R&S®NGA100
Power Supply Series
Instrument Security Procedures

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Make ideas real

This document describes the types of memory and their use in the R&S®NGA100.

While every effort has been made to ensure the accuracy of the information herein, it is provided without warranty. Design iteration and revisions may result in minor differences between the information provided here and your product.

Throughout this document, products from Rohde & Schwarz are indicated without the ® symbol , e.g. R&S®NGA100 is indicated as R&S NGA100.

Contents

1 Overview

Securing important information is crucial in many applications.

Generally, 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, e.g. to be calibrated.

"Regarding sanitization, the principal concern is ensuring that data is not unintentionally released" [1].

This document provides a statement regarding the volatility of the memory types used and specifies the steps required to sanitize an instrument.

The procedures in this document follow "NIST Special Publication 800-88: Guidelines for Media Sanitization" [1].

In addition, recommendations are provided to safeguard information on the product.

References

See the following literature for further information.

[1]   **Kissel Richard L. [et al.]** Guidelines for Media Sanitization = Special Publication (NIST SP) = NIST SP - 800-88 Rev 1. - Gaithersburg : [s.n.], December 17, 2014.

[2]   **National Industrial Security Program Authorization Office** Defense Security Service (DSS) Assessment and Authorization Process Manual (DAAPM). - May 6, 2019.

[3]   **ACSC Australian Cyber Security Centre** Australian Government Information Security Manual, January 2020.

2 Instrument models covered

Table 2-1: R&S NGA100 models

Product name	Order number
R&S®NGA101	5601.8002.02
R&S®NGA102	5601.8002.04
R&S®NGA141	5601.8002.03
R&S®NGA142	5601.8002.05

3 Security terms and definitions

Terms defined in Guidelines for Media Sanitization

According to NIST Special Publication 800-88 [1]: "Sanitization is a process to render access to target data (the data subject to the sanitization technique) on the media infeasible for a given level of recovery effort." It defines the following categories of sanitization:

- **"Sanitization"**
  "Media sanitization refers to a process that renders access to target data on the media infeasible for a given level of effort."

- **"Clear"**
  "Clear applies logical techniques to sanitize data in all user-addressable storage locations for protection against simple non-invasive data recovery techniques; typically applied through the standard Read and Write commands to the storage device, such as by rewriting with a new value or using a menu option to reset the device to the factory state (where rewriting is not supported)."

- **"Purge"**
  "Purge applies physical or logical techniques that render Target Data recovery infeasible using state of the art laboratory techniques."

- **"Destroy"**
  "Destroy renders Target Data recovery infeasible using state of the art laboratory techniques and results in the subsequent inability to use the media for storage of data."

Control of media

Another option to secure sensitive information is to keep physical media within the classified area, see [1], paragraph 4.4.

Volatile memory

"Memory components that do not retain data after removal of all electrical power sources, and when reinserted into a similarly configured system, are considered volatile memory components." [2]

Typical examples are RAM, e.g. SDRAM.

Non-volatile memory

"Components that retain data when all power sources are discontinued are non-volatile memory components." [2].

In the context of this document, non-volatile memory components are non-user accessible internal memory types, e.g. EEPROM, Flash, etc.

Media

Media are types of non-volatile memory components. In the context of this document, media are user-accessible and retain data when you turn off power.

Media types are Hard Disk Drives (HDD), Solid State Drives (SSD), Memory Cards, e.g. SD, microSD, CFast, etc., USB removable media, e.g. Pen Drives, Memory Sticks, Thumb Drives, etc. and similar technologies.

4 Statement of volatility

The R&S NGA100 contains various memory components. See the subsequent sections for a detailed description regarding type, size, usage and location.

(i) **Notes on memory sizes**

Due to the continuous development of memory components, the listed values of memory sizes may not represent the current, but the minimal configuration.

This document uses the common notation kbyte, Mbyte and Gbyte for memory sizes, although the prefix multiplication factor is 1024.

4.1 Volatile memory

Volatile memory modules refer to non-accessible internal storage devices, as described in Security terms and definitions > Volatile memory.

Table 4-1: Types of volatile memory

Memory type	Location	Size	Content / Function	User modifiable
DDR2 SDRAM	Front Controller	1 Gbit	Operating instructions, user and program data	No
MPU Internal SRAM	Front Controller	128 kbyte	Operating instructions, user and program data	No
MCU Internal SRAM	Mainboard	4 kbyte per channel	Channel operating data	No
PSoC Internal SRAM	Front Controller	1 kbyte	PSoC operating data	No

4.2 Non-volatile memory

Non-volatile memory modules refer to non-accessible internal storage devices, as described in Security terms and definitions > Non-volatile memory.

Table 4-2: Types of non-volatile memory

Memory type	Location	Size	Content / Function	User modifiable
NAND	Front Controller	2 Gbit	Board and device IDs, instrument firmware, calibration data, instrument settings, state and user data	Yes
MPU Internal ROM	Front Controller	160 kbyte	Boot loader	No

Memory type	Location	Size	Content / Function	User modifiable
MCU Flash	Mainboard	Depending on models, either 32 kbyte + 4 kbyte per channel or 64 kbyte + 4 kbyte per channel	Channel control firmware	No
MCU EEPROM	Mainboard	Depending on models, either 1 kbyte per channel or 2 kbyte per channel	Channel calibration data	No
PSoC Flash	Front Controller	16 kbyte	Firmware for instrument peripherals	No

4.3 Media

Media are considered as non-volatile memory devices, as described in Security Terms and Definitions > Media.

The product R&S NGA100 does not contain media, as defined in Security terms and definitions > Media.

Table 4-3: Types of media memory modules

Memory type	Location	Size	Content / Function	User modifiable
USB	Front panel	n.a.	n.a.	Yes

5 Instrument sanitization procedure

5.1 Volatile Memory

You can purge the volatile memory by following the procedure below. The sanitization procedure complies with the definition of NIST [1], see "Terms defined in Guidelines for Media Sanitization" on page 7.

ⓘ The volatile memory in the instrument does not have battery backup. It loses its contents when power is removed from the instrument.

To turn off and remove power

1. Turn off the R&S NGA100.

2. Disconnect the power plug.

    Leave the instrument powered off at least for 10 minutes to make sure that all volatile memory modules lose their contents, see [3].

5.2 Non-volatile memory

You can clear the non-volatile memory by following the procedure below. The sanitization procedure complies with the definition of NIST [1], see "Terms defined in Guidelines for Media Sanitization" on page 7.

To sanitize the non-volatile memory

ⓘ **Risk of losing data**

The sanitization procedure clear all user data and resets the instrument.

1. Back up all data you want to keep.

2. Remove all media:

    a) Disconnect USB mass memory.

3. Keep the media memory devices under organizational control.

4. **NOTICE!** Risk of instrument damage when interrupting the sanitizing procedure.
    Do not turn off or disconnect the R&S NGA100 from the mains while the sanitizing procedure is running.
    Wait until the instrument confirms the completed sanitizing.

    To activate the sanitizing procedure, press the [Menu] key on the front panel of the R&S NGA100.

5. Select "Device" > "Reset" menu item.

6. Select "Yes" to proceed when prompted to reset all settings to factory defaults.

7. Wait for the "Device reset" message to appear at the top left corner of the screen. All user data will be removed and factory default settings restored.

5.3 Media

To remove the USB at the front/rear of the instrument:

1. **NOTICE!** Do not remove the USB during operation it can lose data. Turn off the R&S NGA100.

2. Remove all media memory devices.

3. Keep the memory devices under organizational control.

6 Operability outside secured area

The sanitization does not affect the functionality of the R&S NGA100 power supply series. The instrument works properly after sanitization.

7 Validity of Instrument calibration

The validity of the R&S NGA100 power supply series's calibration is maintained throughout the sanitization.

Glossary

C

CFast: Compact Fast - compact flash mass memory device.

D

DRAM: Dynamic Random Access Memory.

H

HDD: Hard disk drive.

M

microSD: Micro Solid-state Drive - memory card.

S

SD: Solid-state drive - memory card.

SSD: ATA Solid-state drives (including PATA, SATA, eSATA, mSATA,...).

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