R&S®ZNB/ZNBT/ZNC/ZND
Vector Network Analyzer
Instrument Security Procedures

1175640302

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Contents

1   Overview

It is often imperative that R&S ZNB/ZNBT/ZNC/ZND Vector Network 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 ZNB/ZNBT/ZNC/ZND. 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: Vector Network Analyzer models

Vector Network Analyzer	
R&S ZNB4 - 2 port	1311.6010.22
R&S ZNB4 - 4 port	1311.6010.24
R&S ZNB8 - 2 port	1311.6010.42
R&S ZNB8 - 4 port	1311.6010.44
R&S ZNB20 - 2 port	1311.6010.62
R&S ZNB20 - 4 port	1311.6010.64

Vector Network Analyzer	
R&S ZNB40 - 2 port	1311.6010.72
R&S ZNB40 - 2 port	1311.6010.82
R&S ZNB40 - 4 port	1311.6010.84
R&S ZNBT8 - up to 24 ports	1318.7006.24
R&S ZNBT20 - up to 24 ports	1332.9002.24
R&S ZNBT26 - up to 24 ports	1332.9002.34
R&S ZNBT40 - up to 24 ports	1332.9002.44
R&S ZNC3	1311.6004.12
R&S ZND	1328.5170.92

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

Vector Network Analyzers R&S ZNB/ZNBT/ZNC/ZND contain 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)	• **R&S ZNB:** 2 Gbyte or 8 Gbyte • **R&S ZNBT:** 8 Gbyte • **R&S ZNC:** 2 Gbyte or 4 Gbyte • **R&S ZND:** 4 Gbyte	Temporary information storage for operating system and instrument firmware	Volatile	Yes	Turn off instrument power

EEPROM (board assembly)
 	
 or
 	
 Flash (board assembly)
	Up to 32 Mbyte	• Hardware information:
		   – Serial number
		   – Product options
		   – Calibration correction data
		 • BIOS
		
		 FPGA configuration data
			Non-volatile	No	None required (no user data)

HDD or SSD (removable system drive)	128 to 500 Gbyte	• Operating system • Instrument firmware • Instrument states and setups • Limit lines • User calculation data • Trace data • Measurement results and screen images	Non-volatile	Yes	Remove system drive 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 size of the SDRAM on the CPU board depends on the Vector Network Analyzer model:

- The R&S ZNB is equipped with 2 Gbyte or 8 Gbyte of SDRAM.
- The R&S ZNBT is equipped with 8 Gbyte of SDRAM.
- The R&S ZNC is equipped with 2 Gbyte or 4 Gbyte of SDRAM.
- The R&S ZND is equipped with 4 Gbyte of SDRAM.

It 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 ZNB/ZNBT/ZNC/ZND contains various non-volatile memories. Out of these, only the removable system drive (HDD or SSD) contains user data. The system drive can be physically removed from the R&S ZNB/ZNBT/ZNC/ZND and left in the secure area.

All non-volatile memories of the R&S ZNB/ZNBT/ZNC/ZND are not a security concern.

EEPROM/Flash

Each board assembly in the R&S ZNB/ZNBT/ZNC/ZND Vector Network Analyzer has either a serial EEPROM device or a Flash memory device. The EEPROM/Flash has a size of 32 Mbyte.

The EEPROM contains the BIOS and information related to the installed hardware, such as board serial number, product options and calibration correction data.

The Flash memory devices hold the FPGA configuration data.

The EEPROM/Flash does not hold user data nor can the user access the storage.

Sanitization procedure: None required (no user data)

HDD/SDD

The R&S ZNB/ZNBT/ZNC/ZND Vector Network Analyzer is equipped with a removable system drive (HDD or SDD).

The system drive is used to store:

- Instrument operating system
- Instrument firmware and firmware options (measurement personalities) with option license keys
- Instrument states and setups
- Limit lines
- Trace data

- User calculation data
- Screen images

The system drive can hold user data and is non-volatile. Hence, user data is not erased when power is removed from the instrument.

The removable system drive can be removed from the Vector Network Analyzer to make sure that no user data is stored within the Vector Network Analyzer.

With its removable system drive the R&S ZNB/ZNBT/ZNC/ZND Vector Network Analyzer addresses the needs of customers working in secured areas.

Sanitization procedure: Remove system drive from instrument

5 Instrument Declassification

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

1. Turn off the Vector Network Analyzer and disconnect the power plug. This will sanitize the volatile memory.

2. To remove the classified system drive (HDD or SSD containing user data), perform the following steps:

a) Locate the system drive at the rear of the instrument.

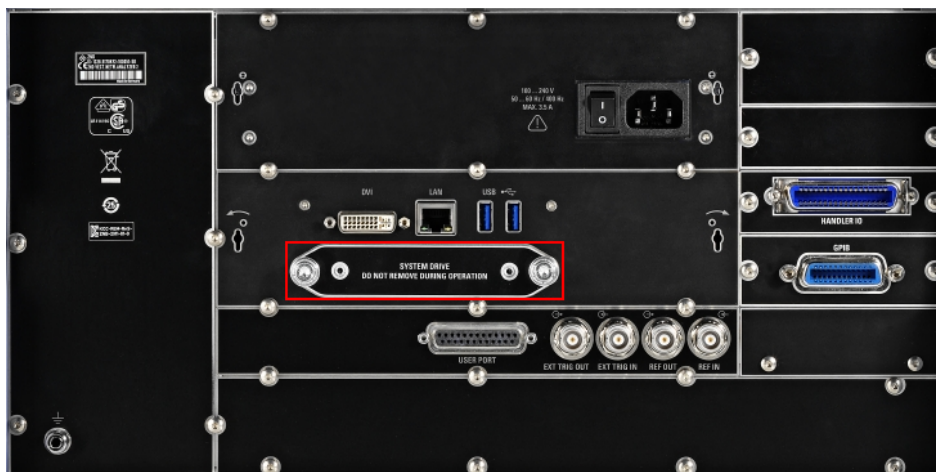*Figure 5-1: Location of the system drive for R&S ZNB/ZNBT/ZNC*

Figure 5-2: Location of the system drive for R&S ZND

b) Unscrew the two knurled screws.
c) Remove the system drive.

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

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

Once the Vector Network Analyzer is outside the secured area, installing a second non-classified removable system drive (without any user data) allows the Vector Network Analyzer to function properly for service or other needs (options R&S ZNB/ZNBT/ZNC/ZND-B19).

Prior to re-entering the secured area, the non-classified removable system drive (without the user data), is removed. When the Vector Network Analyzer is back within the secured area, the original classified removable system drive can be reinstalled.

- To hold classified user data in secure areas, use the removable system drive which comes with the instrument.
- To hold non-classified user data in non-secure areas, use a second removable system drive (R&S ZNB/ZNBT/ZNC/ZND-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 Flash/EEPROM is the only memory type used to hold permanent adjustment values required to maintain the validity of the R&S ZNB/ZNBT/ZNC/ZND's calibration. Therefore, replacing one removable system drive (HDD or SSD) with another, does not affect the validity of the instrument's calibration.

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 ZNB/ZNBT/ZNC/ZND via a utility software. This utility software is available on the R&S ZNB/ZNBT/ZNC/ZND website https://www.rohde-schwarz.com/product/znb.html, https://www.rohde-schwarz.com/product/znbt.html, https://www.rohde-schwarz.com/product/znc.html and https://www.rohde-schwarz.com/product/znd.html.

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

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