



Products: R&S Signal and Spectrum Analyzer FSV

## Resolving Security Issues When Working with the R&S<sup>®</sup> FSV in Secure Areas

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

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



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## 1 Overview

In many cases it is imperative that the R&S® FSV signal and spectrum 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 signal and spectrum 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® FSV signal and spectrum 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 Signal and Spectrum Analyzers

R&S® FSV
FSV3
FSV7
FSV13
FSV30
FSV40

## 3 Battery Information

There are no batteries in the R&S® FSV signal and spectrum 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® FSV Signal and Spectrum Analyzer and Their Security Concerns

### SDRAM

The R&S® FSV signal and spectrum analyzer has 1 GByte or 2 GByte of SDRAM on the CPU board (depending on CPU board model). 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.**

### EEPROM

Each board assembly in the R&S® FSV signal and spectrum analyzer has one serial EEPROM device. These devices hold 32 kByte 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® FSV signal and spectrum 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 Hard Drive

The R&S® FSV signal and spectrum analyzer is equipped with a removable Hard Drive. The Hard Drive disk is used to store:

- Instrument operating system (Windows® XP)
- Instrument firmware and firmware options (measurement personalities) with option license keys
- Instrument states and setups
- Trace data
- Limit Lines, Transducer tables
- Screen images

The Hard Drive content is non-volatile, so nothing is lost when power is removed from the instrument.

**The Hard Drive is not a security concern because it can be physically removed from the instrument and left in the secure area.**

## 5 Information Storage within the R&S® FSV Signal and Spectrum Analyzer

	SDRAM	EEPROM	FLASH	REMOVABLE HARD DRIVE
<b>DATA</b>	Not a security concern	Not a security concern	Not a security concern	Not a security Concern
Temporary Information storage for the functioning of the CPU (CPU Cache, and Swap area)	<b>X</b>			<b>X</b>
Hardware Info, Serial Number Product Options and Calibration Correction Constants		<b>X</b>		
BIOS			<b>X</b>	
Operating System and Instrument Firmware				<b>X</b>
Instrument states, setups, Limit Lines and Transducer tables				<b>X</b>
Trace data, Measurement Results and Screen Images				<b>X</b>

## 6 Information Security in Highly Sensitive Areas

Since the SDRAM is erased when power is removed from the signal and spectrum 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 HARD DRIVE 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 signal and spectrum analyzer leaving the customer assured that no user data is stored within the signal and spectrum analyzer.

**The R&S® FSV signal and spectrum analyzer equipped with the REMOVABLE HARD DRIVE address the needs of customers working in highly sensitive areas.**

## 7 Performing Service, Calibration and Maintenance on the R&S® FSV Signal and Spectrum Analyzer

### R&S® FSV Signal and Spectrum Analyzer equipped with the REMOVABLE HARD DRIVE

Remove the **classified** hard drive (with the user data). This can be done without opening the instrument.

To remove the hard drive, perform the following steps:

1. **IMPORTANT:** Switch off the instrument and disconnect the power plug before removing the hard drive!
2. Unscrew the two knurled screws and remove the hard drive at the rear of the device.



This removes all user data from the signal and spectrum analyzer. The signal and spectrum analyzer, without the removable hard drive, can now leave the secured area. Once the signal and spectrum analyzer is outside the secured area, installing a second **non-classified** removable hard drive (without any user data), allows the signal and spectrum analyzer to function properly for service or other needs.

Prior to re-entering the secured area, the **non-classified** removable hard drive (without the user data), is removed. When the signal and spectrum analyzer is back within the secured area, the original **classified** removable hard drive can be reinstalled.

To hold **classified** user data in the secure areas, use the **REMOVABLE HARD DRIVE** which comes with the instrument.

To hold **non-classified** user data in the non-secure areas, use a second **REMOVABLE HARD DRIVE (Option FSV-B19)**.

### **Calibration and the validity of the signal and spectrum analyzer's calibration after exchange of the REMOVABLE HARD DRIVE**

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 signal and spectrum analyzer's calibration. Hence, replacing one removable hard drive with another, does not affect the validity of the instrument's calibration.

After an exchange of the removable hard drive, the self-alignment function has to be executed once. This is done with the

SETUP -> Alignment -> Self Alignment

function. This function uses the high-stability internal reference generator to produce the temporary adjustment values. Using the permanent and temporary values, the necessary adjustment information is then stored on the removable hard drive. Rohde & Schwarz recommends that users perform the self-alignment function on a weekly basis after the analyzer has had sufficient time to warm-up.

## **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 signal and spectrum 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® FSV signal and spectrum 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 signal and spectrum 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® FSV signal and spectrum analyzer can be updated with an utility to disable the write capability on any USB Port for storage devices. This utility is available from Rohde & Schwarz FSV web site w/o any charge. To disable the write capability copy the utility software to the signal and spectrum analyzer and run it once. After reboot of the instrument the write capability on any USB memory device is disabled.

## **Additional Information**

Please contact your support center for comments and further suggestions:

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