R&S®AFQ100B
UWB Signal and I/Q Modulation Generator
Instrument Security Procedures

ROHDE&SCHWARZ

Contents

1   Overview

In many cases, it is imperative that the R&S AFQ UWB Signal and I/Q Modulation Generators 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 AFQ. 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: UWB Signal and I/Q Modulation Generator models

Product name	Order number
R&S AFQ100B	1410.9000.02

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 AFQ

The UWB Signal and I/Q Modulation Generator 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)	256 Mbyte up to 512 Mbyte	Temporary information storage for operating system and instrument firmware	Volatile	Yes	Turn off instrument power
EEPROM (one per module)	2 kbyte	Module-specific data: • Serial number • Calibration correction data	Non-volatile	No	None required (no user data)
Flash (motherboard)	1 Mbyte	Hardware information: • Serial number • Product options • Calibration correction data	Non-volatile	No	None required (no user data)
Flash (CPU board)	512 kbyte	BIOS			

Hard Disk (removable)	160 Gbyte	• Operating system
		• Instrument firmware and firmware options
		• User data:
		  – Instrument states and setups
		  – Waveform data
		  – List mode data
			Non-volatile	Yes	Remove Hard Disk 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 NISPOM.

SDRAM

The SDRAM on the CPU board has a size of 256 Mbyte or 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 AFQ contains various non-volatile memories. Out of these, only the Hard Disk memory contains user data.

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

EEPROM

Each board assembly in the R&S AFQ UWB Signal and I/Q Modulation Generator, except the motherboard, has one serial EEPROM device with a size of 2 kbyte. The EEPROM contains module-specific data, such as the serial number of the module 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

There are two Flash memories in the R&S AFQ. The first 512 kbyte Flash memory contains the BIOS. It is located on the CPU board of the R&S AFQ.

The second 1 Mbyte Flash memory contains information related to the installed hardware, such as the serial number of the module, product options and calibration correction data. It is located on the motherboard of the R&S AFQ.

The Flash memory does not hold user data nor can the user access the Flash memory.

Sanitization procedure: None required (no user data)

Hard Disk

The removable Hard Disk has a size of 160 Gbyte.

The Hard Disk is used to store:

- Operating system
- Instrument firmware and firmware options (measurement personalities) with option license keys
- User data:
  – Instrument states and setups
  – Waveform data
  – List mode data

The Hard Disk holds user data and is non-volatile. Hence, user data is not erased when power is removed from the instrument.

The removable Hard Disk can be removed from the UWB Signal and I/Q Modulation Generator to make sure that no user data is stored within the UWB Signal and I/Q Modulation Generator. This can be done without opening the instrument.

The R&S AFQ, equipped with the removable Hard Disk, addresses the needs of customers working in highly sensitive areas.

Sanitization procedure: Remove Hard Disk from instrument

5 Instrument Declassification

Before you can remove the UWB Signal and I/Q Modulation Generator from a secured area (for example to perform service or calibration), all classified user data needs to be removed. You can declassify the UWB Signal and I/Q Modulation Generator as follows.

1. Turn off the UWB Signal and I/Q Modulation Generator and disconnect the power plug. This will sanitize the volatile memory.

2. To remove the Hard Disk, perform the following steps:

    a) Locate the Hard Disk.
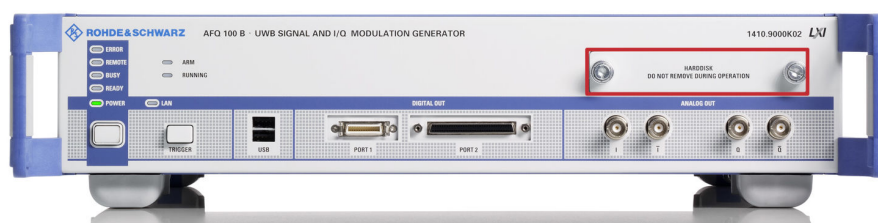
Figure 5-1: Location of the Hard Disk

    b) Unscrew the two knurled screws.
    c) Remove the Hard Disk on the front panel of the R&S AFQ.

Following these steps removes all user data from the UWB Signal and I/Q Modulation Generator. The UWB Signal and I/Q Modulation Generator can now leave the secured area.

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

Once the R&S AFQ is outside the secured area, installing a second non-classified removable Hard Disk (without any user data) allows the R&S AFQ to function properly for service or other needs.

Prior to re-entering the secured area, remove the non-classified removable Hard Disk (without the user data). When the R&S AFQ is back within the secured area, the original classified removable Hard Disk can be reinstalled.

*   To hold classified user data in secure areas, use the removable Hard Disk which comes with the instrument.
*   To hold non-classified user data in non-secure areas, use a second removable Hard Disk (spare part R&S service).

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 AFQ's calibration. Therefore, replacing one removable Hard Disk with another does not affect the validity of the instrument calibration.

6 Special Considerations for USB Ports and LAN Services

There are special considerations for R&S AFQ USB ports and LAN services to avoid unauthorized data access in a high-security location.

6.1 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

You can disable the USB ports of the R&S AFQ in the setup dialog:

1. Select "Setup", "Security", "USB Storage" and then "Disable".

2. Enter the **Security Password** and confirm with "Accept".

   When disabled, no USB storage device is accepted by the instrument. Other non-memory USB devices (such as keyboards and mice) are not affected.

The enable/disable state of the USB port is stored on the Flash memory.

6.2 Special Considerations for LAN Ports

To protect the instrument against unauthorized data access in your high-security location, you can disable the LAN interface.

Disabling LAN ports

You can disable the LAN ports of the R&S AFQ in the setup dialog:

1. Select "Setup", "Security", "LAN Services" and disable "LAN Interface".

2. Enter the **Security Password** and confirm with "Accept".

   When disabled, no LAN connection can be established with the instrument.

The enable/disable state of the LAN port is stored on the Flash memory.

For more information concerning the security features, refer to the R&S AFQ100A Operating Manual.