Products: R&S Network Analyzer ZVB

Resolving Security Issues
When Working with the R&S® ZVB in
Secure Areas

Based upon the user's security requirements, this document describes the Rohde&Schwarz options available to address the user's network analysis needs. It also covers the different memory types and locations where user information can be stored in the network analyzer R&S® ZVB.

For secure environments, it describes an approach to physically remove the user data from the network analyzer.

Contents

1   Overview

In many cases it is imperative that the R&S® ZVB network analyzer be used in a secured environment. Generally these highly secured environments will not allow any test equipment to leave the area unless it can be proven that no user information will leave with the test equipment. Security concerns can arise when network analyzers need to leave a secured area to be calibrated or serviced.

This document describes the types of memory and their usage in the R&S® ZVB network analyzer. It also addresses methods of ensuring that no user data will leave the secured area should the product be removed for calibration or service needs.

2   Instrument Models Covered

R&S Network Analyzers

R&S® ZVB 4 GHz	R&S® ZVB 8 GHz	R&S® ZVB 20 GHz
ZVB4 - 2 port	ZVB8 - 2 port	ZVB20 - 2 port
ZVB4 - 3 port	ZVB8 - 3 port	
ZVB4 - 4 port	ZVB8 - 4 port	ZVB20 - 4 port

3 Battery Information

There are no batteries in the R&S® ZVB network analyzer other than the one on the CPU board used to power the clock in the chipset.

4 Types of Memory in the R&S® ZVB Network Analyzer and Their Security Concerns

SDRAM

The R&S® ZVB network analyzer has 512 MByte of SDRAM on the CPU board. SDRAM is volatile memory and it loses its memory as soon as power is removed. The SDRAM will be unreadable within one minute after the power is removed from the instrument.

The SDRAM is not a security concern.

SSRAM

The R&S® ZVA network analyzer has for each port 256k x 36bit of SSRAM on the NetCon boards. SSRAM is volatile memory and it loses its memory as soon as power is removed. The SSRAM will be unreadable within one minute after the power is removed from the instrument.

The SSRAM is not a security concern.

EEPROM

Each board assembly in the R&S® ZVB network analyzer has one serial EEPROM device. These devices hold 256 Bytes up to 1 MByte and contain information related to the installed hardware, such as board serial number, options, correction constants, etc. The EEPROM does not hold user data nor can the user access the EEPROM storage.

The EEPROM is not a security concern.

FLASH

The CPU board of the R&S® ZVB network analyzer has one 512 kByte flash memory device which contains the BIOS. The Flash memory does not hold user data nor can the user access the Flash memory.

The Flash memory is not a security concern.

Removable Compact Flash Memory and Non-removable Hard Drive

The R&S® ZVB network analyzer can be equipped with either a Hard Drive or a Compact Flash Memory. The Hard Drive and Compact Flash Memory hold user data and are non-volatile. Hence, user data is not erased when power is removed from the instrument.

The Hard Drive and the removable Compact Flash Memory should be treated differently with respect to security concerns.

➢ **The Compact Flash Memory is not a security concern because it <u>can be removed</u> from the instrument and left in the secure area.**

➢ **The Hard Drive can still pose a security concern because it <u>cannot be removed</u> from the instrument.**

5   Information Storage in the R&S® ZVB Network Analyzer

DATA	SDRAM Not a security concern	EEPROM Not a security concern	FLASH Not a security concern	REMOVABLE COMPACT FLASH MEMORY Not a security Concern
Temporary Information storage for the functionment of the CPU (CPU Cache, and Swap area)	X			X
Hardware Info, Serial Number Product Options and Calibration Correction Constants		X		
BIOS			X	
Operating System and Instrument Firmware				X
Instrument states, setups, Limit lines				X
Trace data, Measurement Results and Screen Images				X

6   Information Security in Highly Sensitive Areas

Since the SDRAM is erased when power is removed from the network analyzer it does not pose a security risk. No user data is written to the EEPROM and FLASH memories; hence, it is deemed that they do not pose a risk either.

The REMOVABLE COMPACT FLASH MEMORY is the only device that does not lose its memory when power is removed and can contain user data. It can be removed from the network analyzer leaving the customer assured that no user data is stored within the network analyzer. The R&S® ZVB network analyzer can be equipped with this option.

The R&S® ZVB network analyzer equipped with the REMOVABLE COMPACT FLASH MEMORY (Option ZVAB-B18) address the needs of customers working in highly sensitive areas.

7   Performing Service, Calibration and Maintenance on the R&S® ZVB Network Analyzer

R&S® ZVB Network Analyzer equipped with the REMOVABLE COMPACT FLASH MEMORY

Turn-off the network analyzer and remove the **classified** compact flash memory (with the user data). This removes all user data from the network analyzer. The network analyzer, <u>without</u> the removable compact flash memory, can now leave the secured area. Once the network analyzer is outside the secured area, installing a second **non-classified** removable compact flash memory (without any user data), allows the network analyzer to function properly for service or other needs.

Prior to re-entering the secured area, the **non-classified** removable compact flash memory (without the user data), is removed. When the network analyzer is back within the secured area, the original **classified** removable compact flash can be reinstalled.

To hold <u>classified</u> user data in the secure areas, Rohde & Schwarz recommends the REMOVABLE COMPACT FLASH MEMORY Option ZVAB-B18.

To hold <u>non-classified</u> user data in the non-secure areas, Rohde & Schwarz recommends the REMOVABLE COMPACT FLASH MEMORY Option ZVAB-B19.

Calibration and the validity of the network analyzer's calibration after exchange of the REMOVABLE COMPACT FLASH MEMORY

The calibration ensures a user that their measurements are traceable to a government standard. Rohde & Schwarz highly recommends that users follow the calibration cycle suggested for their instrument.

The EEPROM is the only location used to hold permanent adjustment values required to maintain the validity of the ZVB network analyzer's calibration. Hence, replacing one removable compact flash memory with another, does not affect the validity of the instrument's calibration.

Factory Calibration Data

There is an individual Factory Calibration Data set stored on each instrument which will be used when no special calibration is performed. This calibration data set has been taken in the factory and consists of two files `factory.cal` and `factory.dat`.

These files are stored on the removable Compact Flash card in the directory:

`C:\Documents and Settings\All Users\Aplication Data\`
`Rohde&Schwarz\Nwa\Data\calibration`

When it is necessary to use the factory calibration in the secured area, those two files must be transferred from the **non-classified** to the **classified** removable compact flash memory the first time the network analyzer returns from the service.

Note: *When there is always an individual calibration performed, no action is necessary.*

8   Performing Firmware Updates and Backing-Up User Data in Sensitive Areas

Rohde & Schwarz highly recommends, but does not require, the users of its products, to maintain their products with the latest updates and to regularly back-up important user data that can be erased. Firmware updates are available from the R&S website. How does a user perform firmware updates and back-up user data in sensitive areas? There are several options available for the user to safely perform these operations without compromising the security of the sensitive areas.

Via the USB port

Rohde & Schwarz network analyzers are equipped with USB ports as standard equipment. The instrument firmware update can be performed directly from the USB stick. The USB stick can likewise hold or transport user data back-ups to an approved storage medium. As described below, users can disable the capability of the USB ports for saving data (set to "read only"). For users that have not elected to disable the USB ports for writing data a memory stick can be used for backing-up user data.

Via the LAN interface

The R&S® ZVB network analyzer is equipped with a LAN interface as standard equipment. A user can transport the firmware update into the secure area via a CD or another medium that meets the security requirements. The update can then be placed on a system on the LAN within the secure area. The network analyzer can be updated directly from the LAN. The LAN can likewise be used to back-up user data to an approved storage medium.

9   Special Considerations for USB ports

USB ports can pose a security threat in high-security locations. Generally, this threat comes from small USB pen drives (a.k.a. memory sticks, key drives, etc) which can be very easily concealed, yet can quickly read/write several GBytes of data.

Disable USB Ports for Writing User Data

The R&S$^®$ ZVB network analyzer can be updated with an utility to disable the write capability on any USB Port for storage devices. This utility is available for download from Rohde & Schwarz ZVB web site w/o any charge. To disable the write capability copy the utility software to the network analyzer and run it once. After reboot of the instrument the write capability on any USB memory device is disabled.

Note: If the USB ports are disabled for USB memory devices, it is not possible to store any User Characterization data on a Calibration Unit R&S ZV-Z5x.

Additional Information

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