9000RF-PROBE
In Service, Real-Time RF and TS Monitoring SystemUser Manual

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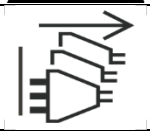
IMPORTANT SAFETY INSTRUCTIONS

	The lightning flash with arrowhead symbol within an equilateral triangle is intended to alert the user to the presence of uninsulated “Dangerous voltage” within the product’s enclosure that may be of sufficient magnitude to constitute a risk of electric shock to persons.
	The exclamation point within an equilateral triangle is intended to alert the user to the presence of important operating and maintenance (Servicing) instructions in the literature accompanying the product.
	The multiple power source symbol showing multiple power input plugs is intended to alert the users that all power sources should be disconnected to avoid shock hazards.

- Read these instructions
- Keep these instructions.
- Heed all warnings.
- Follow all instructions.
- Do not use this apparatus near water
- Clean only with dry cloth.
- Do not block any ventilation openings. Install in accordance with the manufacturer’s instructions.
- Do not install near any heat sources such as radiators, heat registers, stoves, or other apparatus (including amplifiers) that produce heat.
- Do not defeat the safety purpose of the polarized or grounding-type plug. A polarized plug has two blades with one wider than other. A grounding-type plug has two blades and a third grounding prong. The wide blade or the third prong is provided for your safety. If the provided plug does not fit into your outlet, consult an electrician for replacement of the obsolete outlet.
- Protect the power cord from being walked on or pinched particularly at plugs, convenience receptacles and the point where they exit from the apparatus.
- Only use attachments/accessories specified by the manufacturer
- Unplug this apparatus during lightning storms or when unused for long periods of time.
- Refer all servicing to qualified service personnel. Servicing is required when the apparatus has been damaged in any way, such as power-supply cord or plug is damaged, liquid has been spilled or objects have fallen into the apparatus, the apparatus has been exposed to rain or moisture, does not operate normally, or has been dropped.

WARNING TO REDUCE THE RISK OF FIRE OR ELECTRIC – SHOCK, DO NOT EXPOSE THIS APPARATUS TO RAIN OR MOISTURE
WARNING DO NOT EXPOSE THIS EQUIPMENT TO DRIPPING OR SPLASHING AND ENSURE THAT NO OBJECTS FILLED WITH LIQUIDS ARE PLACED ON THE EQUIPMENT
WARNING TO COMPLETELY DISCONNECT THIS EQUIPMENT FROM THE AC MAINS, DISCONNECT THE POWER SUPPLY CORD PLUG FROM THE AC RECEPTACLE
WARNING THE MAINS PLUG OF THE POWER SUPPLY CORD SHALL REMAIN READILY OPERABLE

INFORMATION TO USERS IN EUROPE

NOTE

CISPR 22 CLASS A DIGITAL DEVICE OR PERIPHERAL

This equipment has been tested and found to comply with the limits for a Class A digital device, pursuant to the European Union EMC directive. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance withthe instruction manual, may cause harmful interference to radio communications. Operation of this equipment in a residential area is likely to cause harmful interference in which case the user will be requiredto correct the interference at his own expense.

CE

EN60065	Safety
EN55103-1: 1996	Emission
EN55103-2: 1996	Immunity

EN504192 2005
Waste electrical products should not bedisposed of with household waste. Contact your Local Authority for recyclingadvice

INFORMATION TO USERS IN THE U.S.A.

NOTE

FCC CLASS A DIGITAL DEVICE OR PERIPHERAL

This equipment has been tested and found to comply with the limits for a Class A digital device, pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instruction manual, may cause harmful interference to radio communications. Operation of this equipmentin a residential area is likely to cause harmful interference in which case the user will be required to correctthe interference at his own expense.

WARNING

Changes or Modifications not expressly approved by Evertz Microsystems Ltd. could void the user'sauthority to operate the equipment.

Use of unshielded plugs or cables may cause radiation interference. Properly shielded interface cableswith the shield connected to the chassis ground of the device must be used.

REVISION HISTORY

REVISION	DESCRIPTION	DATE
1.0	First Release	June 2020
2.0	Updated with RF-inSITE monitoring, spectrum analyzer & security	May 2021

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TABLE OF CONTENTS

FIGURES

TABLES

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1. OVERVIEW

The RF Probe is a real-time RF and TS monitoring system that is able to monitor multiple RFsources simultaneously. Each RF Probe is 1RU rack-based unit and comes in three differentflavors: 8x, 16x or 32x RF inputs.

The compact monitoring system offers features such as integrated spectrum analyzer, transportstream analyzer, channel cycling and more. The monitoring system interface operates via web- based GUI which allows the user to monitor signals remotely.

The user may configure thresholds and notifications based on critical RF parameters such as RFpower level to ensure signal continuity.

The RF Probe is able to tune and demodulate all types of signal with the right ordering option, including satellite DVBS/S2/S2x,ATSC, DVBT/T2, ISDBT, QAM and DVBC/C2 signals. This manual is based on the satellite probe, named as 9000RF-PROBE-SAT.

Features & Benefits

Configuration	Each RF input is individually configurable to perform 24/7 static monitoring for high importance channels/transponders or dynamic cycling to monitor multiple channels/transponders within a single RF feed. Up to 12x channels per input may be cycled for a total of 384x channels/transponders for the 32-input configuration.
Scalability	The monitoring system is able to monitor RF sources at one localized location, as well as monitor sites across a wide geographical area within the same network; achievable by simply installing the RF Probe at each location, sending the information to a centralized graphical interface.
Web GUI	The RF Probe provides an intuitive web-based GUI, facilitating rapid deployment and easy configuration. The user has the ability to export data and integrate with third-party NMS using standard protocols. The RF Probe provides a 10Base-T/100Base-TX/1000Base-TX Ethernet port. This provides a single point of access to communicate with multiple RF Probe units located across the globe.
Monitoring	Customizable alarms and notifications are available through standalone web GUI and Evertz' own VistaLINK® PRO NMS software. User is able to log, store, plot, and report critical parameters. In addition to critical RF parameters, constellation diagram is another level of visual indication and monitoring the health and quality of RF signals coming into facility.
Spectrum Analyzer	The RF Probe offers an optional built-in remote spectrum analyzer with carrier monitoring. Any source can be routed to the spectrum analyzer for further monitoring, controllable using web GUI interface. Evertz' spectrum analyzer is well-suited to measure any type of satellite, cable or terrestrial wireless carrier, including very small carriers, beacon signals and for carrier monitoring applications. Requires +SA-HW hardware option

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2. SPECIFICATIONS

2.1. DEFAULT MONITORED PARAMETERS

- Demodulator Lock
- Packet Errors
- RF Power
- Modulation/FEC
- Constellation
- TS P1 Errors
- Services Tree
- EsNo ratio/margin
- CC errors
- MER/BER
- PIDs and services
- Sync byte and loss
- Total bitrate and more

2.2. RF INPUT

Number: 8, 16 or 32 (hardware options)

Connector: 75Ω BNC per IEC 61169–8 Annex A (optional F–Type)

Frequency Range:

SAT Version: 950–2150MHz
DVBT/DVBC/ISDBT/ATSC Version: 50–860MHz

Input Power: -20dBm to -60dBm

2.3. MODULATION SUPPORT

2.4. SAT VERSION:

Symbol Rate:

QPSK, 8PSK, 16APSK: 1-64 Msps
32APSK: 1-51 Msps
64APSK 1-43 Msps

Roll-Off Factor 5-35%

2.5. CODING RATES

FECFRAME (Normal) 64 800 (bits):

DVB–S QPSK: 1/2, 2/3, 3/4, 5/6, 7/8

DVB–S2 QPSK: 1/4, 1/3, 2/5, 1/2, 3/5, 2/3, 3/4, 4/5, 5/6, 8/9, 9/10

DVB–S2 8PSK: 3/5, 2/3, 3/4, 5/6, 8/9, 9/10

DVB–S2 16APSK: 2/3, 3/4, 4/5, 5/6, 8/9, 9/10, 3/4, 4/5, 5/6, 8/9, 9/10, 1/4, 1/3, 2/5, 1/2, 3/5, 2/3, 3/4, 4/5, 5/6, 8/9, 9/10, 13/45,9/20, 11/20

DVB–S2x 8PSK: 3/5, 2/3, 3/4, 5/6, 8/9, 9/10, 23/36, 25/36, 13/18

DVB–S2x 8APSK–L: 5/9, 26/45

DVB–S2x 16APSK: 2/3, 3/4, 4/5, 5/6, 8/9, 9/10 (S2–MODCODs), 26/45, 3/5, 28/45, 23/36, 25/36, 13/18, 7/9, 77/90

DVB–S2x 16APSK–L: 5/9, 8/15, 1/2, 3/5, 2/3

DVB–S2x 32APSK: 3/4, 4/5, 5/6, 8/9, 9/10, 32/45, 11/15, 7/9

DVB–S2x 32APSK–L: 2/3

DVB–S2x 64APSK: 11/15, 7/9, 4/5, 5/6

DVB–S2x 64APSK–L: 32/45

FECFRAME (Short) 16 200 (bits):

DVB–S2x QPSK: 1/4, 1/3, 2/5, 1/2, 3/5, 2/3, 3/4, 4/5, 5/6, 8/9, 9/10, 11/45,4/15, 14/45, 7/15, 8/15, 32/45

DVB–S2x 8PSK: 3/5, 2/3, 3/4, 5/6, 8/9, 7/15, 8/15, 26/45, 32/45

DVB–S2x 16APSK: 2/3, 3/4, 4/5, 5/6, 8/9, 7/15, 8/15, 26/45, 3/5, 32/45

DVB–S2x 32APSK–L: 2/3, 32/45

For –ATSC Version:

8VSB Demodulation Standard: ATSC per A53

QAM Demodulation Standard: ITU–TJ.83 Annex B, QAM64, 256

For –DVBC2/DVBT2/ISDBT2 Version:

Channel Bandwidth: 6MHz, 7MHz, 8MHz

Sub Format: QAM16–QAM256, QPSK

Standard: DVB–T/T2, DVB–C/C2, ISDBTb (ITU–T J.83 Annex A and C)

2.6. CONTROL

- SNMP over Ethernet
- Web browser
- Reset API

2.7. PHYSICAL

Form Factor: 1RU

2.8. POWER SUPPLY

Dual/Redundant PS: Standard with all frames

Inlets: Separate inlets per power supply

Electrical: 100–240V AC, 50/60Hz

2.9. ENVIRONMENTAL

Temperature Range: 0–40°C

Humidity: 10–90% non–condensing

Ventilation: Fan–assisted

2.10. ORDERING INFORMATION

9000RF8–PROBE–SAT: 1RU DVB–S/S2 probe monitoring system, 8x RF input configuration, dual power supply, optional DVB–S2x support

9000RF16–PROBE–SAT: 1RU DVB–S/S2 probe monitoring system, 16x RF input configuration, dual power supply, optional DVB–S2x support

9000RF32–PROBE–SAT: 1RU DVB–S/S2 probe monitoring system, 32x RF input configuration, dual power supply, optional DVB–S2x support

Note: for off–air, cable and QAM versions, please contact the factory.

2.11. ORDERING OPTIONS

+SA–HW: On–board remote spectrum analyzer for 9000RF Probe series

+PROCM: On-board hardware processing module for 9000RF Probe series, software and channel keys sold separately.

2.12. SOFTWARE LICENSES

RF–PROBE–CK–DM: Channel key for 9000RF–Probe series to activate one RF input.

RF–PROBE–FK–CC: Feature key for 9000RF–Probe series to enable channel cycling for one additional frequency/channel.

SpecAn–FK–CM: Feature key to enable enhanced carrier monitoring on RF spectrum analyzer; one license is available per HW module.

MXP–SW–APP–TSM: IP transport stream monitor container application (must purchase MXP–SW–FK–XXXX to enable functionality)

MXP–SW–FK–TSM: Feature key to enable one input of TS monitoring on 3482MXP–VM–APP–XXXX

RF–INSITE–SW: inSITE software for RF and TS monitoring and data collection applications; software key required to add devices and channels.

RF–INSITE–FK–AD: inSITE software feature key to enable advance dashboards to correlate and display collected data (RF–INSITE–SW is required)

RF–INSITE–CK–PROBE: Software channel key to activate historical data logger for single RF input for 9000RF–Probe series, up to 12x channels per RF input (RF–INSITE–SW is required)

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3. GETTING STARTED

3.1. FRONT PANEL

Figure 3-1: 9000RF-PROBE Front Panel

Micro-USB Port: This port allows the user to connect to the serial port of the unit.

Status (PS1 and PS2)**:** This allows the user to visual check if both the power supplies are functioning. Green LED indicates power supply is turned ON and working fine. Red LED indicates the power supply is not running.

Monitor (RF Inputs)**:** There are 32 x LEDs in MONITOR section which are labelled from 1 to 32. This allows the user to visual check the status of each of the 32 RF Inputs.

- **Green** LED indicates that the corresponding RF Input is enabled, locked to the signal and has no RF and TS faults.
- **Yellow** LED indicates that the corresponding RF Input is not locked
- **Blue** LED indicates that the corresponding RF input has TS faults present
- **Red** LED indicates that the corresponding RF input has both RF and TS faults present.
- If RF Input is disabled, the LED will remain off.

HDMI port: This port is used to configure the CPU (internal hardware that is used to run RF-RF-INSITE-SW and/or TSM applications, if purchased by the user). It is meant to be used in factory for initial installation only.

USB ports: These Type-A USB ports are also used to configure the CPU in factory.

3.2. BACK PANEL:

Figure 3-2: Back Panel - 9000RF8-PROBE-SAT

Figure 3-3: Back Panel - 9000RF32-PROBE-SAT

Figure 3-4: Back Panel - 9000RF32-PROBE-SAT

RF Inputs: The number of RF Input ports depend on the hardware options purchased by the user. It could come with 8, 16 or 32 inputs as shown in above figures. Type of connector is 75Ω BNC per IEC 61169–8 Annex A (optional F–Type).

RF Loop Out: An output port for troubleshooting incoming signals from RF inputs.

Control Port: To be connected to a network. Allows the user to interact with the unit using WebEASY®

Power Supply Ports: To be connected to a power source.

DATA ports (1G/10G): These ports are used to insert SFPs in order to get TSoIP output from the PROBE.

3.3. INSTALLATION OF THE 9000RF-PROBE

1. Mount the unit to a desired location.
2. Connect the control port to the network.
3. Connect a power source to the unit and turn ON the power switch.

3.4. WEB INTERFACE

The unit can be completely configured using the web interface. To do this, simply type in the IP address of the **Control Port** on the 9000RF-PROBE module in the web browser.

Note: Computer must be connected to the same network as the 9000RF-PROBE.

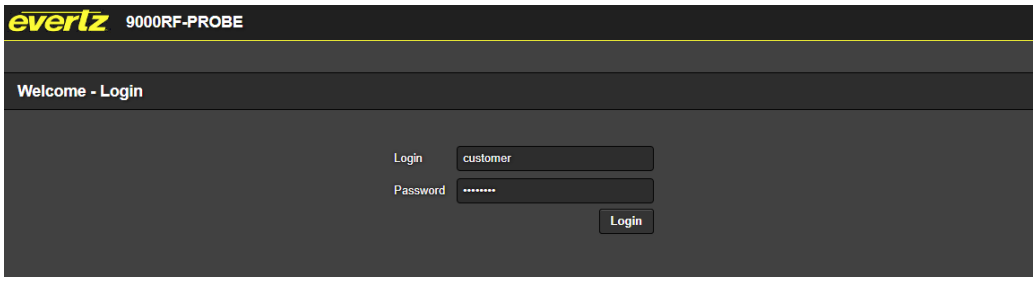


Figure 3-5: WebEASY® - Login Menu

For login and password, type in "***customer***".

Upon entering the correct credentials, the user will be directed to the main User Interface that displays display the following information:

Top Navigation Bar

Product Name: Displays the product name
Refresh: Manually refreshes the user's configuration
Auto Refresh: Automatically refreshes the user's configuration
Apply: Manually saves the user's configuration
Dynamic Apply: Automatically saves the user's configuration
Upgrade: Upgrade the Firmware version of the product
Logout: Logs the user out of the User Interface

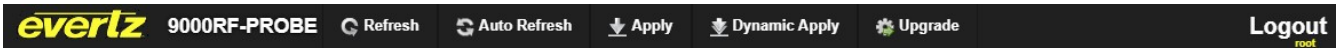


Figure 3-6: WebEASY® - Top Navigation Bar

Menu: Displays a menu of all tabs that a user is able to monitor/configure. These tabs include System, RF Input, Logs, Notify, RF Status and Monitoring. The location of this menu can be set to horizontal, vertical or merged with top navigation bar, depending on the setting configured in WebEASY.

This option can be selected by following below steps:

i. Navigate to the bottom right corner of the webpage, click on "Settings"

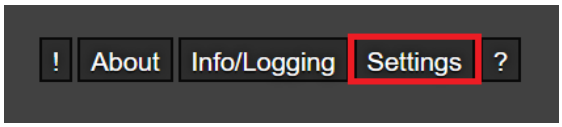


Figure 3-7: WebEASY® - Settings (Part 1 of 2)

ii. Under Settings → General → go to Menu location. Select the desired option from drop-down list. Click Apply button beside it to save the changes.

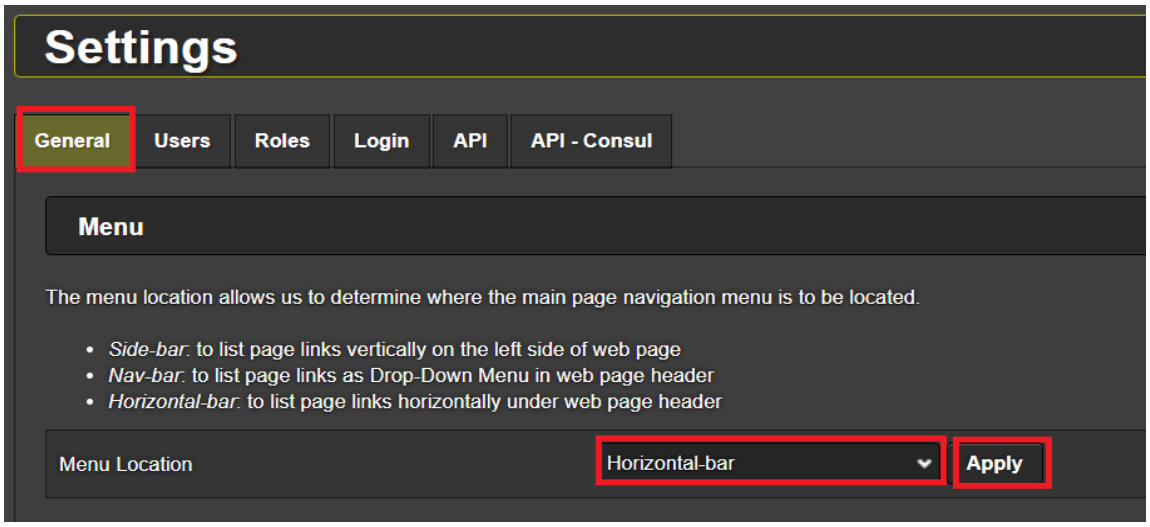


Figure 3-8: WebEASY® - Settings (Part 2 of 2)

Figure 3-9: WebEASY® - Horizontal Menu

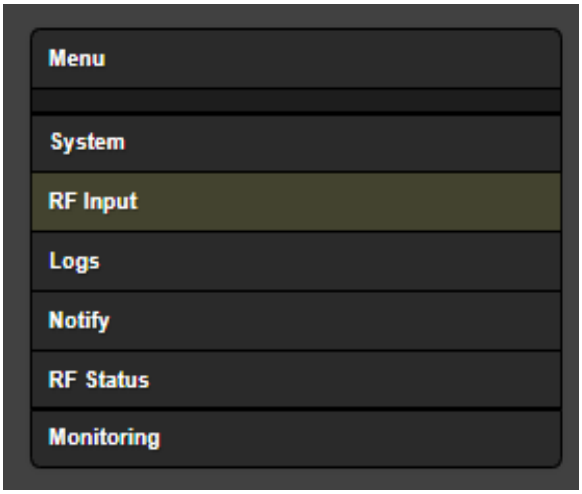


Figure 3-10: WebEASY® - Side Menu

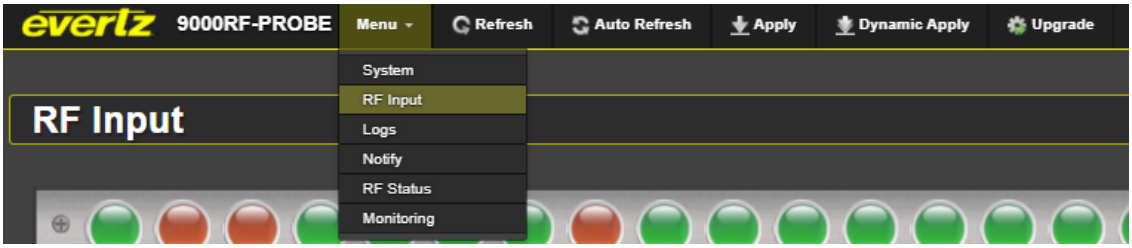


Figure 3-11: WebEASY® - Navigation bar Menu

3.5. SYSTEM

The system tab displays general information of the 9000RF-PROBE. Here the user may configure settings on how to access the unit as well as save/load configurations. General operations like rebooting or factory resetting the unit can also be made here.

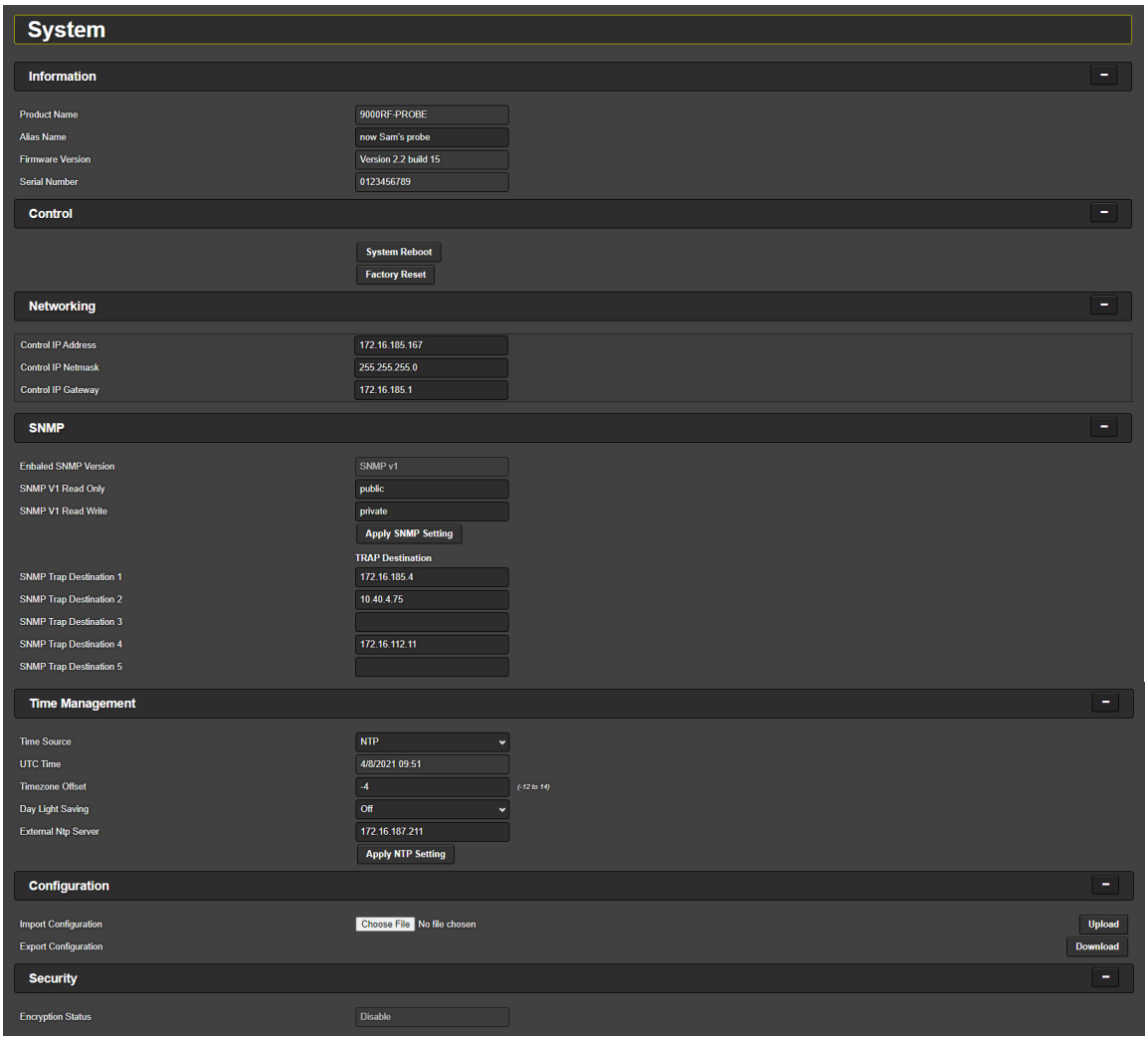


Figure 3-12: WebEASY® - System Information

Product Name: This field specifies the model of the unit. The product name cannot be changed.

Alias Name: This field shows the alias string assigned to the unit. This is user configurable.

Firmware Version: This field shows the firmware version currently running on the unit.

Serial Number: This field shows the unit serial number. This is needed for the factory while applying licensefile to the unit.

3.5.1. Control

System Reboot: This button allows the user to perform a software reboot of the unit.

Factory Reset: This control resets all configuration settings back to factory settings. The followingconfigurations

settings will be reset: all RF input settings excluding the cycling/manual mode and cycle interval; the total log time of all channels; all channel thresholds settings.

Note: If Factory Rest is performed, a manual “System Reboot” is required in order for the settings to take effect, as indicated by the pop-up message below.

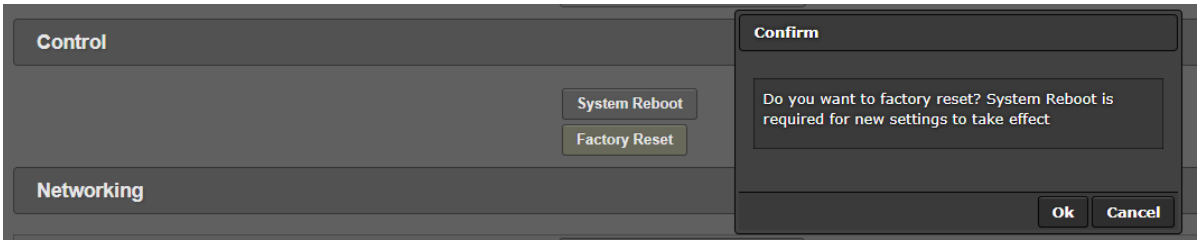


Figure 3-13: WebEASY® - Control

3.5.2. Networking

Control IP Address: This parameter allows the user to set the IP address for the control port.

Control IP Netmask: This parameter allows the user to set the IP netmask for the control port.

Control IP Gateway: This parameter allows the user to set the IP gateway for the control port.

Note: If any changes are made to Network Settings, a manual System Reboot is required in order for the changes to take effect, as indicated by the pop-up message below.

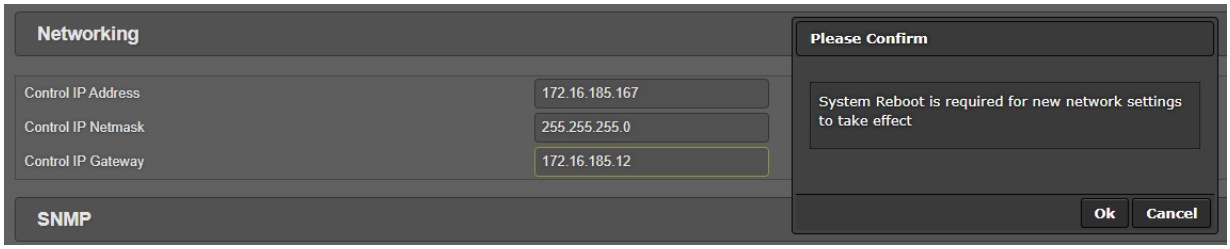


Figure 3-14: WebEASY® - Networking

3.5.3. SNMP

Enabled SNMP Version: This field displays the SNMP Version currently enabled on the unit.

SNMP V1 Read Only: This parameter allows the user to control the read privileges for the SNMP communication. This can be configured as private or public.

SNMP V1 Read Write: This parameter allows the user to control the read and write privileges for the SNMP communication. This can be configured as private or public.

Apply SNMP setting: This button is used to save the SNMP read/write permissions for above two controls.

Trap Destination: This parameter allows the user to define the destination IP addresses for SNMP v1 or v3 traps. User can add up to 5 IP addresses here.

SNMP V3: The secured webpage only uses SNMP V3.

Note: SNMP V3 is visible only when the Security is enabled.

3.5.4. Time Management

Time Source: This parameter allows the user to select how the unit will retrieve the current time. Network Time Protocol (NTP) is the only option that is currently available on PROBE. Hence, user must use an external NTP server to retrieve correct time.

UTC Time: This display shows the current time of the unit in Coordinated Universal Time (UTC).

Time zone Offset: This parameter allows the user to specify what time zone the unit will show. Possible Values: -12 to 14.

Day Light Saving: This parameter allows the user to set day light savings on the unit. Options are On orOff.

External NTP Server: This parameter allows the user to set the IP address for the NTP server.

Apply NTP Setting: This button allows the user to update the system time once NTP server is defined. Hence, every time user changes the external NTP server IP address, this button must be clicked on to sync up the 9000RF-PROBE with NTP server timing.

3.5.5. Configuration Management

Import Configure File: This feature allows the user to load a previously saved configuration file onto the probe. Click the “Choose File” button then browse to the saved file, then click on the “upload” button & wait for the configuration to take effect.

Note: A manual System Reboot is required for the new settings to take effect, Wait for 5 to 10 seconds after hitting “upload” button and then click on System reboot.

Export Configure File: The “Download” button allows the user to download & save the probe’s current configuration to a file on a local PC. Configuration files are useful for backing up a card’s settings for future use or to aid Evertz technical support for debugging purposes.

3.5.6. Security

Encryption Status: This field shows the security is enabled or disabled. Steps on how to enable security is explained in Section 5

When the security is enabled, Warning Banner and Certificate settings will appear like the image below:

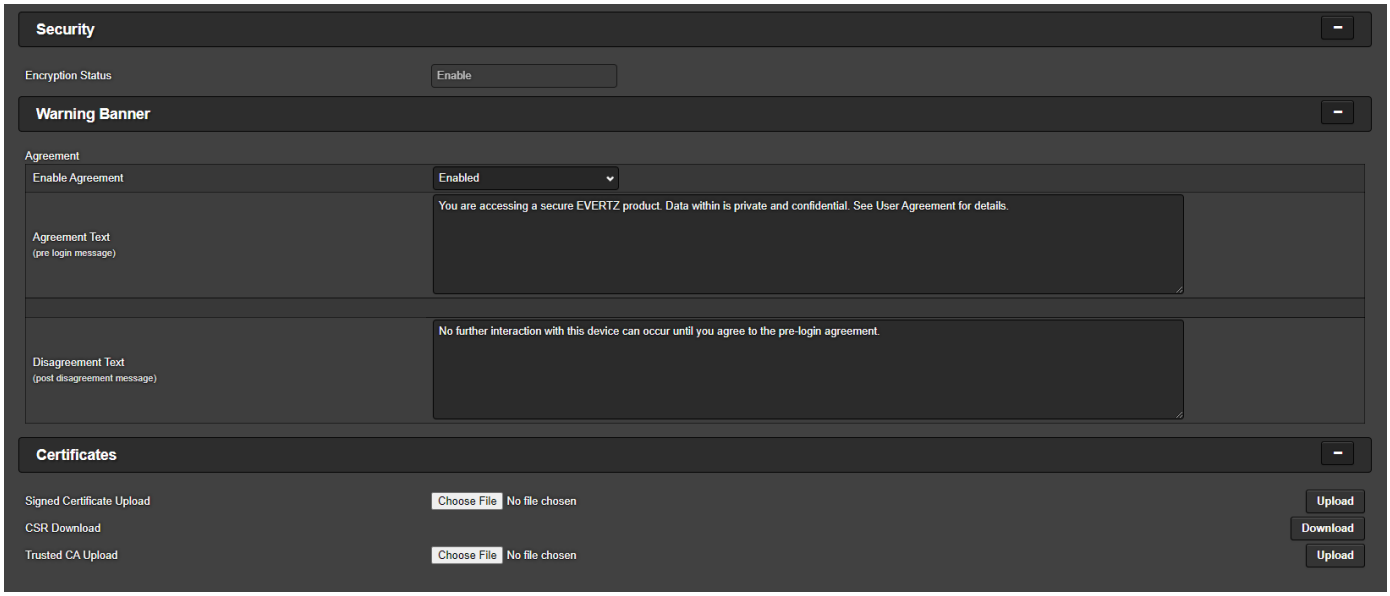


Figure 3-15: WebEASY® - Enabled Security

Warning Banner

- **Enable Agreement:** This option allows the user to enable/disable the agreement and disagreement message.
- **Agreement Text:** The default agreement text is “You are accessing a secure EVERTZ product. Data within is private and confidential. See User Agreement for details.” This message will be displayed prior to showing the console menu. The user has to type “Yes” in order to agree and login.

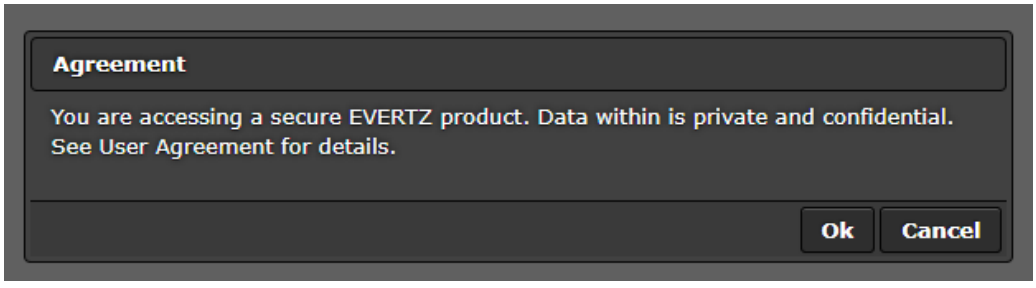


Figure 3-16: WebEASY® - Warning Banner – Agreement Text

- **Disagreement Text:** The disagreement text will be displayed as “No further interaction with this device can occur until you agree to the pre-login agreement.” Upon typing “No” and stops the user from login.

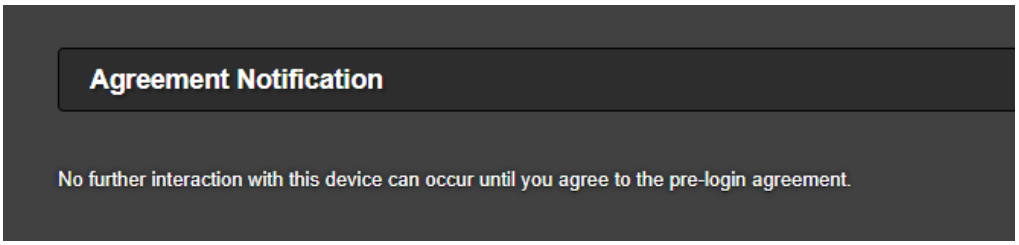


Figure 3-17: WebEASY® - Warning Banner – Disagreement Text

Certificates

- **Signed Certificate Upload:** This “Upload” button allows the user to load a signed certificate. Click the “Choose File” button then browse to the certificate file, then click on the “upload” button.
- **CSR Download:** This “Download” button allows the user to download the Certificate Signing Request (CSR) that can be signed by internal or external Certificate Authority.
- **Trusted CA Upload:** This “Upload” button allows the user to load a trusted Certificate Authority. Click the “Choose File” button then browse to the certificate file, then click on the “upload” button.

3.6. RF INPUT

The RF Input tab allow users to configure RF parameters for each input and channel. These settings include changing the mode of each input, and how each channel will lock to a signal. Also, an image of a rear plateto provide a quick glance of every input status.

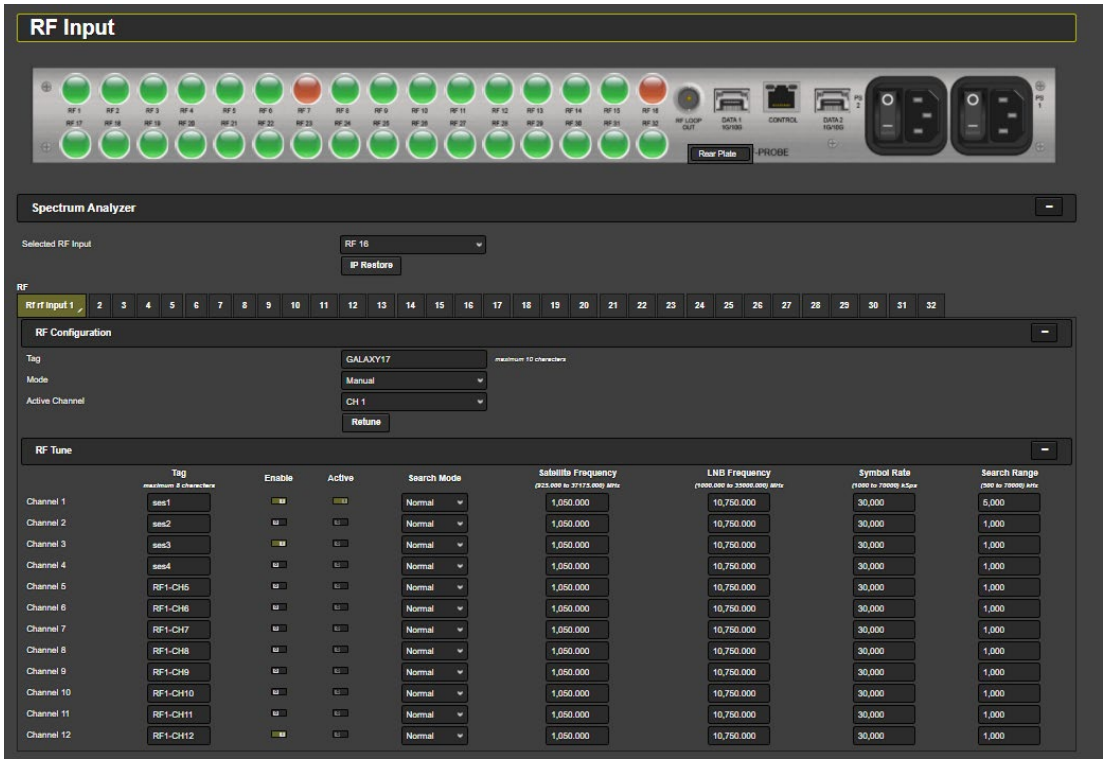


Figure 3-18: WebEASY® - RF Input

3.6.1. Rear Image of Unit

Connectivity Indicators: Displays the status for each specific input. The user can see below three scenarios here:

- If all the channels for an input are DISABLED, indicator remains GREY.
- If one or more channels for an input are ENABLED and RF signal is LOCKED, the indicator will turngreen
- If one or more channels for an input are ENABLED and none of the channels is LOCKED to the RFsignal, the indicator will turn RED

3.6.1.1. Hovering over an Input

Figure 3-19: WebEASY® - RF Input / Hovering

RF #: This label indicates the index of the input (1 to 32)

Active CH: This field indicates which channel is currently active on the RF input.

Spectrum Analyzer: This field indicates if the RF input is currently routed to the spectrum analyzer or not.

3.6.2. Spectrum Analyzer

Figure 3-20: WebEASY® - Spectrum Analyzer (Part 1 of 2)

Selected RF input: The dropdown list displays the 32 RF Inputs that can be routed to monitor signal through the internal spectrum analyzer and from the external loop out.

IP Restore: This button will reset the network settings of the internal Spectrum Analyzer to its default network settings as below:

IP address = 192.168.10.1
Netmask = 255.255.255.0
Gateway = 192.168.10.1

Click "**Ok**" in the dialog box below to proceed with the IP restore.

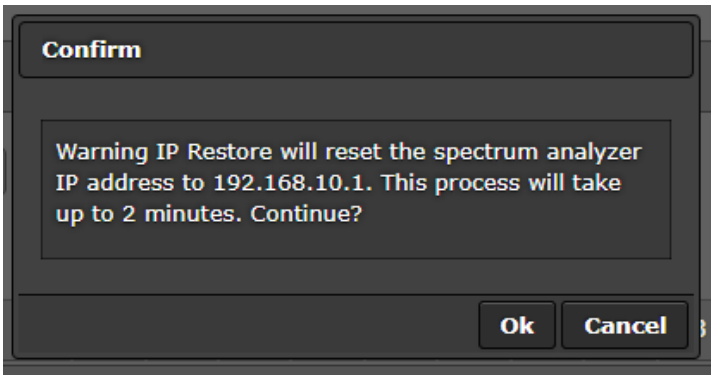


Figure 3-21: WebEASY® - Spectrum Analyzer (Part 2 of 2)

A detailed guide on Spectrum Analyzer is explained in Section 4. .

3.6.3. RF Configuration

Tag: This field allows the user to assign a specific tag to each input. User can enter maximum of 10 characters" Make sure you do this change wherever same definition is used.

Mode: This control allows selection on how each input and their channels will behave. There are two possible modes:

1. **Cycling**: the input will automatically change to the next available channel based on the cycle interval.

Figure 3-22: WebEASY® - RF Configuration (Part 1 of 2)

2. **Manual**: the input will remain on the specified channel.

Figure 3-23: WebEASY® - RF Configuration (Part 2 of 2)

Active Channel: When in Manual mode, the active channel option will appear. This allows selection on which channel will be active.

Cycle Interval: This parameter allows the user to specify the cycling duration for each channel. This interval can range from 60 seconds to 300 seconds.

3.6.4. RF Tune

Tag: This field allows the user to assign a specific tag to each input. User can enter maximum of 8 characters" Make sure you do this change wherever same definition is used.

Enable: This control allows the user to enable and disable a channel.

Active: Displays the current active channel.

Search Mode: This control allows the user to determine the signal search mode to be used by demod.

- **Normal**: This mode requires the user to enter the Satellite frequency, LNB frequency and symbol rate as mandatory parameters to acquire a carrier lock.
- **Blind search**: This mode requires the user to enter the Satellite frequency and LNB frequency only, symbol rate is not required. Thus, demod will automatically search for the carrier on specified frequency and acquire a LOCK.

Satellite Frequency (MHz): This parameter allows the user to enter the Satellite Frequency (MHz) value.The Satellite Frequency can range from 925 to 37,175 MHz.

LNB Frequency (MHz): This parameter allows the user to enter the Local Oscillator Frequency (LO) value.The LNB frequency can range from 1,000 to 35,000 MHz.

Symbol Rate (kSps): This parameter allows the user to enter symbol rate in kSymbol/s. The Symbol Ratevalue can range from 1000 to 70,000 kSps.

Search Range (kHz): This parameter allows the user to set the frequency range to be covered while performing carrier search (in kHz). The Frequency Search range can be set from 500 to 70000 kHz.

3.7. LOGS

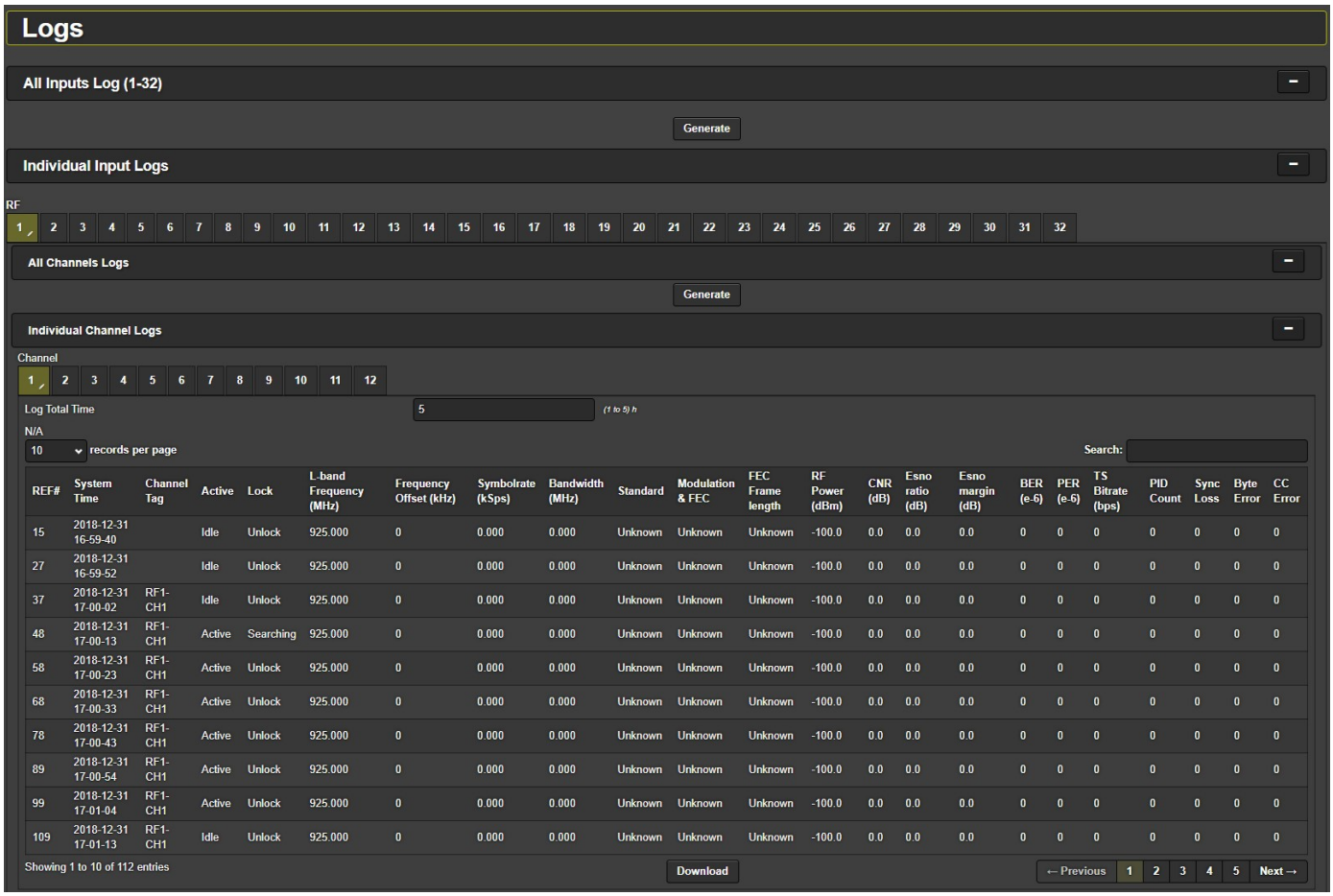


Figure 3-24: WebEASY® - Channel Log

3.7.1. Generate and Download Logs.

This page allows the user to generate and download logs. All files downloaded will be a .csv format. There are total of three options to download:

All Inputs Log (1-32): downloads logs for each channel on each input. Therefore, this file contains a total of 384 channels (32 inputs x 12 channels each). This takes approximately 1 to 4 minutes to generate the log.

Individual Input Logs: downloads all channels from a single input. This takes approximately 10 to 15 seconds to generate the log.

Individual Channel Log: downloads a single channel. This takes less than a second to generate the log.

Note: All approximate generate/download times are based off each channel set to 5hrs log times.

3.7.2. Log Parameters

Log Total Time: This parameter allows the user to configure the total log time for each channel. Possible Values: 1 to 5 hours.

Records per page: This control allows the user to change how many logs will be visible per page. Possible Values: 10, 25, 50, 100, 200, 400.

Search: This control returns specific logs based on the string entered.

REF#: Displays the reference number of the log.

System Time: Displays when the log was created.

Channel Tag: Displays the associated alias string.

Active: Displays if the channel was active.

Lock: Displays if channel acquired a LOCK to the carrier.

L-band Frequency (MHz): This parameter returns the L-band frequency of the locking carrier. The defaultvalue returns 925.000 MHz if input is not locked to any signal.

Frequency Offset (kHz): This parameter returns the frequency offset, which is the difference between L-band frequency entered by user and the actual L-band frequency that demod is LOCKED to.

Symbol Rate (kSps): This parameter returns the symbol rate of the input carrier.

Bandwidth (MHz): This parameter returns the bandwidth of the input carrier.

Standard: This parameter returns the standard of the connection, DVB-S/S2.

Modulation & FEC: This parameter returns the modulation and FEC of the input carrier.

FEC Frame length: This parameter returns the FEC frame length of the input carrier.

RF Power (dBm): This parameter returns the RF power level of the locking carrier. The default value returns -100.0 dBm if there is no input signal.

CNR (dB): This parameter returns the Carrier-to-noise ratio of the input carrier.

EsNo ratio (dB): This parameter returns the EsNo ratio of the input carrier.

EsNo margin (dB): This parameter returns the EsNo of the input carrier.

BER (e-6): This parameter returns the bit error rate of the input RF signal.

PER (e-6): This parameter returns the packet error rate of the input RF signal.

TS Bitrate (bps): This parameter returns the input TS bitrate.

PID Count: This parameter returns the number of PIDs in the input transport stream.

Sync Loss: This parameter returns the sync loss error count in input transport stream.

Byte Error: This parameter returns the sync byte error count in input transport stream.

CC Error: This parameter returns the continuity error count in input transport stream.

3.8. NOTIFY

The Notify tab allow users to configure traps for each input and their channels.

Send Trap control: By setting this option to True, the user will start receiving SNMP traps for the specific parameter. Otherwise, setting it to false, the user will not receive any SNMP traps for that parameter.

Fault indicators: The indicators are available to show what faults are currently present, RED being there is a fault present and GREEN being everything is good.

The types of faults/alarms have been categorized into below three categories:

- **RF faults:** This section shows alarms associated with RF signal health for all 32 inputs and 12 channels on each input. These alarms include Demodulator Lock, Frequency Offset, RF Power Low, RF Power High, CNR, Es/No Ratio, Es/No Margin and BER.
- **TS faults:** This section shows alarms associated with TS such as TS Present, Sync Loss Error, Sync Byte Error and CC Error for all 32 inputs and 12 channels on each input.
- **System faults**: This section shows faults associated with the two power supplies and five fans installed in the chassis.

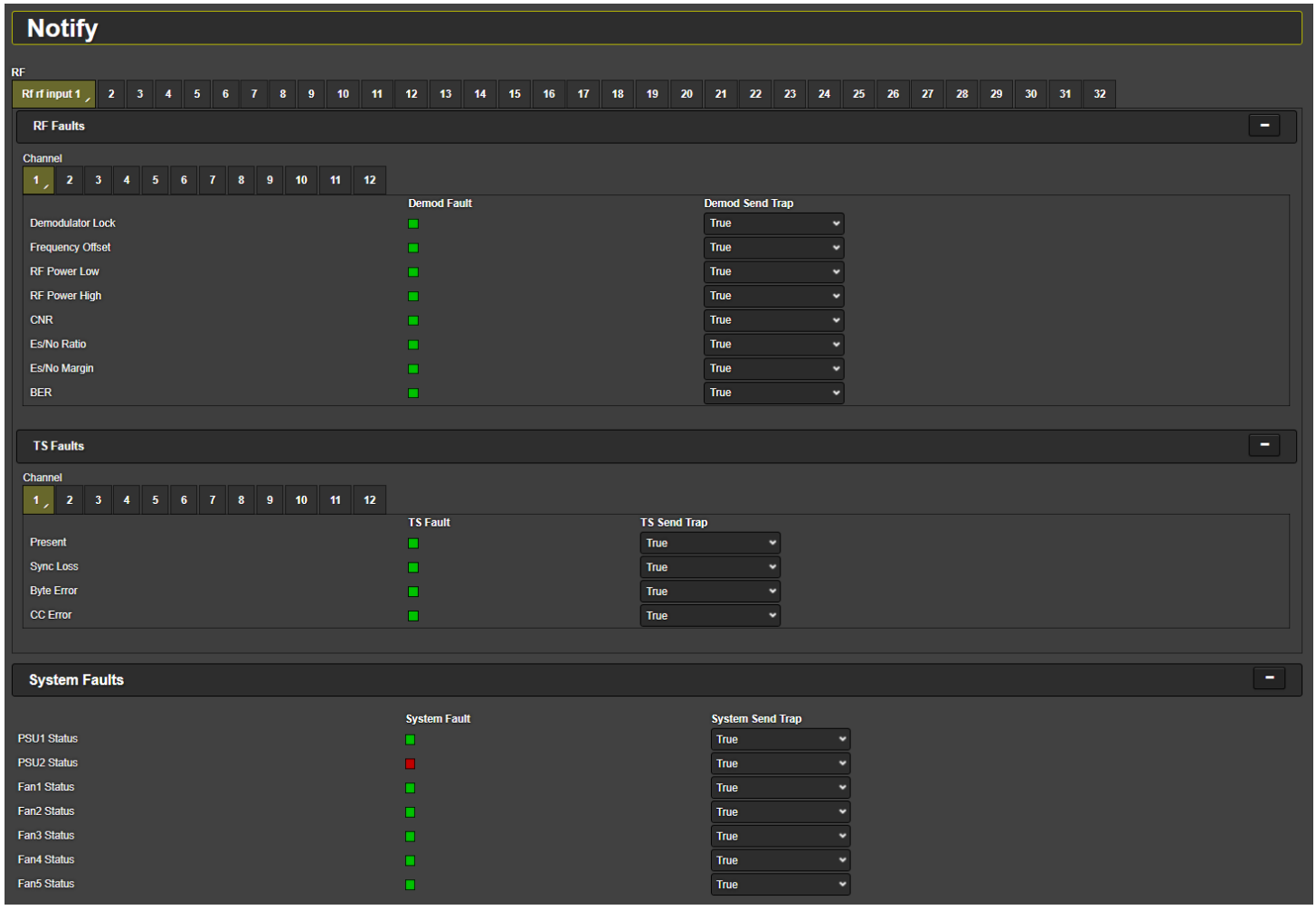
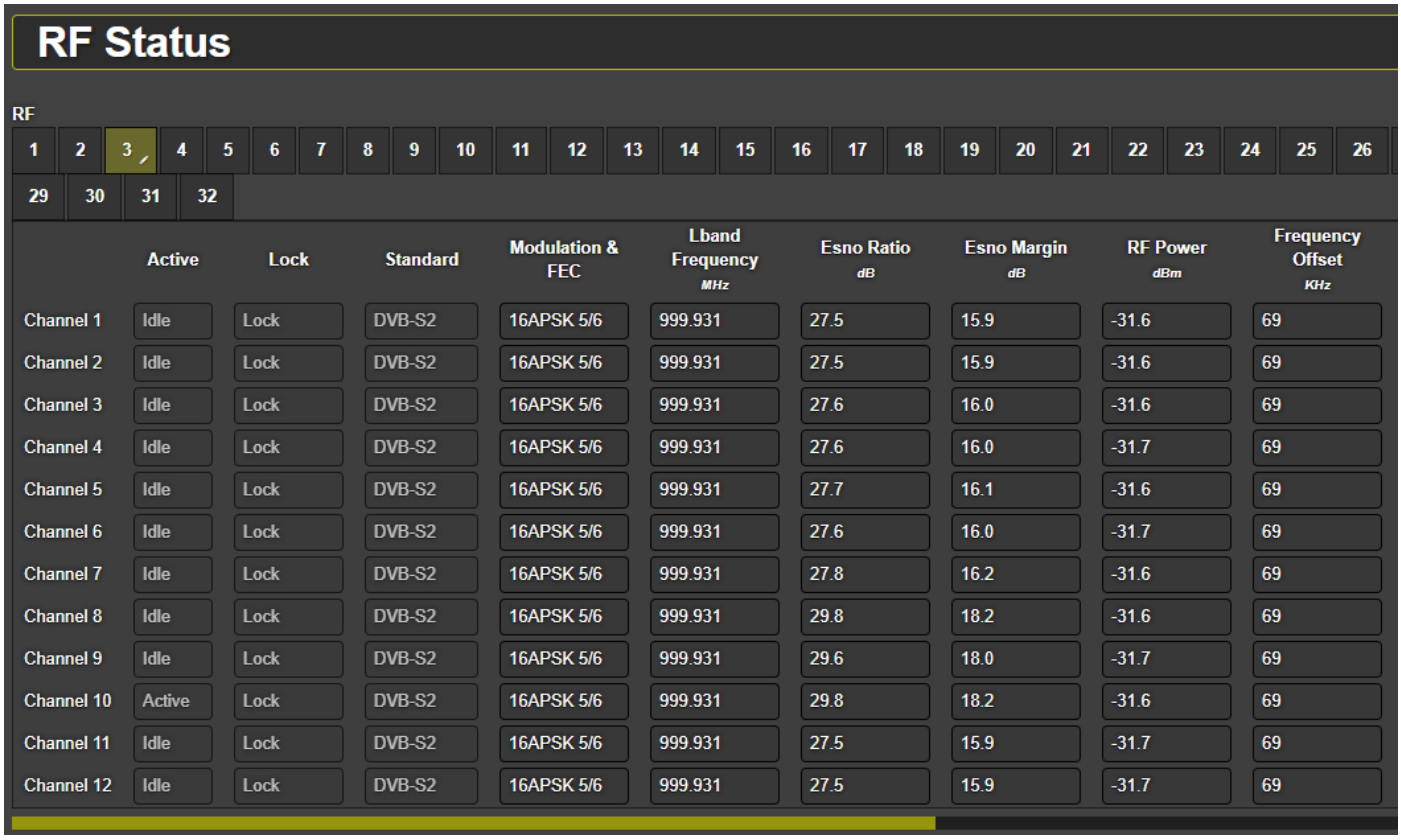


Figure 3-25: WebEASY® - Notify

3.9. RF STATUS

The RF status tab allows the user to view the current states of each input and channel. Similar to the channellog tab, resembling statistics are given here. Each input has their own tab with their corresponding 12 channels



	Active	Lock	Standard	Modulation & FEC	Lband Frequency MHz	Esno Ratio dB	Esno Margin dB	RF Power dBm	Frequency Offset KHz
Channel 1	Idle	Lock	DVB-S2	16APSK 5/6	999.931	27.5	15.9	-31.6	69
Channel 2	Idle	Lock	DVB-S2	16APSK 5/6	999.931	27.5	15.9	-31.6	69
Channel 3	Idle	Lock	DVB-S2	16APSK 5/6	999.931	27.6	16.0	-31.6	69
Channel 4	Idle	Lock	DVB-S2	16APSK 5/6	999.931	27.6	16.0	-31.7	69
Channel 5	Idle	Lock	DVB-S2	16APSK 5/6	999.931	27.7	16.1	-31.6	69
Channel 6	Idle	Lock	DVB-S2	16APSK 5/6	999.931	27.6	16.0	-31.7	69
Channel 7	Idle	Lock	DVB-S2	16APSK 5/6	999.931	27.8	16.2	-31.6	69
Channel 8	Idle	Lock	DVB-S2	16APSK 5/6	999.931	29.8	18.2	-31.6	69
Channel 9	Idle	Lock	DVB-S2	16APSK 5/6	999.931	29.6	18.0	-31.7	69
Channel 10	Active	Lock	DVB-S2	16APSK 5/6	999.931	29.8	18.2	-31.6	69
Channel 11	Idle	Lock	DVB-S2	16APSK 5/6	999.931	27.5	15.9	-31.7	69
Channel 12	Idle	Lock	DVB-S2	16APSK 5/6	999.931	27.5	15.9	-31.7	69

Figure 3-26: WebEASY® - RF Status (Part 1 of 2)

3.9.1. Channel Information

Active: This parameter displays if the channel status is currently active or idle.

Lock: Displays if channel acquired a LOCK to the carrier.

Standard: This parameter returns the standard of the connection, DVB-S/S2.

Modulation & FEC: This parameter returns the modulation and FEC of the input carrier.

L-band Frequency (MHz): This parameter returns the L-band frequency of the locking carrier. The defaultvalue returns 925.000 MHz if input is not locked to any signal.

EsNo ratio (dB): This parameter returns the EsNo ratio of the input carrier.

EsNo margin (dB): This parameter returns the EsNo of the input carrier.

RF Power (dBm): This parameter returns the RF power level of the locking carrier. The default value returns -100.0 dBm if there is no input signal.

Frequency Offset (kHz): This parameter returns the frequency offset, which is the difference between L-band frequency entered by user and the actual L-band frequency that demod is LOCKED to.

BER (e-6): This parameter returns the bit error rate of the input RF signal.

PER (e-6): This parameter returns the packet error rate of the input RF signal.

CNR (dB): This parameter returns the Carrier-to-noise ratio of the input carrier.

TS Bitrate (bps): This parameter returns the input TS bitrate.

PID Count: This parameter returns the number of PIDs in the input transport stream.

Sync Loss: This parameter returns the sync loss error count in input transport stream.

Byte Error: This parameter returns the sync byte error count in input transport stream.

CC Error: This parameter returns the continuity error count in input transport stream.

Clear TS Counters: This button allows the user to clear the Sync Loss, Byte Error and CC Errors counters.

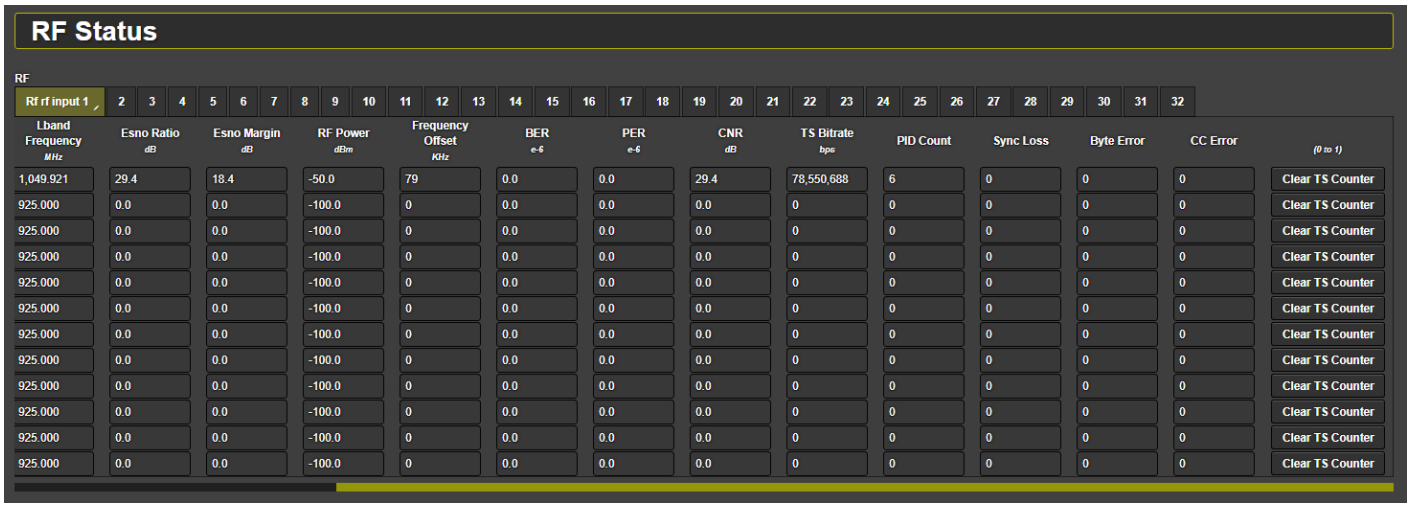


Figure 3-27: WebEASY® - RF Status (Part 2 of 2)

3.10. MONITORING

Identical to the RF status tab, the monitoring tab allows the user to view the current states of each input andchannel. Here, the user can observe all inputs/channels at a glance with color indicators. When clicking a channel, additional information is provided through a pop-up window.

Figure 3-28: WebEASY® - Monitoring / Monitoring Boxes

3.10.1. Color Indicators

For each indicator in order from left to right, top to bottom (RF Input 1 to 32 & Channels 1 to 12):

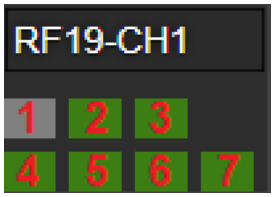


Figure 3-29: WebEASY® - Colour Indicators

1. **ACTIVE**: This indicates if the channel is currently active or not.
    a. Yellow – Active
    b. Grey – Inactive
2. **LOCK**: This indicates if there is a lock.
    a. Green – Lock
    b. Red - Unlock
3. **EsNo Margin**: This indicates if the EsNo Margin is within specified threshold.
    a. Green – No fault present
    b. Red – Past threshold set

4. **RF Power Low**: This indicates if the RF Power Low is within specified threshold.
   a. Green – No fault present
   b. Red - Past threshold set
5. **RF Power High**: This indicates if the RF Power High is within specified threshold.
   a. Green – No fault present
   b. Red - Past threshold set
6. **CNR**: This indicates if the CNR is within specified threshold.
   a. Green – No fault present
   b. Red - Past threshold set
7. **TS CC Errors:** This indicates if the TS CC Errors is within specified threshold.
   a. Green – No fault present
   b. Red - Past threshold set

Note: When a specific channel is disabled, all color indicators are hidden, as shown in Figure 22 above for RF INPUT #17 and 18

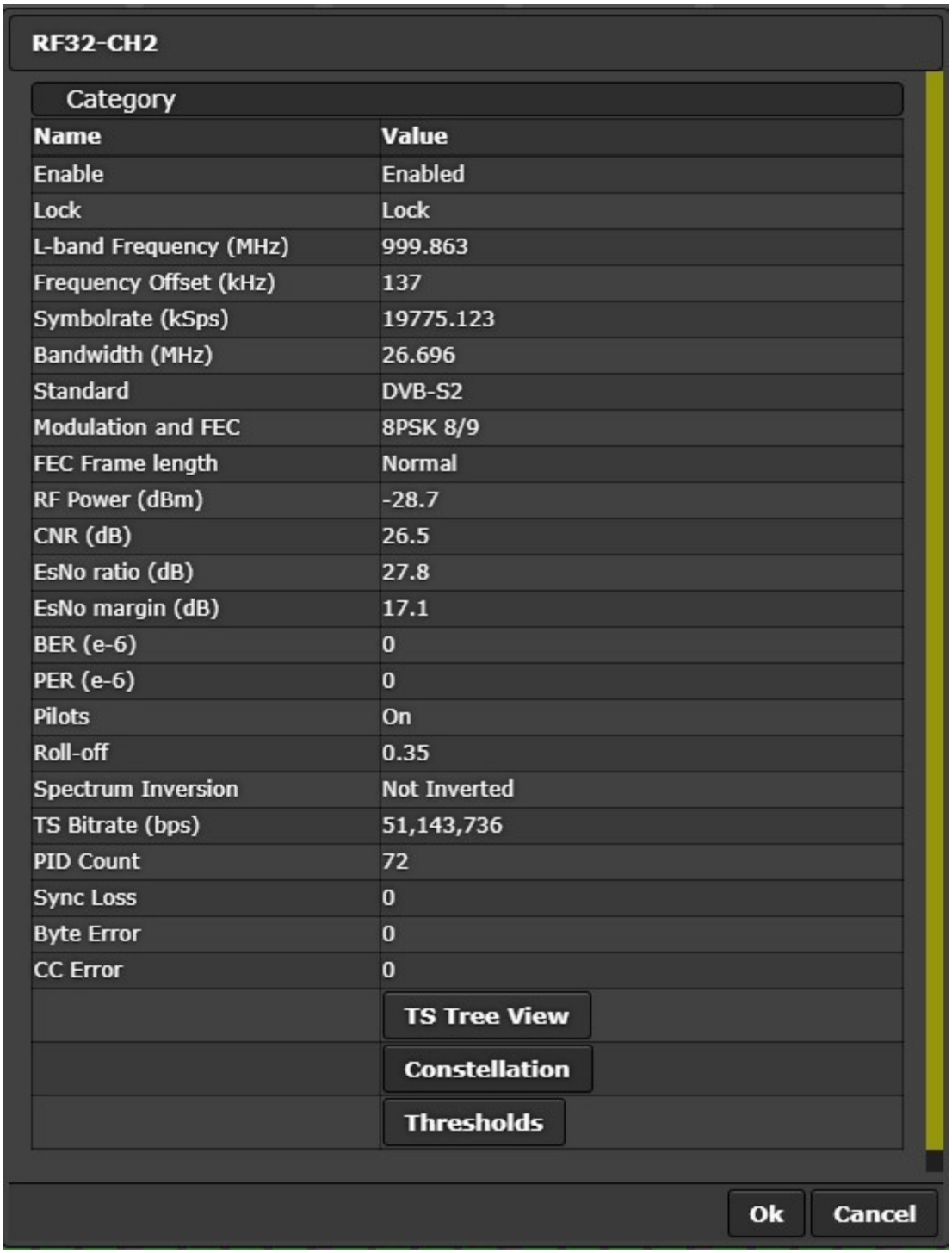


Figure 3-30: WebEASY® - Channel Information Pop-Up

3.10.1. Channel Information Pop-Up

Enable: This field specifies if that particular channel is enabled or disabled.

Lock: This field displays if channel acquired a LOCK to the carrier

L-band Frequency (MHz): This parameter returns the L-band frequency of the locking carrier. The default value returns 925.000 MHz if input is not locked to any signal.

Frequency Offset (kHz): This parameter returns the frequency offset, which is the difference between L-band frequency entered by user and the actual L-band frequency that demod is LOCKED to.

Symbol Rate (kSps): This parameter returns the symbol rate.

Standard: This parameter returns the standard of the connection, DVB-S/S2.

Modulation and FEC: This parameter returns the modulation and FEC.

FEC Frame length: This parameter returns the FEC frame length.

RF Power (dBm): This parameter returns the RF power level of the locking carrier. The default value returns -100.0 dBm if there is no input signal.

CNR (dB): This parameter returns the Carrier-to-noise ratio captured.

EsNo Ratio (dB): This parameter returns the EsNo ratio.

EsNo Margin (dB): This parameter returns the EsNo margin.

BER (e-6): This parameter returns the Bit Error Rate (BER) of the transport stream.

PER (e-6): This parameter returns the Packet Error Rate (PER) of the transport stream.

Pilots: This parameter returns if pilots are enabled.

Roll-off: This parameter returns the roll-off of the input signal.

Spectrum Inversion: This parameter displays whether the input signal spectrum is inverted or not inverted.

TS Bitrate: This parameter returns the bitrate of input transport stream.

PID Count: This parameter returns the number of PIDs in the input transport stream.

Sync Loss: This parameter returns the sync loss error count in input transport stream.

Byte Error: This parameter returns the sync byte error count in input transport stream.

CC Error: This parameter returns the continuity error count in input transport stream.

TS Tree View: This tab displays a list of all the services present in the currently locked transport stream.The user may expand each service to view additional details of the audio and video PIDs.

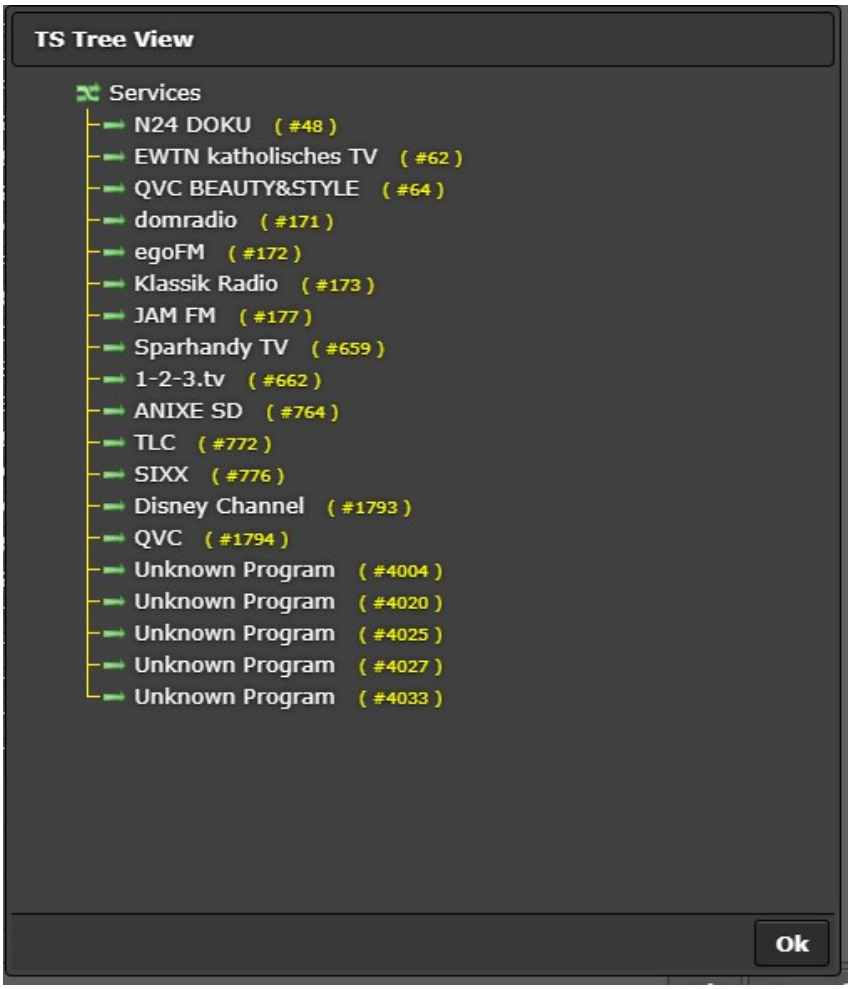


Figure 3-31: WebEASY® - Transport Stream Tree View Tab (Part 1 of 2)

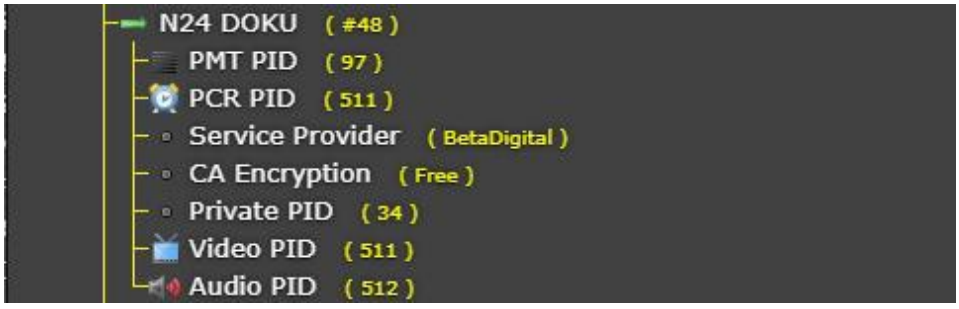


Figure 3-32: WebEASY® - Transport Stream Tree View Tab (Part 2 of 2)

Constellation: This tab displays the constellation of the input RF Signal.

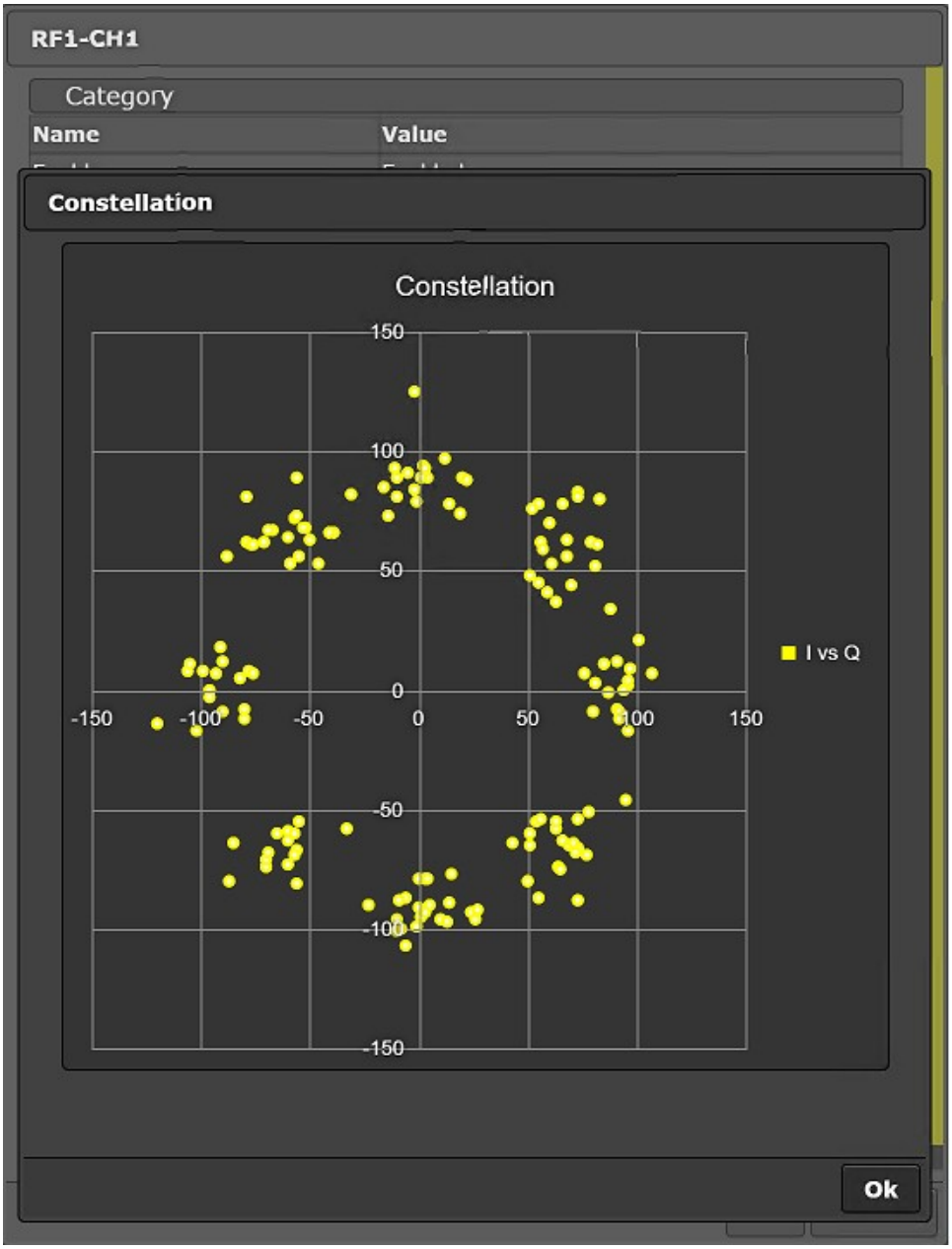


Figure 3-33: WebEASY® - Constellation Tab

Thresholds: This tab allows the user to set the thresholds for each available alarm. The user may enter a value in the threshold column within range (shown in **threshold range** column) and save any changes with the apply button on the right. Also, the user will see current values (shown in the **value** column) of each parameter if there is an input signal present on the channel.

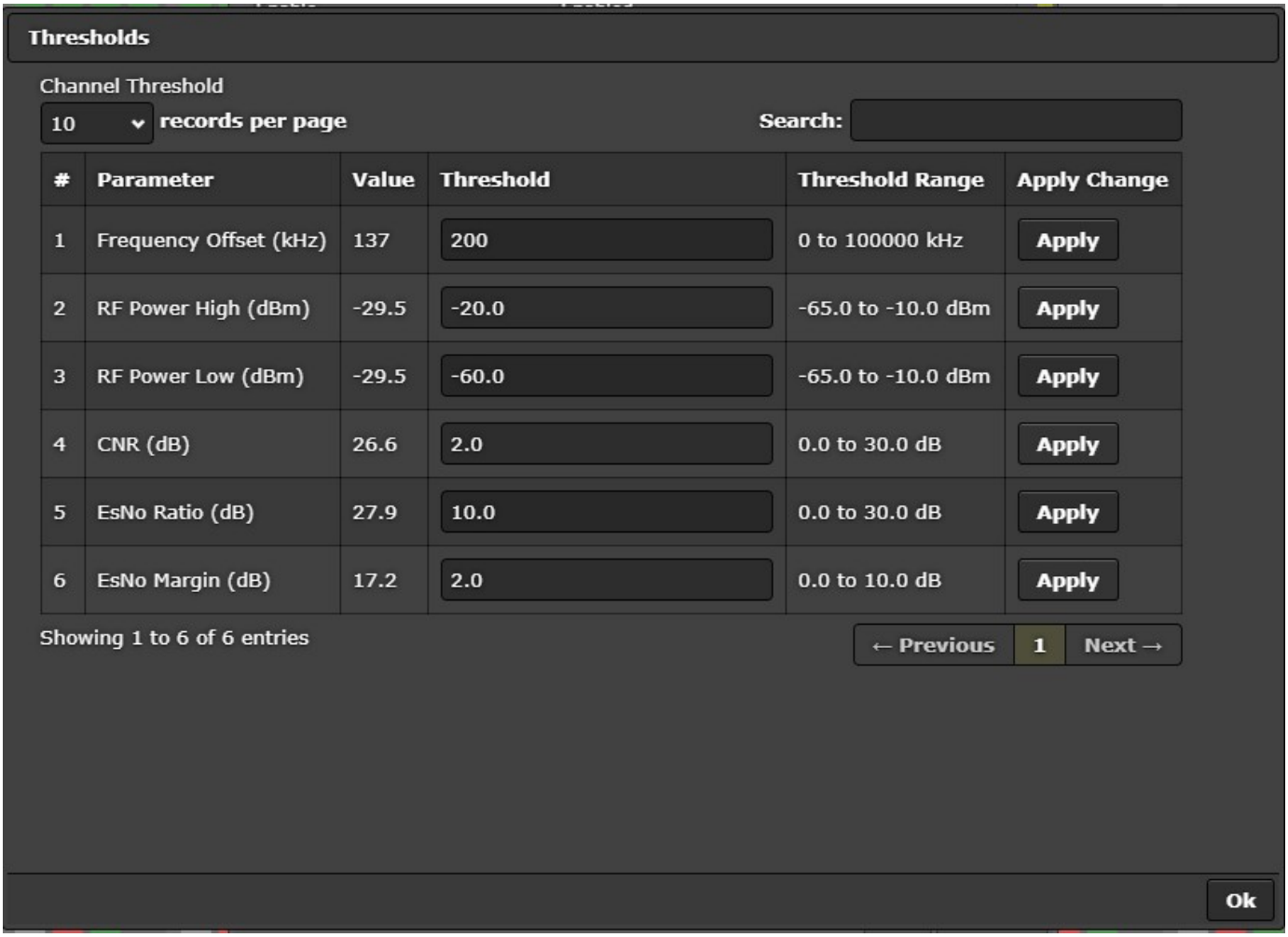


Figure 3-34: WebEASY® - Thresholds Tab

4. SPECTRUM ANALYZER

The 9000RF-PROBE-SA module is Evertz spectrum measurement and analysis module providing high-end performance at a low price. It is available as a 7800 series module as well as an integrated option to Evertz 9000RF-PROBE platform. When installed in a 7800 multi-frame, it can function as an independent spectrum analyzer in a satellite, cable, or terrestrial network or as an integrated monitoring device when purchased with Evertz 9000RF-PROBE.

9000RF-PROBE-SA uses state of the art digital technology and Fast Fourier Transformations to make lightning-fast and accurate measurements. With a very low noise floor and large dynamic range, it is well-suited to measure any type of satellite, cable or terrestrial wireless carrier, including very small carriers, beacon signals and carrier monitoring applications. 9000RF-PROBE-SA accepts all signals from 5 MHz to 3 GHz and input power levels ranging from -110 to +5dBm. RBW varies from 1 Hz to 15 MHz. The 9000RF-PROBE-SA can be connected to an external 10 MHz reference for improved frequency accuracy and stability. All data communications with the 9000RF-PROBE-SA occurs via its built-in Ethernet port.

The 9000RF-PROBE-SA powerful Graphical User Interface (GUI) is available using a Java or Linux web browser or a standalone application provided by Evertz. The GUI is very easy to use and operates like most traditional spectrum analyzers. It provides user-selectable colors for markers and traces, allows storage of multiple traces and provides measurement reporting. The 9000RF-PROBE-SA GUI also includes a powerful built-in Carrier Monitoring function, which provides notification via email or SNMP of carrier measurements that exceed user-defined limits, offering you peace of mind that up to 100 of your carriers are operating as expected.

For integration into a satellite terminal or measurement system, the 9000RF-PROBE-SA can be operated via its built-in GUI or the user can create a separate user interface using the publicly available API. An SNMP status interface is also provided.

Features and Benefits

- Covers full satellite L-band plus cable and wireless bands from 5 MHz to 3 GHz
- A built-in Carrier Monitoring function
- Web browser control
- SNMP status interface
- Available as 7800 module as well as integrated +SA optional on the 9000RF-PROBE

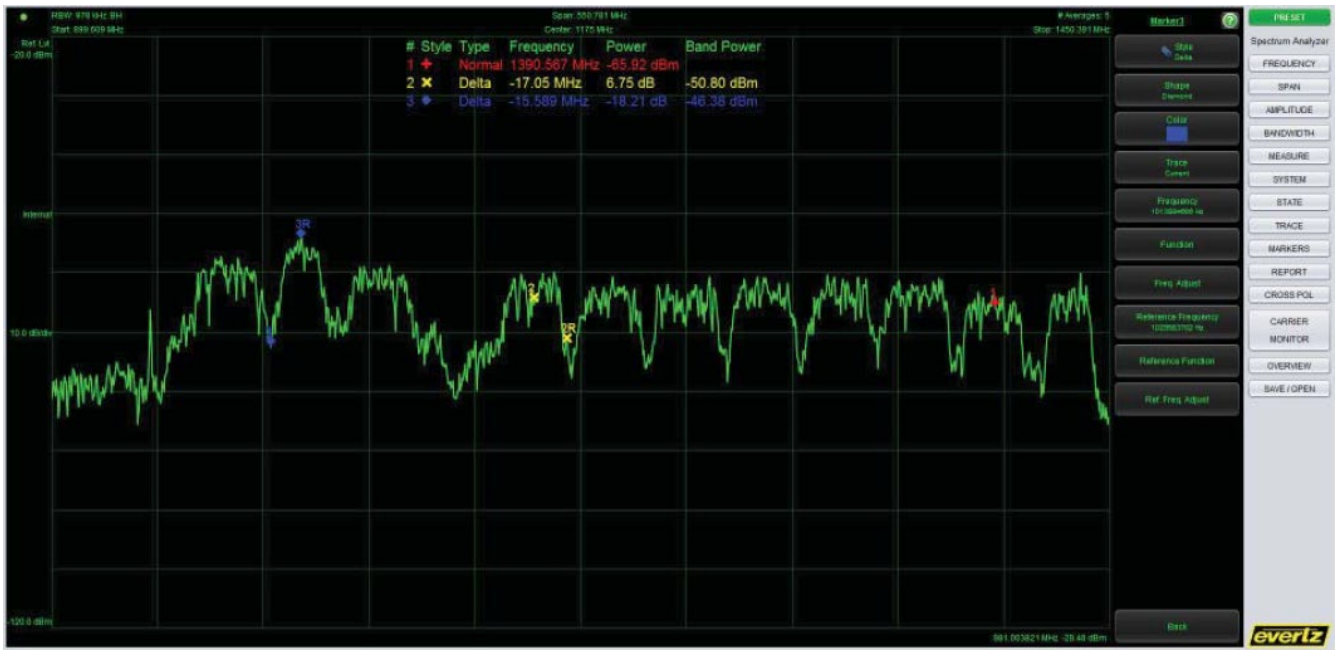


Figure 4-1: Spectrum Analyzer Main

4.1. SPECIFICATIONS

RF Input

Number	1
Connector	50Ω BNC
Input Frequency	5 to 3000 MHz
Input Power	-110 to +5dBm (aggregate)
Maximum Safe Input	+15dBm
Noise Floor	-160dBm/Hz typical at min atten, -160dBm/Hz typical at max atten
Phase Noise	-80dBc/Hz at 1 kHz offset
(Worst case at 3 GHz)	-95dBc/Hz at 100 kHz offset, -125dBc/Hz at 1 MHz offset

Reference Input

Number	1
Connector	50Ω BNC
Input Frequency	10 MHz, -5dBm to +13dBm

Control

Number	1
Connector	RJ -45, 10/100base-T half or full duplex
Interface	TCP/IP API, SNMP, HTTP

Electrical

Voltage	+12 VDC
Power	18W max
Temperature	0-55°C

Physical

Number of Slots	1

Measurements

Amplitude Accuracy	± 0.5 dB (at 25°C) 1, ± 1.0 dB (0 to 55°C)
Frequency Accuracy	± 2.6 ppm (internal) or as per external reference
Frequency Resolution	1 Hz
Resolution Bandwidth2	1 Hz to 15 MHz
Analysis Bandwidth	up to 220 MHz
Spurious:	
Images	< -55dBc (typical)
Aliasing	< -55dBc (typical)
DC Offset	< -30dBc (typical)
Averaging	up to 255 averages

Measurement Speed[3]

- 500 MHz span, 1 MHz RBW, 200ms
- 200 MHz span, 30 kHz RBW, 630ms
- 80 MHz span, 100 kHz RBW, 170ms
- 3.5 MHz, 8kHz RBW, 90ms

FFT Windows

- Flattop
- Hanning
- Hamming
- Rectangular
- Blackman-Harris

FFT Sizes

- 128
- 256
- 512
- 1024
- 2048
- 4096
- 8192

Modes of Operation

- Raw Snapshot Mode; Number of IQ time samples is approx. 32 million
- Linear Power/Bin (4096 samples, up to 255 averages)
- Log Power/Bin (4096 samples, up to 255 averages)
- Raw IQ Samples-decimated 16-4092 in steps of 4-sampling frequency up to 3.7 MHz
- Selectable Spectral Inversion
- Programmatic measurement and control over Ethernet-based API

Notes:

1. Measurement conditions: 10 averages, input level between -8dBm and -68dBm, 3 sigma
2. Resolution bandwidth auto or manual adjustable
3. Expected rates with 10 averages, speed optimization
4. All specification at 25°C unless otherwise noted and are subject to change

4.2. PHYSICAL DESCRIPTION

A picture of the 9000RF-PROBE-SA is shown in image below. Note that user does not have physical access to the spectrum analyzer as it is mounted internally in the 9000RF-PROBE chassis.

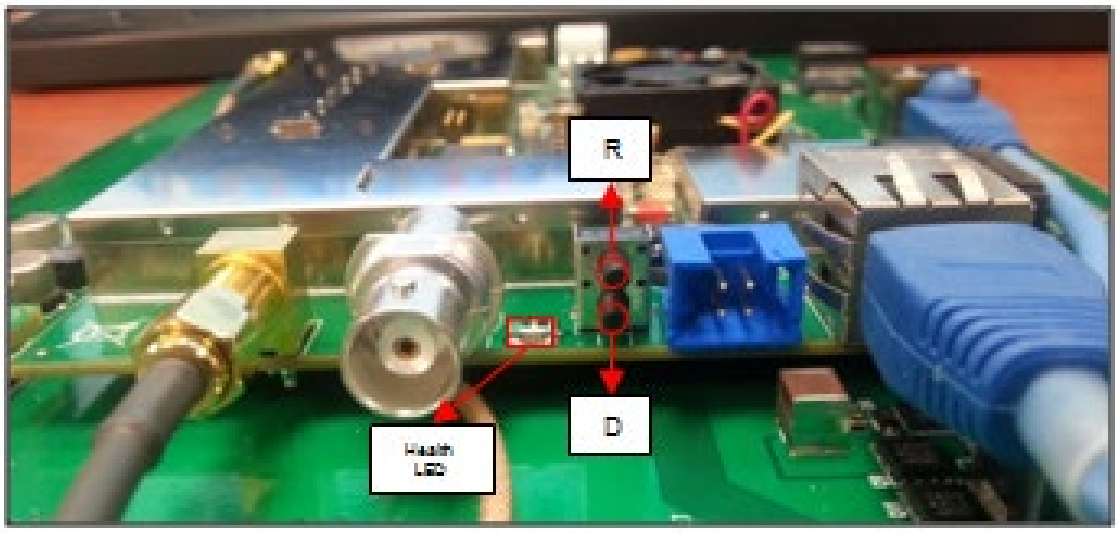


Figure 4-2: 9000RF-PROBE-SA - Rear Plate

4.3. CLIENT COMPUTER REQUIREMENTS

The following minimum capabilities are recommended for the client computer.

- 2.33 GHz Processor (or better)
- 4 GB of RAM (or better)
- An operating system that supports a web browser and Java VM as listed below
- A web browser such as Internet Explorer, Safari or Firefox
- Java JVM 1.4.2 or newer for 9000RF-PROBE-SA software versions up to 1.5.13 and Java JDK 1.6, release 10 or newer for 9000RF-PROBE-SA software versions 2.0.0 and up
- An Ethernet connection available for the 9000RF-PROBE-SA to connect to the computer.

4.4. 9000RF-PROBE-SA INSTALLATION

The 9000RF-PROBE-SA is installed internally into the Evertz' 9000RF-PROBE chassis. This is done in the factory before shipping out the product. Hence, no installation is required from user end.

In order to control and monitor the 9000RF-PROBE-SA, an Ethernet cable is connected between the CONTROL port (highlighted in figure below) located at the rear plate of 9000RF-PROBE and a hub or switch. In this configuration, any computer on the network can access the 9000RF-PROBE-SA Spectrum Analyzer. Any hub or switch is compatible with the 9000RF-PROBE-SA but 10BaseT products will slow down the measurement speed.

Figure 4-3: 9000RF-PROBE - Control Port

No software, other than the Java runtime, needs to be installed on the client computer in order to use the 9000RF-PROBE-SA Spectrum Analyzer from a browser – the Java Applet will automatically be downloaded by the web browser.

4.5. USER INTERFACE SECURITY

No security restrictions are incorporated into the 9000RF-PROBE-SA Java Applet Socket Interface.

4.6. USER INTERFACE CONNECTION DETAILS

The 9000RF-PROBE-SA Java is designed to allow up to 10 remote connections simultaneously. However, multiple connections will impact the speed at which the 9000RF-PROBE-SA can make measurements, as measurement requests on all connections are handled on a first come first serve basis.

4.7. 9000RF-PROBE-SA SETUP CHECKLIST

The following is a summary of the steps to follow when setting up your 9000RF-PROBE-SA.

1. Connect a LAN cable from the CONTROL port (RJ-45 connector) of 9000RF-PROBE to the network. Note that this is the same port that provides access to 9000RF-PROBE GUI and SA GUI.
2. Wait 120 seconds to allow it to boot up.
3. Navigate to the WCM to configure the 9000RF-PROBE-SA (one time).
4. Start viewing the UI (refer to the “Java Applet Software” section).
5. The RF input to the spectrum analyzer does not need any external connection. Internally, each of the RF inputs is connected to the 9000RF-PROBE-SA via a switch and user simply needs to make a selection to route the desired RF input signal to the spectrum analyzer. For more details on how to do this, refer to 3.6.2.

4.7.1. 9000RF-PROBE-SA Configuration

The 9000RF-PROBE-SA uses a Web Configuration Manager (WCM) to modify the network configuration, calibration files, port names, and licenses.

4.7.2. Accessing the WCM

The 9000RF-PROBE-SA network configuration factory defaults are:

- IP Address = 192.168.10.1
- Net Mask = 255.255.255.0
- Gateway = 192.168.10.1

To access the WCM, enter <**9000RF-PROBE-SA IP address**>/cgi-bin/wmc.cgi into a web browser’s address bar. For example, to access the 9000RF-PROBE-SA on the default IP address, use the following:

http://192.168.10.1/cgi-bin/wcm.cgi

This will display the following web page (Figure 37). To log in, select an access level and enter the password. The default password for access level admin is ‘admin’ (without the quotes). The password is case sensitive.

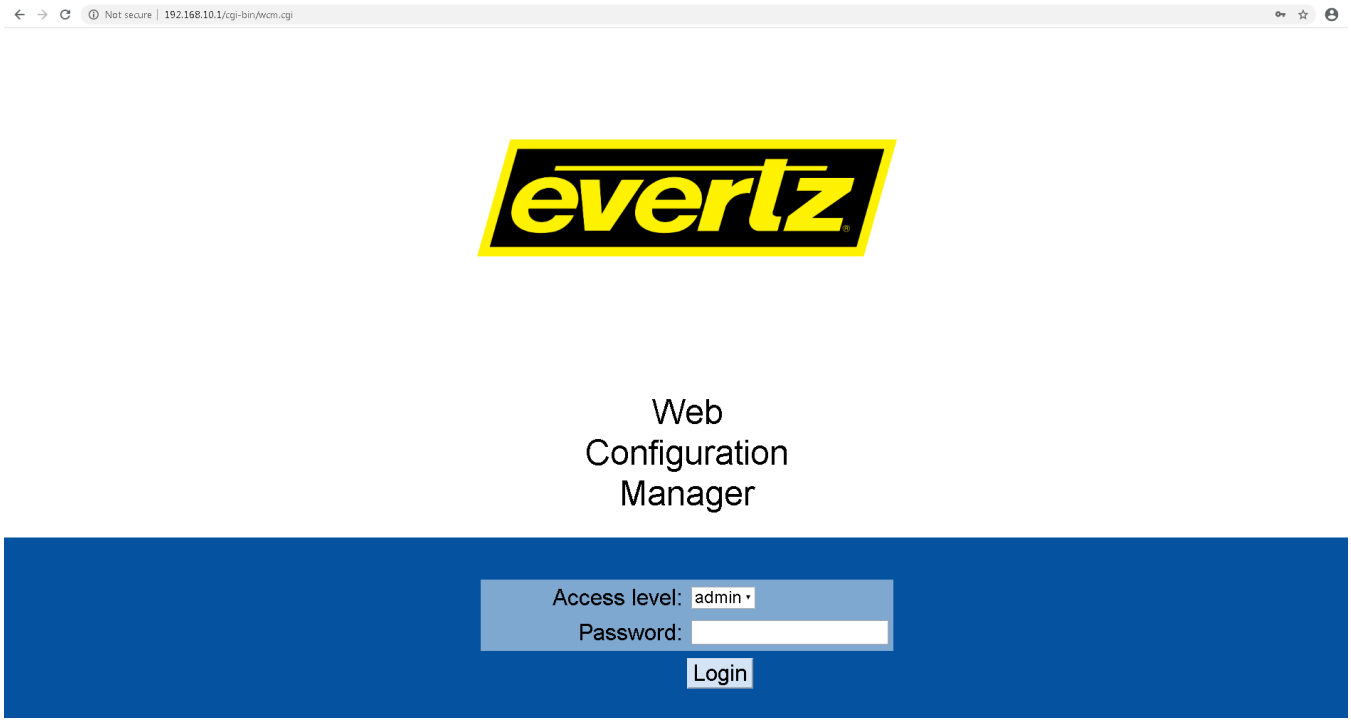


Figure 4-4: SA - Web Configuration Manager Login page

The client computer, whether using the Java Applet or WCM, must have the appropriate network routes to access the 192.168.10.xxx subnet. If a ping or inspection of the routing table determines that no connectivity exists, then a route needs to be configured. To configure connectivity for a Windows 2000/XP/7/8/10 computer, enter the route from a command window. For example, if the client computer has an IP address of 192.168.123.100, enter the command:

route add 192.168.10.0 mask 255.255.255.0 192.168.123.100

4.7.3. Modifying the Network Configuration

To change the 9000RF-PROBE-SA network configuration, log in to the Web Configuration Manager and navigate to the Network tab as is shown in Figure 4-5.

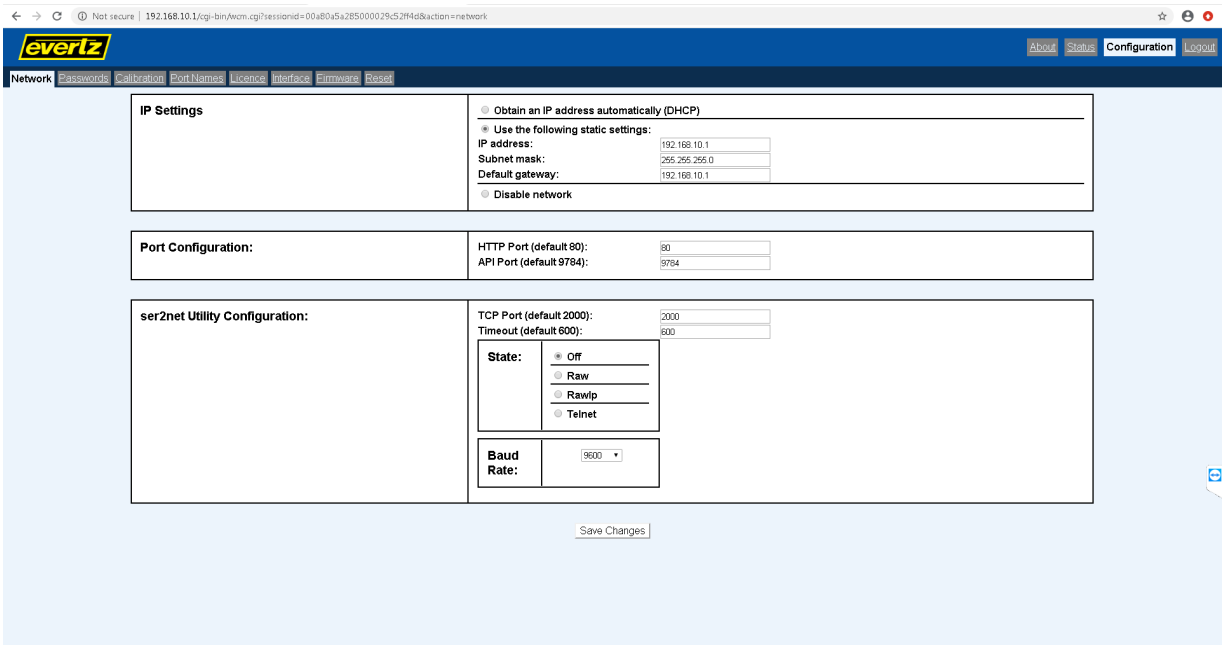


Figure 4-5: SA - Changing the Spectrum Analyzer Network Configuration

Enter the network information and click Save Changes. The following page will be displayed. (Figure 4-6)

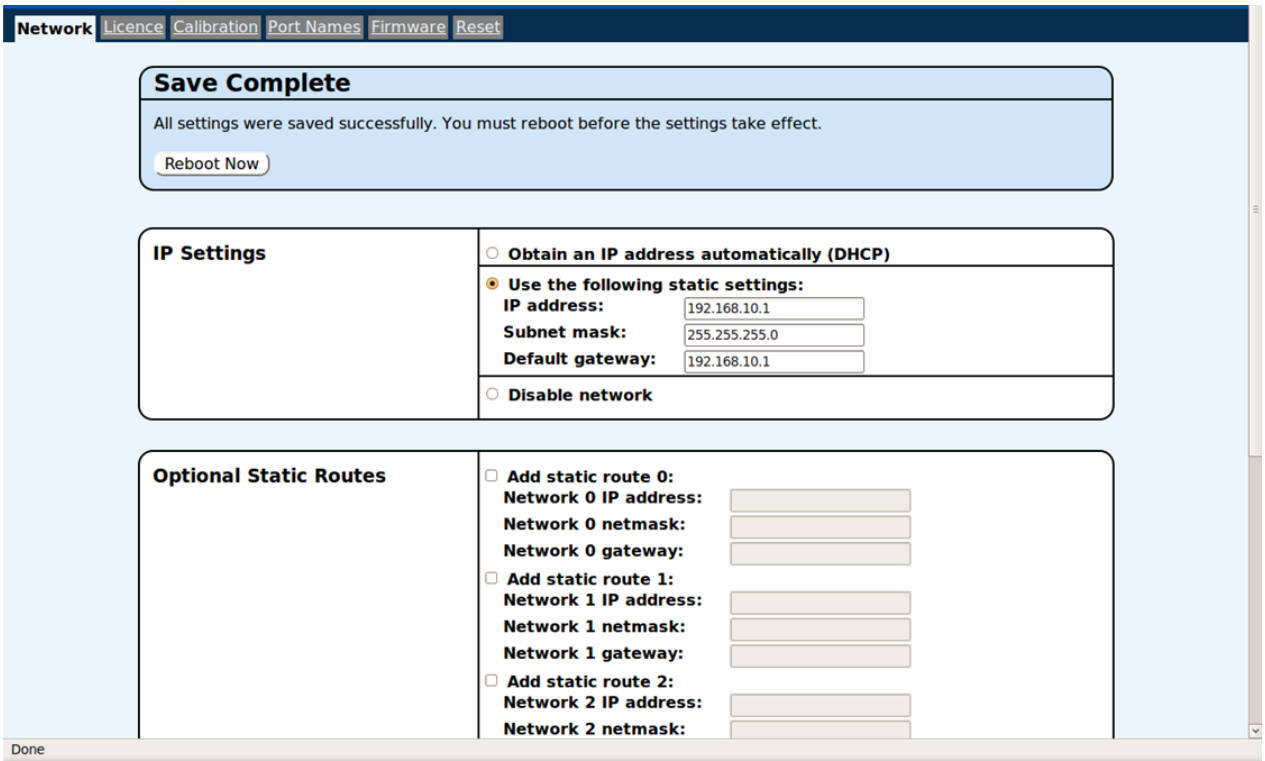


Figure 4-6: SA - Network Changing The Complete Window

Click “Reboot Now” to reboot the card and begin using the new settings.

4.7.4. Restoring the Factory Defaults

There is a button available on the 9000RF-PROBE GUI which can be used to reset the network settings of the spectrum analyzer to default values. This button has been described in 3.6.2. Any calibration or license files installed will remain unchanged.

4.8. JAVA APPLET SOFTWARE

There is a built-in graphical user interface (GUI) that can be displayed using any web browser, such as Internet Explorer, Safari or Firefox. Note that the new versions of Google Chrome (Version 45 and up) have blocked the use of Java applets and will not run the 9000RF-PROBE-SA Applet. The GUI is quite intuitive to use and allows interactive use of the 9000RF-PROBE-SA for any general-purpose investigation that a traditional digital or analog spectrum analyzer can be used for.

Refer to Figure 4-7 for a picture of the main applet for the 9000RF-PROBE-SA**.** The applet window is divided into two areas: the screen, on the left side main area, and the control buttons, on the right-side column.

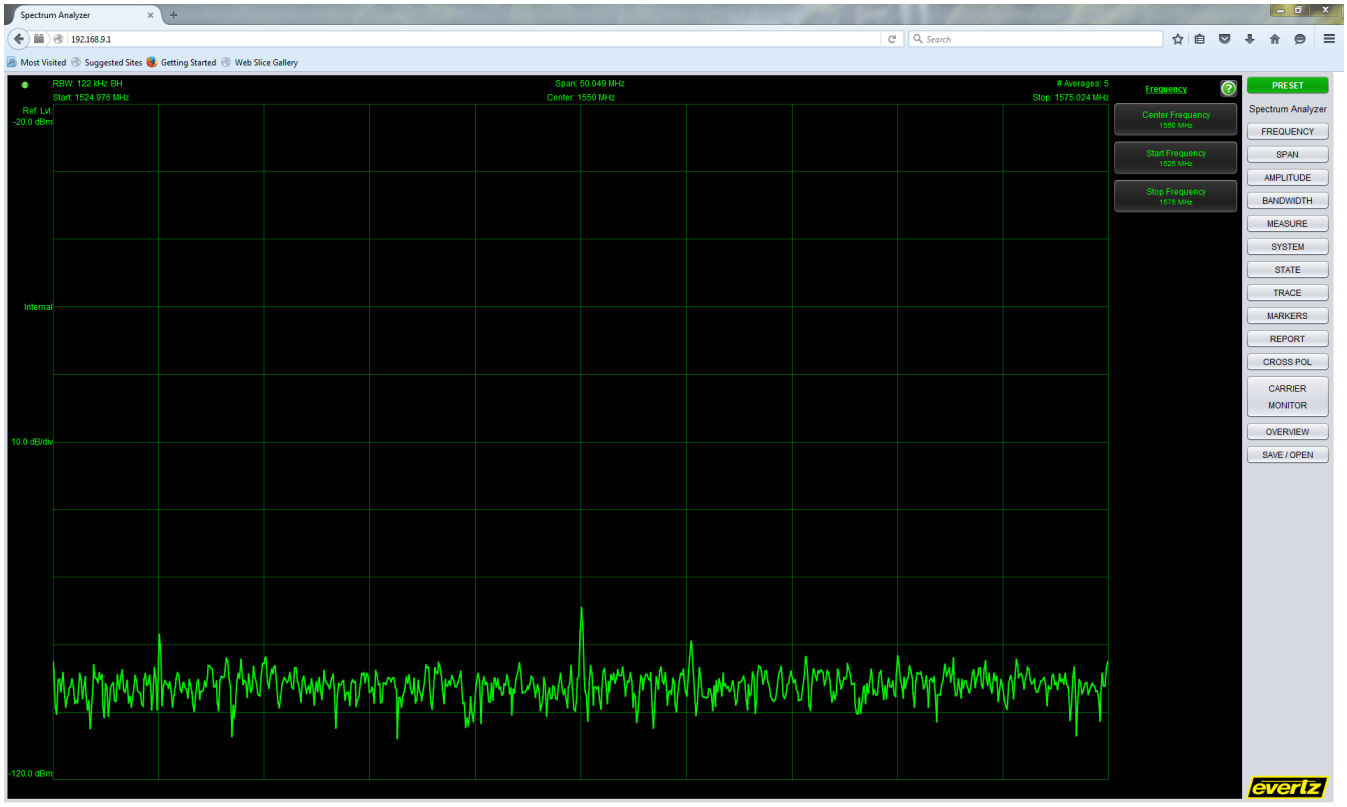


Figure 4-7: SA - Main Applet

For the spectrum mode, the basic operations made by the 9000RF-PROBE-SA are to collect the samples required for the selection made, perform a windowed FFT (see Advanced Settings), and present the spectrum data to the operator. Similar to traditional spectrum analyzers, the speed of the measurement is a function of the RBW and the span.

4.9. VIRTUAL KEYBOARD MODE

The user has to activate the virtual keyboard in order to be able to change SA settings.

1- Click on System.
2- Click on virtual Keyboard Mode and set it to on.

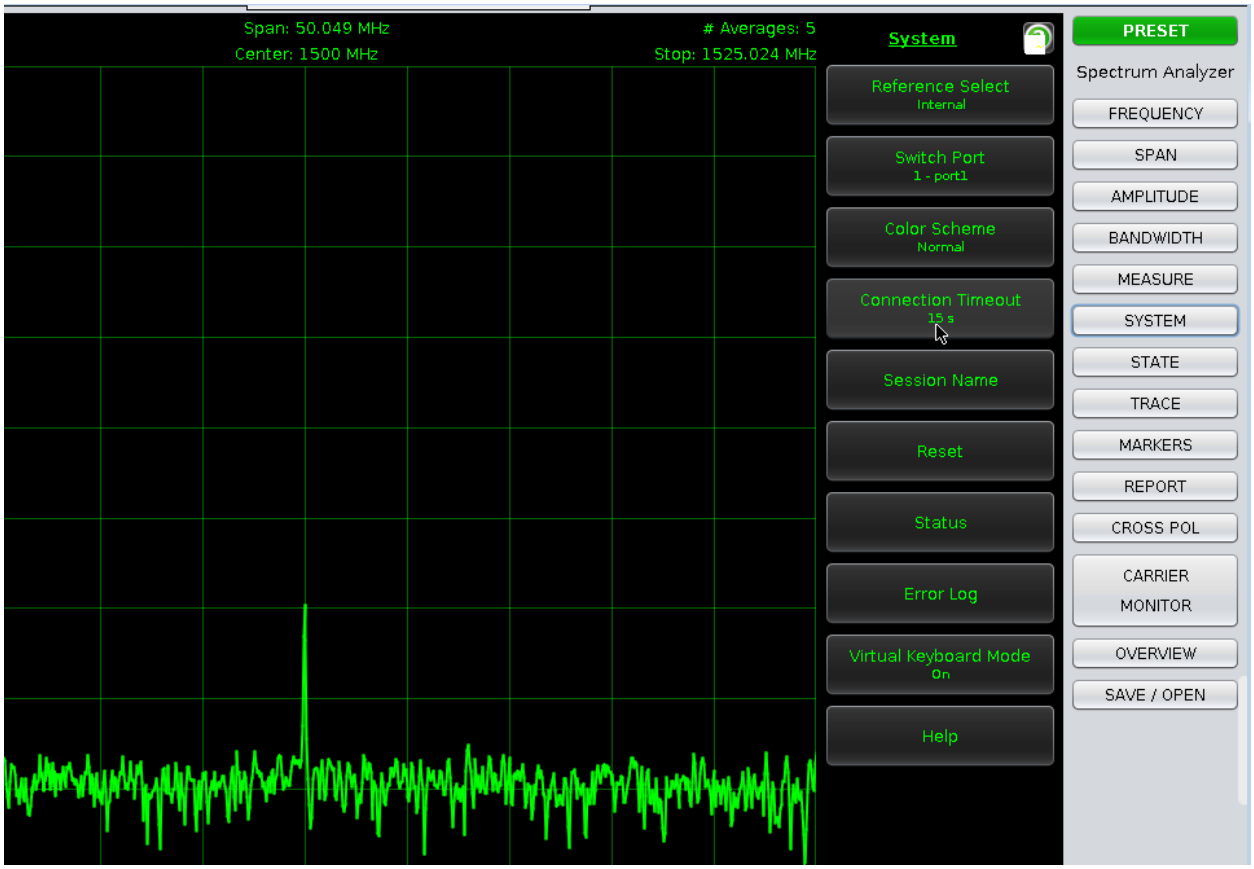


Figure 4-8: SA - Virtual Keyboard

4.10. MAIN SCREEN

The screen consists of four areas, as shown in Figure 4-9. This window will allow the user to control the Y-axis scaling and reference, as well as the attenuation level.

The Plot Area, to the center, is included the grid and plot of the signal. Marker values show up at the top of the plot area.

The North Settings Bar, along the top, is included the connection LED, RBW, Span, # Averages, Start Frequency, center Frequency and Stop Frequency.

The West Settings Bar, along the left, is included the Reference Level, Reference Select, Scale per Division and minimum displayed power level.

And finally, the South Mouse Indicator Bar, along the bottom, is included the mouse cursor positions frequency and amplitude.

The Screen Area will automatically update the values of the various parameters in real-time as the signal changes or the user changes parameters.

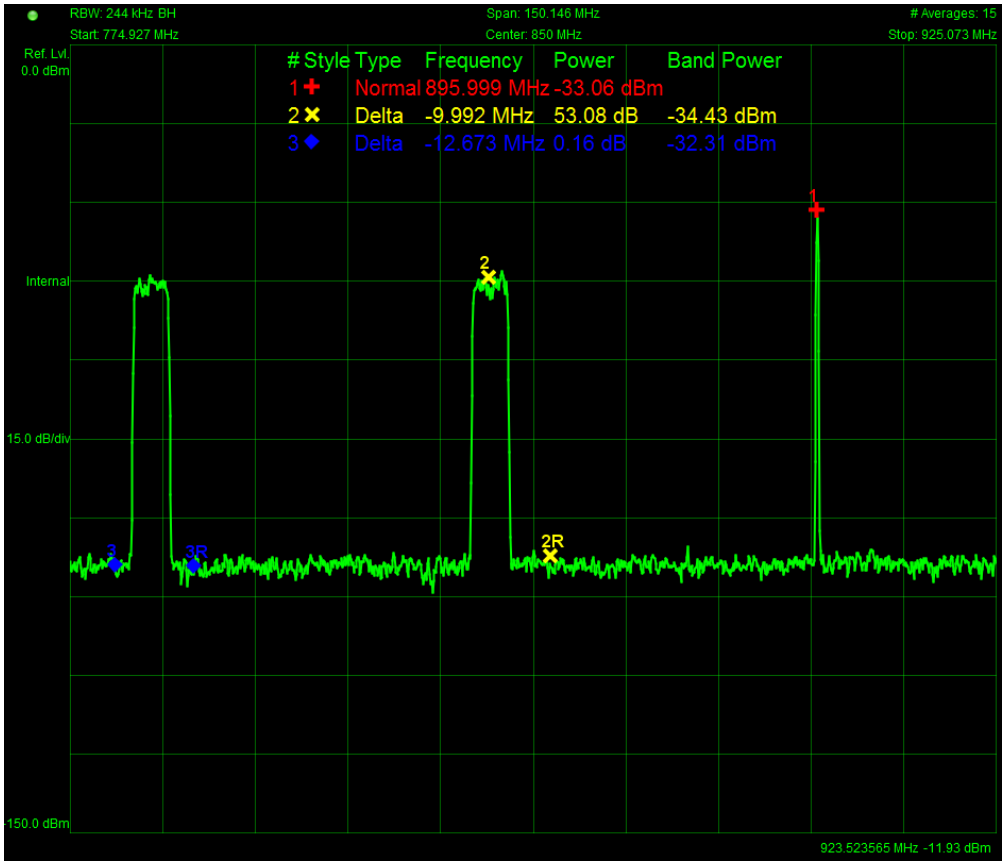


Figure 4-9: 9000RF-PROBE-SA - GUI Main Screen

4.11. CONTROL BUTTONS AND MENU

The Control Buttons reside along the right side of the applet in two columns. The rightmost column of buttons consists of the major functions and the column of buttons to the left of it are the context-sensitive buttons as dictated by the present major function that is selected.

Clicking on one of the major function buttons will change the context-sensitive buttons to the available editable options. Clicking on one of the context-sensitive buttons will either apply that option or bring up a separate dialog box that can be edited to a value or chosen from a drop-down list.

The options available for each context-sensitive function can be multiple levels deep. The menu options can be multiple and their specific functionality is outlined in the below tables.

The following tables describe in detail each button and data field of the 9000RF-PROBE-SA GUI. The use of the GUI is described further in the Help file under the system button.

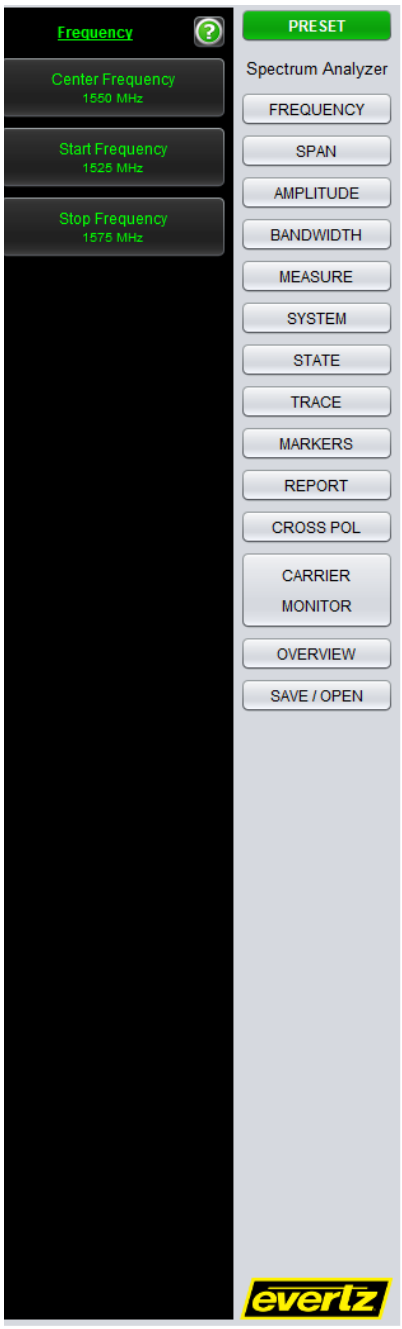


Figure 4-10: SA - GUI Control Buttons

Button	Menu Item	Description
Preset	N/A	Sets the 9000RF-PROBE-SA back to its default settings and clears any stored traces, states and markets.
9000RF-PROBE-SA Logo	N/A	This is the application logo only.
Frequency	Center Frequency	The Center Frequency displays the desired and actual center frequency values. Clicking on the menu item displays the Center Frequency Edit dialog. Setting a value too low or too high is automatically adjusted to the actual value of the card's limit.
	Start Frequency	The Start Frequency displays the desired and actual start frequency values. Clicking on the menu item displays the Start Frequency Edit dialog. Setting a value too low or too high is automatically adjusted to the actual value of the card's limit.
	Stop Frequency	The Stop Frequency displays the desired and actual stop frequency values. Clicking on the menu item displays the Stop Frequency Edit dialog. Setting a value too low or too high is automatically adjusted to the actual value of the card's limit.
Span	Span	The Span displays the desired and actual span values. Clicking on the menu item displays the Span Edit dialog. Setting a value too low or too high is automatically adjusted to the actual value of the card's limit.
	Full Span	Sets the span to 1200 MHz and center frequency to 1550 MHz The 9000RF-PROBE-SA is in wide sweep mode.
	Min Span	Sets the span to 16 kHz.
Amplitude	Auto Y-axis	Whether or not the 9000RF-PROBE-SA will set the Reference Level and Scale / Div to an appropriate value to show the entire active trace in view. Possible options are True or False.
	Reference Level	The Reference Level or Power Level at the top of the screen in dBm. This value will be automatically set if Auto Y-axis is set to true.
	Scale/Div	The scale per vertical division in dB. This value will be automatically set if Auto Y-axis is set to true.
	Auto Atten	The attenuation level is automatically set to the appropriate value, depending on the power level of the incoming signal. Possible options are: True-Disables manual Atten.Menu false-Disables manual Atten.Menu
	Manual Atten	Stepped increments to adjust the input attenuation manually.

Table 4-1: 9000RF-PROBE-SA - GUI Button and Menu Descriptions (1 of 12)

Button	Menu Item	Description
Amplitude (continued)	Max Ref Line	A horizontal reference line is drawn at the maximum power value of the trace analog with a label of the power value. Clicking this menu item sets it visible. **Visible:** Whether or not the reference line is visible. Possible options are Show and Hide. **Color:** The color of the reference line. It displays a color edit dialog. **Thickness:** The thickness of the reference line in pixel. Possible values are 1, 2(Default), 3, 4 and 5. **Back:** This field allows the user to navigate back to the Trace menu.
	Min Ref Line	A horizontal reference line is drawn at the minimum power value of the trace analog with a label of the power value. Clicking this menu item sets it visible. **Visible:** Whether or not the reference line is visible. Possible options are Show and Hide. **Color:** The color of the reference line. It displays a color edit dialog. **Thickness:** The thickness of the reference line in pixel. Possible values are 1, 2(Default), 3, 4 and 5. **Back:** This field allows the user to navigate back to the Trace menu.
Bandwidth	RBW	The resolution bandwidth or spacing between the points. Clicking on the menu item displays a combo box with a list of the appropriate RBWs given the current span and FFT Window. The minimum RBW is 1 Hz.
	RBW Mode	It shows what mode is used. Values are: **Auto(Default):** Sets the RBW=span/ratio **Manual:** Ratio is disabled, users have full control to independently specify an RBW
	Ratio	The ratio of the span to the RBW and is used only in Auto RBW Mode.
	VBW Mode	The VBW Mode used. Values are: **Average (Default):** This field uses the averages when capturing a trace, enables average minimum, disables VBW menu item. **VBW:** This field uses VBW when capturing trace, enables VBW menu item, disables average menu item.
	Average	The number of averages. Displays the desired and actual number of averages. Clicking on the menu item displays the Number of Averages Edit dialog. The lower limit is 1.
	VBW	The video bandwidth used when capturing a trace.

Table 4-2: 9000RF-PROBE-SA - GUI Button and Menu Descriptions (2 of 12)

Button	Menu Item	Description
Measure	Capture Mode	This field allows the user to set the Capture Mode. Possible options are: **Continuous**, **Single** and **Stopped**
	Restart	This field allows the user to restart the measurement if the capture mode is selected as **Continuous**. This is useful if Max Hold, Min hold or Min-Max Active mode is on while in continuous mode.
	FFT Window	This field allows the user to set the Fast Fourier Transform window type. Possible options are : **Rectangular**, **Flattop**, **Blackman-Harris** (Default), **Hamming** and **Hanning.**
	Spectral Inversion	This field allows the user to set the Spectral Inversion. Possible options are **Off** and **ON**.
	Optimization	This filed allows the user to set the Optimization. Possible options are **Spurious** and **Speed**.
	Detector	This field allows the user to set the Detector which is used. Possible options are **Normal** and **Peak**.
	Hold	This filed allows the user to set the Hold mode. Possible options are: **Normal** (None), **Max Hold**, **Min Hold,** and **Min-Max Active**.
State	State 1 to State 10	Store to restore the state of 9000RF-PROBE-SA from the storage of one of 10 states. When the state is captured, a gear marker icon is shown on the menu item. Hovering over the menu item when a state is captured, displays the state in an HTML tooltip. **Clear:** Clears the state. **Capture:** Stores the current state. **Apply:** Applies the stored state in a display dialog. **View:** View the stored state in a display dialog. **Name:** Name the state. The name will appear on the menu item.

Table 4-3: 9000RF-PROBE-SA - GUI Button and Menu Descriptions (3 of 12)

Button	Menu Item	Description
System	Reference Select	This field allows the user to select the reference. Possible options are: **External**, **Internal** and **Audio**
	Switch Port	This field allows the user to set the switch port. On 9000RF-PROBE-SA**,** the value will be set to 0 and disabled.
	Color Scheme	The color scheme of the background and grid lines. Possible options are: **Normal** (Black and Green) **Print** (White and Black)
	Connection Timeout	The number of seconds to wait for a response from the 9000RF-PROBE-SA in addition to a minimum of a second. The default is 30 seconds. The minimum is 1 second. Setting the number to 1 second will detect network failures quicker. Setting the number to 60 seconds will provide more time when running the UI over a WAN and/or when connecting through the 9000RF-PROBE-SA proxy.
	Session Name	The value for the session name appears on the following: • **Browser Tab** • **South Toolbar shortcut label** (Ideal for inclusion in email notifications rich HTML screenshots.) • **Carrier Watch Title Caption**
	Reset	This field allows the user to perform software reset on the card.
	Status	This field displays the status of the card in a display dialog. A tooltip does the same.
	Error Log	This filed displays a list of errors received by the 9000RF-PROBE-SA UI. The dialog automatically pops up when an error is encountered.
	Help	Display the 9000RF-PROBE-SA UI help in the default browser.

Table 4-4: 9000RF-PROBE-SA - GUI Button and Menu Descriptions (4 of 12)

Button	Menu Item	Description
Trace	Active	**Visible:** whether or not the active Trace is visible, the values are Show and Hide. **Color:** This filed allows the user to set the color of the active trace. This field displays a color edit dialog. **Thickness:** This file allows the user to set the thickness of the active trace in pixels. Possible values are: 1, 2(default), 3, 4 and 5. **Export to CSV:** Export the Tracepoints to a CSV file. This field displays a File Save as Dialog. **Back:** This field navigates back to the Trace menu.
	Trace 1 to Trace 4	These are memory-based traces. The trace color is shown in the menu item. **Capture:** This field copies the active trace to the stored trace. Displays a graph icon on the menu item and on the Trace menu item one level above when captured. **Clear:** This filed clears the trace from memory. **Visible:** whether or not the active Trace is visible, the values are Show and Hide.

Table 4-5: 9000RF-PROBE-SA – GUI Button and Menu Descriptions (5 of 12)

Button	Menu Item	Description
Trace (Continued)	Trace 1 to Trace 4 (Continued)	**Color:** This filed allows the user to set the color of the active trace. This field displays a color edit dialog. **Thickness:** This file allows the user to set the thickness of the active trace in pixels. Possible values are: 1, 2(default), 3, 4 and 5. **Freq.Rendring:** This field allows setting the Frequency Rendering mode. Possible values are: • **Overlay:** Displays the trace exactly as was taken, disregarding the frequency. This is a WYSIWYG of the trace when it was captured. • **Absolute:** Renders the trace in the exact frequency location. It may be off-screen. • **Shifted:** Renders the trace centered in the center of the screen but scale it in the frequency direction according to the new Span. **Ampl.Rendering:** This field allows setting the amplitude rendering mode. Possible values are: • **To Scale:** Renders the trace in the vertical direction to scale. • **Overly:** Rendering the trace in the vertical direction as was taken during capture, disregarding the reference level. **Export to CSV:** Export the Tracepoints to a CSV file. Displays a File Save as Dialog. **Details:** This field displays the setting at the time the frame was captured. **Back:** This field navigates back to the Trace menu list.

Table 4-6: 9000RF-PROBE-SA - GUI Button and Menu Descriptions (6 of 12)

Button	Menu Item	Description
Markers	Marker 1 to Marker 5	Markers that can be applied to traces. The markers are added to the active trace and then can be moved to memory-based traces. The trace color is shown in the menu item. Note that markers can only be dragged using the mouse on memory-based traces that have the Freq. Rendering set to absolute. **Style:** This field allows the user to set the style of the marker. When it is set to Normal or Delta, a paper clip graphic is shown. Possible values are: • **OFF:** Turns off the marker. • **Normal:** A single marker. • **Delta:** A pair of markers. **Shape:** This filed allows setting the shape of the marker. Possible values are: **Plus**, **X**, **Diamond**, **Up facing Triangle**, **Down Facing Triangle**, **and Right facing Triangle**, **left Facing Triangle**, **Circle**, **Do Not Enter** and **Circle Plus**. **Color:** This field allows setting the color of the marker. It displays a color edit dialog. **Trace:** This field shows what the Trace marker is attached to. Its possible values are: **Current** (Active) **1**, **2**, **3** and **4**. **Frequency:** This field is enabled when the style is Normal, Delta. It displays the Frequency Edit Dialog to adjust the marker frequency. **Function:** This field is enabled when the style is Normal or Delta. It displays the functions that can be performed on the marker frequency. Possible values are: **Peak Search**, **Marker to Center Frequency**, **Marker to Reference Level**, **Next Peak Right**, **Next Peak Left**, **Next Lower Peak** **Freq.Adjust:** This field is enabled when the style is Normal, Delta. It displays a previous and next button. The buttons will move the marker one point to the left or right. **Reference Freq:** This field is enabled when the style is Delta. It displays the Frequency Edit Dialog to adjust the reference frequency maker.

Table 4-7 : 9000RF-PROBE-SA - GUI Button and Menu Descriptions (7 of 12)

Button	Menu Item	Description
Markers (continued)	Marker 1 to Marker 5 (continued)	**Reference function:** This field is enabled when the style is Delta. It displays the Function that can be performed on the reference frequency maker. Possible values are: **Peak Search**, **Marker to Center Frequency**, **Marker to Reference Level**, **Next Peak Right**, **Next Peak Left**, **Next Lower Peak** **Ref.Freq. Adjust:** This field is enabled when the style is Delta. It displays a previous and next button. The buttons will move the reference frequency marker one point to the left or right.
Report	Export to CSV	This field exports the active trace and any captured memory-based traces to a CSV file. It displays a file which is saved as dialog.
	Export to HTML	This field exports the screen, traces, markers and states to an HTML file report. It displays a File Save as Dialog to specify a target directory. 9000RF-PROBE-SA UI optionally displays the report HTML file in the default browser when done.

Table 4-8 : 9000RF-PROBE-SA - GUI Button and Menu Descriptions (8 of 12)

Button	Menu Item	Description
Carrier Monitor	New measurement	This field allows the user to create a new measurement using the current state of the 9000RF-PROBE-SA. It provides a name and specifies which analyses to run.
	Measurement Delay	This field displays the measurement delay in seconds. This is the time to wait between successive measurements.
	Log Directory	The output Log directory for traces and analysis files. If blank, logging will not occur. Log files will be in a subdirectory off this root log directory in a format *root_log_dir/yyyy_mm_dd/measurement_name/* Within that directory, there will be a BandPower.csv(if Band Power analysis is configured) PresenceOfACarrier.csv (if Presence of a Carrier Analysis is configured) Trace subdirectory containing a trace file per trace with an hh_mm_ss_uuu.csv format
	Log File Lifespan	The length in days to preserve log files written in the Log Directory. If the value is set to something greater than 7, for example, 10, log files older than 10 days will be purged. The system will check the network drive during the 0th hour in the day only, so as not to continually access the disk all the time. Possible values are: **0**(default) turned off. Don't purge any Log files. Log files will have to be deleted manually by a user if disk space becomes an issue. **>=7**: This is the number of days to preserve log files. 7 is the minimum since Carrier watch software uses this for historical analysis.

Table 4-9 : 9000RF-PROBE-SA - GUI Button and Menu Descriptions (9 of 12)

Button	Menu Item	Description

Carrier Monitor (continued)	Email	An edit window to specify:
		• Master Switch: Enables email
		• Mail Server:
		  ○ Name
		  ○ Port
		• Authentication
		  ○ None
		  ○ SSL
		  ▪ Username
		  ▪ Password
		  ○ TLS
		  ▪ Username
		  ▪ Password
		• From
		  ○ Email
		  ○ Name
		• Recipients
		  ○ Email
		  ○ Name
		  ○ Style
		  ▪ Simple Text: Text Only
		  ▪ Rich HTML: Text and screenshot
		• Test Button: Select a recipient and click the test button to send a test email.
		
		Note: Ensure that nothing is blocking port 25, such as virus software. You will need to remove or disable that port blocking for the email to work.

	Band Power	Displays sub-menus for the default band Power analysis. **Nominal Power:** Edit the default Nominal Power in dBm. **Tolerance Power:** Edit the default Tolerance Power in dBm.
	Presence of a Carrier	Displays sub-menu for the default presence of a carrier analysis. Delta Power: Edit the default Delta power in dB.

Table 4-10: 9000RF-PROBE-SA - GUI Button and Menu Descriptions (10 of 12)

Carrier Monitor (continued)	SNMP	An edit window to specify:
		• **Master Switch**: enables SNMP
		• **Trap Destinations:**
		  ○ IP Address
		  ○ Port
		  ○ Community
		• **Test button**: Select a trap destination and click the test button to send a test trap. Default values used.
		• **Show MIB button**: Extract the MIB file from the application and prompt the user to save the file to the local disk. This MIB file can be loaded directly into an NMS.

Table 4-11 : 9000RF-PROBE-SA - GUI Button and Menu Descriptions (11 of 12)

Button	Menu Item	Description
Overview	Overview Mode	This field allows setting the Overview mode. Possible values are **ON** and **OFF** (Default). Setting the value to ON makes the Overview Bar and Refresh buttons visible on the screen. It also takes acquires an Overview trace and renders it on the Overview Bar.
	Refresh	This field allows the user to refresh the Overview bar by acquiring a new trace. Enabled if the Overview Mode is on.
Save/Open	Save Screen to PNG	Save the screen to a PNG file. It displays a file save as dialog.
	Save Project	Save the current settings, memory-based traces, markers attached to memory-based traces, and states are loaded from the project XML file.
	Open Project	Opens a saved project from file and loads the data into the 9000RF-PROBE-SA UI. The current settings, memory-based traces, markers attached to memory-based traces, and states are loaded from the project XML file.

Table 4-12: 9000RF-PROBE-SA - GUI Button and Menu Descriptions (12 of 12)

4.11.1. Advanced Measurement Settings

Pressing the Measure button (Measure Setup on software version prior to 3.0.0) allows access to some advanced settings, not typically changed for most measurements, but available if desired. These settings allow the user to select the FFT Window type and Optimization. On Software versions prior to 3.0.0, Spectral Inversion and FFT Overlap are also available.

A selection of FFT windows types has been made available to provide the user with expanded analysis capability. The available window types and their respective characteristics are shown in Table 4-9

FFT Window	Highest Side Lobe Level (dB)	Equivalent Noise BW (bins)	3.0 dB BW (bins)	Scallop Loss (dB)
Rectangular[1]	-13.0	1.00	0.89	3.92
Flattop[2, 3]	-93.6	3.77	3.72	0.005
Blackman-Harris[1]	-92	2.00	1.90	0.83
Hamming[1]	-43.0	1.36	1.30	1.78
Hanning[1]	-32.0	1.50	1.44	1.42

Table 4-13 : FFT Window Type Figures of Merit

[1] "On the Use of Windows for Harmonic Analysis with Discrete Fourier Transform", Fredric J. Harris, Proceedings of the IEEE, Vol. 66, No. 1, January 1978

[2] "Extremely Flat-Top Windows for Harmonic Analysis", Irini S. Reljin, Branimir D. Reljin, Veljko D. Papić, IEEE Transactions on Instrumentation and Measurement, Vol. 56, No. 3, June 2007"

[3] "Technical Review, Windows to FFT Analysis", Brüel & Kjær, No. 3 1987

Configuring the 9000RF-PROBE-SA to an Optimization setting of Spurious will increase the measurement time but reduce, and in most cases remove completely, the spurious signals generated within the 9000RF-PROBE-SA. It is recommended that speed Optimization be used when measuring modulated or noise signal band power, as spurious optimization can reduce measurement accuracy. An Optimization setting of speed will increase measurement speed at the expense of leaving internally generated spurious signals visible to the user.

4.12. OVERVIEW BAR

The Overview Bar is a navigational assistance feature recently added in the 9000RF-PROBE-SA to help the user to set center frequency and span more efficiently. It is a full span bar that provides an overview of the entire spectrum. The blue selection block indicates the selected span for the trace in the plot area. The selection block can be dragged left or right to create a new center frequency in the plot area.

The selection block edges can be dragged to create a new span and center frequency in the plot area. Mouse moving on the Overview Bar updates the frequency on the Mouse Location Bar and mouse clicking sets the center frequency at that frequency. The Overview Bar full span trace can be refreshed manually with the Refresh button.

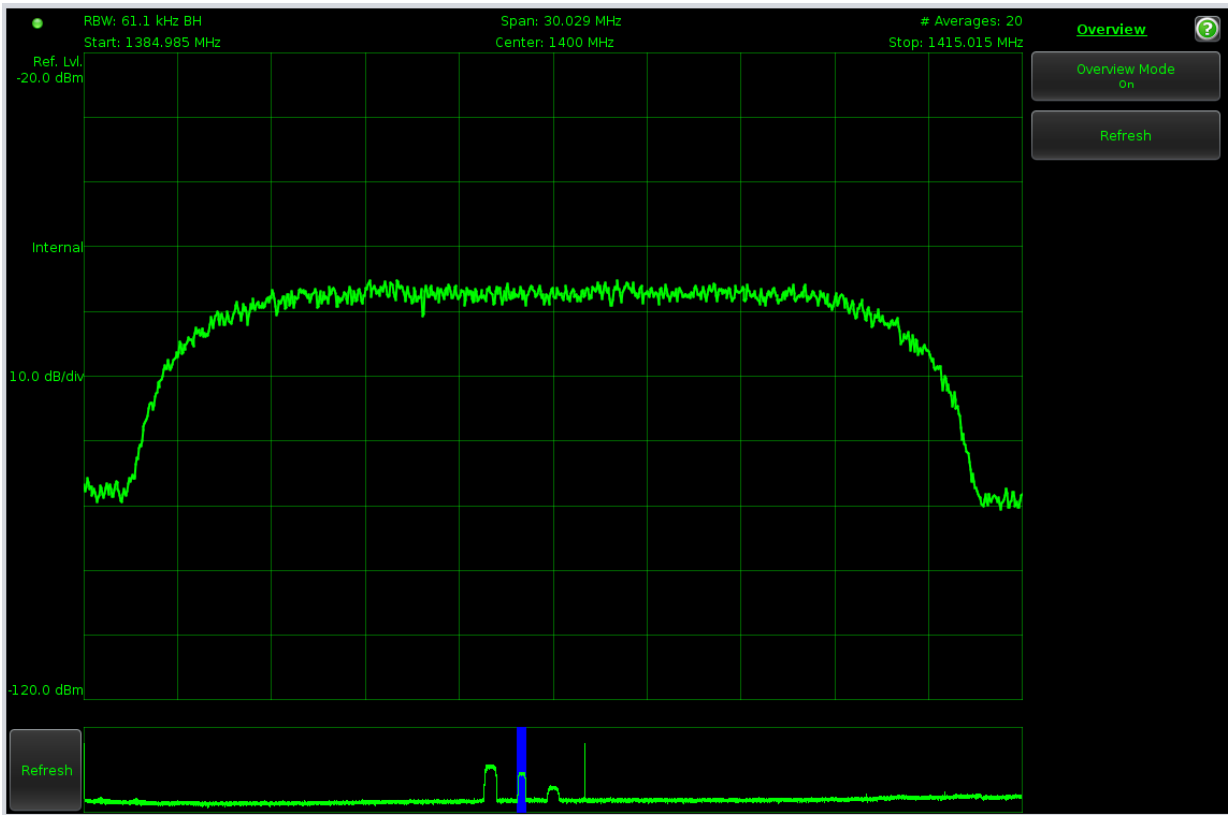


Figure 4-11: SA - Overview Bar

4.13. CARRIER MONITOR (OPTIONAL WITH LICENSE)

The 9000RF-PROBE-SA can be configured to monitor up to 100 carriers, validating the captured trace for limits within acceptable Band Power and Presence of a Carrier thresholds. The measurement is defaulted to use the entire span of the viewport. If configured, email or SNMP trap notification events will be raised when an alarm threshold is exceeded. To use the carrier monitor, a new measurement must be configured then enabled.

4.13.1. New Measurement

The following figure shows the New Measurement window.

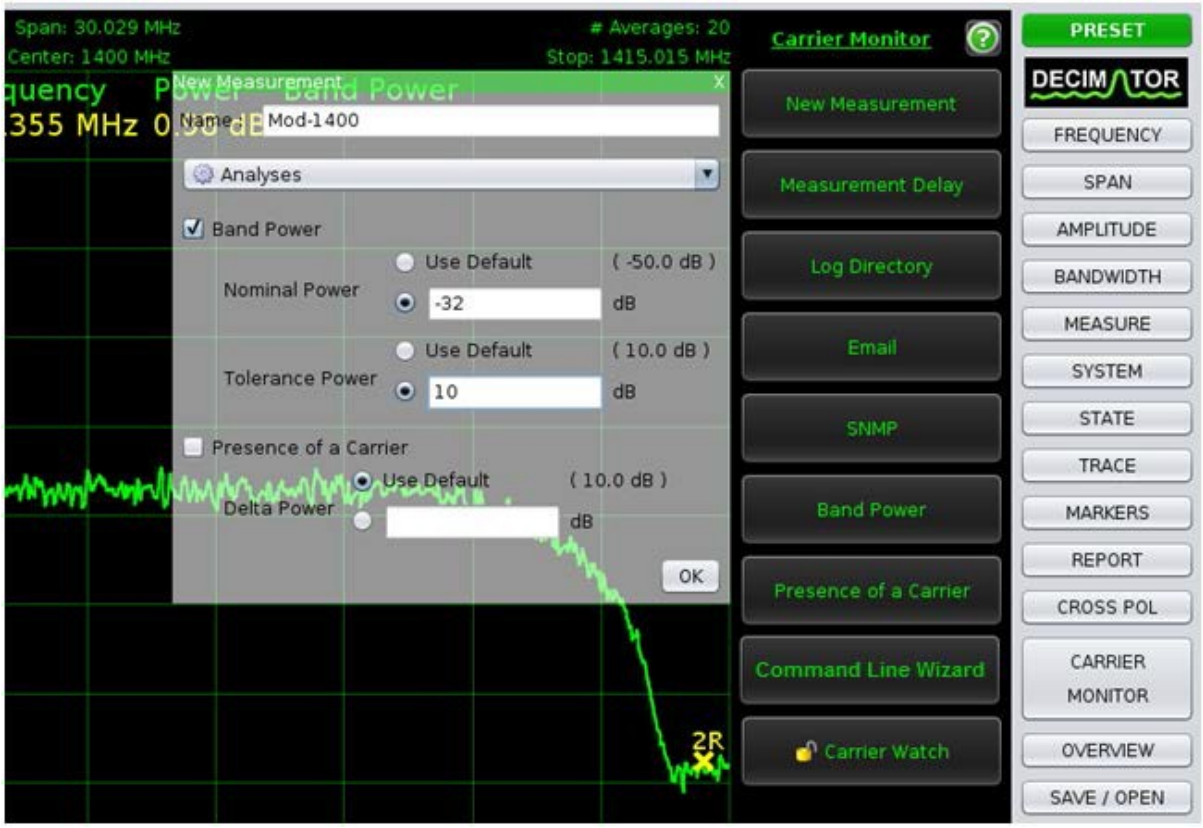


Figure 4-12: SA - New Measurement

To add a measurement:

- Click the Carrier Monitor button
- Click the New Measurement menu item
- On the New Measurement display:
  - Enter a unique carrier name
  - Specify the Analysis to perform
  - Specify the threshold parameters by accepting the default ones or overriding
  - Click OK
- The measurement is added to the table in the Carrier Monitor toolbar
- Alternatively, click on the add button on the carrier monitor toolbar

A unique name must be given to each new measurement. Use the drop-down box to configure the options for Analyses, Notifications, and State. Note that the state options are not configurable through this menu. These values are determined from the current Java Applet configuration.

4.13.2. Carrier Monitor Toolbar

The carrier monitor toolbar appears after one New Measurement has been configured. Moving the mouse cursor over the toolbar widens it to make the measurement names visible. **Error! Reference source not found.** shows the Java Applet with 4 Carrier Monitor measurements configured in the toolbar. Note that the measurement has been 'Played' so many of the Carrier Monitor Toolbar buttons have been disabled. The selected carrier ("Mod-1400" from the Measurement Table) has up to 24 hours of results shown in the Carrier window.

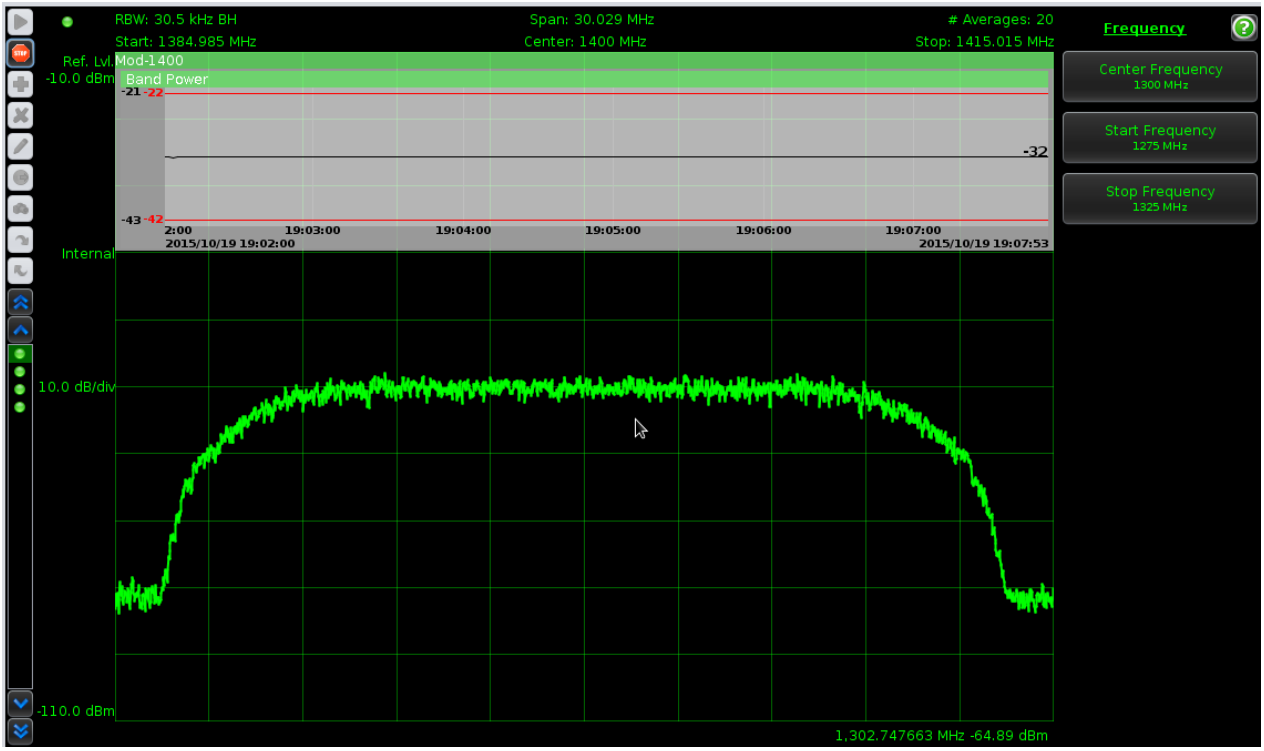


Figure 4-13: SA - Carrier Monitor

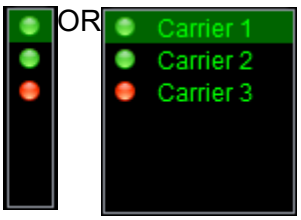
Button Name	Button Graphic	Description
Play		Start the carrier monitor. This will sequentially process the carrier monitor measurements. If a threshold is exceeded Measurement Status LED will go red and, if enabled, a notification will be sent
Stop		Stop the carrier monitor measurements
Add		Create a new measurement
Delete		Delete the selected measurement
Edit		Edit the selected measurement
Recall State		Recall the 9000RF-PROBE-SA state from the selected measurement
Capture State		Capture the state of the 9000RF-PROBE-SA to the selected measurement
Move measurement down		Move the selected measurement down one
Move measurement Up		Move the selected measurement up to one
Scroll to Top		Scroll to the top of the measurement table
Scroll Up		Scroll up one
Measurement Table		When the mouse cursor is not in the Carrier Monitor Toolbar area, then only the Measurement Status LED is shown. Otherwise, a two-column table with Measurement Status and Measurement Name is shown LED: Gray is unknown, Green is a success, Red is failure
Scroll Down		Scroll down one
Scroll to Bottom		Scroll to the bottom of the measurement table

Table 4-14: Carrier Monitor Toolbar Buttons

4.13.3. Play

To start playing in carrier monitor mode, click the **Play** button.
The current measurement state will be set, a trace acquired, analysis run, measurement status evaluated and displayed, optional logging of results and any notification event(s) rose if necessary. A measurement overlay is added to the screen in the upper left indicates the current measurement in progress. The Measurement Table updates the selection. The overlay contains the last 24 hours of historical data for each analysis configured. Each analysis is evaluated, and its status is rendered in the caption bar.

4.13.4. Stop

To stop playing in carrier monitor mode, click the Stop button.

4.13.5. Delete a measurement

To delete a measurement, select the measurement and click **Delete**.

4.13.6. Edit a measurement

To edit a measurement, select the measurement and click **Edit**. Or, move the mouse over the measurement in the Measurement Table.

Then modify the Measurement's Analyses, State or Notification Events. Users may Recall the state when editing a measurement and adjust the State as if they were normally modifying the settings of the 9000RF-PROBE-SA and Capture the State.

4.13.7. Recall State

To recall the state of measurement, select the measurement and click **Recall State**. Or, move the mouse over the measurement, select State and click Recall.

4.13.8. Capture State

To capture state to the selected measurement, select the measurement and click **Capture State**. Or, move the mouse over measurement, select state and click capture.

4.13.9. Carrier Monitor Notifications

The Carrier Monitor can be configured to send Email (non-secure, SSL or TLS) or SNMP V2 trap notifications if a measurement threshold is exceeded.

Email

Email notification events are raised if and only if:

- The master email switch is on, and
- The individual email notification is on within the measurement, and
- There is a status change in the measurement

SNMP

To view the specific SNMP trap raised, click the "Show MIB" button to save the MIB file to disk. This can be loaded into an NMS. SNMP traps are raised if and only if:

- The master SNMP switch is on, and
- The individual SNMP notification is on within the measurement

4.14. SNMP INTERFACE

The 9000RF-PROBE-SA supports monitoring of the operational status through the SNMP interface. MIB definitions are available to provide translations of the OIDs to readable labels. The SNMP interface provides read-only data concerning the device operations.

The OIDs of interest is the device identification and version information, as well as the operational status.

The device identification is provided in the ISO branch of the object ID structure. The ENTITY - MIB file contains the translations for these nodes. Notable entries are as follows:

.1.3.6.1.2.1.47.1.1.1.1.8 Hardware revision.

.1.3.6.1.2.1.47.1.1.1.1.10	Software revision.
.1.3.6.1.2.1.47.1.1.1.1.11	Serial number.

Status information on the device operations is provided in the ISO branch as well. The IADC-MIB file contains the OID translations. Entries are as follows:

.1.3.6.1.4.1.9633.4.1.1.0	Input overload status.
.1.3.6.1.4.1.9633.4.1.2.0	Overall device status, indicates if a major fault occurred.
.1.3.6.1.4.1.9633.4.1.3.0	System uptime indicates how long the device has been running since the last reset.
.1.3.6.1.4.1.9633.4.1.4.0	The voltage of the onboard 1.2V power supply.
.1.3.6.1.4.1.9633.4.1.5.0	The voltage of the onboard 2.5V power supply.
.1.3.6.1.4.1.9633.4.1.6.0	The voltage of the onboard 5.0V power supply.
.1.3.6.1.4.1.9633.4.1.7.0	The voltage of the onboard 12.0V power supply.
.1.3.6.1.4.1.9633.4.1.8.0	The voltage of the onboard 17.0V power supply.
.1.3.6.1.4.1.9633.4.1.9.0	Onboard temperature.
.1.3.6.1.4.1.9633.4.1.10.0	The center frequency of the current capture.
.1.3.6.1.4.1.9633.4.1.11.0	The span width of the current capture.
.1.3.6.1.4.1.9633.4.1.12.0	The resolution bandwidth of the current spectrum capture. If a time capture is in progress, the value is 0.
.1.3.6.1.4.1.9633.4.1.13.0	Spectral Inversion setting.
.1.3.6.1.4.1.9633.4.1.14.0	Internal clock setting.
.1.3.6.1.4.1.9633.4.1.16.0	Auto attenuation setting.
.1.3.6.1.4.1.9633.4.1.17.0	The number of available IF switch ports.
.1.3.6.1.4.1.9633.4.1.18.0	The currently selected IF switch port.

The MIB OID files are available from the HTTP interface of the 9000RF-PROBE-SA . To obtain the files, enter the filename for each into the URL field of a browser and then save the file for use by your SNMP tools. Example, to access the files using the default IP address, use the following URLs:

http://192.168.10.1/ENTITY-MIB.mib

http://192.168.10.1/IADC-MIB.mib

http://192.168.10.1/SEDSYSTEMS-MIB.mib

4.15. INPUT SIGNAL CONSIDERATION

The input to the 9000RF-PROBE-SA must be in the range listed in the specifications section. Note that the input can be limited by an external filter to the band of interest within this range in order to avoid reducing the signal to noise ratio of the instrument. The more broadband noise allowed into the 9000RF-PROBE-SA, the lower the dynamic range available for the 9000RF-PROBE-SA using. The total power in the full L-Band range should not exceed the input power level specification for 9000RF-PROBE-SA. Any bandpass, high pass, or low pass RF filter suitable for 75-ohm (or 50-ohm) applications may be used on the input to the 9000RF-PROBE-SA.

4.16. UPDATING THE FIRMWARE

The 9000RF-PROBE-SA incorporates a web page to manage updating the firmware. This eliminates the need to return the unit to the factory for updates.

Restart the 9000RF-PROBE-SA before installing firmware and ensure that there are no connections made, including the Java Applet, after the restart, and during the installation. The 9000RF-PROBE-SA can be restarted in the Configuration->Reset tab of the Web Configuration Manager or by cycling the power to it.

The Firmware Upgrade tab as is shown in Figure 47 is the default tab displayed after successfully logging in to the 9000RF-PROBE-SA WCM.

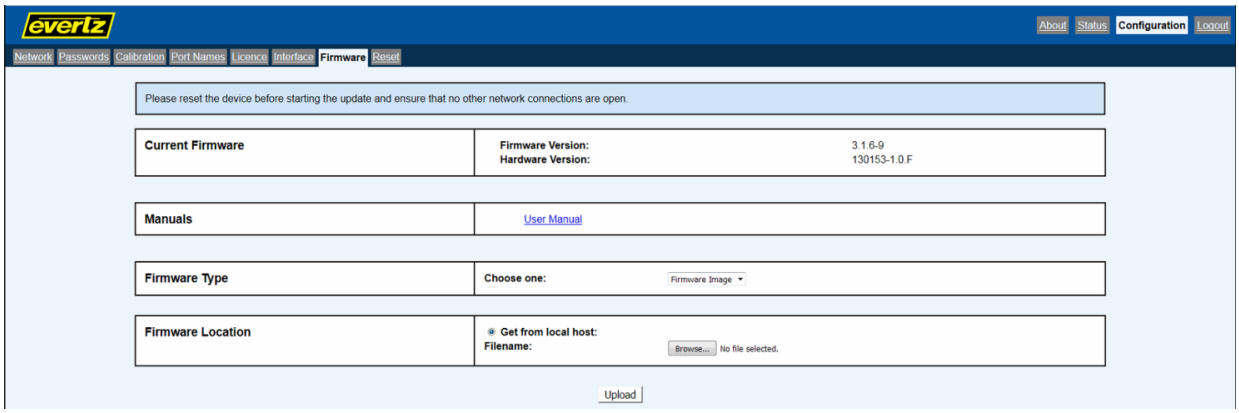


Figure 4-14: SA - Firmware Upgrade Tab

The firmware update file, supplied by Evertz, can be transferred to the 9000RF-PROBE-SA using a local host computer. After specifying the server information and clicking Upload, the file will be obtained and then the following screen will be displayed:

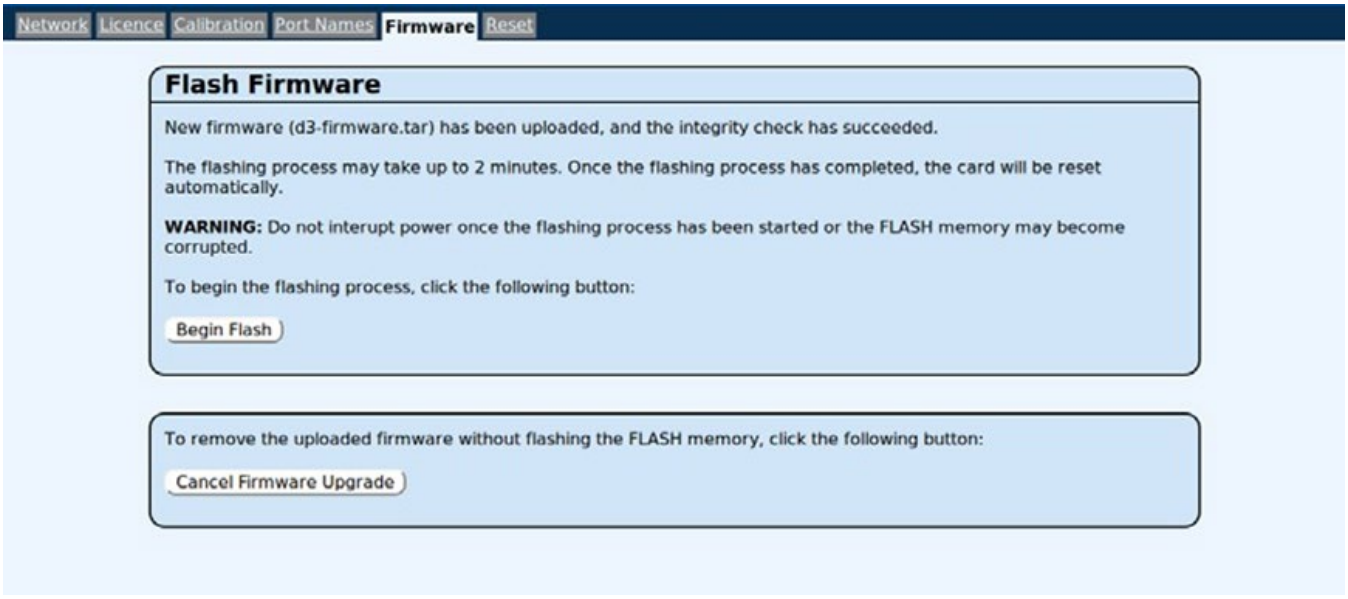


Figure 4-15: SA - Flash Firmware Window

Clicking on Begin Flash will update the 9000RF-PROBE-SA firmware. When complete, the 9000RF-PROBE-SA will be automatically reset. If the firmware file fails the integrity check, it is highly recommended that the Cancel Firmware Upgrade button be pressed or there is a risk that the 9000RF-PROBE-SA may be rendered unresponsive.

5. SYSTEM SECURITY

In order to get the security-enabled and working fully on the system, the user should have physical access to the RF Probe. Below steps have to be followed to enable the security.

Enabling the security mode will affect the system as follow:

- When the secure mode is enabled, the user will be able to access the secure web page only. The secure HTTPS web page can be accessed by adding "**https://**" prior to the Probe's IP address. For example, if the IP address of the Probe is 172.16.185.167, the user should browse to https://172.16.185.167 and proceed to accept the security risk since we did not upload the CA-signed certificate.
- Only SNMP V3 will be available when the secure mode is enabled.
- Only console access will be available when the secure mode is enabled.
- A strong password must be used to log in to the console.
    a. At least 15 characters long.
    b. Must contain at least 2 uppercase (A-Z) and 2 lowercase (a-z) letters.
    c. Must contain at least 2 numbers (0-9).
    d. Must contain at least 2 special character (!@#$%^&*()+=-[]';,. /{}|\":<>?~\ ).

5.1. ENABLING SECURITY USING THE SERIAL PORT

5.1.1. SSL/TLS Security Management

To enable the Security mode, the steps below have to be followed:

- Login using the credentials "customer" for username and "customer" for password.
- Type console and hit Enter.
- Select option "SSL/TLS Security Management" as shown in the image below and hit Enter.

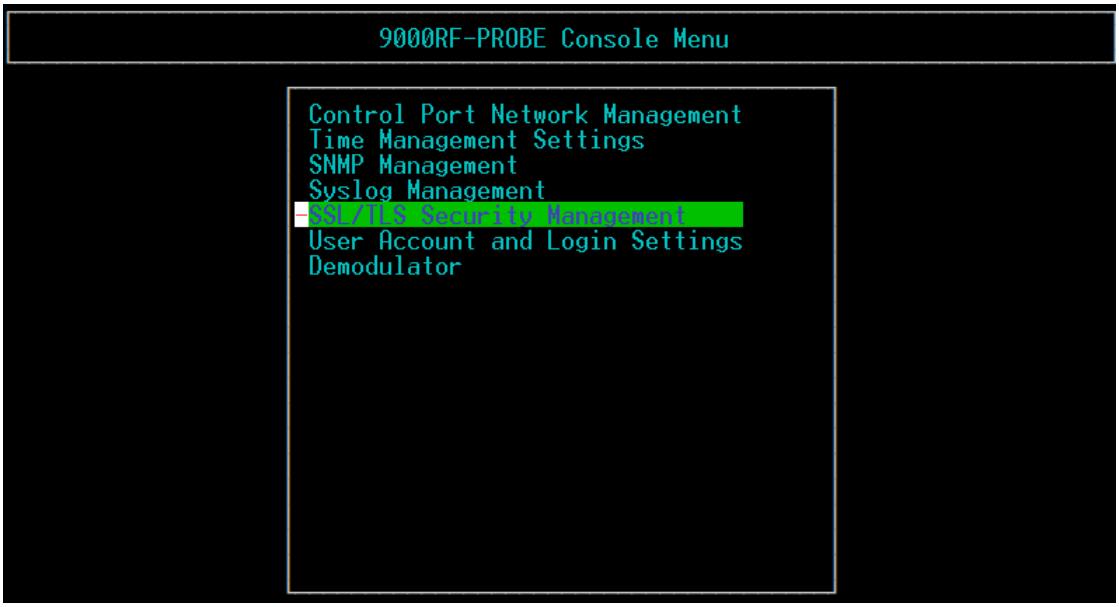


Figure 5-1: Console® - Console Menu

5.1.1.1. SSL/TLS Security Settings

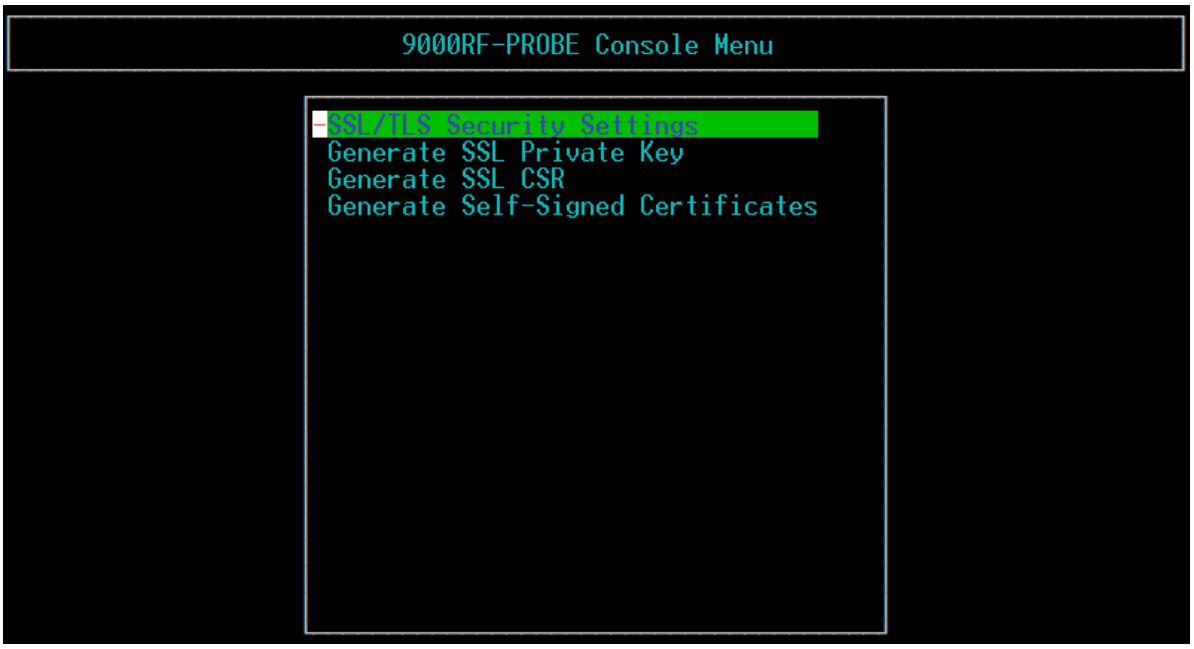


Figure 5-2: Console® - SSL/TLS Security Management

Note:

SSL/TLS Security Settings: Allows the user to Enable/Disable the SSL/TLS Security Settings

Generate SSL Private Key: Allows the User to Generate the SSL Private Key that is used in the encryption/decryption of data

Generate SSL CSR: Allows the User to Generate SSL Certificate Signing Request

Generate Self-Signed Certificates: Allows the User to Generate the Self-Signed Certificate for the Probe

- Select “SSL/TLS Security Settings” as shown in the image above and hit Enter
- **SSL Security Enable:** This will allow user to Enable/Disable the Security. Use the Left and Right Arrow Keys to Enable/Disable.
- **Minimum TLS Version:** The Probe can support the minimum standard security protocol 1.0, 1.1, 1.2 and 1.3. To set the version use the Left and Right Arrow Keys.

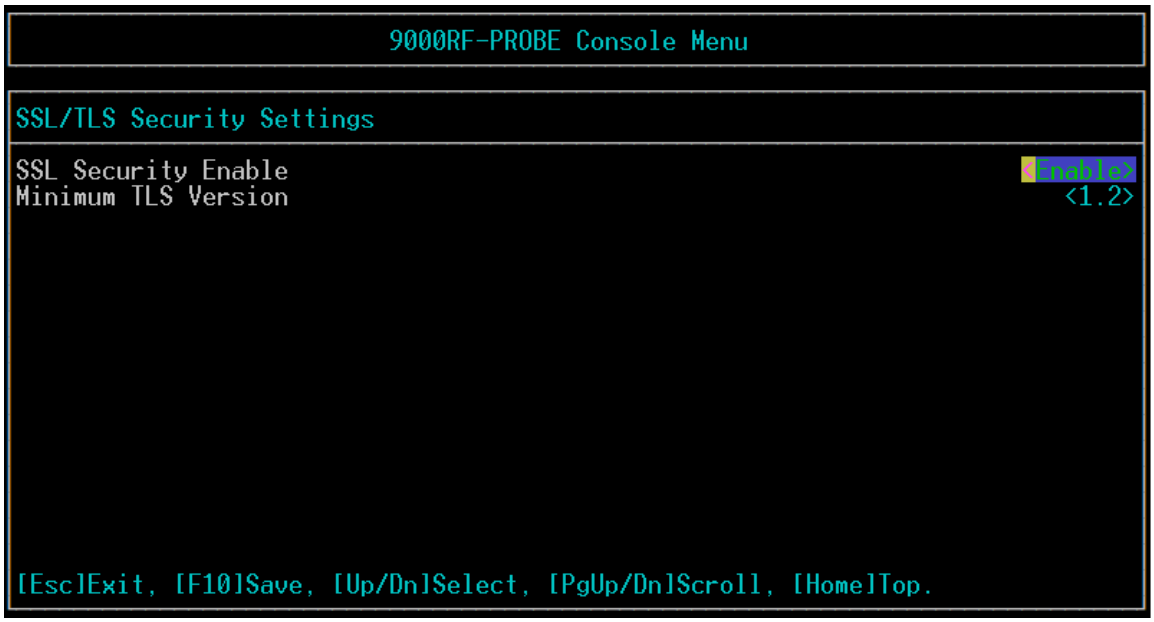


Figure 5-3: Console® - SSL/TLS Security Settings

If the user purchased RF-INSITE hardware option, they need to enable HTTPS on RF-INSITE Poller once the SSL security is enabled from console. The steps to do so have been explained in Section 7.8

All changes made within this menu must be saved prior to exiting this menu level by pressing the "F10" Key. Failure to do so will result in the changes not taking effect.

5.2. SNMP MANAGEMENT

When the security is enabled on the system, SNMP V3 will be forced all the time. SNMP settings can be changed using the serial port/SSH connection.

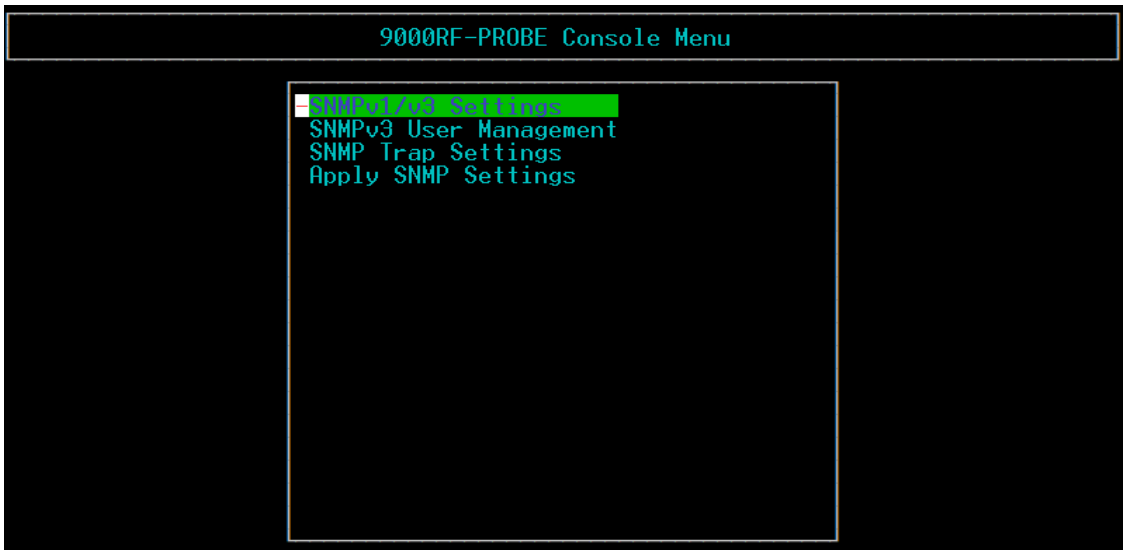


Figure 5-4: Console® - SNMP Management

5.2.1. SNMPv3 User Management

This section allows the user to add, edit and delete user.

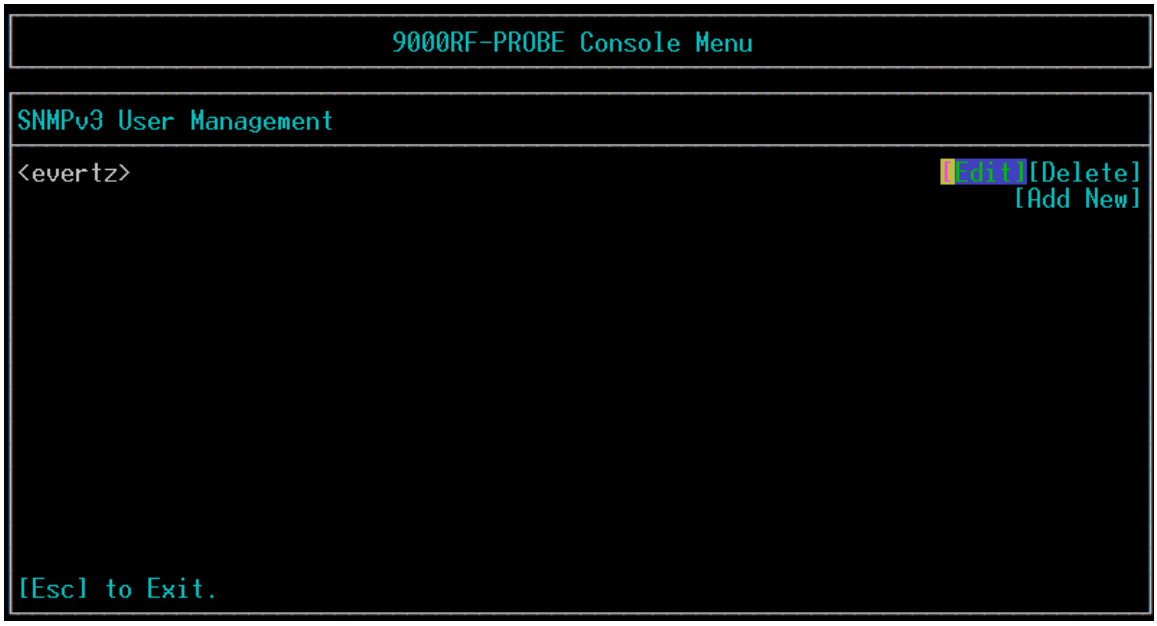


Figure 5-5: Console® - SNMPv3 User Management (Part 1 of 3)

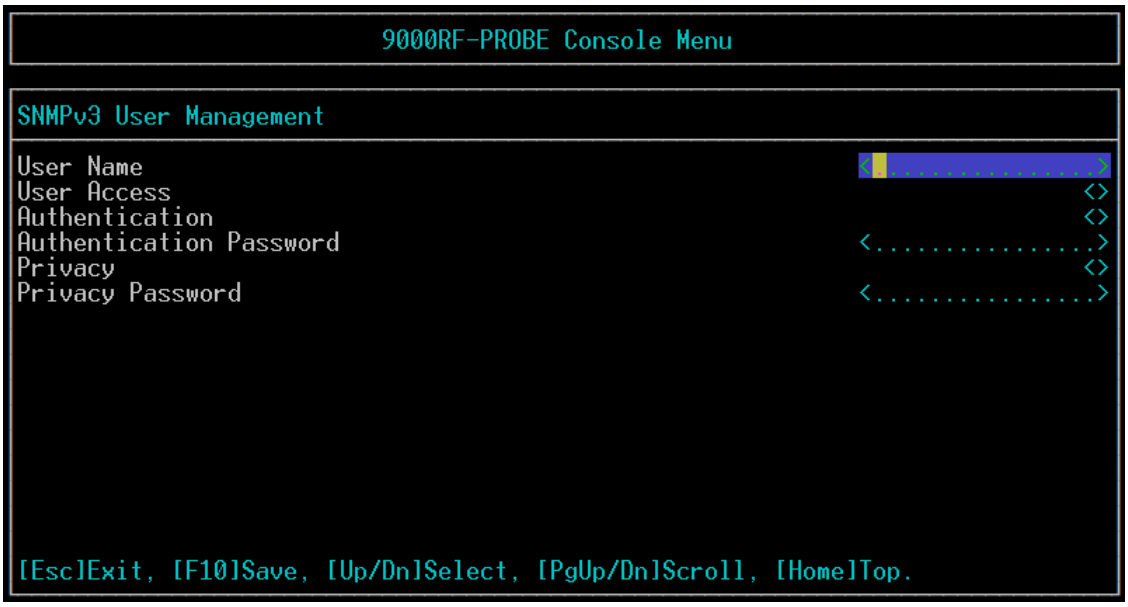


Figure 5-6: Console® - SNMPv3 User Management (Part 2 of 3)

User Name: This field allows the user to set the user name for SNMP v3 authentication.

User Access: This field allows the user to specify the user's permissions as read-only or read-write.

Authentication: This field allows the user to set MD5 or SHA-1 password encryption.

Authentication Password: This field allows the user to set the password used for user authentication.

Privacy: This field allows the user to set DES or AES packet encryption.

Privacy Password: This field allows the user to set the password used for packet encryption.

A sample of a new user creation can be as the photo below.

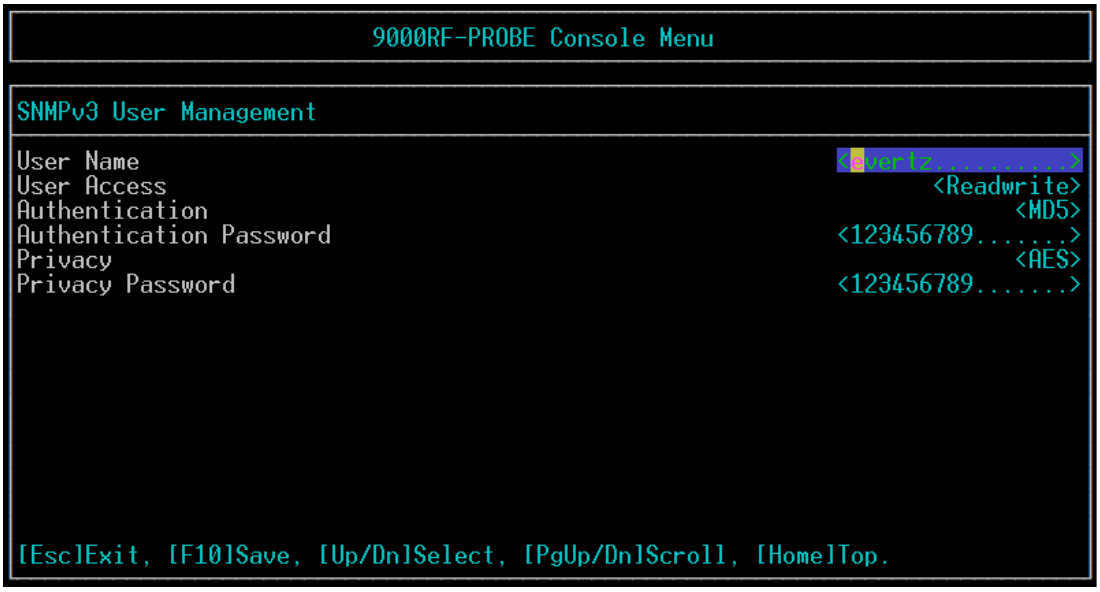


Figure 5-7: Console® - SNMPv3 User Management (Part 3 of 3)

5.2.2. SNMP Trap Settings

This parameter allows the user to define the destination IP addresses for SNMP traps.

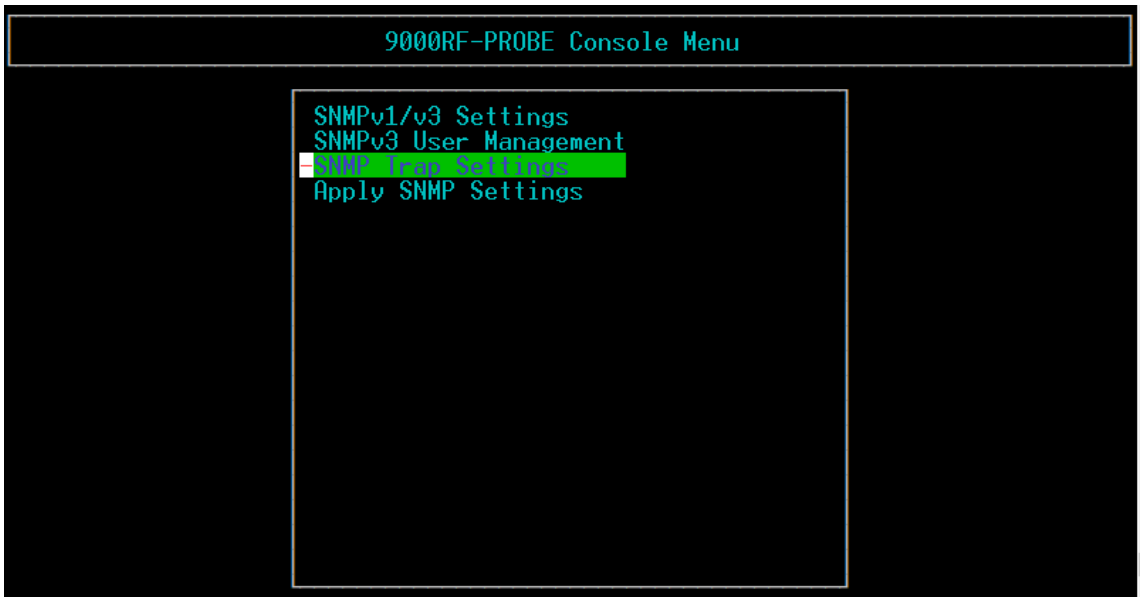


Figure 5-8: Console® - SNMP Trap Settings (Part 1 of 2)

- User can add up to 5 addresses here.

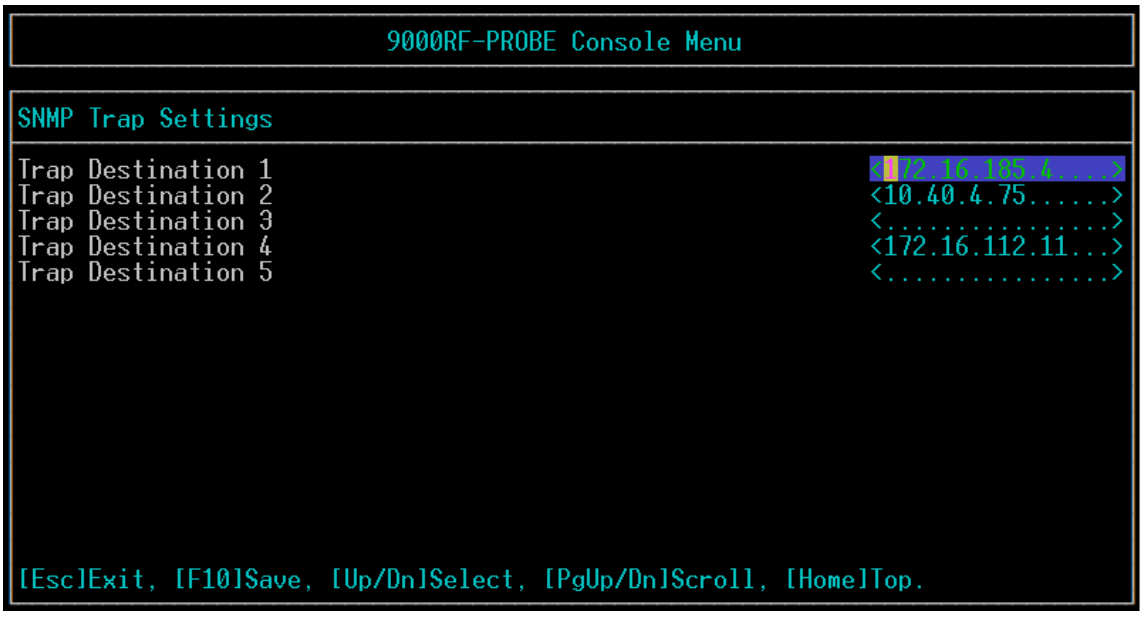


Figure 5-9: Console® - SNMP Trap Settings (Part 2 of 2)

5.2.3. Apply SNMP Settings

In order to apply the changes made on the settings from the Console Menu. Apply SNMP Settings needs to be applied for the changed SNMP service to implement.

- Hit Continue to Apply SNMP Settings.

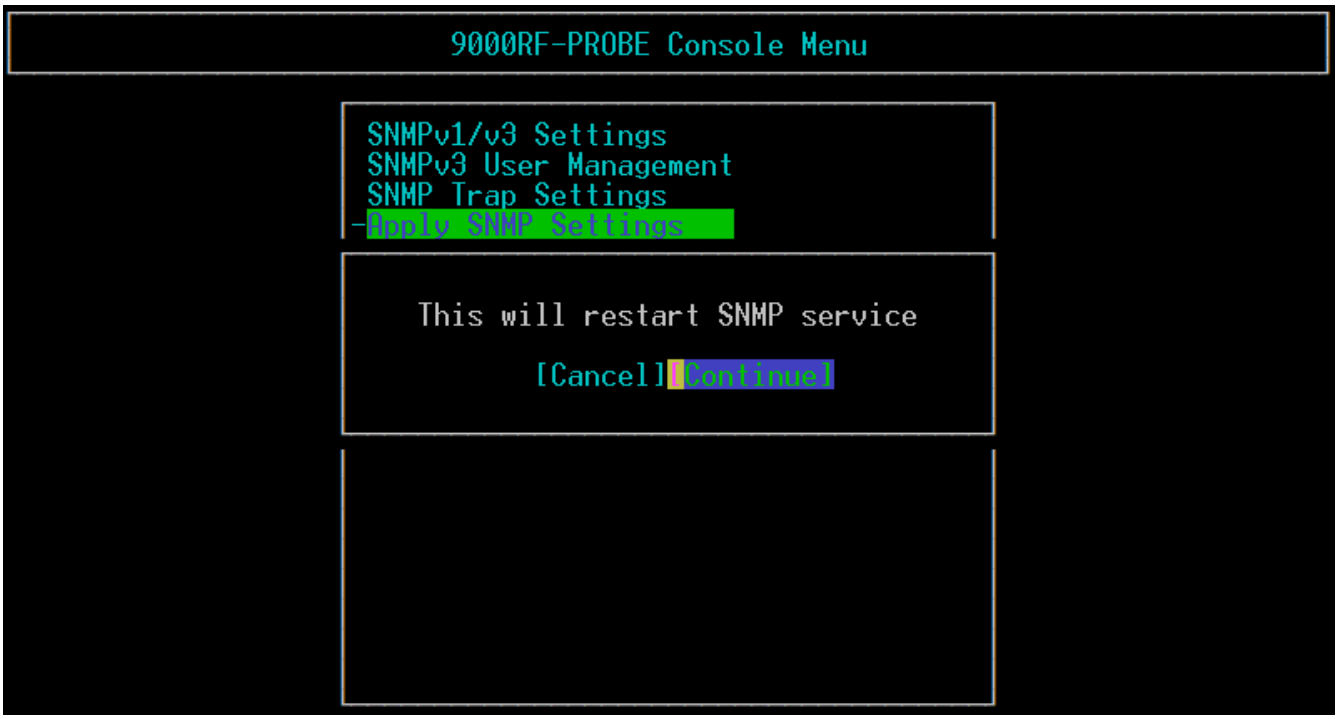


Figure 5-10: Console® - Apply SNMP Settings

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6. FIRMWARE UPGRADE

Using the WebEASY® on a web interface is the faster and recommended procedure to load the firmware onto the 9000RF-PROBE.

6.1. FIRMWARE UPGRADE USING WEBEASY®

When first visiting the 9000RF-PROBE web interface, the user will be asked to enter a Login and Password.Enter "***customer***" for Login and "***customer***" for Password.
On the top of the web page for the 9000RF-PROBE, there is a tab labeled **Upgrade**. The **Upgrade** tab is used to check current firmware version and upload the latest firmware.

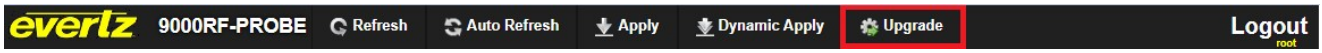

Figure 6-1: WebEASY® - Upgrade Button on Top Menu Bar

Selecting the *Upgrade* tab, will open a new window as shown in Figure 6-2 where the current firmware version is shown. Should the firmware version be outdated, the user will need to download the firmware image file

Note: Contact Evertz get the latest firmware file.

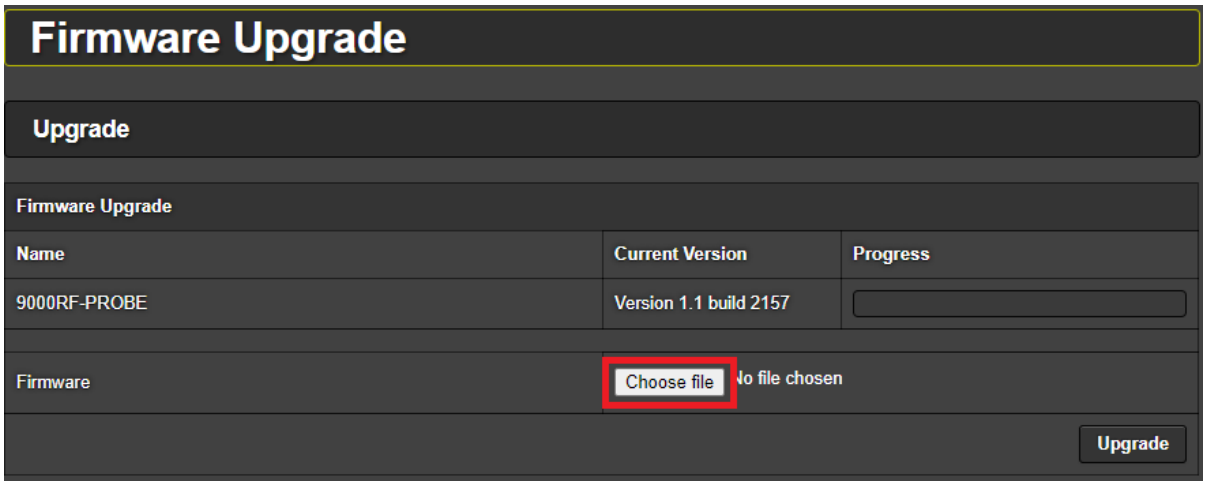

Figure 6-2: WebEASY® - Firmware Upgrade Menu

Click ***Choose File*** and browse to locate image file.

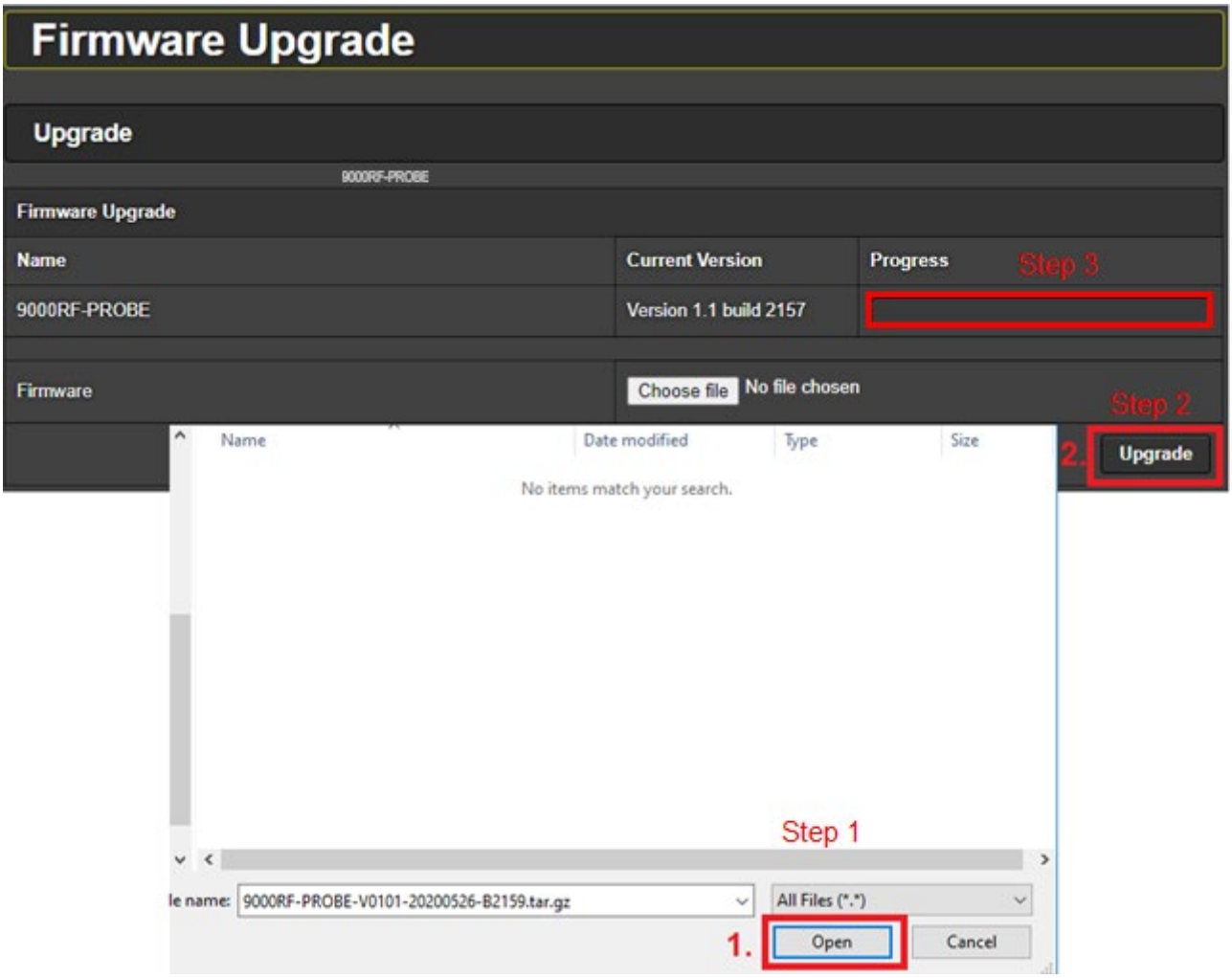

Figure 6-3: WebEASY® - Firmware Upgrade Menu

Once selected, click ***Open*** (Step 1) to advance to next step. Click ***Upgrade*** (Step 2) and watch progressbar for status (Step 3). Once completed, the device will automatically reboot.

7. RF-INSITE MONITORING

Note: This option is only available if the user has purchased RF-RF-INSITE-SW and RF-RF-INSITE-FK-AD software licenses.

The RF-inSITE is a real-time monitoring and historical data logging system which works with 9000RF-PROBE. It provides an intuitive web-based dashboard, requires very minimal configuration and provides in-depth monitoring of RF and TS parameters. The RF statuses are displayed in the form of graphs along with the time-stamps associated with each value. These RF statuses include RF power, CNR, LOCK status, Frequency offset, EsNo ratio, EsNo margin, Sync loss errors, Sync byte errors etc.

The user can log up to 30 days of data/logs and choose the interval of time for which they want to plot the graph on webGUI in order to do a comparison of the RF signals' health over time. RF-inSITE also allows user to download the logs for individual RF parameters for each input (or channel).

7.1. WEB INTERFACE

RF-inSITE can be completely configured using the web interface. To do this, simply type in the IP address of the RF-inSITE installed on the 9000RF-Probe in the web browser.

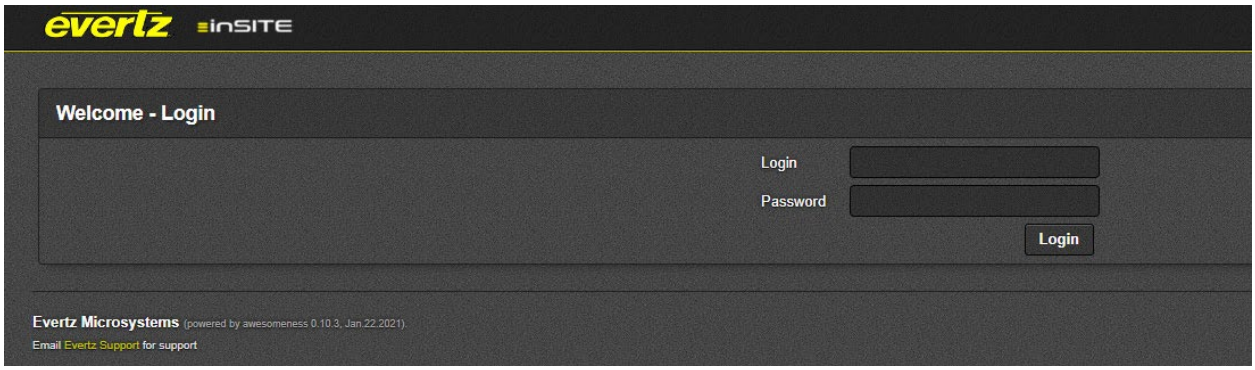

Figure 7-1: RF-inSITE® - Login Menu

For login and password, type in "***admin***".
The user will be directed to the main User Interface that displays the following information:

Figure 7-2: RF-inSITE® - Top Navigation Menu

- **Top Navigation Bar**
  - Product Name: Displays the product name
  - Content: Contains sub-menus: Operations, Nodes and Probes
  - Status: Displays the database health
  - System: Contains sub-menus: Settings, Catalogs, Tools, Upgrade, About and Release
  - Logout: Logs the user out of the User Interface
    - User Name: Displays the logged in User Name

- **Main Tab:** This is the middle section of the interface and displays options as per the menu selected. Operations menu will be displayed by default. These menu tabs and fields will be fully described in the following sections.

Figure 7-3: RF-inSITE® - Main Tab

7.2. SYSTEM

The System menu has the option to create user from Settings. It also has the option to Upgrade the firmware version running on RF-inSITE. General information of the RF-inSITE such as version can also be found on this page.

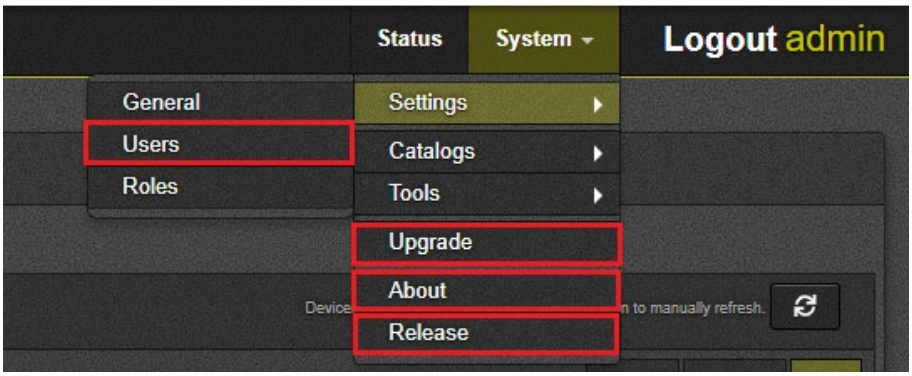

Figure 7-4: RF-inSITE - System Menu

Users: in this section you can add new users or edit existing users or delete users.

Figure 7-5: RF-inSITE – Users

Upgrade: this section allows the user to upgrade the firmware version running on RF-inSITE. Click on "**file**" button located in the top right corner of the page → select the file to be uploaded → click on "**upgrade**" button.

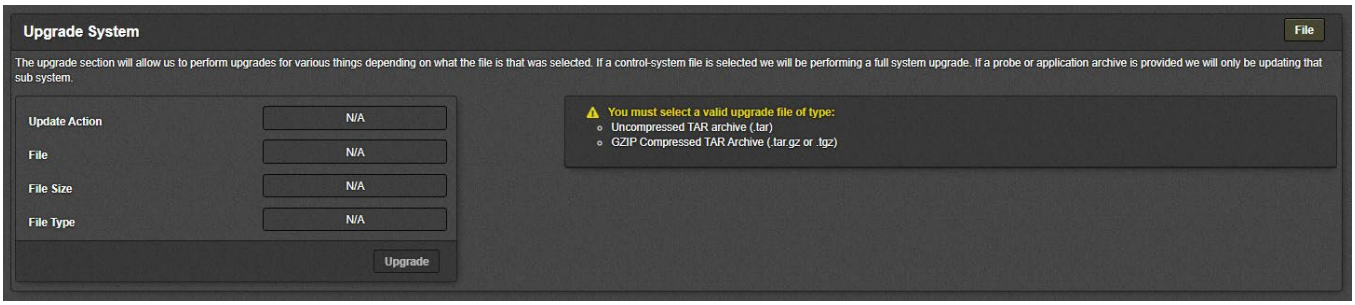

Figure 7-6: RF-inSITE – Upgrade

About: in this section, user will find information related to system version, node applications and their version, certificates available for security purpose, license details and cluster information.

Figure 7-7: RF-inSITE – About

Release: this section displays the RF-inSITE version currently running on the unit.

Figure 7-8: RF-inSITE - Release

7.3. RF PROBE MONITORING

This can be accessed directly from the main interface or from the Content menu. The steps to open RF Probe are as follows:

- Click on **Content** (located on top left corner of the top navigation bar) → Select **Operations** from the dropdown

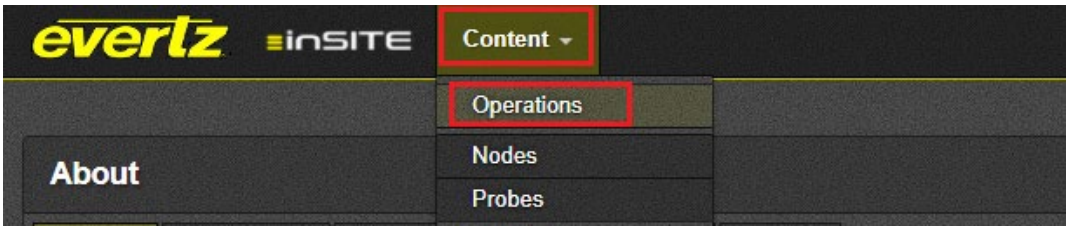

Figure 7-9: RF-inSITE® - SDVN Interface – RF Probe (Part 1 of 4)

- The Operations interface will have four options; Devices, Tools, Dashboards and Notifications. Select Tools.

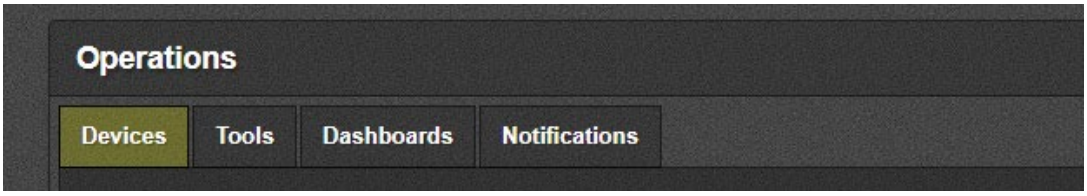

Figure 7-10: RF-inSITE® - SDVN Interface – RF Probe (Part 2 of 4)

- The Tools page will have RF Probe as one of the options. Click on RF Probe box.

Figure 7-11: RF-inSITE® - SDVN Interface – RF Probe (Part 3 of 4)

- The RF Probe interface will display all the RF Inputs and its respective 12 RF Channels as shown in the image below.

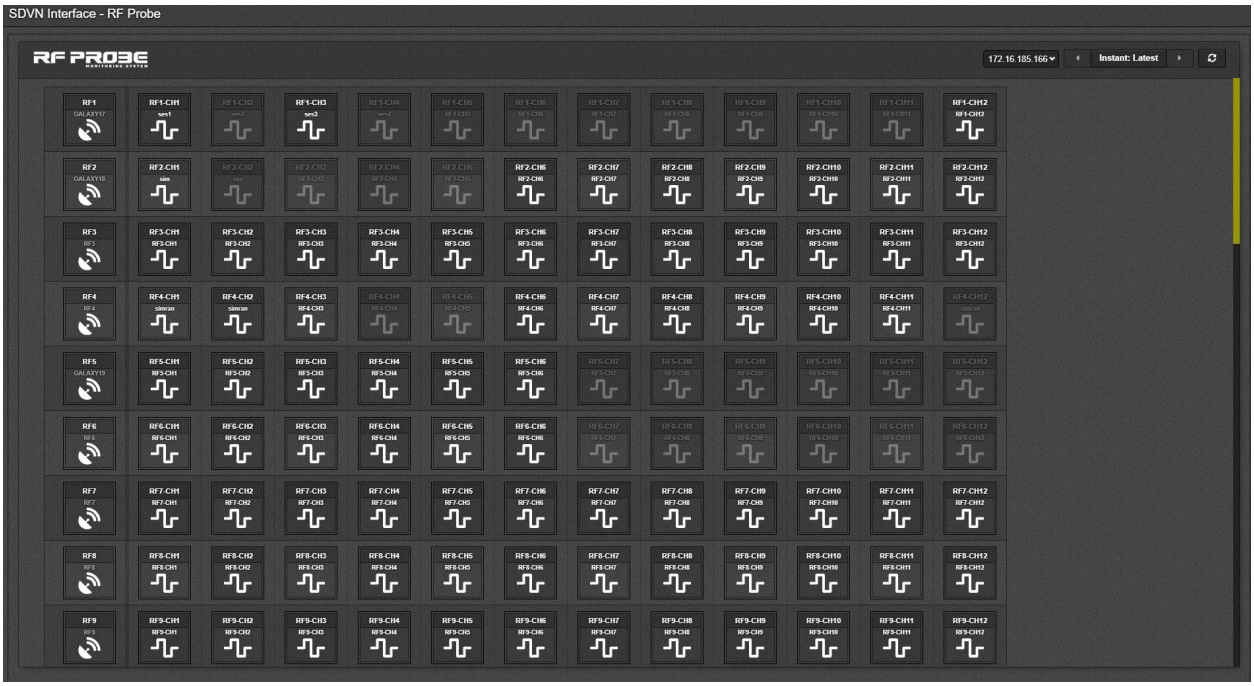

Figure 7-12: RF-inSITE® - SDVN Interface – RF Probe (Part 4 of 4)

7.4. SDVN INTERFACE - RF PROBE

Figure 7-13: RF-inSITE® - Top Navigation Bar

IP Address: Displays the IP Address of the RF Probe connected to the RF-inSITE.
Instant: This field allows the user to select the time interval to monitor the data. The instant selection is explained in detail on the following section.
Refresh: This icon allows the user to manually refresh the page to display the latest data.

7.4.1. Instant

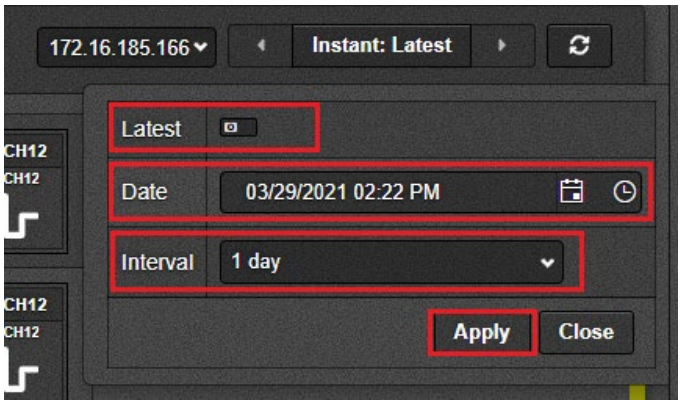

Figure 7-14: RF-inSITE® - Instant (Part 1 of 3)

Latest: This toggle button can be enabled/disabled to perform following actions:

- **Enabled:** When enabled, RF-inSITE will display the data from latest date and time.
- **Disabled**: When disabled, it allows the user to select any date and time manually, for which they want to monitor the data.

Interval: This drop down list displays the options that can be selected to view the desired set of data according to the time interval selected. The available options are 4 hrs, 8 hrs, 1 day, 2 days, 3 days and 7 days.

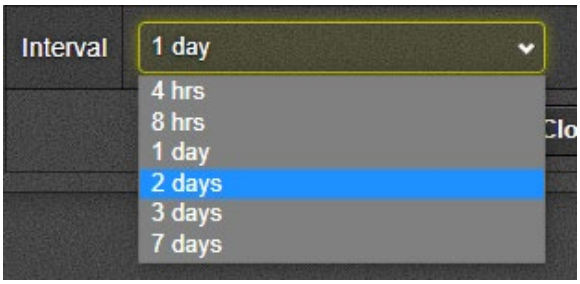

Figure 7-15: RF-inSITE® - Instant (Part 2 of 3)

Apply: This button will implement the changes made to the above three controls, Latest, Date and Interval.

The user can also use the left and right arrows to navigate between the dates of the instant settings.

Figure 7-16: RF-inSITE® - Instant (Part 3 of 3)

7.4.2. RF Input and RF channel description

This interface displays the grid of all 32 RF Inputs and its respective 12 Channels.
RF Inputs: The first vertical column refers to the RF Inputs
RF Channels: The horizontal row next to each box refers to the channels corresponding to each RF Input

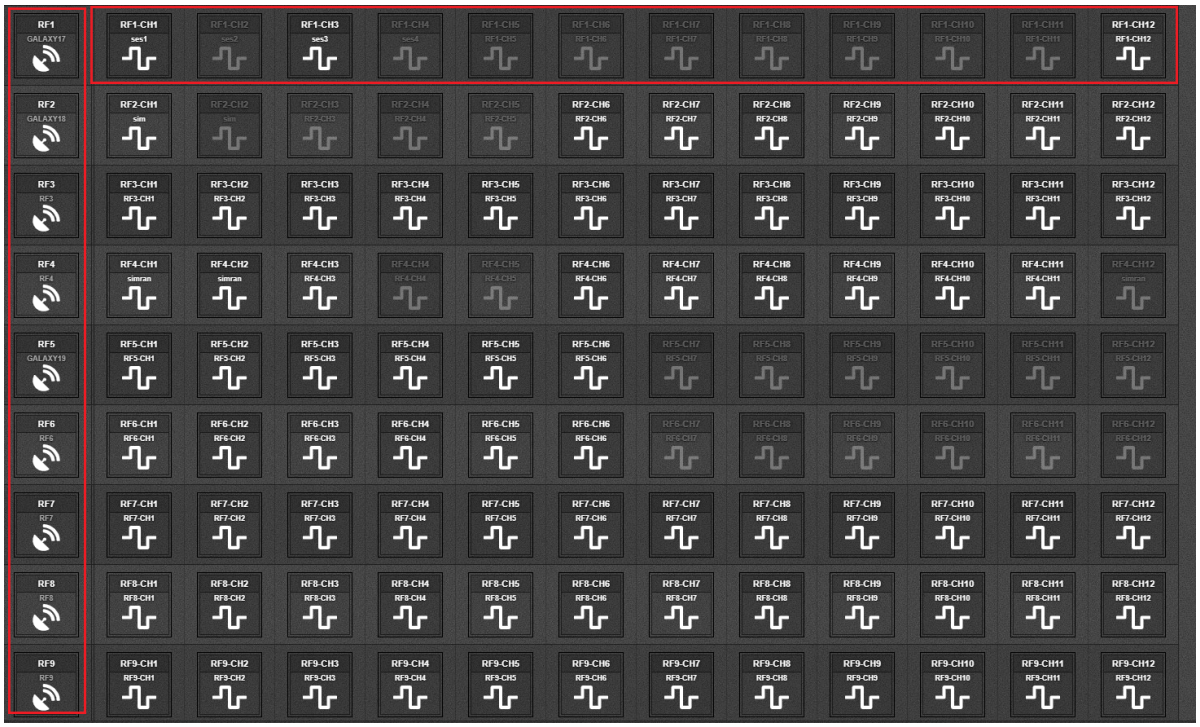

Figure 7-17: RF-inSITE® - RF Input and RF Channel Description (Part 1 of 3)

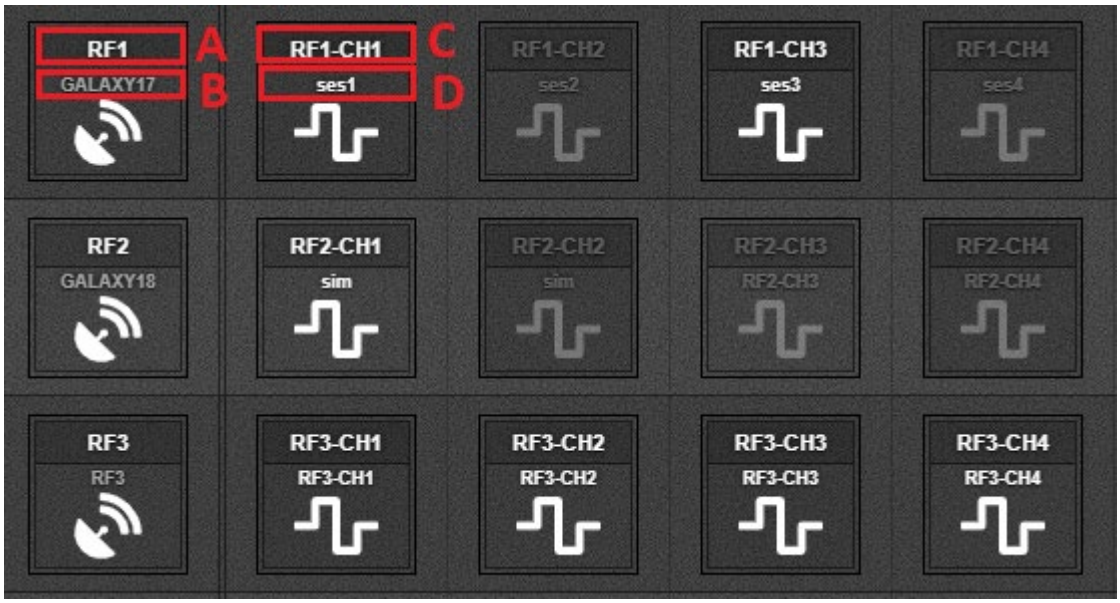

Figure 7-18: RF-inSITE® - RF Input and RF Channel Description (Part 2 of 3)

Referring to above figure, each cell provides below information:

- **A.** RF Input Number
- **B.** RF Input Tag name
- **C.** RF Channel Number & RF Input Number. The disabled Channel is represented as grayed out box and the enabled channel as white text.
- **D.** RF Channel Tag name

To monitor a particular RF Channel in detail, click on the respective box. An interface like image below will appear.

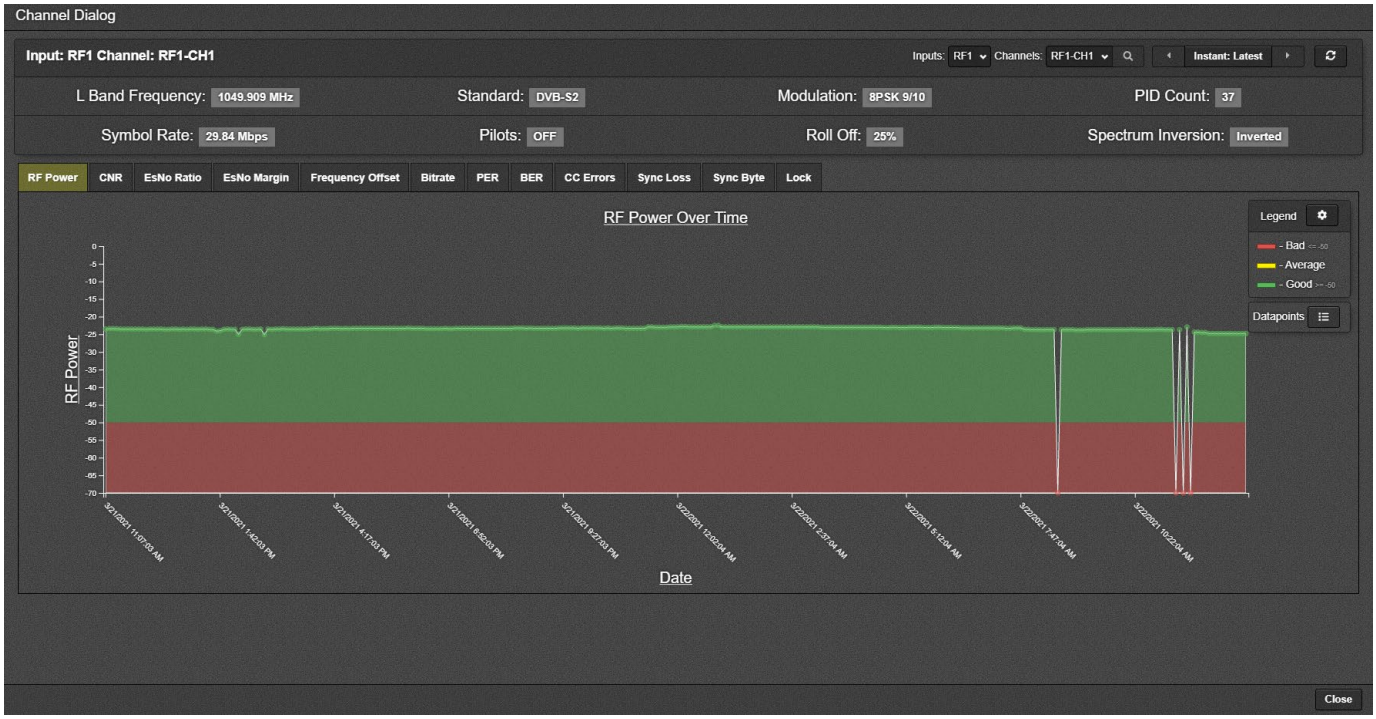

Figure 7-19: RF-inSITE® - RF Input and RF Channel Description (Part 3 of 3)

7.5. RF NAVIGATION

Figure 7-20: RF-inSITE® - RF Navigation Bar

- The top right corner will display the selected RF Input and its Channel Number
- **Inputs:** The Inputs option will display all the RF Inputs.

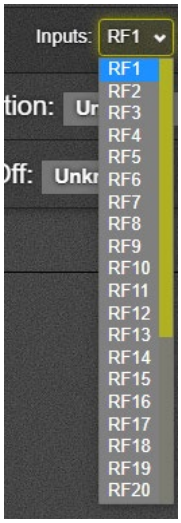

Figure 7-21: RF-inSITE® - Inputs

- **Channels:** This Channels selection will display the 12 Channels of the particular RF Input selected.

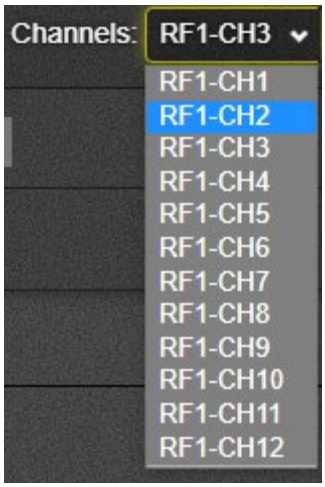

Figure 7-22: RF-inSITE® - Channels

- **Search:** Click the search icon to display the selection made above.

7.5.1. RF status

This section displays various RF statuses for the selected channel.

Figure 7-23: RF-INSITE® - RF Channel Readings

L-band Frequency (MHz): This parameter returns the L-band frequency of the locking carrier.

Standard: This parameter returns the standard of the connection, DVB-S/S2.

Modulation: This parameter returns the modulation of the input carrier.

PID Count: This parameter returns the number of PIDs in the input transport stream.

Symbol Rate (Mbps): This parameter returns the symbol rate.

Pilots: This parameter returns if pilots are enabled.

Roll-off: This parameter returns the roll-off of the input signal.

Spectrum Inversion: This parameter displays whether the input signal spectrum is inverted or not inverted.

7.5.2. RF graphs

This section allows the user to monitor various RF parameters in a graphical form for the selected time interval. The values for each parameter are displayed on the Y-axis of the graph whereas X-axis shows the timestamp for each value being shown on graph.

The available graphs for selection are listed below:

- RF Power
- CNR
- EsNo Ratio
- EsNo Margin
- Frequency Offset
- Bitrate
- PER
- BER
- CC Errors
- Sync Loss
- Sync Byte
- Lock

RF Power graph has been explained in detail below:

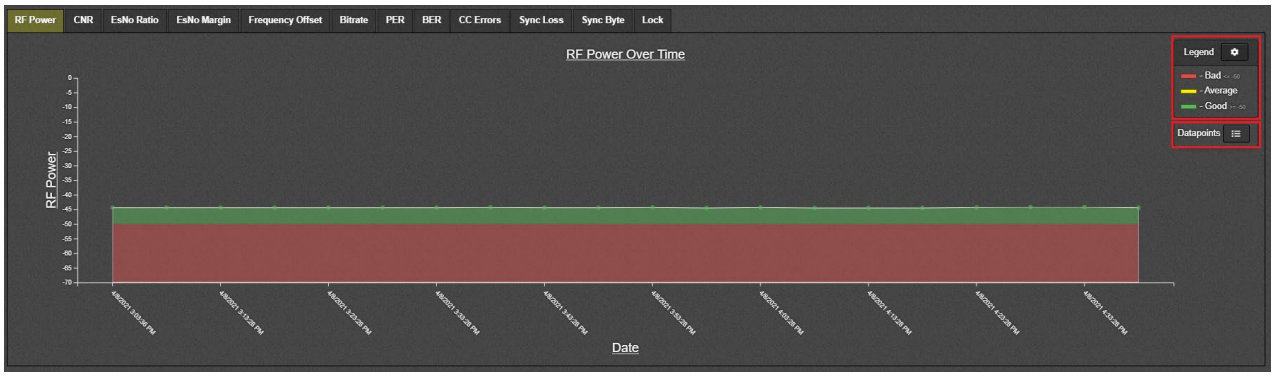

Figure 7-24: RF-INSITE® - RF Channel Graph

Legend: The Legend allows user to set the threshold for Bad, Average and Good. It is explained more in detail in the following section.

Datapoints: The datapoints lets the user to view the data or to download the data. It is explained more in detail in the following section.

7.5.2.1. Legends

- Legend Setting configuration

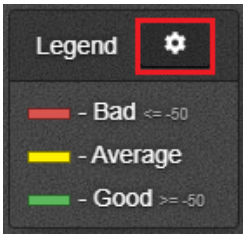

Figure 7-25: RF-inSITE® - Legends Settings (Part 1 of 2)

- Click on the icon next to the Legend. An interface like below will appear

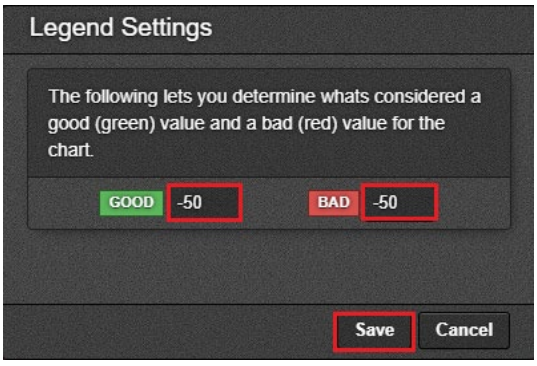

Figure 7-26: RF-inSITE® - Legends Settings (Part 2 of 2)

- Enter the threshold for GOOD and BAD according to your requirement and click Save.

7.5.2.2. Datapoints

This section allows the user to download the data in the form of a pdf file or an excel file. To view the datapoints in a tabular form, click on the icon shown below.

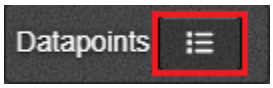

Figure 7-27: RF-inSITE® - Datapoints (Part 1 of 2)

Date: The left side of the Table will display the date and time of the data entry.

Parameter: Will display the value of the Parameter.

Table Properties: This button will open the Column Settings of the table and display the visibility option of the columns.

Download Table data: This button will give you the option to download in PDF or Excel file.

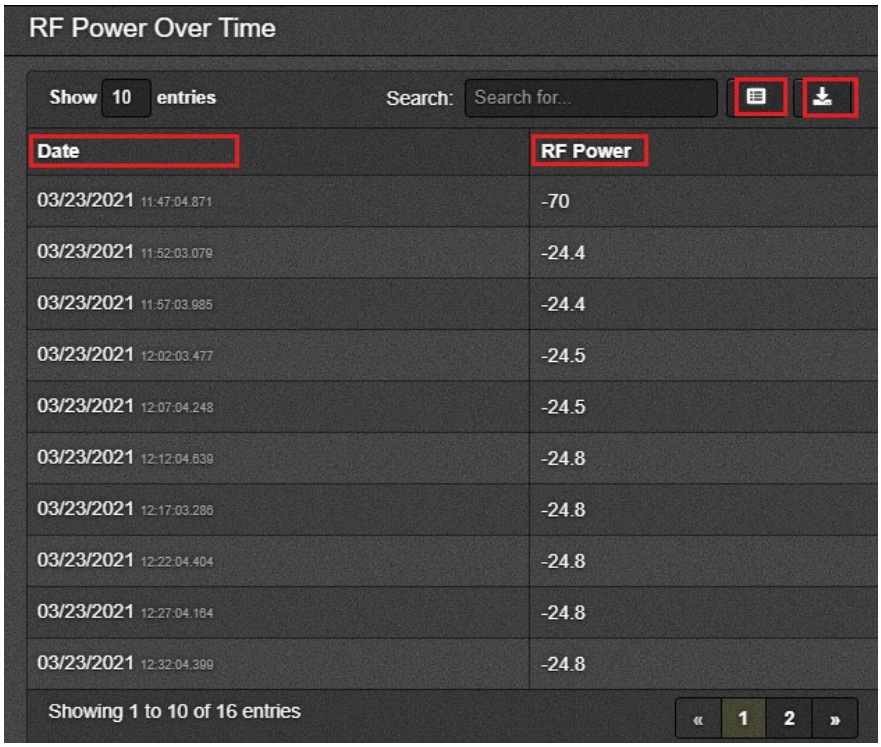

Figure 7-28: RF-inSITE® - Datapoints (Part 2 of 2)

7.6. SYSTEM TIME

The System Time allows user to set Date and Time locally or with the use of NTP Server.
The steps to set System Time are as follows:

- Click Content → Select Nodes form the dropdown.

Figure 7-29: RF-inSITE® - System Time (Part 1 of 4)

- Click on the “node” box

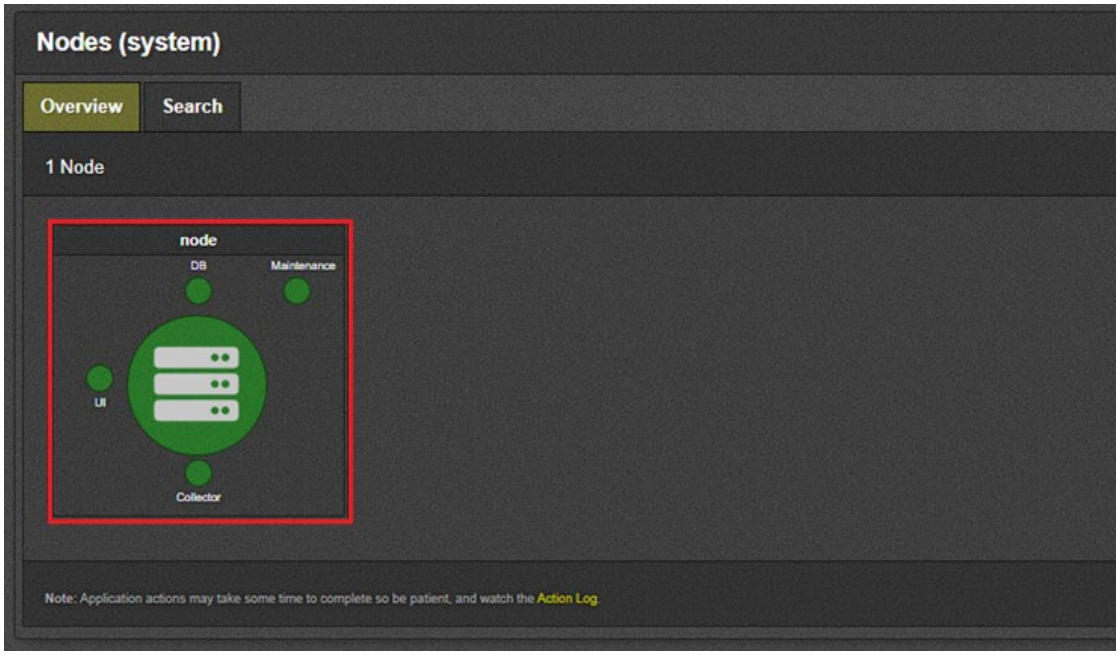

Figure 7-30: RF-inSITE® - System Time (Part 2 of 4)

- Click on the “Machine” box

Figure 7-31: RF-inSITE® - System Time (Part 3 of 4)

- The Maintenance-Machine interface will appear as shown in below.

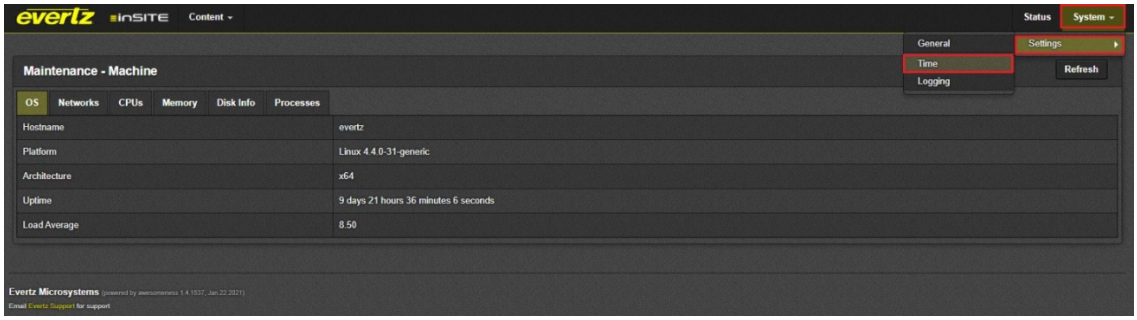

Figure 7-32: RF-inSITE® - System Time (Part 4 of 4)

- Navigate to System option located on the top right corner. Next, click on Settings →Then, click Time

Standard: If the user wants to enter the time manually, it can be done under "Standard" tab

- **Date and Time:** Enter the date and time you want to set on RF-inSITE unit.
- **Time Zone:** Select the correct time zone as per your area.
- **Save Time**: Click on this button to save the changes made.

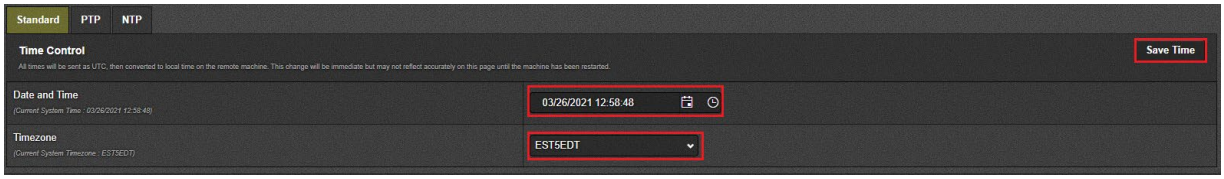

Figure 7-33: RF-inSITE® - System Time – Standard

NTP: If the user wants to retrieve the time from an external NTP server, it can be done under "NTP" tab. Steps to configure NTP time are listed below:

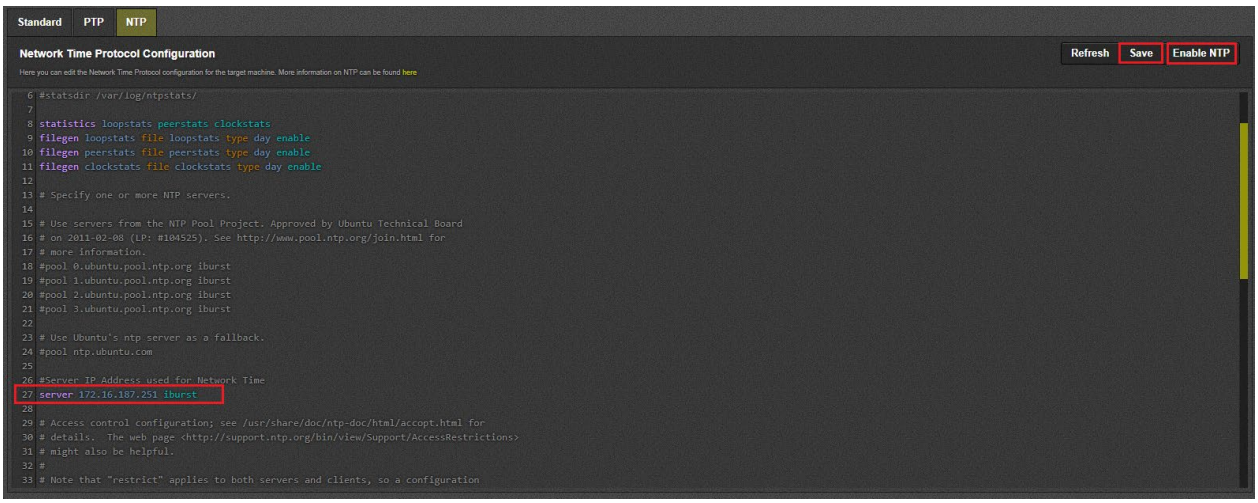

Figure 7-34: RF-inSITE® - System Time – NTP (Part 1 of 2)

- On line no. 27, add the following line as shown in the image below:

```
26 #Server IP Address used for Network Time
27 server 172.16.187.251 iburst
```

Figure 7-35: RF-inSITE® - System Time – NTP (Part 2 of 2)

Note: The Server IP Address will differ according to your machine

- Click Save and Enable NTP.

7.7. CERTIFICATE SIGNING REQUEST

The Certificate Signing Request (CSR) that can be signed by internal or external Certificate Authority can also be generated and downloaded from RF-inSITE.

- Click System from the top left corner of the top navigation bar → Then, Click About.

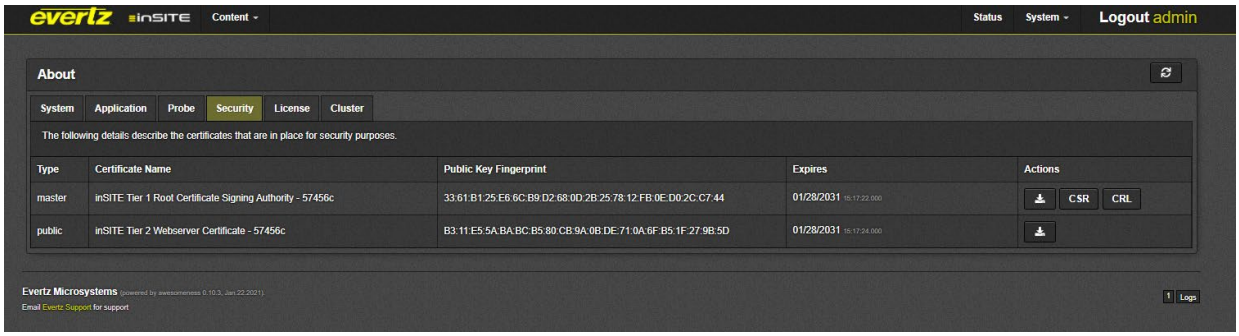

Figure 7-36: RF-inSITE® - RF-inSITE Security

7.8. ENABLE HTTPS ON RF-INSITE POLLER

This section will show the steps on how to update the protocol on RF-inSITE if security is enabled on 9000RF-PROBE, in order for RF-inSITE application to poll the data from a secure webpage (HTTPS).

- Click on Content from the top right corner of the Navigation Menu → Then, Nodes → Click on the Node Box
- Click the Engineering Tab → Then, Applications Tab and under “Collectors” → Click on Pollers

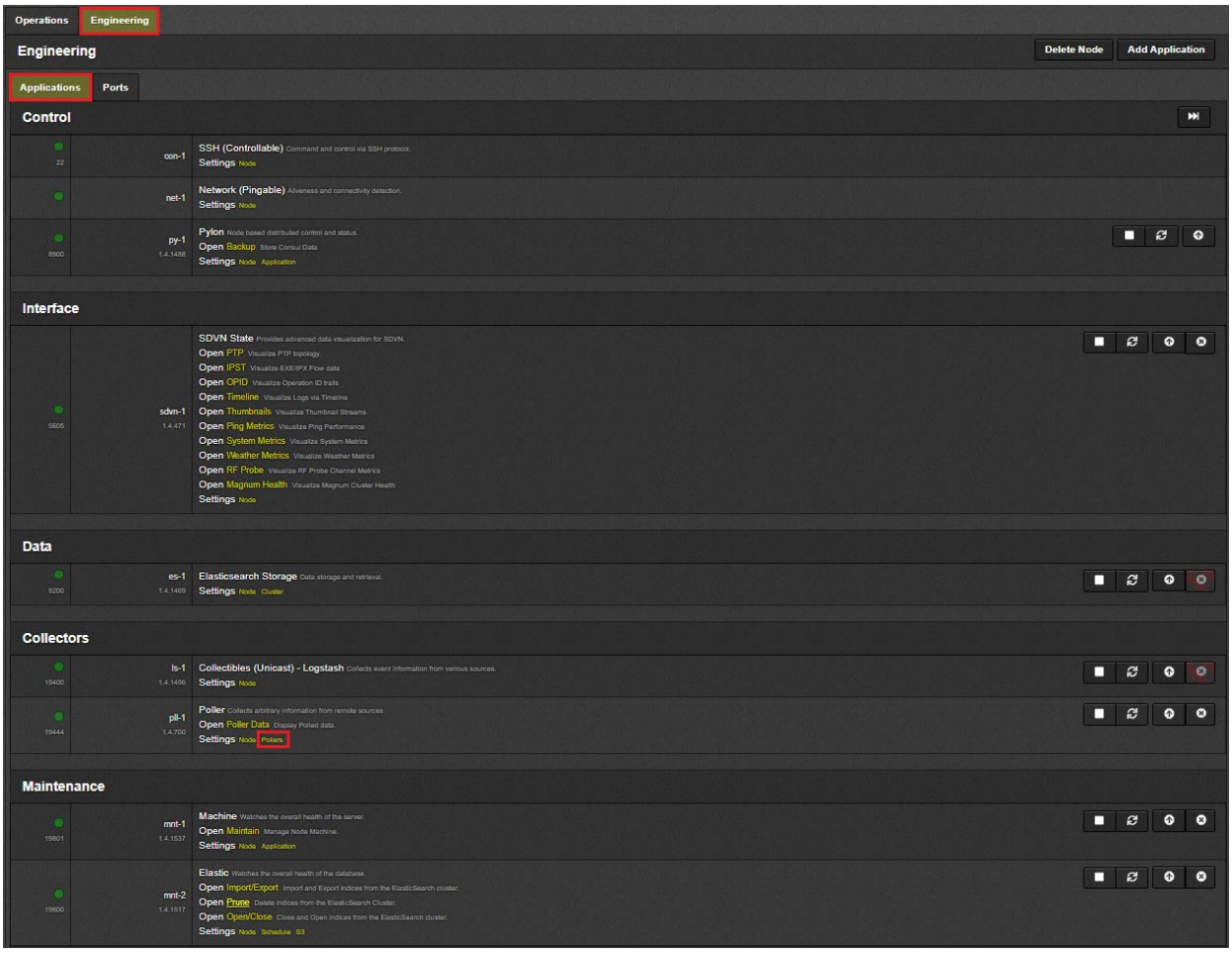

Figure 7-37: RF-inSITE® - Enable https (Part 1 of 2)

- Click on the Edit button of the Pollers Interface

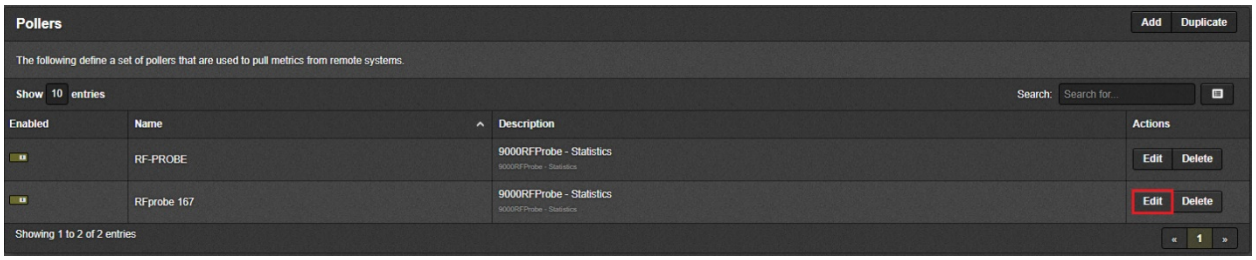

Figure 7-38: RF-inSITE® - Enable https (Part 2 of 2)

- Click on WebEASY tab. Then, under “General” tab the protocol can be changed and it has two options; HTTP and HTTPS.
    - **Protocol:** Select HTTPS and then Click Ok.

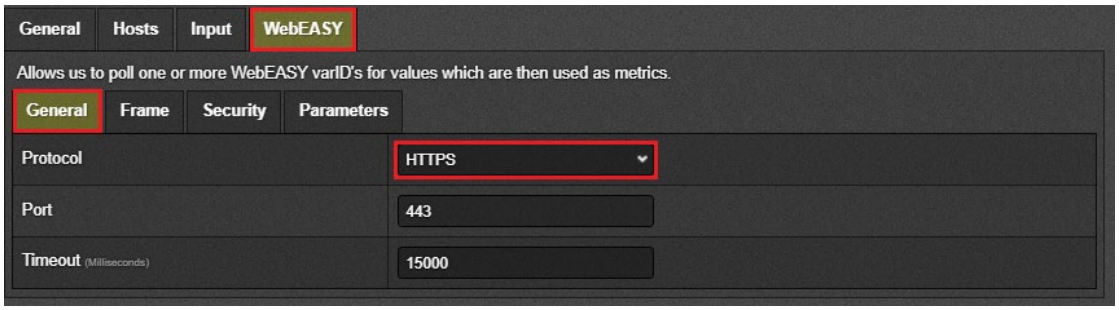

Figure 7-39: RF-inSITE® - Secure WebEasy

7.9. PRUNE OR DELETE OLDER DATA

The RF-inSITE application provides the flexibility of deleting the older data logs to the User. Please note that RF-inSITE has the ability to delete the data automatically when it becomes older than 30 days, but the feature being described in this section is for the user to manually delete the data (only if needed).

The steps to perform this action are listed below:

- Click on Content from the top right corner of the Navigation Menu → Then, Nodes → Click on the Node Box
- Click the Engineering Tab → Then, Applications Tab and under "Maintenance" → Click on Prune

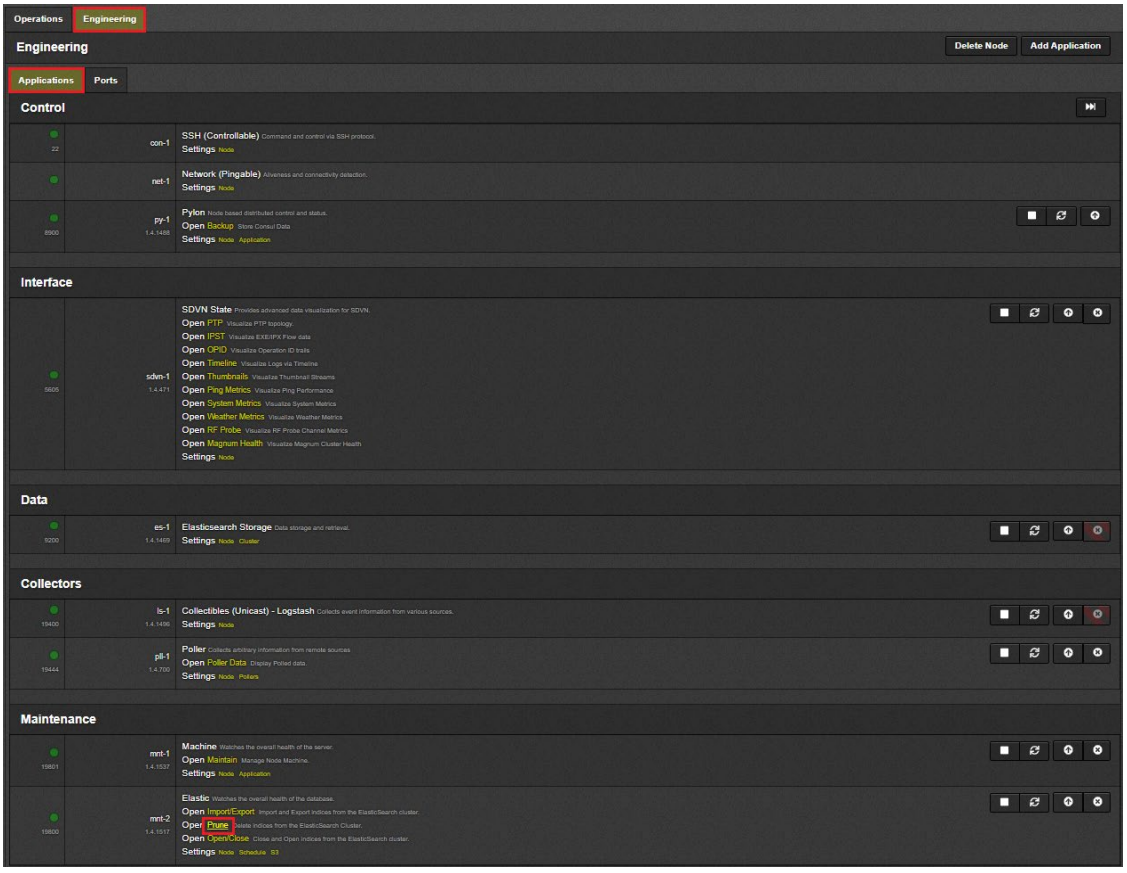

Figure 7-40: RF-inSITE® - Prune or Delete Data (Part 1 of 3)

- Click the tab name "Prune By Name" → Under the Index column, Click log-metric-poller-rfprobe

- The log-metric-poller-rfprobe will display the list of the logs polled from RF Probe

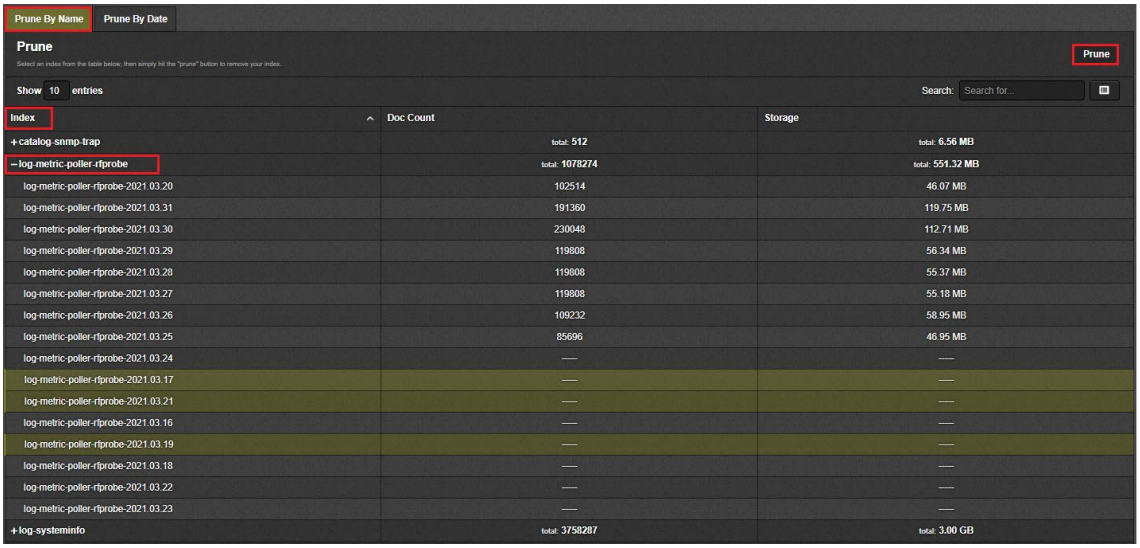

Figure 7-41: RF-inSITE® - Prune or Delete Data (Part 2 of 3)

- Click on the log(s) to delete → Then Click the Prune button
- A confirmation dialog will appear like an image below. Then, Click OK.

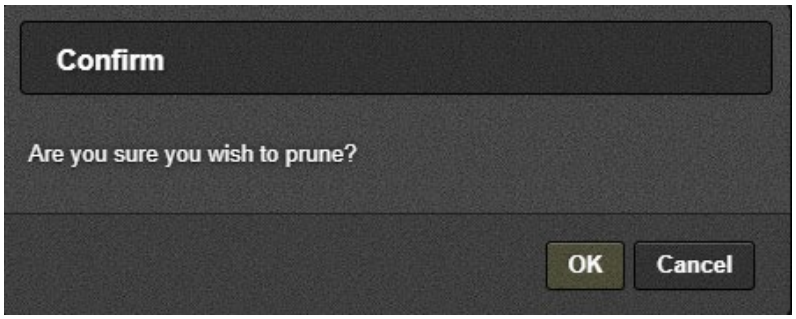

Figure 7-42: RF-inSITE® - Prune or Delete Data (Part 3 of 3)

7.10. HOW TO OPEN DATA LOGS OLDER THAN 7 DAYS

The RF-inSITE by default keeps 7 days of data open for monitoring. To monitor older data beyond 7 days it needs to be manually opened. In this section the steps on how to open the data is explained.

- Click on Content from the top right corner of the Navigation Menu → Then, Nodes → Click on the Node Box
- Click the Engineering Tab → Then, Applications Tab and under “Maintenance” → Click on Open/Close

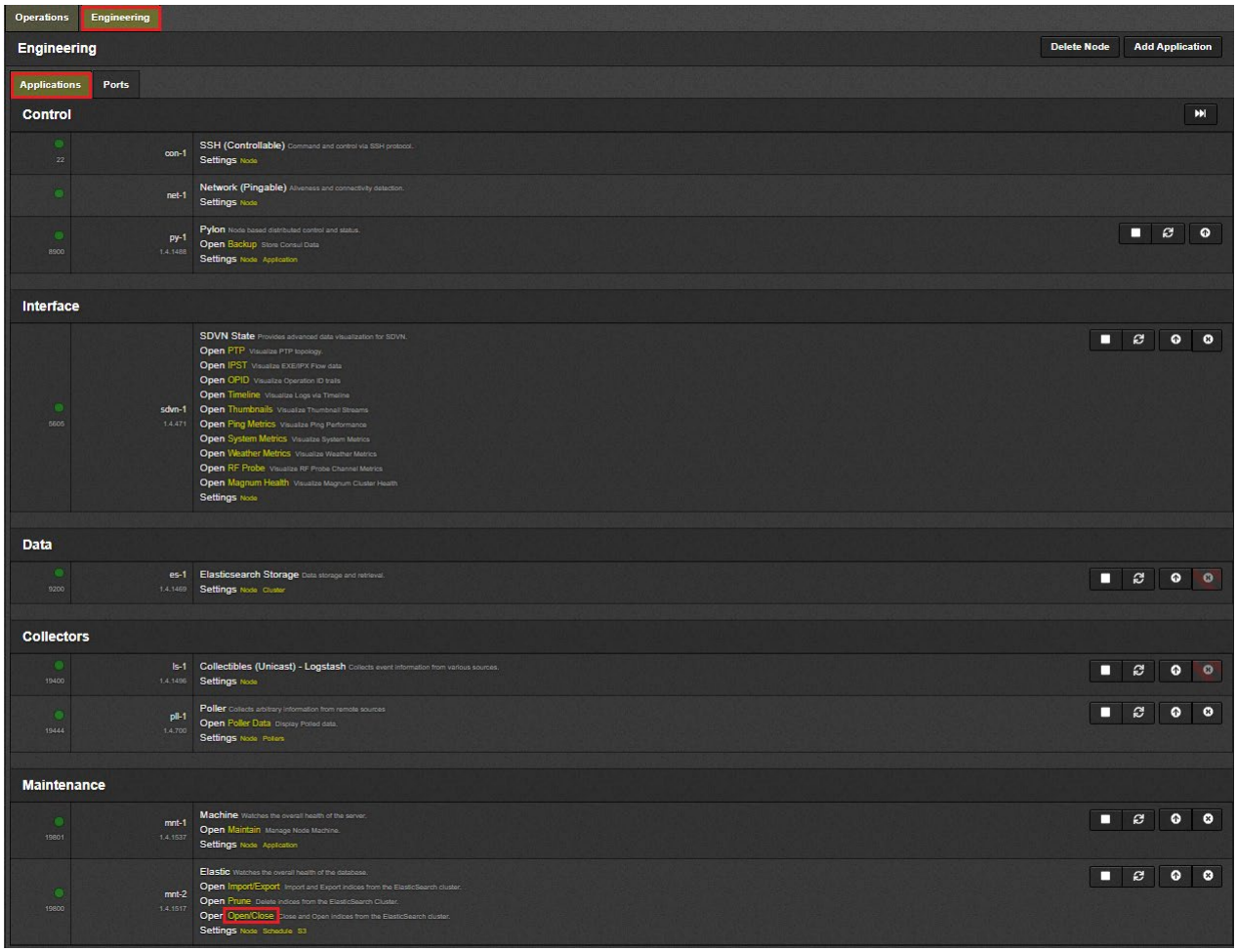

Figure 7-43: RF-inSITE® - Open Data Logs

The log-metric-poller-rfprobe will display the list of the logs according to the state of Open and Close of data.

- Click the tab name “Open/Close” → Under the Indices column, Click log-metric-poller-rfprobe
- The log-metric-poller-rfprobe will display the list of the logs polled from RF Probe

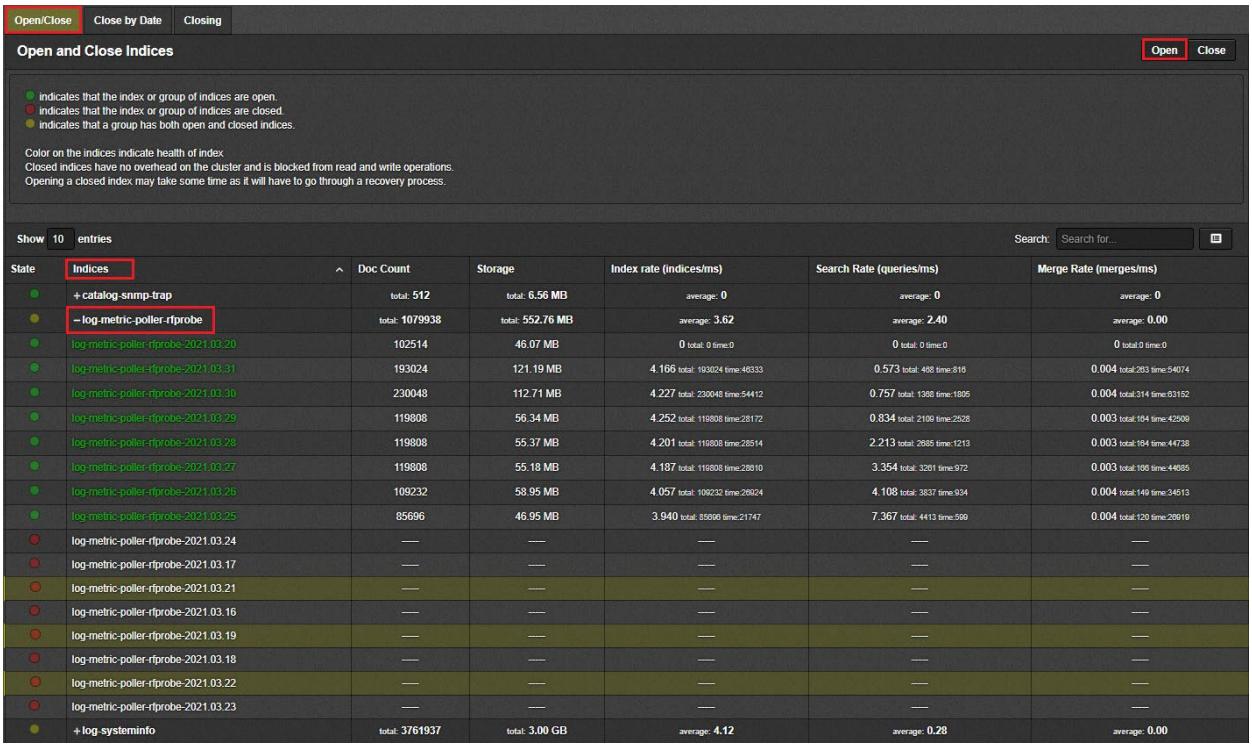

Figure 7-44: RF-inSITE® - Open Older Data

- Click on the log(s) that are **Closed** to **Open** →Then, Click the Open button