R&S®ZNLE
Vector Network Analyzer
Instrument Security Procedures

1178653302

ROHDE&SCHWARZ

Instrument Security Procedures

Version 05

Contents

1 Overview

Securing important information is crucial in many applications.

In many cases, it is imperative that the R&S ZNLE instruments are used in a secured environment. 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 R&S ZNLE.

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.

2 Instrument Models Covered

Table 2-1: Vector Network Analyzer models

Vector Network Analyzer	
R&S ZNLE3 – 2 port	1323.0012.53
R&S ZNLE4 – 2 port	1323.0012.54
R&S ZNLE6 – 2 port	1323.0012.56

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 ZNLE

The Vector Network 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.

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.

Memory type	Location	Size	Content	Volatility	User Data	Sanitization procedure
SDRAM	PC board	4 GByte or 8 GByte	Temporary information storage for operating system and instrument firmware	Volatile	Yes	Turn off instrument power
EEPROM	PC board	1 kByte	• Board information / configuration • Serial number	Non-volatile	No	None required (no user data)
	Front panel	2 kByte	Hardware information			
Flash	PC board	8 MByte	BIOS	Non-volatile	No	None required (no user data)
	Mother-board	32 MByte	• FPGA configuration • Hardware information • Correction data			
	VNA board	512 kByte	• FPGA configuration • HW information • Correction data			
	Reference board	1 MByte	• Hardware information • Correction data			
	GPIB board (R&S FPL1 -B10)	4 MByte	FPGA configuration			
SSD	PC board	≥32 GByte	• Operating system • Instrument firmware • Instrument settings • Limit lines • User calculation data • Trace data • Measurement results and screen images	Non-volatile	Yes	Remove PC board 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.

SDRAM

The R&S ZNLE is equipped with 8 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 ZNLE contains various non-volatile memories. Out of these, only the SSD contains user data.

The SSD is located on the PC board. The PC board can be physically removed from the R&S ZNLE and left in the secure area.

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

EEPROM

On the PC board of the R&S ZNLE there is one EEPROM, which has the size of 1 kByte and contains configuration data and board serial number.

On the front panel board there is one EEPROM with 2 kByte, which contains hardware information.

The EEPROM memory devices do not hold any user data nor can the user access the storage.

Sanitization procedure: None required (no user data).

Flash

There is one Flash memory of 8 MByte on the PC board, which contains the BIOS.

On the VNA board of the R&S ZNLE there is one Flash memory with 512 kByte, which contains FPGA configuration, hardware information, and correction data.

On the reference board there is one Flash memory of 1 MByte, which contains hardware information and correction data.

On the GPIB board (option R&S FPL1-B10, if installed) there is one Flash memory with 4 MByte for the FPGA configuration.

The Flash memory devices do not hold any user data nor can the user access the storage.

Sanitization procedure: None required (no user data).

SSD

The R&S ZNLE Vector Network Analyzer is equipped with a SSD.

The SSD is used to store:

- Instrument operating system
- Instrument firmware
- Instrument settings
- Limit lines
- User calculation data
- Trace data
- Measurement results and screen images

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

The SSD is located on the PC board. The PC board can be physically removed from the Vector Network Analyzer to make sure that no user data is stored within the Vector Network Analyzer.

With its removable PC board the R&S ZNLE Vector Network Analyzer addresses the needs of customers working in secured areas.

Sanitization procedure: Remove PC board from instrument.

5 Instrument Declassification

The R&S ZNLE offers the possibility to keep classified data in the secured area.

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

1. Turn off the R&S ZNLE and disconnect the power plug. Removing power sanitizes the volatile memory.
2. **NOTICE!** Risk of electrostatic discharge. Electrostatic discharge can damage the electronic components of the product.

   To remove the classified SSD, perform the following steps:

a) Locate the PC board at the rear of the instrument.

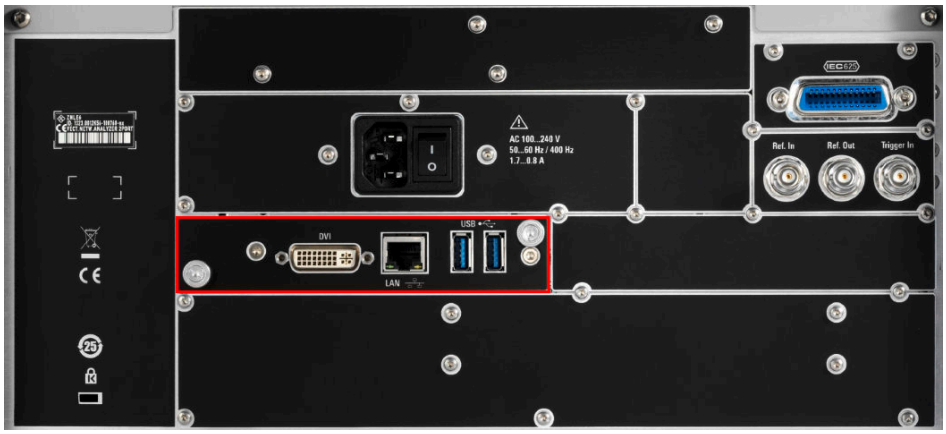

Figure 5-1: Location of the PC board for R&S ZNLE

b) Unscrew the two knurled screws.
c) Remove the PC board.

Following these steps removes all user data from the R&S ZNLE. The R&S ZNLE can now leave the secured area.

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

Once the R&S ZNLE is outside the secured area, you can send it to your local service center for calibration or other needs.

When the R&S ZNLE is back within the secured area, reinstall the original classified PC board.

Validity of instrument calibration after declassification

The flash memory on the VNA board is the only memory type used to hold permanent adjustment values required to maintain the validity of the R&S ZNLE's calibration. Therefore, replacing one removable PC board 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 ZNLE via a utility software. This utility software is available on the R&S ZNLE website https://www.rohde-schwarz.com/product/znle.html.

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

Mühldorfstr. 15, 81671 München, Germany
Phone: +49 89 41 29 - 0
Email: info@rohde-schwarz.com
Internet: www.rohde-schwarz.com