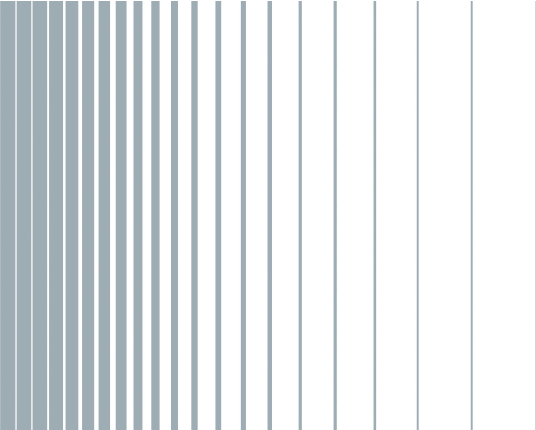


# R&S® SMA100B

## RF and Microwave Analog Signal Generator

### Instrument Security Procedures



# 1 Overview

It is often imperative that R&S SMA100B Signal 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 SMA100B. 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 Generator models*

Product name	Order number
R&S SMA100B	1419.8888K02

## 3 Security Terms and Definitions

### Clearing

The term "clearing" is 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. Therefore, clearing is typically used when the instrument is to remain in an environment with an acceptable level of protection.

### Sanitization

The term "sanitization" is 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 "Manual for the Certification and Accreditation of Classified Systems under the NISPOM".

### Instrument declassification

The term "instrument declassification" refers to procedures that must be undertaken before an instrument can be removed from a secure environment, for example 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 SMA100B

The Signal 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.

### Standard configuration (no option R&S SMAB-B85 installed)

*Table 4-1: Types of memory and information storage*

Memory type	Size	Content	Volatility	User data	Sanitization procedure
SDRAM (CPU board)	1 GByte	Temporary information storage for operating system and instrument firmware, or RAM disk for user data	Volatile	Yes	Turn off instrument power
EEPROM/Flash (one per module)	256 Byte up to 4 MByte	Module-specific data: <ul style="list-style-type: none"> <li>Serial number</li> <li>Board internal correction data</li> </ul>	Non-volatile	No	None required (no user data)
Flash (CPU board)	8 MByte	BIOS	Non-volatile	No	None required (no user data)
microSD memory card (CPU board)	1 GByte	<ul style="list-style-type: none"> <li>User data</li> <li>Instrument Setups</li> </ul>	Non-volatile	Yes	see " <a href="#">Sanitize internal memory</a> " on page 6
		<ul style="list-style-type: none"> <li>Operating system</li> <li>Instrument firmware</li> <li>Instrument internal correction data</li> <li>Instrument states, e.g. <a href="#">USB port, LAN services</a> and setups</li> </ul>	Non-volatile	No	None required (no user data)

### With the optional R&S SMAB-B85 removable mass memory installed

Table 4-2: Types of memory and information storage

Memory type	Size	Content	Volatility	User data	Sanitization procedure
SDRAM (CPU board)	1 GByte	Temporary information storage for operating system and instrument firmware, or RAM disk for user data	Volatile	Yes	Turn off instrument power
EEPROM/Flash (one per module)	256 Byte up to 4 MByte	Module-specific data: <ul style="list-style-type: none"> <li>Serial number</li> <li>Board internal correction data</li> </ul>	Non-volatile	No	None required (no user data)
Flash (CPU board)	8 MByte	BIOS	Non-volatile	No	None required (no user data)
microSD memory card (CPU board)	1 GByte	<ul style="list-style-type: none"> <li>Operating system</li> <li>Instrument firmware</li> <li>Instrument internal correction data</li> <li>Instrument states, e.g. <a href="#">USB port, LAN services</a> and setups</li> </ul>	Non-volatile	No	None required (no user data)
Removable SD memory card	8 GByte	<ul style="list-style-type: none"> <li>User data</li> <li>Instrument Setups</li> </ul>	Non-volatile	Yes	see <a href="#">Chapter 7.1, "Special Considerations for SD Cards"</a> , on page 8

## 4.1 Volatile Memory

The volatile memory in the instrument does not have battery backup. It loses its contents when 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 contains temporary information storage for operating system and instrument firmware. The SDRAM loses its memory when power is removed.

**Sanitization procedure:** Turn off instrument power.

## 4.2 Non-Volatile Memory

The R&S SMA100B contains no user-accessible non-volatile memory, except for the microSD memory card on the CPU board and the removable SD memory card (optional).

The microSD memory card on the CPU board can require a sanitization procedure, depending on specific conditions, see [microSD memory card \(CPU board\)](#).

The removable SD card can be left in the secure area, see [Removable SD memory card \(R&S SMAB-B85\)](#).

All other non-volatile memories of the R&S SMA100B are not a security concern.

### EEPROM/Flash (module memory)

Every module, except the CPU board, is equipped with a persistent module memory, which can be EEPROM or Flash memory. These module memories contain module-specific data, such as the serial number of the module and 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 (CPU board)

The flash memory contains the BIOS. It is on the CPU board of the R&S SMA100B. This flash memory does not hold user data nor can the user access the flash memory.

**Sanitization procedure:** None required (no user data).

### microSD memory card (CPU board)

The R&S SMA100B saves user and application data permanently on the microSD memory card, if the following conditions are met:

- The **volatile mode is disabled** (the default setting on the instrument).  
The R&S SMA100B saves user data and instrument setups permanently on the microSD memory card.  
Find more about setting the volatile mode in section "Setting Security Parameters" of the user manual [www.rohde-schwarz.com/manual/sma100b](http://www.rohde-schwarz.com/manual/sma100b).
- The **removable mass memory is not installed** (option R&S SMAB-B85).

The microSD memory card holds the data and is non-volatile. Hence, data is not erased when power is removed from the instrument.

**Sanitization procedure:** [Sanitize internal memory](#) procedure.

### Removable SD memory card (R&S SMAB-B85)

The R&S SMA100B Signal Generator can be equipped with the removable mass memory (option R&S SMAB-B85) for inserting an SD card.

If option R&S SMAB-B85 is installed, the R&S SMA100B maps the user directory to the removable memory. If an SD card is inserted, user data is saved there. Otherwise user data is redirected to the volatile memory (SDRAM).



Do not remove the SD card during operation, since data can get lost.

The SD card is used to store user data and application data.

If the option is installed, the following conditions determine the state of volatility:

- SD card inserted  
The SD card holds user data and instrument setups and is non-volatile. Hence, user data is not erased when power is removed from the instrument.  
**Sanitization procedure:** Remove the SD card from the instrument.
- No SD card inserted  
The R&S SMA100B enables the volatile mode automatically. The R&S SMA100B redirects user data and instrument setups to the volatile memory (SDRAM), see [SDRAM](#). Without an SD card, it is not possible to disable the volatile mode in the "Setting Security Parameters" settings dialog.  
**Sanitization procedure:** Turn off instrument power.

## 5 Secure Erase Procedures

Because the volatile memory types are erased when power is removed from the Signal Generator, they do not pose a security risk. The flash memories on the CPU board contain no user data. Therefore, it is deemed that they do not pose a risk either.

The microSD memory card on the CPU board does not lose its contents when power is removed. It can contain user data.

### Sanitize internal memory

You can sanitize the microSD memory card by executing the sanitizing procedure provided on the instrument:

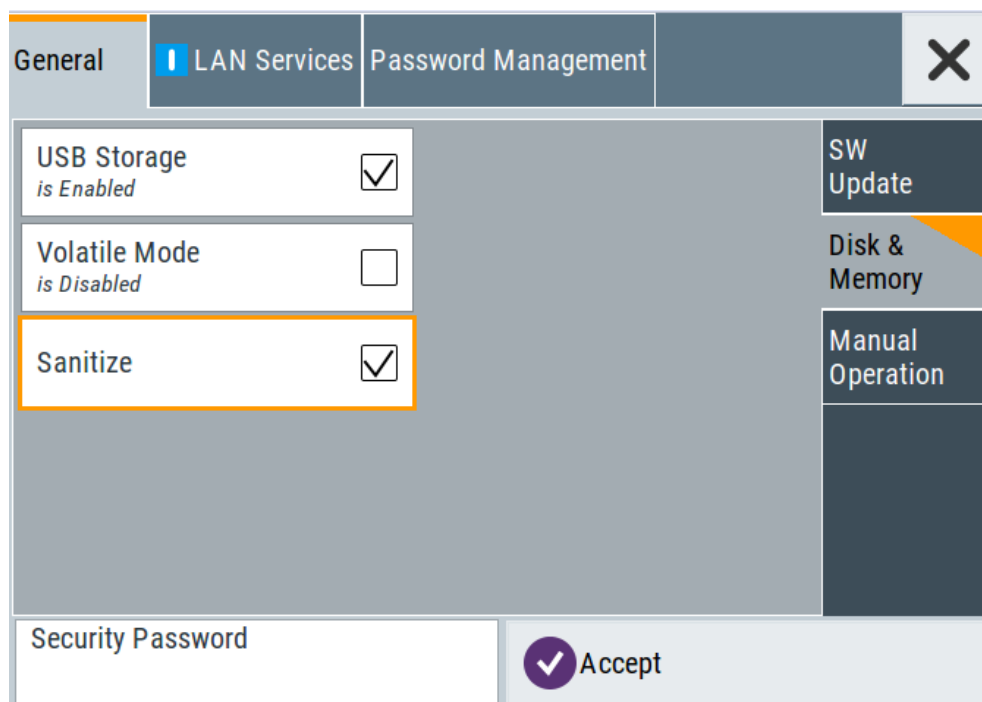
#### **NOTICE**

#### **Risk of instrument damage when interrupting the sanitizing procedure**

The R&S SMA100B must not be switched off or disconnected from mains while the sanitizing procedure is running.

Access:

1. Select "System Config > Setup > Security > General".
2. Select "Disk & Memory".



3. Enable "Sanitize".
4. Enter the "Security Password".
5. Confirm with "Accept".

**Note:** The default password is 123456. For more information, see section "Managing Security Settings" in the R&S SMA100B user manual (see [www.rohde-schwarz.com/manual/sma100b](http://www.rohde-schwarz.com/manual/sma100b)).

The Secure Erase Procedure meets the memory sanitization requirements 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.

## 6 Instrument Declassification

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

1. **No R&S SMAB-B85 installed**  
Sanitization procedure: as per [Chapter 5, "Secure Erase Procedures"](#), on page 6.
2. **R&S SMAB-B85 installed**
  - a) SD card inserted.  
Sanitization procedure: Remove SD card.

- b) No SD card inserted.  
Sanitization procedure: Turn off the instrument.

Following these steps removes all user data from the Signal Generator. The Signal Generator without the SD memory card can now leave the secured area.

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

Once the Signal Generator is outside the secured area, inserting a second non-classified removable SD memory card (without any user data) allows the Signal Generator to function properly for service or other needs.

Before reentering the secured area, remove the non-classified SD memory card. When the Signal Generator is back within the secured area, the original classified removable SD memory card can be reinstalled.



To hold classified user data in secure areas, use the removable SD memory card.  
To hold non-classified user data in non-secure areas, use a second SD memory card.

#### Validity of instrument calibration after declassification

The EEPROM is the only memory type used to hold permanent adjustment values required to maintain the validity of the R&S SMA100B's calibration. Therefore, replacing one removable SD memory card with another, does not affect the validity of the instrument's calibration.

## 7 Special Considerations for SD Cards, USB Ports and LAN Services

There are special considerations for SD cards, USB ports and LAN services of the R&S SMA100B to avoid unauthorized data access in a high-security location.

The access states of the USB ports and LAN services are saved according to [Table 4-1](#).

### 7.1 Special Considerations for SD Cards

Removable mass memory (R&S SMAB-B85) is a safe and easy way to keep data in classified areas. However, we recommend that you safeguard the SD card from being removed without allowance. Using a lead-sealing, for example, protects the SD card from access without being noticed. We recommend that you seal the SD card cross-wise.



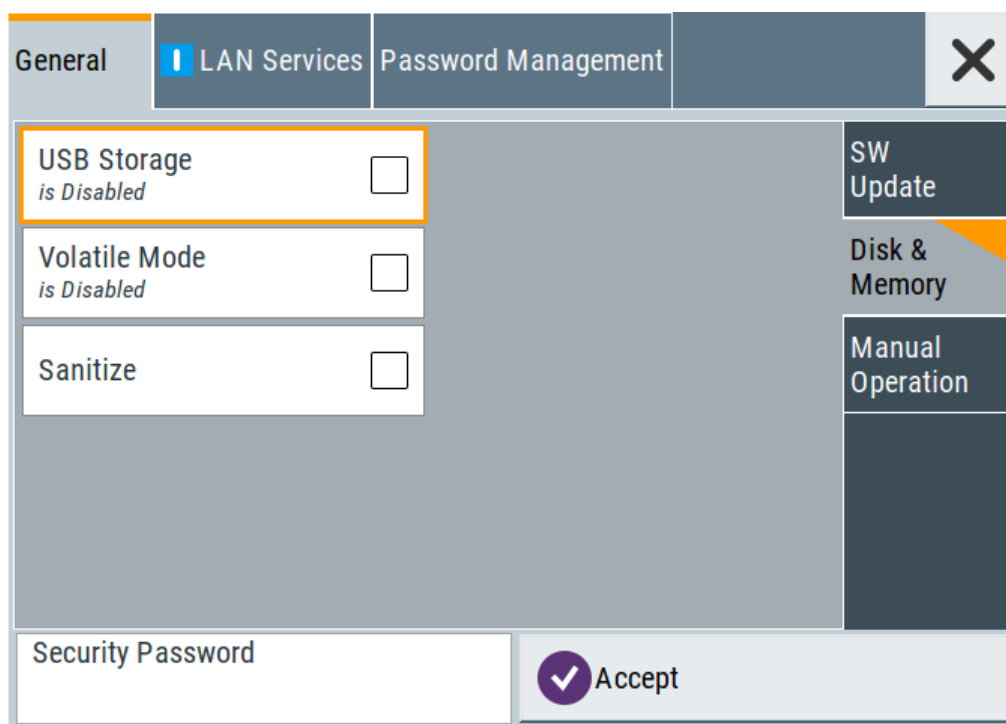
## 7.2 Special Considerations for USB Ports

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. To protect the instrument against unauthorized data access, you can disable the USB interface.

### Disabling USB ports for writing user data

To disable the write capability on the USB ports of the R&S SMA100B:

1. Select "System Config > Setup > Security > General".
2. Select "Disk & Memory".
3. Disable "USB Storage".
4. Enter the "Security Password".
5. Confirm with "Accept".



When disabled, no USB storage device is accepted by the instrument. After a reboot of the instrument, the write capability on any USB memory device is disabled. Other non-memory USB devices (such as keyboards and mice) are not affected.



Remove all USB memory devices before disabling the USB storage. If any USB memory device remains connected, disabling is blocked, and the instrument returns a warning message.

The microSD card is also considered a USB memory device and must be removed. If you have sealed the SD card slot, you can not disable the USB storage.

## 7.3 Special Considerations for LAN Ports

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

### Disabling LAN ports

To disable the LAN ports of the R&S SMA100B:

1. Select "System Config > Setup > Security > LAN Services".
2. Disable the "LAN" interface.
3. Enter the "Security Password".
4. Confirm with "Accept"

General	LAN Services	Password Management	X
LAN	0		
SCPI over LAN <i>is Enabled</i>	<input checked="" type="checkbox"/>	FTP <i>is Enabled</i>	<input checked="" type="checkbox"/>
VNC <i>is Enabled</i>	<input checked="" type="checkbox"/>	SMB (Samba) <i>is Enabled</i>	<input checked="" type="checkbox"/>
SSH <i>is Enabled</i>	<input checked="" type="checkbox"/>	Avahi (Zeroconf) <i>is Enabled</i>	<input checked="" type="checkbox"/>
HTTP <i>is Enabled</i>	<input checked="" type="checkbox"/>	Software Update <i>is Enabled</i>	<input checked="" type="checkbox"/>
Security Password		<input checked="" type="button" value="Accept"/>	

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

For information concerning the security features, refer also to the R&S SMA100B user manual.

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