAVform?                                          | available in V4.61 SP2 and above |
| [[:SENSe]:FREQuency:CENTer <numeric>                    | available in V4.61 SP2 and above |

| Supported 89600 commands                                    | Status                           |
|-------------------------------------------------------------|----------------------------------|
| [.SENSe]:FREQuency:STARt <numeric>                          | available in V4.61 SP2 and above |
| [.SENSe]:FREQuency:STOP <numeric>                           | available in V4.61 SP2 and above |
| [.SENSe]:FREQuency:SPAN <numeric>                           | available in V4.61 SP2 and above |
| [.SENSe]:POWEr:ATTenuation <numeric>                        | available in V4.61 SP2 and above |
| [.SENSe]:ROSCillator:EXTernal:FREQuency <numeric>           | available in V4.61 SP2 and above |
| [.SENSe]:ROSCillator:OUTPut OFF ON                          | available in V4.61 SP2 and above |
| [.SENSe]:ROSCillator:SOURce INTernal EXTernal EAUTO         | available in V4.61 SP2 and above |
| [.SENSe]:SPECTrum:TRIGger:SOURce EXTernal<1 2> IF IMMediate | available in V4.61 SP2 and above |
| [.SENSe]:WAVEform:ADC:RANGe P6                              | available in V4.61 SP2 and above |
| [.SENSe]:WAVEform:APER?                                     | available in V4.61 SP2 and above |
| [.SENSe]:WAVEform:AVERage:TACount <numeric>                 | available in V4.61 SP2 and above |
| [.SENSe]:WAVEform:BWIDth:ACTive?                            | available in V4.61 SP2 and above |
| [.SENSe]:WAVEform:BWIDth:TYPE FLAT GAUSSian                 | available in V4.61 SP2 and above |
| [.SENSe]:WAVEform:IFGain <numeric>                          | available in V4.61 SP2 and above |
| [.SENSe]:WAVEform:IFPath NARRow WIDE                        | available in V4.61 SP2 and above |
| [.SENSe]:WAVEform:NCPTTrace ON OFF                          | available in V4.61 SP2 and above |
| [.SENSe]:WAVEform:PDIT ON OFF                               | available in V4.61 SP2 and above |
| [.SENSe]:WAVEform:SRATe <numeric>                           | available in V4.61 SP2 and above |
| [.SENSe]:WAVEform:SWEep:TIME <numeric>                      | available in V4.61 SP2 and above |
| [.SENSe]:WAVEform:TRIGger:EOffset?                          | available in V4.61 SP2 and above |
| [.SENSe]:WAVEform:TRIGger:INTerpolation ON OFF              | available in V4.61 SP2 and above |
| [.SENSe]:WAVEform:TRIGger:SOURce EXTernal<1 2> IF IMMediate | available in V4.61 SP2 and above |
| :STATus:QUESTionable:CONDition?                             | available in V4.61 SP2 and above |
| :STATus:QUESTionable:ENABLE <number>                        | available in V4.61 SP2 and above |

| Supported 89600 commands                              | Status                           |
|-------------------------------------------------------|----------------------------------|
| :STATus:QUESTionable:NTRansition <number>             | available in V4.61 SP2 and above |
| :STATus:QUESTionable:PTRansition <number>             | available in V4.61 SP2 and above |
| :STATus:QUESTionable[:EVENT]?                         | available in V4.61 SP2 and above |
| :STATus:QUESTionable:CALibration:CONDition?           | available in V4.61 SP2 and above |
| :STATus:QUESTionable:CALibration:ENABLE <number>      | available in V4.61 SP2 and above |
| :STATus:QUESTionable:CALibration:NTRansition <number> | available in V4.61 SP2 and above |
| :STATus:QUESTionable:CALibration:PTRansition <number> | available in V4.61 SP2 and above |
| :STATus:QUESTionable:CALibration[:EVENT]?             | available in V4.61 SP2 and above |
| :STATus:QUESTionable:FREQuency:CONDition?             | available in V4.61 SP2 and above |
| :STATus:QUESTionable:FREQuency:ENABLE <number>        | available in V4.61 SP2 and above |
| :STATus:QUESTionable:FREQuency:NTRansition <number>   | available in V4.61 SP2 and above |
| :STATus:QUESTionable:FREQuency:PTRansition <number>   | available in V4.61 SP2 and above |
| :STATus:QUESTionable:FREQuency[:EVENT]?               | available in V4.61 SP2 and above |
| :STATus:QUESTionable:INTegrity:CONDition?             | available in V4.61 SP2 and above |
| :STATus:QUESTionable:INTegrity:ENABLE <number>        | available in V4.61 SP2 and above |
| :STATus:QUESTionable:INTegrity:NTRansition <number>   | available in V4.61 SP2 and above |
| :STATus:QUESTionable:INTegrity:PTRansition <number>   | available in V4.61 SP2 and above |
| :STATus:QUESTionable:INTegrity[:EVENT]?               | available in V4.61 SP2 and above |
| :STATus:OPERation:CONDition?                          | available in V4.61 SP2 and above |
| :STATus:OPERation:ENABLE <integer>                    | available in V4.61 SP2 and above |
| :STATus:OPERation:NTRansition <integer>               | available in V4.61 SP2 and above |
| :STATus:OPERation:PTRansition <integer>               | available in V4.61 SP2 and above |
| :STATus:OPERation[:EVENT]?                            | available in V4.61 SP2 and above |
| :SYSTem:COMMunicate:GPIB[:SELF]:ADDRESS <integer>     | available in V4.61 SP2 and above |



| Supported 89600 commands                                                                                                  | Status                           |
|---------------------------------------------------------------------------------------------------------------------------|----------------------------------|
| :SYSTem:DATE <year>,<month>,<day>                                                                                         | available in V4.61 SP2 and above |
| :SYSTem:ERRor[:NEXT]?                                                                                                     | available in V4.61 SP2 and above |
| :SYSTem:KLOCK?                                                                                                            | available in V4.61 SP2 and above |
| :SYSTem:MESSage <string>                                                                                                  | available in V4.61 SP2 and above |
| :SYSTem:PRESet                                                                                                            | available in V4.61 SP2 and above |
| :SYSTem:TIME <hour>,<minute>,<second>                                                                                     | available in V4.61 SP2 and above |
| :SYSTem:VERSion?                                                                                                          | available in V4.61 SP2 and above |
| :TRACe:COpy <src_trace>,<dest_trace>                                                                                      | available in V4.61 SP2 and above |
| :TRACe[:DATA] TRACE1   TRACE2   TRACE3   TRACE4   TRACE5   TRACE6, <definite_length_block>   <comma_separated_ASCII_data> | available in V4.61 SP2 and above |
| :TRACe:MODE WRITe MAXHold MINHold VIEW BLANK                                                                              | available in V4.61 SP2 and above |
| :TRIGger[:SEQuence]:DELay <numeric>                                                                                       | available in V4.61 SP2 and above |
| :TRIGger[:SEQuence]:DELay:STATe OFF ON 0 1                                                                                | available in V4.61 SP2 and above |
| :TRIGger[:SEQuence]:EXTernal:DELay <numeric>                                                                              | available in V4.61 SP2 and above |
| :TRIGger[:SEQuence]:EXTernal:LEVel <numeric>                                                                              | available in V4.61 SP2 and above |
| :TRIGger[:SEQuence]:EXTernal:SLOPe POSitive NEGative                                                                      | available in V4.61 SP2 and above |
| :TRIGger[:SEQuence]:HOLDoff <numeric>                                                                                     | available in V4.61 SP2 and above |
| :TRIGger[:SEQuence]:IF:DELay <numeric>                                                                                    | available in V4.61 SP2 and above |
| :TRIGger[:SEQuence]:IF:LEVel <numeric>                                                                                    | available in V4.61 SP2 and above |
| :TRIGger[:SEQuence]:IF:SLOPe POSitive NEGative                                                                            | available in V4.61 SP2 and above |
| :TRIGger[:SEQuence]:SLOPe POSitive NEGative                                                                               | available in V4.61 SP2 and above |
| :TRIGger[:SEQuence]:SOURce IMMEDIATE VIDeo EXTernal<1 2>                                                                  | available in V4.61 SP2 and above |
| :TRIGger[:SEQuence]:VIDeo:LEVel <numeric>                                                                                 | available in V4.61 SP2 and above |
| :TRIGger[:SEQuence]:VIDeo:LEVel:FREQuency <freq>                                                                          | available in V4.61 SP2 and above |

# R&S FS-K7 Extensions

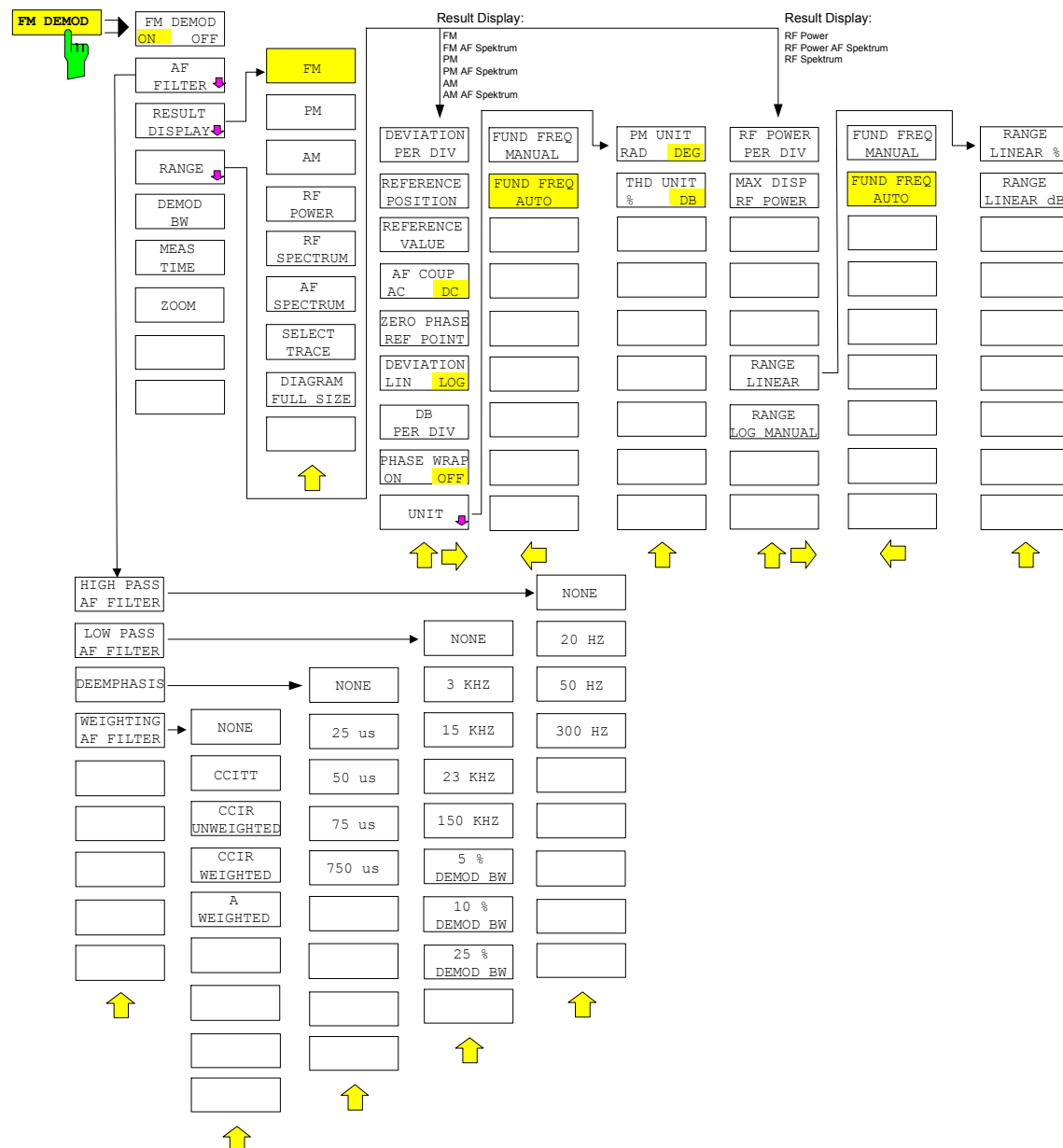
## Operating Manual "FM Measurement Demodulator R&S FS-K7":

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

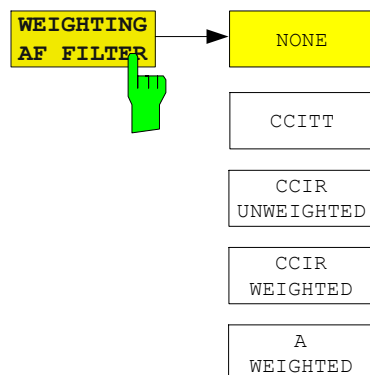
The corresponding PDF-Files are separately available on the service board.

## 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:

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

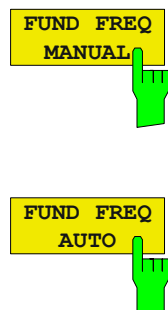
**A WEIGHTED:** Switches on the A weighted filter. The weighting filter is active in the following demodulation bandwidth range:

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

### Remote commands:

```
:SENSe:FILTer:CCIR[:UNWeighted][:STATE] ON | OFF
:SENSe:FILTer:CCIR:WEIGhted[:STATE] ON | OFF
:SENSe:FILTer:CCITt[:STATE] ON | OFF
:SENSe:FILTer:AWEightd[: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&lt;1|2&gt;: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.

|                 |                                    |                             |
|-----------------|------------------------------------|-----------------------------|
| <b>Example:</b> | "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&lt;1|2&gt;: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".

|                 |                                    |                                                                                                                  |
|-----------------|------------------------------------|------------------------------------------------------------------------------------------------------------------|
| <b>Example:</b> | "CALC:ADEM:THD:FREQ:FUND:AUTO OFF" | ' deactivates the auto se<br>' lection and uses the<br>' current Modulation Freq.<br>' as fundamental frequency. |
|-----------------|------------------------------------|------------------------------------------------------------------------------------------------------------------|

|                         |            |                 |
|-------------------------|------------|-----------------|
| <b>Characteristics:</b> | *RST-Wert: | ON              |
|                         | SCPI:      | device-specific |

The numeric suffix <1 to 4> at marker is irrelevant with this command.

## :SENSe&lt;1|2&gt;: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

|                         |            |                 |
|-------------------------|------------|-----------------|
| <b>Characteristics:</b> | *RST-Wert: | OFF             |
|                         | SCPI:      | device-specific |

The numeric suffix <1|2> is irrelevant with this command.

## :SENSe&lt;1|2&gt;: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

|                         |            |                 |
|-------------------------|------------|-----------------|
| <b>Characteristics:</b> | *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":**

- 1157.2597.41-03 (English). and
- 1157.2597.42-03 (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.

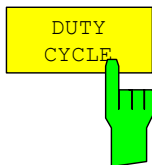
### Software Manual "Measurements with Power Sensors, Application Firmware R&S FS-K9":

- 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

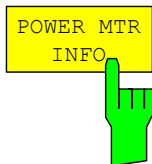


The DUTY CYCLE softkey opens a dialog to set the duty cycle to a percent value for the correction of pulsemulated signals. With the correction activated, the sensor calculates the signal pulse power from this value and the mean power. The softkey is highlighted if the correction is switched on. Press 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:DCYCl:STATe ON | OFF
SENSe1:PMETer:DCYCl: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: DCYCl: 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 FS-K15 Extensions

The R&S FS-K15 VOR/ILS Avionics Measurements Application functions are included in a separate manual set. Please refer to the following order numbers:

### Operating Manual "VOR/ILS Avionics Measurements Application Firmware R&S FS-K15":

- 1302.0942.42-02 (English)

The corresponding PDF-File ist separately available on the service board.

### Last minute changes to the R&S FS-K15 operating manual

None.

## 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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