



ROHDE & SCHWARZ

Test and Measurement
Division

Release Notes

Noise Test

Application Firmware R&S FS-K30

Release 4.51

for R&S FSP, FSU, FSQ, FSG, FSMR, FSUP
Analyzer Firmware V4.5x

New Features:

- Single frequency measurement

Release Note Revision: 1

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History

Date	Rel Note Rev	Changes
26 March 2010	1	First revision for Noise Application Firmware 4.51

General Topics

Compatibility of the R&S FS-K30 Noise Application Firmware with other Firmware Releases

The following table shows the compatible versions of the basic analyzer firmware and the Noise Application Firmware:

Table of compatible versions:

R&S FS-K30 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 FSG Basic Firmware
4.51	4.50 SP1	4.51 SP1	4.55 SP2	-	-	4.59 SP1
4.50	4.50	4.51	4.55	-	-	4.59
4.40	4.40	4.41	4.45	-	-	4.49
4.30	4.30	4.31	4.35	-	-	4.39
4.20 SP1	4.20	4.21	4.25	-	4.27	4.29
4.20	-	-	-	-	-	4.29
4.10 / 4.10 SP1	4.10	4.11	4.15	-	4.17	-
4.00	4.00	4.01	4.05	4.06	-	-
3.90	3.90	3.91	3.95	3.96	3.99/3.97	-
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	-	-	-
-	3.10	3.11	3.15	-	-	-

Note: For **R&S FSMR** a system memory of 512MByte is required.
For instruments, shipped with 256MByte system memory, a memory extension FSQ-B512, order number 1157.1590.02, is available.
The system memory size can be easily checked by pressing SETUP – SYSTEM INFO – STATISTICS, item "Memory size".

Firmware Update of the R&S FS-K30

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

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

Enabling the Application Firmware via License Key Code Entry

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

After installing the application firmware package a license key for validation must be entered. The license key is printed either on a label on the rear panel of the instrument or delivered as a part of the R&S FS-K30 Noise 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. The instrument will perform an automatic reboot.
- If the validation failed, the application firmware is not installed.
The most probable reason will be that the instrument is not equipped with the correct basic firmware version. Therefore a messagebox will appear asking for installation of the correct basic firmware version.

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

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

New Functions in version 4.51

- Single frequency measurement

Improvements

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

1. [V4.50] **Correction incorrect LOSS Out error reporting in Fixed IF/Fixed LO modes**
2. [V4.50] **Improved capacity to restore the 'Calibrated' status when settings are set back to what they were during calibration**
3. [V4.50] **Correction to SCPI command 'STATus:QUESTionable:CORRection'. Bits 2 and 3 meaning modified:**
 - Bit 2: deprecated, unused
 - Bit 3: Missing Loss or ENR values

No ENR, Loss In and/or Loss Out can be determined for one or all of the measurement frequencies. This occurs when using tables of ENR, Loss In and/or Loss out values. Check that the frequency ranges of the tables covers the range of frequencies to be measured. For each measurement frequency where ENR, Loss In or Loss Out cannot be determined 0 is used.

Known Issues

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

IEC/IEEE Bus only

1. [V3.90] [SENSe:]CONFigure:MODE commands

[SENSe] is not optional for these commands when using the short form: "CONF:MODE" as it conflicts with the "CONFigure" subsystem.

Workaround: Do not omit SENSE for these commands.

Modified Functions

The behaviour of the following functions changed compared to earlier versions [the number in brackets indicates the firmware version that introduced the individual change]:

1. [V3.60] **ASCII Trace export available**
2. [V3.70] **Increased number of digits in table of results**
3. [V3.80] **X-axis scale is configurable between RF and IF frequencies**
4. [V3.80] **Roll key direction is same as the spectrum analyzer**
5. [V4.10] **One marker is supported for noise and gain trace.**
6. [V4.10] **Binary trace data export supported.**
7. [V4.10] **Memory traces supported via SCPI.**
8. [V4.10] **Additional enhancement labels OVLD, EXREF, EXT, SGL and PA.**

9. [V4.10] Optimized print colours.

Print functionality is using the optimized print colours for better view.

10. [V4.10] Trace Export shows all data values in one line

Trace Export function now provides useful array of data. All data values for one frequency point are displayed in the same line.

11. [V4.20] Support for new instrument model R&S FSG.**12. [V4.20 SP1] Added Print Table hardcopy functionality.****13. [V4.30] Added support for the Application recovery feature.****14. [V4.50] Support for option External Mixer B21.****15. [V4.51] Single frequency measurement.**

Modifications to the Operating Manual

The R&S FS-K30 Noise application functions are included in a separate manual set. Please refer to the following order numbers:

- 1157.2316.02 (German and English)

Modified Chapters for manual operation

Single Frequency measurement

Single Frequency measurements give access to the functionalities of Frequency List measurements for quick measurements at one particular frequency: only one frequency has to be set before running the measurement and the measurement is performed at this frequency only. As with Frequency List measurements measurement at this frequency can be done once (Single measurements) or continuously (Continuous measurements).

Single Frequency measurements are run:

- by checking the Single Freq checkbox in the Frequency Settings dialog and then choosing the type of execution by pressing the Run Single or Run Cont Hotkey
- by using the CONFIGure:FREQUENCY:SINGLE or CONFIGure:FREQUENCY:CONTinuous SCPI command and then INITiate

The frequency the measurement is done at can be set in the Start Frequency field in the Frequency Settings dialog.

The result is displayed in the Result List, limiting the list to one element.

However in this mode the graphical display is disabled and remains blank.

Frequency Settings

The parameters in the Frequency Settings group are used to automatically generate the list of Receive Frequency (*RF*) values for the Frequencies List shown on the right of the settings view.

The *RF* values in the Frequencies List are generated into a list of ascending frequencies as follows (when the *Start Frequency* is less than the *Stop Frequency*):

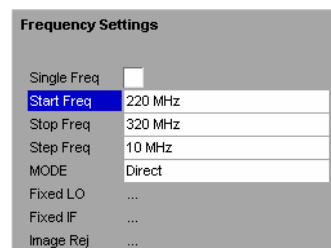
1. *Start Frequency*
2. *Start Frequency* + *Step Frequency*
3. *Start Frequency* + *Step Frequency* * 2
4. *Start Frequency* + *Step Frequency* * 3
- ...
- n. Stop Frequency*

If the *Start Frequency* is larger than the *Stop Frequency*, then the *RF* values will be generated into a list of descending frequencies with the *Step Frequency* being subtracted for each step.

If the values for *Start*, *Stop* & *Step Frequency* will result in a Frequencies List of more than 100 measurement steps, only the first 100 *RF* steps will be generated and a warning will be displayed to the user (See Section 4). Reduce the gap between the *Start* & *Stop Frequencies* or increase the *Step Frequency* to reduce the list to 100 points or less.

If the Single Frequency measurement is selected *Start* and *Stop* frequencies are always identical and the list reduced to one element, allowing to quickly run a measurement at one specific frequency. The *Stop* and *Step Frequency* fields are disabled and the *Stop Frequency* follows changes made to the *Start Frequency*.

Start Frequency

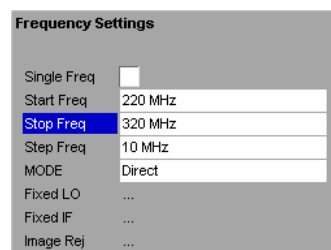


Frequency Settings	
Single Freq	<input type="checkbox"/>
Start Freq	220 MHz
Stop Freq	320 MHz
Step Freq	10 MHz
MODE	Direct
Fixed LO	...
Fixed IF	...
Image Rej	...

The *Start Frequency* will be the frequency at which the Frequencies List starts, that is, the first Receive Frequency (*RF*) in the list.

Changing the *Start Frequency* will regenerate the list of measurement steps, using the measurement *Mode* selected.

Stop Frequency



Frequency Settings	
Single Freq	<input type="checkbox"/>
Start Freq	220 MHz
Stop Freq	320 MHz
Step Freq	10 MHz
MODE	Direct
Fixed LO	...
Fixed IF	...
Image Rej	...

The *Stop Frequency* will be the frequency at which the Frequencies List stops, that is, the last Receive Frequency (*RF*) in the list. If the number of measurement steps in the list reaches 100 steps before the *Stop Frequency* is reached, then the list generation will stop before it reaches the *Stop Frequency* and a warning will be displayed to the user (See Section 4).

Changing the *Stop Frequency* will regenerate the list of measurement steps, using the measurement *Mode* selected.

Step Frequency

Frequency Settings	
Single Freq	<input type="text"/>
Start Freq	220 MHz
Stop Freq	320 MHz
Step Freq	10 MHz
MODE	Direct
Fixed LO	...
Fixed IF	...
Image Rej	...

The *Step Frequency* will be the increment (or decrement) in Receive Frequency (*RF*) between each measurement step in the Frequencies List. If the *Step Frequency* is larger than the difference between the *Start Frequency* and the *Stop Frequency* then the Frequencies List will contain just the *Start Frequency* and *Stop Frequency*.

Changing the *Step Frequency* will regenerate the list of measurement steps, using the measurement Mode selected.

Mode

Frequency Settings	
Single Freq	<input type="text"/>
Start Freq	220 MHz
Stop Freq	320 MHz
Step Freq	10 MHz
MODE	Direct
Fixed LO	...
Fixed IF	...
Image Rej	...

The measurement *Mode* should be selected according to the type of Device Under Test.

R&S FS-K30 provides five different measurement Modes:

- Direct
- Fixed IF, $LO = RF + IF$
- Fixed IF, $LO = \text{abs}(RF - IF)$
- Fixed LO, $IF = RF + LO$
- Fixed LO, $IF = \text{abs}(RF - LO)$

Changing the *Mode* will regenerate the list of measurement steps, using the *Start*, *Stop* & *Step Frequencies*.

Fixed LO

Frequency Settings	
Single Freq	<input type="text"/>
Start Freq	220 MHz
Stop Freq	320 MHz
Step Freq	10 MHz
MODE	Fixed LO, $IF = RF + LO$
Fixed LO	0 Hz
Fixed IF	...
Image Rej	0 dB

The *Fixed LO* is the fixed local oscillator frequency for measurement *Modes*.

- Fixed LO, $IF = RF + LO$
- Fixed LO, $IF = \text{abs}(RF - LO)$

Changing the *Fixed LO* will replace all LO values in the Frequencies List (the list of measurement steps).

Fixed IF

Frequency Settings	
Single Freq	<input type="text"/>
Start Freq	220 MHz
Stop Freq	320 MHz
Step Freq	10 MHz
MODE	Fixed IF, $LO = RF + IF$
Fixed LO	...
Fixed IF	0 Hz
Image Rej	0 dB

The *Fixed IF* is the fixed intermediate frequency for measurement *Modes*.

- Fixed IF, $LO = RF + IF$
- Fixed IF, $LO = \text{abs}(RF - IF)$

Changing the *Fixed IF* will replace all IF values in the Frequencies List (the list of measurement steps).

Image Rejection

Frequency Settings	
Single Freq	<input type="checkbox"/>
Start Freq	220 MHz
Stop Freq	320 MHz
Step Freq	10 MHz
MODE	Fixed IF, LO=RF+IF
Fixed LO	...
Fixed IF	0 Hz
Image Rej	0 dB

The *Image Rejection* is the suppression applied to the second sideband during calculations for measurement *Modes*:

- Fixed IF, LO = RF + IF
- Fixed IF, LO = abs(RF – IF)
- Fixed LO, IF = RF + LO
- Fixed LO, IF = abs(RF – LO)

The value entered is applied across the complete frequency range. The default value of 999.99 dB means that the second sideband does not noticeably affect the measurement result because a suppression of 999.99 dB is applied to it. This corresponds to the generally used single-sideband (SSB) measurement. An entry of 0 dB would mean that both sidebands are converted to the same extent – this corresponds to a double-sideband (DSB) measurement.

Thus, for a SSB mixer, *Image Rejection* should be set to 999.99 dB. For a DSB mixer (one without any image rejection), the value should be 0 dB. Using an *Image Rejection* value of 999.99 dB for a DSB measurement will produce measurement errors: the measured noise figure will be 3 dB lower than the actual noise figure and the measured gain will be 3 dB higher than the actual gain.

For comparison with noise test systems of other manufacturers, the *Image Rejection* should be set to 999.99 dB (SSB measurement) as this is the setting implicitly used by almost all manufacturers.

Single Frequency Measurement

Frequency Settings	
Single Freq	<input checked="" type="checkbox"/>
Start Freq	220 MHz
Stop Freq	220 MHz
Step Freq	10 MHz
MODE	Fixed IF, LO=RF+IF
Fixed LO	...
Fixed IF	100 MHz
Image Rej	0 dB

When the Single Frequency Measurement is selected (by checking the “Single Freq” checkbox), the Stop and Step Frequency fields are disabled and the Stop Frequency is always set to the Start Frequency value.

Thus the Frequency List contains only one value, giving quicker access to both Single and Continuous measurements at that frequency.

Modified Chapters for remote operation

CONFigure:FREQuency:CONTInuous

This remote control command configures R&S FS-K30 for a continuous frequency measurement (continuous measurement at one single frequency as opposed to frequency list measurements). After this command has been executed a continuous frequency measurement will be the measurement started when the user issues the INITiate command.

Example: “CONF:FREQ:CONT” R&S FS-K30 is configured to run continuous frequency measurements.

Characteristics: *RST value: -
SCPI: device-specific

This command is an event and is therefore not assigned an *RST value and has no query.

CONFigure:FREQuency:SINGle

This remote control command configures R&S FS-K30 for a single frequency measurement (single measurement at one single frequency as opposed to frequency list measurements). After this command has been executed a single frequency measurement will be the measurement started when the user issues the INITiate command.

Example: "CONF:FREQ:SING" R&S FS-K30 is configured to run single frequency measurements.

Characteristics: *RST value: -
SCPI: device-specific

This command is an event and is therefore not assigned an *RST value and has no query.

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