

R&S®FSQ

Signal Analyzer

Instrument Security Procedures



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1 Overview

In many cases, it is imperative that the R&S FSQ Signal Analyzers are used in a secured environment. Generally these highly secured environments do not allow any test equipment to leave the area unless it can be proven that no user information leaves with the test equipment. Security concerns can arise when devices need to leave a secured area e.g. to be calibrated or serviced.

This document describes the types of memory and their usage in the R&S FSQ. It provides a statement regarding the volatility of all memory types and specifies the steps required to declassify an instrument through memory clearing or sanitization procedures. These sanitization procedures are designed for customers who need to meet the requirements specified by the US Defense Security Service (DSS).

2 Instrument Models Covered

Table 2-1: Signal Analyzer models

Product name	Order number
R&S FSQ3	1313.9100.03
R&S FSQ8	1313.9100.08
R&S FSQ26	1313.9100.26
R&S FSQ40	1313.9100.40

3 Security Terms and Definitions

Clearing:

As defined in Section 8-301a of DoD 5220.22-M, "National Industrial Security Program Operating Manual (NISPOM)", clearing is the process of eradicating the data on media so that the data can no longer be retrieved using the standard interfaces on the instrument. Hence, clearing is typically used when the instrument is to remain in an environment with an acceptable level of protection.

Sanitization:

As defined in Section 8-301b of DoD 5220.22-M, "National Industrial Security Program Operating Manual (NISPOM)", sanitization is the process of removing or eradicating stored data so that the data cannot be recovered using any known technology. Instrument sanitization is typically required when an instrument is moved from a secure to a non-secure environment, such as when it is returned for service of calibration.

The memory sanitization procedures described in this document are designed for customers who need to meet the requirements specified by the US Defense Security Service (DSS). These requirements are specified in the "Clearing and Sanitization Matrix" in Section 14.1.16 of the ISFO Process Manual for the Certification and Accreditation of Classified Systems under the NISPOM.

Instrument declassification:

A term that refers to procedures that must be undertaken before an instrument can be removed from a secure environment, such as is the case when the instrument is returned for calibration. Declassification procedures include memory sanitization or memory removal, or both. The declassification procedures described in this document are designed to meet the requirements specified in DoD 5220.22-M, "National Industrial Security Program Operating Manual (NISPOM)", Chapter 8.

4 Types of Memory and Information Storage in the R&S FSQ

The Signal Analyzer contains various memory components.

The following table provides an overview of the memory components that are part of your instrument. For a detailed description regarding type, size, usage and location, refer to the subsequent sections.

Memory type	Size	Content	Volatility	User data	Sanitization procedure
SDRAM (CPU board)	512 Mbyte	Temporary information storage for operating system and instrument firmware	Volatile	Yes	Turn off instrument power
EEPROM (board assembly)	256 bytes up to 32 kbyte	Hardware information: <ul style="list-style-type: none"> • Serial number • Product options • Calibration correction data 	Non-volatile	No	None required (no user data)
Flash (CPU board)	512 kbyte	BIOS	Non-volatile	No	None required (no user data)
Compact flash (removable)	4 Gbyte	<ul style="list-style-type: none"> • Operating system • Instrument firmware • Instrument states and setups • Trace data • Limit lines and transducer tables • Measurement results and screen images 	Non-volatile	Yes	Remove compact flash memory from instrument

4.1 Volatile Memory

The volatile memory in the instrument does not have battery backup. It loses its contents as soon as power is removed from the instrument. The volatile memory is not a security concern.

Removing power from this memory meets the memory sanitization requirements specified in the "Clearing and Sanitization Matrix" in section 5.2.5.5.5 of the ISFO Process Manual for the Certification and Accreditation of Classified Systems under the NIS-POM.

SDRAM

The SDRAM on the CPU board has a size of 512 Mbyte and contains temporary information storage for operating system and instrument firmware. The SDRAM loses its memory as soon as power is removed.

Sanitization procedure: Turn off instrument power

4.2 Non-Volatile Memory

The R&S FSQ contains various non-volatile memories. Out of these, only the compact flash memory contains user data. The compact flash memory can be physically removed from the R&S FSQ and left in the secure area.

All non-volatile memories of the R&S FSQ are not a security concern.

EEPROM

Each board assembly in the R&S FSQ Signal Analyzer has one serial EEPROM device with a size of 256 bytes up to 32 kbyte. The EEPROM contains information related to the installed hardware, such as board serial number, product options and calibration correction data. The EEPROM does not hold user data nor can the user access the EEPROM storage.

Sanitization procedure: None required (no user data)

Flash

The CPU board of the R&S FSQ Signal Analyzer has one 512 kbyte flash memory device. It contains the BIOS. The flash memory does not hold user data nor can the user access the flash memory.

Sanitization procedure: None required (no user data)

Compact flash memory / hard disk

The R&S FSQ Signal Analyzer can be equipped with either a non-removable hard disk or a removable compact flash memory. The hard disk and compact flash memory hold user data and are non-volatile. Hence, user data is not erased when power is removed from the instrument.

The compact flash memory (R&S FSQ-B18) can be removed from the Signal Analyzer to make sure that no user data is stored within the Signal Analyzer.

The R&S FSQ Signal Analyzer, equipped with the removable compact flash memory (R&S FSQ-B18), addresses the needs of customers working in secured areas.

Sanitization procedure: Remove compact flash memory from instrument

5 Instrument Declassification

Before you can remove the Signal Analyzer from a secured area (for example to perform service or calibration), all classified user data needs to be removed. You can declassify the Signal Analyzer as follows:

1. Turn off the Signal Analyzer. This will sanitize the volatile memory.
2. Remove the classified compact flash memory (containing user data).

Following these steps removes all user data from the Signal Analyzer. The Signal Analyzer can now leave the secured area.

These declassification procedures meet the needs of customers working in secured areas.

Once the Signal Analyzer is outside the secured area, installing a second non-classified removable compact flash memory (without any user data) allows the Signal Analyzer to function properly for service or other needs.

Prior to re-entering the secured area, the non-classified removable compact flash memory (without the user data) is removed. When the Signal Analyzer is back within the secured area, the original classified removable compact flash memory can be reinstalled.

- To hold classified user data in secure areas, use the removable compact flash memory (R&S FSQ-B18) which comes with the instrument.
- To hold non-classified user data in non-secure areas, use a second compact flash memory (R&S FSQ-B19).

Validity of instrument calibration after declassification

The calibration makes sure that measurements comply to government standards. Rohde & Schwarz recommends that you follow the calibration cycle suggested for your instrument.

The EEPROM is the only memory type used to hold permanent adjustment values required to maintain the validity of the R&S FSQ's calibration. Therefore, replacing one removable compact flash memory with another, does not affect the validity of the instrument's calibration.

However, for the R&S FSQ Signal Analyzer, equipped with the option B72 (I/Q bandwidth extension), there is an instrument-specific file which contains factory correction data. This file named `cal_freq_resp_b72.bin` which resides in the directory `D:/R_S.FW/Instr/EEPROM/CAL` must be copied to whichever hard disk is being used (see installation instructions of R&S FSQ-B19 for more details).

After an exchange of the removable compact flash memory, the board assembly EEPROMs need to be registered once:

1. Turn off the instrument.
2. Turn the instrument back on while holding down the decimal point key [.] on the number keypad on the front panel.
3. Continue to hold this key for 10 seconds after pressing the "On" button.
The instrument recognizes the changes and then powers up.

In case of a R&S FSQ Signal Analyzer with option B72, copy the appropriate calibration file from the non-classified removable compact flash memory by using a USB stick to the classified compact flash memory.

It is only necessary to perform these steps the first time the signal analyzer returns from the service.

After exchanging the removable compact flash memory, perform a self-alignment once:



Note that the instrument has sufficient warm-up time before you perform the self-alignment.

1. Select the CAL key.

2. Select the "CAL-TOTAL" softkey.

This function uses the high-stability internal reference generator to produce the temporary adjustment values. Using the permanent and temporary values, the necessary adjustment information is then stored on the compact flash memory. Rohde & Schwarz recommends that you perform the self-alignment function once a week.

6 Special Considerations for USB Ports

USB ports can pose a security risk in high-security locations. Generally, this risk comes from small USB pen drives, also known as memory sticks or key drives. They can be easily concealed and can quickly read/write several Gbyte of data.

Disabling USB ports for writing user data

You can disable the write capability on the USB ports of the R&S FSQ via a utility software. This utility software is available on the R&S FSQ website <https://www.rohde-schwarz.com/product/fsq.html>.

To disable the write capability, copy the utility software to the R&S FSQ and run it once. After a reboot of the instrument, the write capability on any USB memory device is disabled.

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