SpectrumVue-2

SpectrumVue-2 User's Guide

Part Number MN-SPECTRUMVUE2   Revision 0

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About this User Guide

This user guide contains installation and operation information for the Comtech EF Data (CEFD) SpectrumVue-2.

The user guide is a single resource for information including, but not limited to the set up, operation, management, and troubleshooting of the SpectrumVue-2.

Intended Audience

The information in this user guide is for operators of the SpectrumVue-2.

Conventions and References

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Cautions and Warnings

WARNING means a potentially hazardous situation that could result in death or serious injury.

CAUTION means a hazardous situation that could result in minor or moderate injury, or risk of property damage.

NOTE means information critical for correct equipment function, or an important statement that is applicable to a task.

Licensing

The software included in this product contains copyrighted open source software that is licensed under various open source licenses including the GPL and LGPL. The licenses and copies of the licenses are

available via the product's web interface. You may obtain the complete corresponding open source source code by emailing service@sedsystems.ca.

Regulatory Compliance

Telecommunications Terminal Equipment Directive

In accordance with the Telecommunications Terminal Equipment Directive 91/263/EEC, do not connect this equipment directly to the Public Telecommunications Network.

European Union RoHS Directive (2002/95/EC)

This unit satisfies (with exemptions) the requirements specified in the European Union Directive on the Restriction of Hazardous Substances in Electrical and Electronic Equipment (EU RoHS, Directive 2002/95/EC).

European Union Telecommunications Terminal Equipment Directive (91/263/EEC)

In accordance with the European Union Telecommunications Terminal Equipment Directive 91/263/EEC, the unit must not be connected directly to the Public Telecommunications Network.

CE Mark

Comtech EF Data declares that the unit meets the necessary requirements for the CE Mark.

EMC (Electromagnetic Compatibility)

In accordance with European Directive 89/336/EEC, independent testing showed that the SpectrumVue-2 unit complied with these standards:

Emissions EN 55022 Class B Limits and methods of measurement of radio interference characteristics of Information Technology Equipment
(Also tested to FCC Part 15 Class B)

Immunity EN 50082 Part 1 Generic immunity standard, Part 1: Domestic, commercial and light industrial environment.

Additionally, the SpectrumVue-2 unit complied with these standards:

- EN 61000-3-2 Harmonic Currents Emission
- EN 61000-4-6 RF Conducted Immunity
- EN 61000-3-3 Voltage Fluctuations and Flicker
- EN 61000-4-8 Power frequency Magnetic Field Immunity
- EN 61000-4-2 ESD Immunity
- EN 61000-4-9 Pulse Magnetic Field Immunity
- EN 61000-4-4 EFT Burst Immunity
- EN 61000-4-11 Voltage Dips, Interruptions and Variations Immunity
- EN 61000-4-5 Surge Immunity
- EN 61000-4-13 Immunity to Harmonics

Electrical Safety

The SpectrumVue-2 unit has been shown to comply with the EN 60950 Safety of Information Technology Equipment (including electrical business machines) safety standard.

Fuses

 CAUTION: Always replace the fuses with the correct fuse type and rating. Use correct fuses to help prevent damage to the equipment.

Class I Pluggable Equipment Type A-Protective Earthing

The cable distribution system/telecommunication network of this product relies on protective earthing and the integrity of the protective earthing must be insured
In Finland:
"Laite on liitettävä suojakoskettimilla varustettuun pistorasiaan"
In Norway:
"Apparatet må tilkoples jordet stikkontakt"
In Sweden:
"Apparaten skall anslutas till jordat uttag"

Galvanic Isolator Use

Utrustning som är kopplad till skyddsjord via jordat vägguttag och/eller via annan utrustning och samtidigt är kopplad till kabel-TV nät kan i visa fall medfőra risk főr brand. Főr att undvika detta skall vid anslutning av utrustningen till kabel-TV nät galvanisk isolator finnas mellan utrustningen och kabel-TV nätet

Restricted Access Location

In Nordic Countries, equipotential bonding should be applied using the permanently connected ground stud by a qualified service person

Battery Warning

 CAUTION

Risk of explosion if battery is replaced by an incorrect type. Dispose of used batteries according to the instructions.

Environmental

Maximum storage temperature allowed is -20 to +70°C.

The SpectrumVue-2 must not be operated in an environment where it is exposed to:

- Precipitation

- Condensation

- Humid atmospheres above 95% RH

- Altitudes (unpressurized) greater than 2000 meters

- Excessive dust or vibration

- Flammable gases

- Corrosive or explosive atmospheres

- Extremes of temperature outside the ambient range 0 to +50°C

Operation in vehicles or other transportable installations that are equipped to provide a stable environment is permitted. If such vehicles do not provide a stable environment, safety of the equipment to EN 60950 may not be guaranteed.

Related Documents

- EN300-421 and EN301-210 ETSI

- ETSI EN302-307

- INTELSAT Earth Station Standards IESS-308, -309, -310, and -315

- EUTELSAT SMS

Product Support

For all product support, please call:

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Tempe, Arizona USA 85281

+1.480.333.2200

Warranty Policy

Comtech EF Data products are warranted against defects in material and workmanship for a period of two years from the date of shipment. During the warranty period, Comtech EF Data will, at its option, repair or replace products that prove to be defective. Repairs are warranted for the remainder of the original two year warranty, or a 90 day extended warranty, whichever is longer.

For equipment under warranty, the owner is responsible for freight to Comtech EF Data and all related customs, taxes, tariffs, insurance, etc. Comtech EF Data is responsible for the freight charges only for return of the equipment from the factory to the owner. Comtech EF Data will return the equipment by the same method (i.e., Air, Express, Surface) as the equipment was sent to Comtech EF Data.

All equipment returned for warranty repair must have a valid RMA number issued prior to return and be marked clearly on the return packaging. Comtech EF Data strongly recommends all equipment be returned in its original packaging.

Comtech EF Data Corporation's obligations under this warranty are limited to repair or replacement of failed parts, and the return shipment to the buyer of the repaired or replaced parts.

Limitations of Warranty

The warranty does not apply to any part of a product that has been installed, altered, repaired, or misused in any way that, in the opinion of Comtech EF Data Corporation, would affect the reliability or detracts from the performance of any part of the product, or is damaged as the result of use in a way or with equipment that had not been previously approved by Comtech EF Data Corporation.

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The warranty does not cover damage or loss incurred in transportation of the product.

The warranty does not cover replacement or repair necessitated by loss or damage from any cause beyond the control of Comtech EF Data Corporation, such as lightning or other natural and weather related events or wartime environments.

The warranty does not cover any labor involved in the removal and or reinstallation of warranted equipment or parts on site, or any labor required to diagnose the necessity for repair or replacement.

The warranty excludes any responsibility by Comtech EF Data Corporation for incidental or consequential damages arising from the use of the equipment or products, or for any inability to use them either separate from or in combination with any other equipment or products.

A fixed charge established for each product will be imposed for all equipment returned for warranty repair where Comtech EF Data Corporation cannot identify the cause of the reported failure.

Exclusive Remedies

Comtech EF Data Corporation's warranty, as stated is in lieu of all other warranties, expressed, implied, or statutory, including those of merchantability and fitness for a particular purpose. The buyer shall pass on to any purchaser, lessee, or other user of Comtech EF Data Corporation's products, the aforementioned warranty, and shall indemnify and hold harmless Comtech EF Data Corporation from any claims or liability of such purchaser, lessee, or user based upon allegations that the buyer, its agents, or employees have made additional warranties or representations as to product preference or use.

The remedies provided herein are the buyer's sole and exclusive remedies. Comtech EF Data shall not be liable for any direct, indirect, special, incidental, or consequential damages, whether based on contract, tort, or any other legal theory.

Chapter 1. Overview

This section is an overview of the SpectrumVue-2.

1.1 Description

SpectrumVue-2 is a two-port spectrum viewer. The SpectrumVue-2 is designed to operate with Comtech EF Data's NetVue network management system. However, the SpectrumVue-2 can be managed via software that loads a Java applet on your PC when you connect to it from a web browser such as Internet Explorer (IE) or Firefox. The applet provides a web browser GUI that allows you to select one of the two input ports, make spectrum measurements and see SpectrumVue-2 status.

SpectrumVue-2 can be used standalone, installed onto any standard 19-inch 1U rack shelf, or it can be attached to a 1U front panel for rack installation. Get access remotely via the Ethernet connection by any computer that has access to the same network. See section 2.1 for SpectrumVue-2 installation instructions.
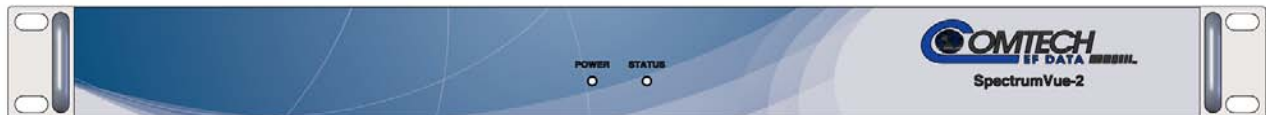

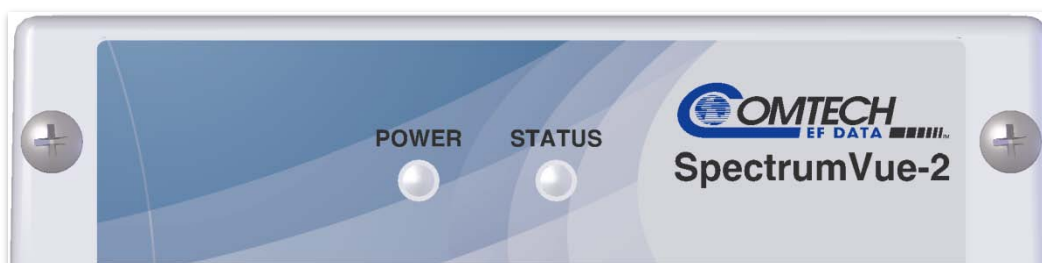**Figure 1-1 SpectrumVue-2 1 RU Front Panel**

Figure 1-2 SpectrumVue-2 Standalone Front Panel

Figure 1-3 SpectrumVue-2 Chassis

SpectrumVue-2 has these LEDs and connections:

Power LED

The power LED (left side of front panel) is green when the input power is normal, and red if there is a problem with the 5VDC input.

Status LED

The status LED (right side of front panel) is green when SpectrumVue-2 is operating normally, and red if SpectrumVue-2 has detected an error.

RF IN 1 and 2

RF inputs are provided via two RF input female SMA connectors: 50 Ω, -50 to +5 dBm normal input range, +10 dBm maximum safe level. Do not connect the RF inputs directly to an outdoor antenna. At a minimum, a low noise block amplifier (LNB) or low noise amplifier (LNA) or similar device must be connected between an antenna and SpectrumVue-2.

Note that each input can be limited by an external filter to the band of interest within the normal input range in order to avoid reducing the signal-to-noise ratio of the instrument. The more broadband noise allowed into SpectrumVue-2, the lower the dynamic range will be available for the unit to use. The total power in the full L-band range must not exceed the input power level specification for SpectrumVue-2. You can use any band-pass, high-pass or low-pass RF filter suitable for 50 Ω applications on the inputs to SpectrumVue-2.

LAN

A LAN connection is provided to support GUI, SNMP and API operation. Connections of 100 Mbps are supported via the female RJ45 connector. This connector is used to connect to the NetVue network management system.

Network reset

This recessed switch, found between the LAN and RF IN 1 connectors, allows the SpectrumVue-2 network configuration to be returned to the defaults. See section 2.2.2 for details.

Power in

5 VDC power is supplied via a micro-B USB connector, compatible with the included AC power adapter.

> NOTE: This connection supplies DC power at a level that exceeds data USB standards.

Ground

A ground terminal screw is used for grounding to facility equipment. It must be connected to a good earth ground, because it provides functional earthing and shielding for the chassis.

1.2 Security

Optional security restrictions are incorporated into the SpectrumVue-2 Java applet or API socket interface. See section 2.2.1 for details on Web Configuration Manager security.

1.3 Remote Connections

The SpectrumVue-2 Java applet and API socket interface are designed to allow up to five remote connections simultaneously. However, multiple connections will affect the speed at which SpectrumVue-2 can make measurements, because measurement requests on all connections are handled on a first-come-first-serve basis. However, the NetVue network management system should be used to interface to the SpectrumVue-2, once the unit has been configured.

1.4 Safety

CAUTION

You must read this manual before installing and operating the SpectrumVue-2. Failure to read this manual can result in damage to the unit or injury to the user. If the equipment is used in a manner not specified by the manufacturer, the protection provided by the equipment can be impaired. Heed all warning signals.

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Chapter 2. Getting Started

This section describes installation and configuration of the SpectrumVue-2.

2.1 Installation

You can use SpectrumVue-2 in three physical configurations: Standalone, Rack shelf installation or Rack panel installation.

Standalone

When used standalone on a bench, provided rubber feet can be screwed to the bottom of the unit.

Rack shelf installation

The unit can be installed onto any standard 19-inch 1U rack shelf. Remove the rubber feet and install the unit directly to the shelf, using four screws.

> ⚠ **CAUTION**
>
> Do not over tighten the four bottom screws when installing SpectrumVue-2 to a shelf: maximum torque = 2.9 in-lb (0.33 N-m).

Rack panel installation

The unit can be installed to a full-width 1U rack panel, and installed in a standard 19-inch rack.

> ⚠ **CAUTION**
>
> Do not over tighten the two front panel screws when installing the rack panel to SpectrumVue-2: maximum torque = 24 in-lb (2.7 N-m).

Access to the SpectrumVue-2 is controlled by the NetVue network management system, once the unit has been set up. You can set up SpectrumVue-2 with dedicated or shared access:

Dedicated access

An Ethernet cable is connected directly between the client computer and SpectrumVue-2. In this configuration, only the client computer can access SpectrumVue-2. This mode must be used only to configure the unit.

Shared access

An Ethernet cable is connected between SpectrumVue-2 and a hub or switch. In this configuration, any computer on the network can access SpectrumVue-2. This is the mode that is used for normal operation with the NetVue network management system.

Other than the Java runtime, no software needs to be installed on the client computer in order to use SpectrumVue-2 from a browser. The web browser downloads the Java applet automatically. Direct access to the API socket interface requires user-written API software.

For initial setup only, these minimum capabilities are recommended for the client computer:

- 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 Firefox
- Java JDK 1.6, release 10 or newer
- An Ethernet port to connect SpectrumVue-2 to the computer

2.2 Configuration

SpectrumVue-2 uses a Web Configuration Manager (WCM) to change the network configuration, passwords, calibration files, port names and firmware.

2.2.1 Web Configuration Manager

To get access to the WCM, enter **<SpectrumVue-2 IP address>/cgi-bin/wcm.cgi** into a web browser's address bar. For example, to access SpectrumVue-2 on the default IP address, enter:

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

This opens the Login web page. To log in, select an access level and enter the password. The default password for access level admin is **admin**. The password is case-sensitive.
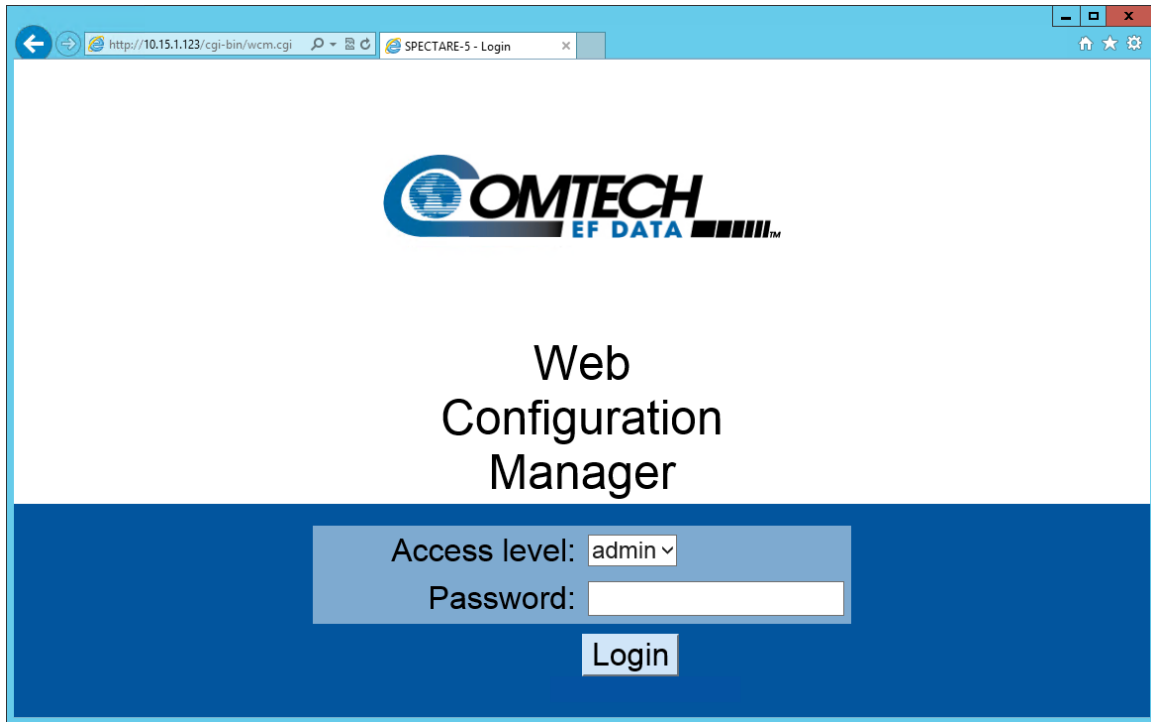
Figure 2-1 Login Web page example

The client computer, whether using the Java applet, API socket interface or WCM, must have the correct network routes to get access to the 192.168.10.xxx subnet. If a ping or inspection of the routing table finds that no connectivity exists, then a route must be configured.

To configure connectivity for a Windows 2000/XP/7/8 computer, enter the route from a command window. For example, if the client computer has an IP address of 192.168.123.100, enter this command:

```
route add 192.168.10.0 mask 255.255.255.0 192.168.123.100
```

2.2.2 Factory Defaults

The SpectrumVue-2 network configuration factory defaults are:

- IP address: 192.168.10.1
- Net mask: 255.255.255.0
- Gateway: 192.168.10.1
- API socket port: 9784

You can use the network reset switch on the rear of SpectrumVue-2 to restore network configuration and the API socket interface port to the factory defaults. Any calibration files installed will be unchanged. The network reset procedure is:

1. Find the network reset switch on the rear of the unit, between the LAN and RF IN 1 connectors.

2. Press the switch and hold it down for about 10 seconds, then release it.

3. Allow 30 seconds for the unit to change its network settings.

After step 3 completes, the network configuration is restored to factory defaults.

⚠ **CAUTION**

This procedure resets password and security settings as well.

2.2.3 Network

To change the SpectrumVue-2 network configuration, log in to the WCM and navigate to the **Network** tab:

Figure 2-2 Network tab example

Enter the new network settings and click **Save Changes**. This message shows:
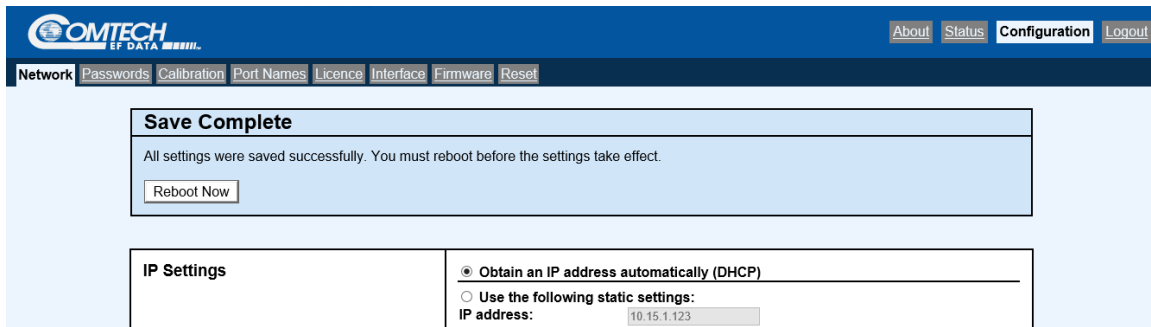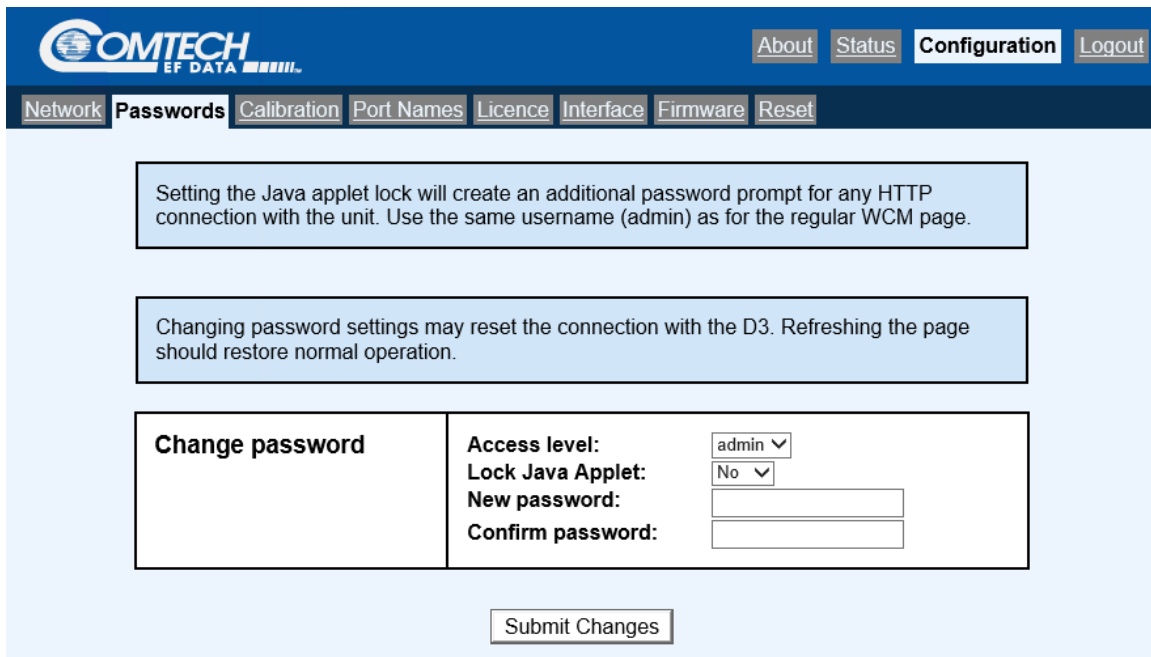

Figure 2-3 Save Complete message example

Click **Reboot Now** to reboot the unit and start using the new settings.

2.2.4 Passwords

To change the SpectrumVue-2 security settings, log in to the WCM and navigate to the **Passwords** tab:

Figure 2-4 Passwords tab

To change the password for WCM access, enter the new password in both boxes and click **Submit Changes**.

Your browser can lose its connection to the WCM at this point. Refresh the page and log in again using the new password.

If **Lock Java Applet** is set to **Yes**, then another layer of security is added to all access to the SpectrumVue-2 IP address. Any user trying to connect to the WCM or the Java applet is asked for a username and password. The username is always **admin.** The password is the same as it was last set to on this page.

2.2.5 Calibration

Use the **Calibration** tab to install or change a switch port calibration:
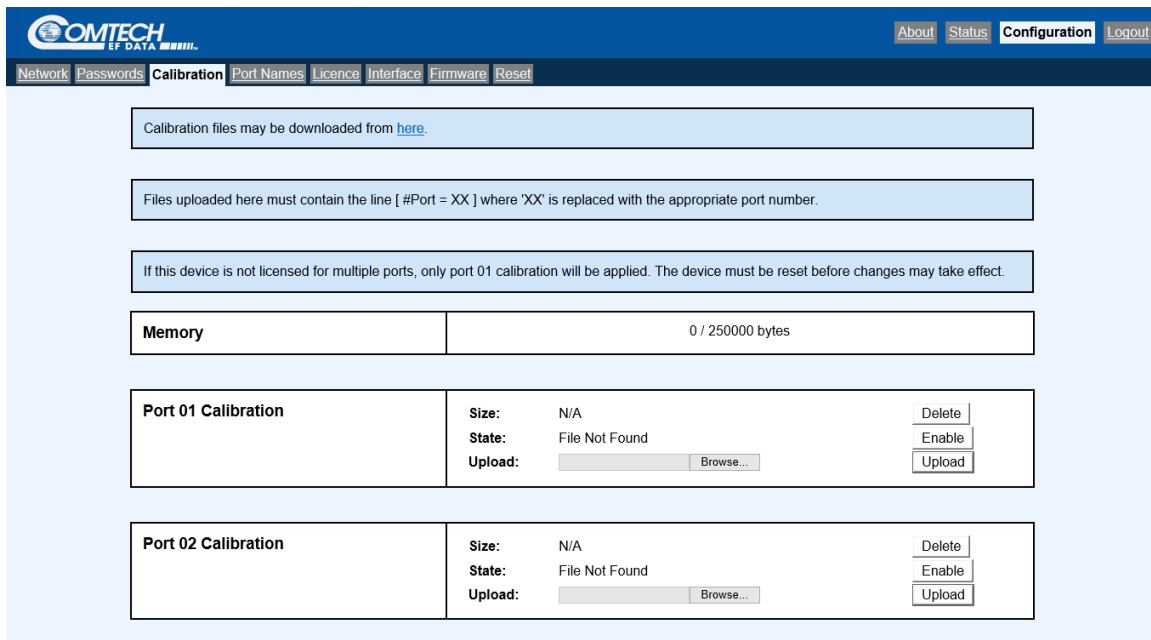

Figure 2-5 Calibration tab

An example switch port calibration file is included with the unit. It is available via the <u>here</u> link in the top section of this window. After a switch port calibration file is installed or modified, SpectrumVue-2 must be reset for the changes to take effect.

The switch port calibration file must include the line:

```
#Port = X
```

Where X is the port for which the calibration is intended (i.e., X = 1 for port 1, X = 2 for port 2).

Make sure to upload the correct calibration file to the correct port, or SpectrumVue-2 can return undesired results. SpectrumVue-2 uses linear interpolation to find the desired offset between calibration points.

2.2.6 Port Names

Use the **Port Names** tab to change the names of the ports:

Figure 2-6 Port Names tab

On the SpectrumVue-2 GUI, these names show in the combo box. This does not affect the low level switch port messaging between clients and SpectrumVue-2, because the switch port number is still used.

After the switch port names are changed, click **Apply Changes**.

2.2.7 License

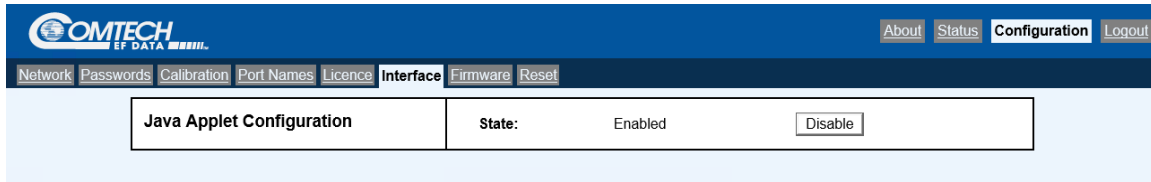Use the **License** tab to manage the SpectrumVue-2 licenses:

Figure 2-7 License tab

You can select a new license using **Browse…** Upload the selected license by clicking **Upload**.

2.2.8   Interface

Use the **Interface** tab to enable or disable the Java applet:

Figure 2-8 Interface tab

If you are using only the API interface to operate SpectrumVue-2, then make sure the Java applet is disabled.

2.2.9   Firmware

SpectrumVue-2 has a web page for you to manage updates of the firmware. This eliminates the need to return the unit to the factory for updates. The **Firmware** tab is the default tab shown after logging in to the WCM successfully:
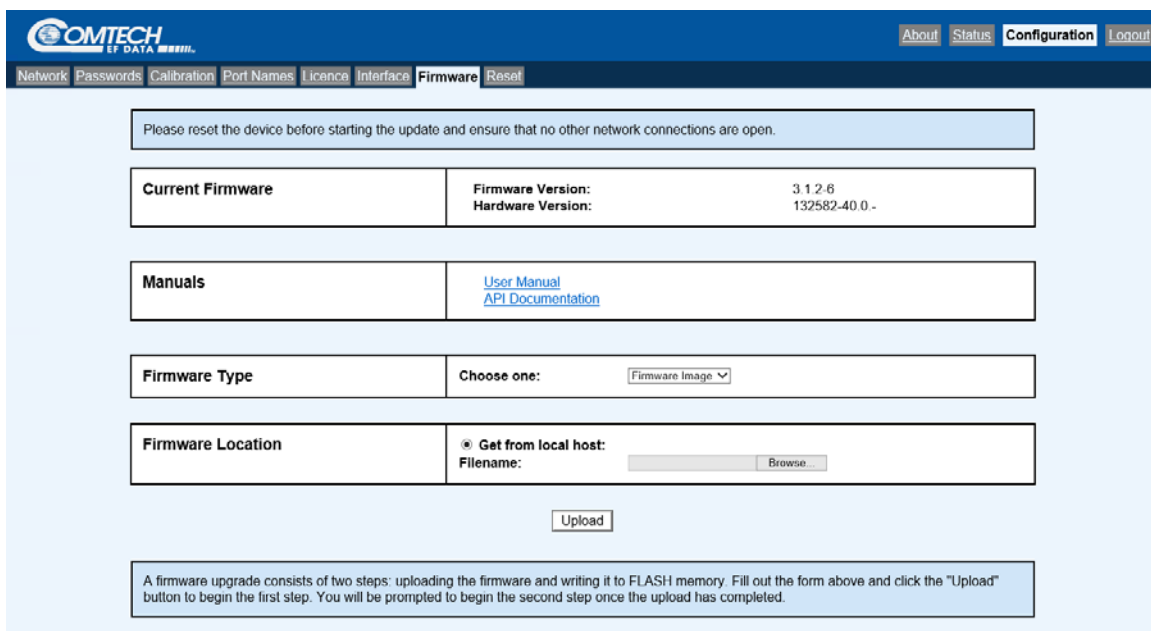
Figure 2-9 Firmware tab

Transfer a firmware update file (supplied by Comtech EF Data) to SpectrumVue-2. Use a local host computer. Specify the server information and click **Upload**. The file is uploaded, and this screen shows:
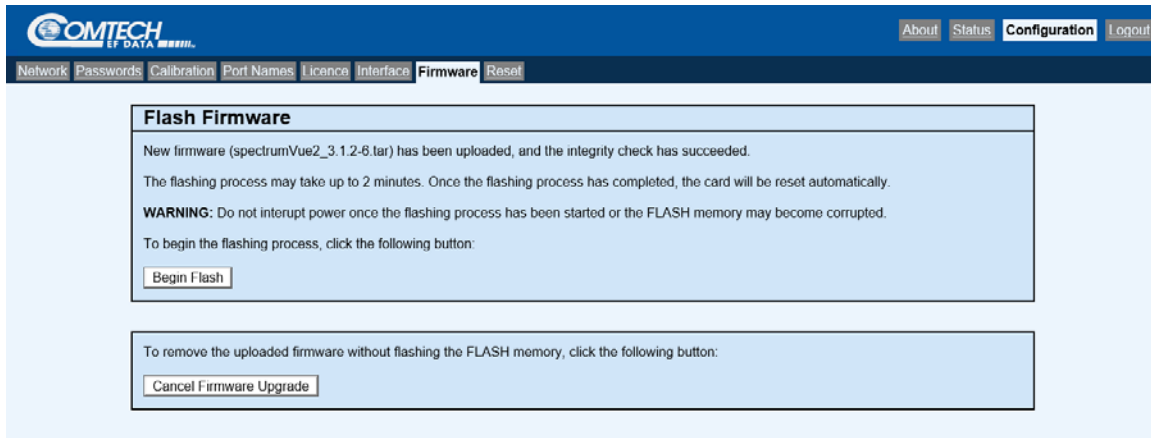
Figure 2-10 Flash Firmware page example

Click **Begin Flash** to update the unit firmware. When finished, SpectrumVue-2 resets automatically.

> **CAUTION**
>
> If the firmware file fails the integrity check, it is highly recommended that you click the **Cancel Firmware Upgrade** button. If you do not, there is a risk SpectrumVue-2 will become unresponsive.

2.2.10 Reset

Use the **Reset** tab to reboot the SpectrumVue-2 software safely:
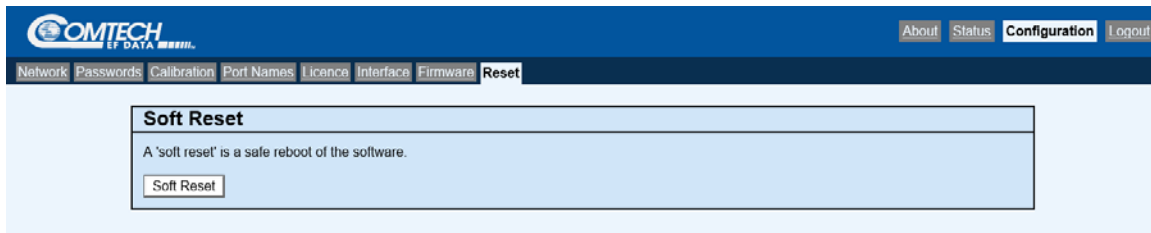
Figure 2-11 Reset tab

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Chapter 3. GUI

In addition to the API socket interface, there is a built-in graphical user interface (GUI). Use any web browser, such as Internet Explorer or Firefox, with the GUI.

> NOTE: Chrome works for the WCM, but not for the GUI.

SpectrumVue-2 has software that loads a Java applet on your PC when you connect to it from a browser. The applet has a web browser GUI that lets you select which of the two ports to use as the input to SpectrumVue-2, to make spectrum measurements and to see SpectrumVue-2 status.

The GUI is intuitive to use. It allows interactive use of the SpectrumVue-2 for any general purpose investigation for which a traditional digital or analog spectrum analyzer is used.

Figure 3-1 shows the main GUI screen for SpectrumVue-2. The main screen has two areas: the left side shows the data screen, and the right side has control buttons.
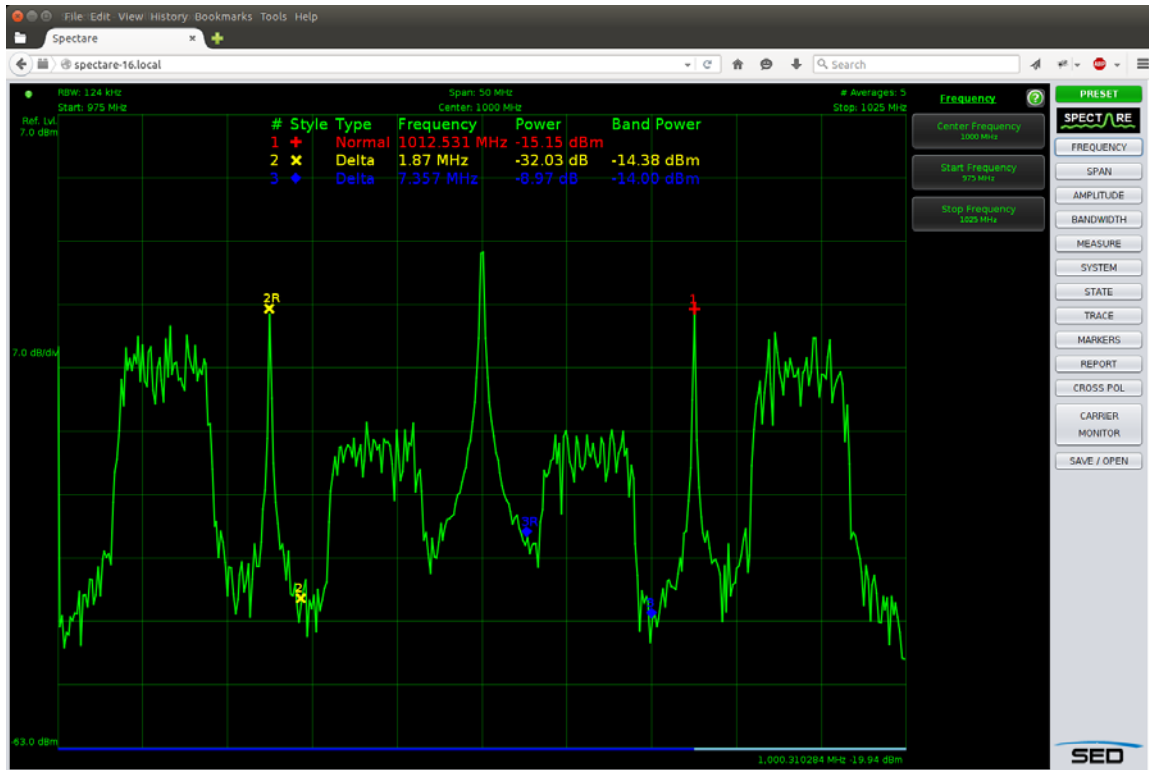
Figure 3-1 SpectrumVue-2 GUI window

The basic operations of SpectrumVue-2 are:

- Collecting the samples required for the selection made
- Performing a DFT
- Presenting the spectrum data to the operator

Similar to traditional spectrum analyzers, the speed of the measurement is a function of the RBW, span and the number of averages specified. See section 3.4.

3.1 Main Screen

Use the main screen to see the spectrum and to control various parameters. The screen updates the values of the various parameters in real time as the signal changes, or as you change parameters. The screen has four areas, as shown in Figure 3-2:

1. The central plot area shows the grid and signal plot. Marker values show at the top of the plot area.

2. The top settings bar shows the RBW, span, number of averages, start frequency, center frequency and stop frequency. You can change these six values by clicking on them. An LED

icon, indicating the health of the connection to the unit, shows at the upper left corner of the screen.

3. The left settings bar shows the reference level, scale per division and minimum power level shown. You can change the first two values by clicking on them.

4. The bottom mouse indicator bar shows the frequency and amplitude corresponding to the mouse cursor position.
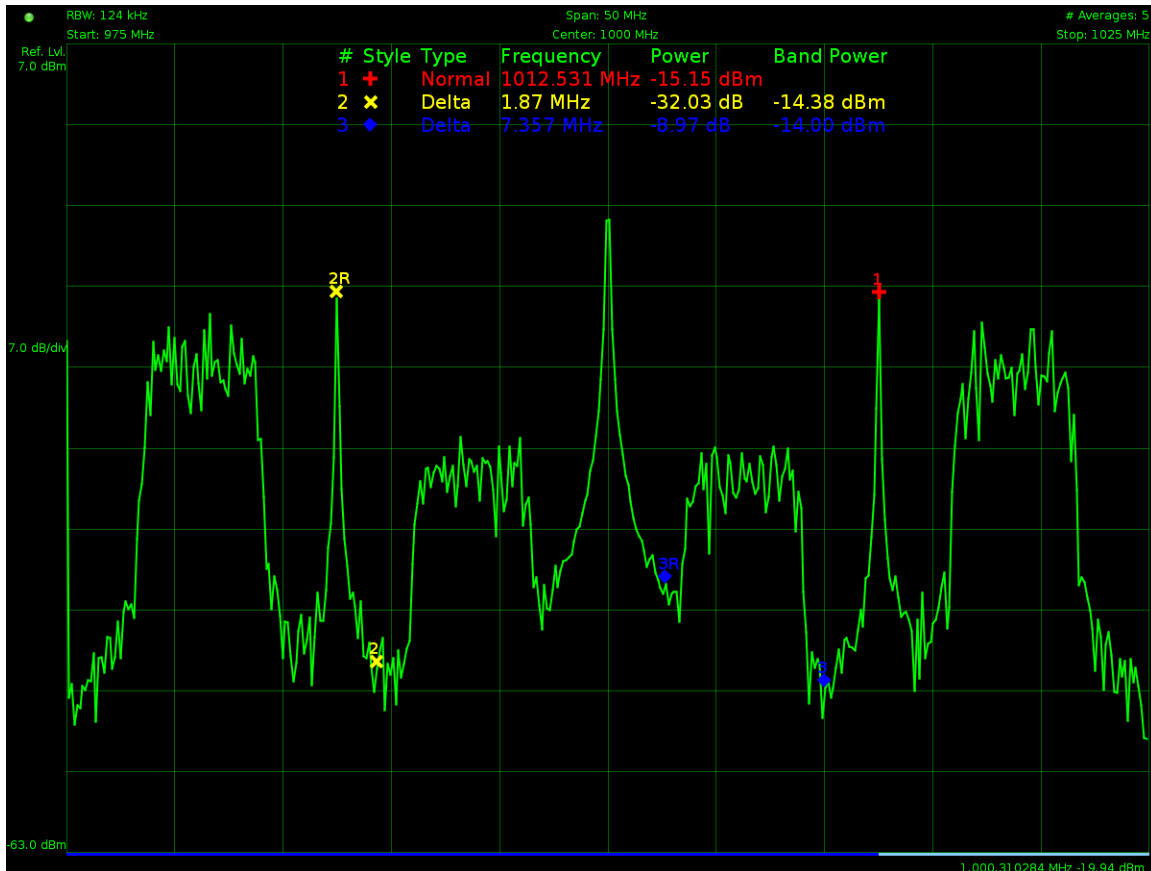

Figure 3-2 SpectrumVue-2 GUI Main Screen

3.2 Controls and Menus

The control buttons are in two columns along the right side of the GUI. The right-most buttons give access to the major functions. The left column shows buttons that relate to the selected major function.
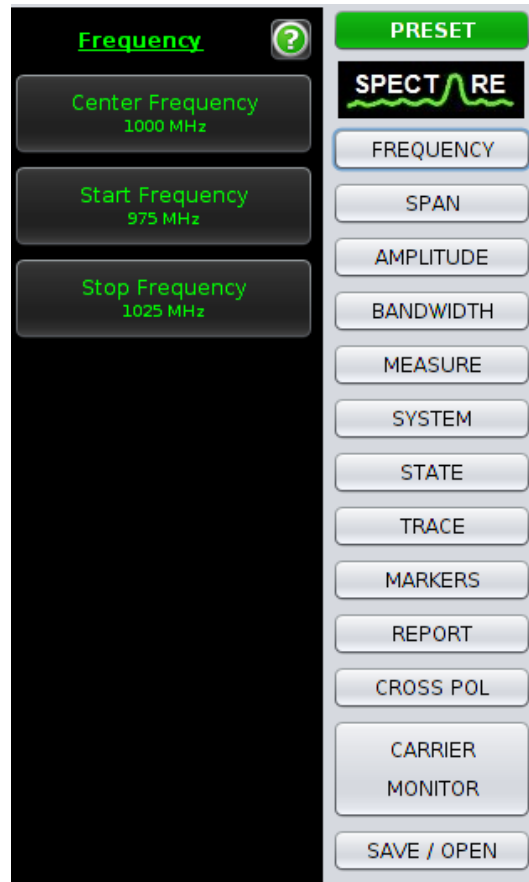
Figure 3-3 SpectrumVue-2 GUI Control Buttons

Click one of the major function buttons (right column) to change the context-sensitive buttons (left column) to the available options.

Click one of the context-sensitive buttons (left column) to apply that option, or to show a dialog box that lets you edit a value or chose from a drop-down list.

Each context-sensitive function can have multiple levels of options.

The buttons and data fields of the SpectrumVue-2 GUI are described in Table 3-1 through Table 3-14.

Table 3-1 SpectrumVue-2 GUI Button – Preset

Menu Item	Description
N/A	Sets unit back to its default settings and clears any stored traces, states and markers.

Table 3-2 SpectrumVue-2 GUI Button – Frequency

Menu Item	Description
Center Frequency	Shows the desired and actual center frequency values. Clicking on the menu item shows the center frequency edit dialog. Setting a value too low or too high is adjusted to the actual value of the unit's limit automatically.
Start Frequency	Shows the desired and actual start frequency values. Clicking on the menu item shows the start frequency edit dialog. Setting a value too low or too high is adjusted to the actual value of the unit's limit automatically.
Stop Frequency	Shows the desired and actual start frequency values. Clicking on the menu item shows the stop frequency edit dialog. Setting a value too low or too high is adjusted to the actual value of the unit's limit automatically.

Table 3-3 SpectrumVue-2 GUI Button – Span

Menu Item	Description
Span	Shows the desired and actual span values. Clicking on the menu item shows the span frequency edit dialog. Setting a value too low or too high is adjusted to the actual value of the unit's limit automatically. NOTE: When adjusting for a known frequency offset, if the configured capture is close to or at the outer edge(s) of the allowed span, the actual span returned can be different from that requested. Care must be taken to avoid the very edge of the span to ensure the measurements remain valid.
Full Span	Sets the span to 1200 MHz and center frequency to 1550 MHz. The unit is in wide sweep mode.
Min Span	Sets the span to 1 MHz.

Table 3-4 SpectrumVue-2 GUI Button – Amplitude

Menu Item	Description
Auto Y-axis	Sets whether the unit will set the *Reference Level* and *Scale/Div* to a value that shows the entire active trace in view. Values: True, False
Reference Level	The *Ref Lvl* power in dBm (at the top left of the screen). This value is set automatically if *Auto Y-axis* is set to *True*.
Scale/Div	The scale per vertical division in dB. This value is set automatically if *Auto Y-axis* is set to *True*.

Menu Item	Description
Max Ref Line	A horizontal reference line is drawn at the maximum power value of the trace along with a label of the power value. Clicking this menu item makes the line visible.
	<table><tr><td>Visible</td><td>Sets whether the reference line is visible. Values: Show, Hide</td></tr><tr><td>Color</td><td>The color of the reference line. Shows a color edit dialog.</td></tr><tr><td>Thickness</td><td>The thickness of the reference line in pixels. Values: 1, 2 (default), 3, 4, 5</td></tr><tr><td>Back</td><td>Navigate back to the *Trace* menu.</td></tr></table>
Min Ref Line	A horizontal reference line is drawn at the minimum power value of the trace along with a label of the power value. Clicking this menu item makes the line visible.
	<table><tr><td>Visible</td><td>Sets whether the reference line is visible. Values: Show, Hide</td></tr><tr><td>Color</td><td>The color of the reference line. Shows a color edit dialog.</td></tr><tr><td>Thickness</td><td>The thickness of the reference line in pixels. Values: 1, 2 (default), 3, 4, 5</td></tr><tr><td>Back</td><td>Navigate back to the *Trace* menu.</td></tr></table>

Table 3-5 SpectrumVue-2 GUI Button – Bandwidth

Menu Item	Description
RBW	The resolution bandwidth or spacing between the points. Clicking on the menu item shows a combo box with a list of the correct RBWs given the current span and FFT Window. The minimum RBW is 300 Hz.
RBW Mode	The mode used. Values: Auto (default): Sets the RBW = span / ratio. Manual: Ratio is disabled; users have full control to specify an RBW independently.
Ratio	The ratio of the span to the RBW; used only when *RBW Mode* is set to *Auto*.
VBW Mode	The VBW emulation mode used. Values: Averages (default): Sets the number of spectrum trace averages directly. VBW: Spectrum trace averages are used to emulate a desired video filter bandwidth.
Averages	Shows the desired and actual number of averages. Clicking on the menu item shows the number of averages edit dialog. Range is 1 to 255. Used only when *VBW Mode* is set to *Averages*.
VBW	Shows the desired and actual video filter bandwidth. Clicking on the menu item shows the VBW edit dialog. Used only in *VBW Mode*.

Table 3-6 SpectrumVue-2 GUI Button – Measure

Menu Item	Description
Capture Mode	The capture mode. Values: • Continuous • Single • Stopped
Restart	If *Capture Mode* is set to *Continuous*, restarts the trace and clears the hold display if *Min/Max/Min Max Active Hold* mode was selected. If *Capture Mode* is set to *Single*, initiates a single trace.
Spectral Inversion	Inverts the spectrum. Values: Off, On
Hold	The hold mode. Values: • Normal: No hold. • Max Hold • Min Hold • Min Max Active: Combination of Max Hold and Min Hold.

Table 3-7 SpectrumVue-2 GUI Button – System

Menu Item	Description
CrossPol Mode	The cross polarity mode. Users must make sure proper values are set for the *Switch Port* and *CrossPol Switch Port* settings. Values: True, False
Switch Port	The switch port, either 1 or 2.
CrossPol Switch Port	The cross polarity switch port, either 1 or 2.
Color Scheme	The color scheme of the background and grid lines Values: Normal (black and green), Print (white and black)
Connection Timeout	The number of seconds to wait for a response from the unit in addition to a minimum of a second. The default is 15 seconds, and 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 GUI over a WAN.
Reset	Perform a software reset on the unit.
Status	Show the status of the unit in a display dialog. A tool tip does the same.
Error Log	Shows a list of errors received by the GUI. The dialog pops up automatically when an error occurs.
Help	Show the GUI help in the default browser.

Table 3-8 SpectrumVue-2 GUI Button – State

Menu Item	Description
State 1 to State 10	Store or restore the state of the unit from storage of one of ten 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 shows the state in a tool tip. • Clear: Clears the state. • Capture: Stores the current state. • Apply: Applies the stored state to the current state. • View: See the stored state in a display dialog.

Table 3-9 SpectrumVue-2 GUI Button – Trace

Menu Item	Description	
Active	The trace color is shown in the menu item. This trace also acts as the *CrossPol* trace when in *CrossPol Mode*.	
	Visible	Sets whether the active trace is visible. Values: Show, Hide
	Color	The color of the active trace. Shows a color edit dialog.
	Thickness	The thickness of the active trace in pixels. Values: 1, 2 (default), 3, 4, 5
	Export to CSV	Export the trace points to a CSV file. Shows a file save dialog.
	Back	Navigate back to the *Trace* menu.
CrossPol	The trace color is shown in the menu item. This trace is the *CrossPol* trace when in *CrossPol Mode*.	
	Visible	Sets whether the active trace is visible. Values: Show, Hide
	Color	The color of the active trace. Shows a color edit dialog.
	Thickness	The thickness of the active trace in pixels. Values: 1, 2 (default), 3, 4, 5
	Export to CSV	Export the trace points to a CSV file. Shows a file save dialog.
	Back	Navigate back to the *Trace* menu.

Menu Item	Description	
Trace 1 to Trace 4	Memory based traces. The trace color is shown in the menu item.	
	Capture	Copy the active trace to the stored trace. Shows a graph icon on the menu item and on the *Trace* menu item one level above when captured.
	Clear	Clear the trace from memory.
	Visible	Sets whether the trace is visible. Values: Show, Hide
	Color	The color of the stored trace. Shows a color edit dialog.
	Thickness	The thickness of the memory trace in pixels. Values: 1, 2 (default), 3, 4, 5
	Freq. Rendering	The frequency rendering mode. Values: • Overlay: Show 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 can be off screen. • Shifted: Render the trace centered in the center of the screen, but scales it in the frequency direction according to the new span.
	Ampl. Rendering	The amplitude rendering mode. Values: • To Scale: Renders the trace in the vertical direction to scale. • Overlay: Renderings the trace in the vertical direction as was taken during capture, disregarding the reference level.
	Export to CSV	Export the trace points to a CSV file. Shows a file save dialog.
	Details	Shows the settings at the time the trace was captured.
	Back	Navigate back to the *Trace* menu.

Table 3-10 SpectrumVue-2 GUI Button – Markers

Menu Item	Description
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*.

Menu Item	Description	
	Style	Set the style of the marker. When *Normal* or *Delta*, a paper clip graphic is shown. Values: • Off: Turns off the marker. • Normal: A single marker. • Delta: A pair of markers. • CrossPol: A pair of markers on the *Active* and *CrossPol* traces when in *CrossPol Mode*.
	Shape	The shape of the marker. Values: Plus, X, Diamond, Up Facing Triangle, Down Facing Triangle, Right Facing Triangle, Left Facing Triangle, Circle, Do Not Enter, Circle Plus
	Color	The color of the marker. Shows a color edit dialog.
	Trace	Shows what trace the marker is attached to. Not applicable in *CrossPol Mode*. Values: Current (active), Cross Pol (future), 1, 2, 3, 4
	Frequency	Enabled when the *Style* is *Normal*, *Delta*, or *CrossPol*, this shows the frequency edit dialog to adjust the marker frequency.
	Function	Enabled when the *Style* is *Normal* or *Delta*, this shows the functions that can be performed on the marker frequency. Values: Peak Search, Marker to Center Frequency, Marker to Reference Level, Next Peak Right, Next Peak Left, Next Lower Peak
	Freq. Adjust	Enabled when the *Style* is *Normal*, *Delta*, or *CrossPol*, this shows a previous and next button. The buttons will move the marker one point to the left or right.
	Reference Frequency	Enabled when the *Style* is *Delta* or *CrossPol*, this shows the frequency edit dialog to adjust the reference frequency marker.
	Reference Function	Enabled when the *Style* is *Delta* or *CrossPol*, this shows the functions that can be performed on the reference frequency marker. Values: Peak Search, Marker to Center Frequency, Marker to Reference Level, Next Peak Right, Next Peak Left, Next Lower Peak
	Ref. Freq. Adjust	Enabled when the *Style* is *Delta* or *CrossPol*, this shows a previous and next button. The buttons will move the reference frequency marker one point to the left or right.

Table 3-11 SpectrumVue-2 GUI Button – Report

Menu Item	Description
Export to CSV	Export the active trace and any captured memory based traces to a CSV file. Shows a file save dialog.
Export to HTML	Export the screen, traces, markers and states to an HTML file report. Shows a file save dialog to specify a target directory. The GUI optionally shows the report HTML file in the default browser when done.

Table 3-12 SpectrumVue-2 GUI Button – Save/Open

Menu Item	Description
Save Screen to PNG	Save the screen to a PNG file. Shows a file save dialog.
Save Project	Save the current settings, memory based traces, markers attached to memory based traces, and states to a project XML file. Shows the file save dialog.
Open Project	Opens a saved project from file and loads the data into the GUI. The current settings, memory based traces, markers attached to memory based traces, and states are loaded from the project XML file.

Table 3-13 SpectrumVue-2 GUI Button – Carrier Monitor

Menu Item	Description
New Measurement	Create a new measurement using the current state of the unit. Provide a name and specify which analyses to run.
Measurement Delay	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 the format: root_log_dir/yyyy_mm_dd/measurement_name/ Within that directory there will be the following files: • *BandPower.csv* (if *Band Power* analysis is configured) • *PresenceOfACarrier.csv* (if *Presence of a Carrier* analysis is configured) • A trace subdirectory containing a trace file for each trace in the format: • hh_mm_ss_uuu.csv

Menu Item	Description

Email	An edit window to specify:
	
	• Master Switch: Enables email.
	• Mail Server: Name, Port
	• From: Email, Name
	• Recipients
	  o Email
	  o Name
	  o Style
	    ▪ Simple Text: Text only.
	    ▪ Rich HTML: Text and screen shot.
	• Test button: Select a recipient and click the test button to send a test email.
	
	Note: Make sure nothing is blocking port 25, such as virus software. You must remove or disable blocking on that port for email to work.

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 local disk. This MIB file can be loaded directly into an NMS.
Band Power	Shows submenus 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	Shows submenu for the default *Presence of a Carrier* analysis: • Delta Power: Edit the default delta power in dB.

3.3 Cross Polarity Mode

SpectrumVue-2 can enable cross polarity mode (**CrossPol Mode)**, where the unit shows the spectrum from both inputs simultaneously. In the example, the green trace **Switch Port** is configured as **1 - port1** and the orange trace **CrossPol Switch Port** is configured as **7 - port7**. The input port names default to **port1** or **port2**. These names can be changed through the WCM **Port Names** tab. CrossPol markers show the delta power between the two traces.
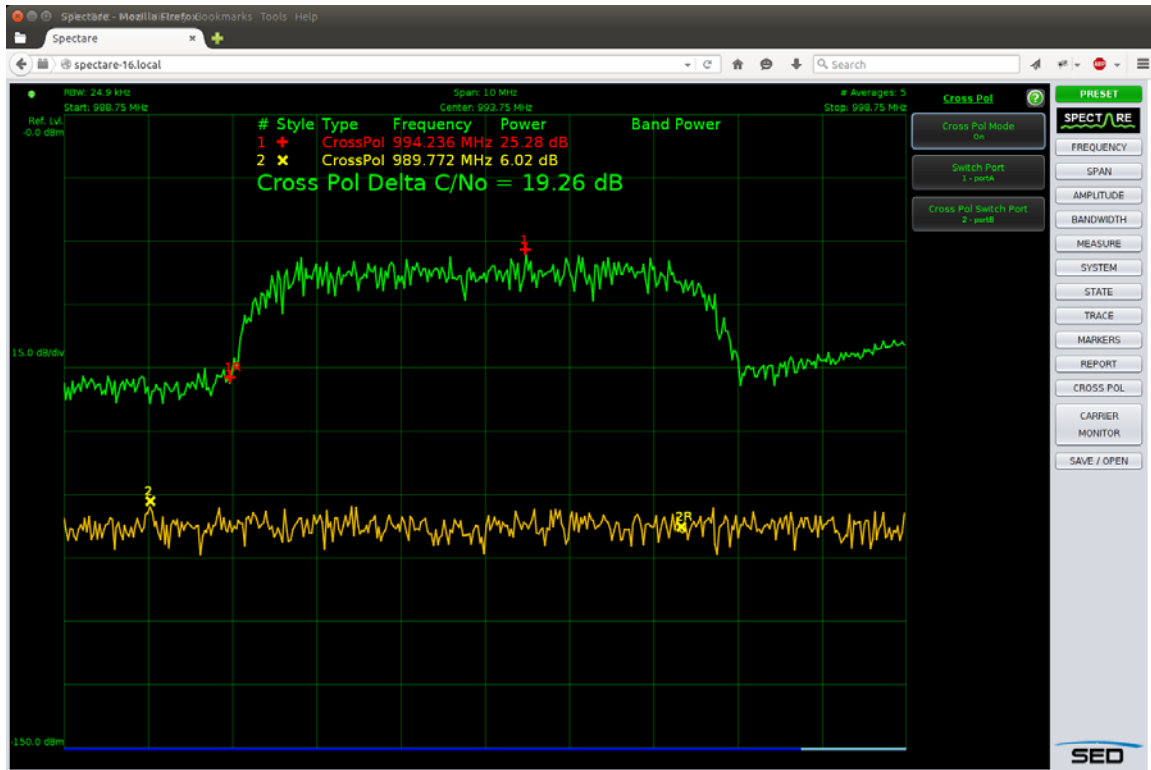
Figure 3-4 SpectrumVue-2 GUI Cross Polarity Mode

3.4 Measurement Time

If the estimated measurement time is more than the current **Connection Timeout** setting in the **System** menu, then a dialog box shows:
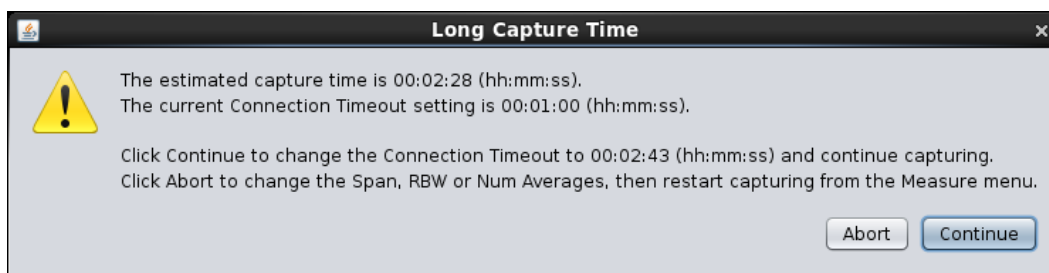
Figure 3-5 Long Capture Time dialog

Click **Abort** to cancel the measurement if it is going to be too long, or click **Continue** to go ahead with the measurement. Via the **System** menu, you can change the **Connection Timeout** back at any time to a shorter value if desired (i.e., changing **Connection Timeout** during a long measurement will not affect that measurement).

The formula to estimate the time needed for a given capture is:

$Time$ = 1.10 * $Averages$ * (250 + (0.80 * $Span$ / RBW) + (1000 * $Span$ / RBW^2)) / 1000

Simplified calculation:

0.275 * $Averages$ * (1 + (0.0032 * $Span$ / RBW) + (4 * $Span$ / RBW^2))

Where:

- $Time$ is the time needed to complete the measurement, in seconds.
- $Averages$ is the number of averages setting.
- $Span$ is the span setting, in Hz.
- RBW is the resolution bandwidth setting, in Hz.

These examples show both practical and impractical measurement times:

#	Number of Averages	Span (Hz)	RBW (Hz)	Measurement Time (seconds)
1.	1	1,200,000,000 (max.)	400,000	2.92
2.	255 (max.)	1,200,000,000 (max.)	400,000	745.43 = 12.42 minutes
3.	1	1,200,000,000 (max.)	300 (min.)	18186.94 = 5.05 hours
4.	1	1,200,000,000 (max.)	10,000,000 (max.)	0.38
5.	255 (max.)	1,200,000,000 (max.)	10,000,000 (max.)	97.06 = 1.62 minutes
6.	255 (max.)	1,200,000,000 (max.)	300 (min.)	53.68 days (maximum)
7.	10	1,000,000 (min.)	1,000	22.55
8.	1	1,000,000 (min.)	300 (min.)	15.43
9.	10	600,000,000	10,000	596.75 = 9.95 minutes
10.	20	10,000,000	1000	401.50 = 6.69 minutes
11.	20	1,000,000	1000	45.10

NOTE: The measurement time will increase with multiple users.

3.5 Carrier Monitor

SpectrumVue-2 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 are raised when an alarm threshold is exceeded. To use the carrier monitor, a new measurement must be configured and then enabled.

3.5.1 New Measurement

The following figure shows the **New Measurement** window. You must give a unique name to each new measurement. Use the drop-down box to configure the options for **Analyses** and **Notifications**, or to see the options for **State.** The **State** options are not configurable through this menu.

Figure 3-6 SpectrumVue-2 GUI – New Measurement

After all of the options are configured, click **OK** in the corner of the **New Measurement** window. This causes the carrier monitor toolbar to show on the left side of the GUI.

3.5.2 Toolbar

The carrier monitor toolbar shows after one new measurement has been configured. Moving the mouse cursor over the toolbar widens it to make the measurement names visible. Figure 3-7 shows the GUI with three carrier monitor measurements configured. The selected carrier, **Carrier 1** from the measurement table, has up to 24 hours of results shown in the carrier window.
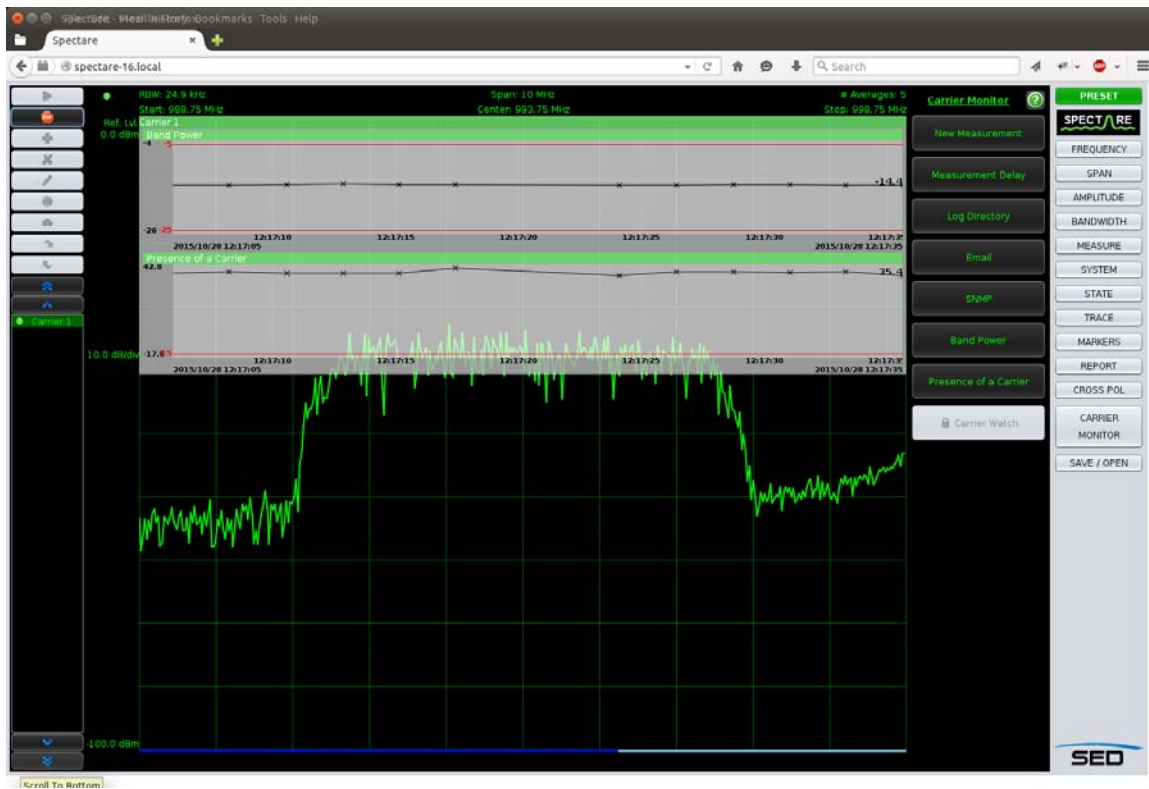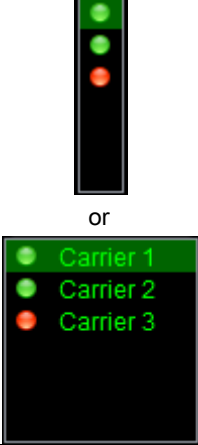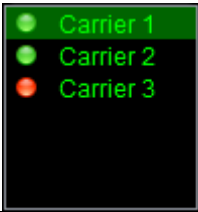
Figure 3-7 SpectrumVue-2 GUI Carrier Monitor

Each of the carrier monitor toolbar buttons are described in Table 3-14.

Table 3-14 Toolbar buttons

Button Name	Button Graphic	Description
Play		Start the carrier monitor, which will process the carrier monitor measurements sequentially. If a threshold is exceeded, the 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 unit state from the selected measurement.
Capture State		Capture the unit state to the selected measurement.
Move Measurement Down		Move the selected measurement down one.
Move Measurement Up		Move the selected measurement up one.

Button Name	Button Graphic	Description
Scroll to Top		Scroll to the top of the measurement table.
Scroll Up		Scroll up one.
Measurement Table	or	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 name is shown. LED: Gray: Unknown. Green: Success. Red: Failure.
Scroll Down		Scroll down one.
Scroll to Bottom		Scroll to the bottom of the measurement table.

3.5.3 Notifications

You can configure the carrier monitor to send SNMP or email notifications if a measurement threshold is exceeded. Both the master switch and the measurement notification control must be enabled for notifications to be generated.

The master switch is either carrier monitor email or SNMP.

To enable measurement notification control, select the measurement from the carrier monitor toolbar and click the **Edit** button. Select **Notifications** from the drop-down menu.

3.5.4 Command Line

After setting up the measurements for carrier monitoring in the previous section and testing them interactively, it can be beneficial to run the carrier monitoring not from within the Java applet, but from a command line task.

Do these steps:

1. Run the GUI to create a project file with all the measurements in it.
2. Test it by running in the browser interactively. Include things like measurement delay, trace analysis result logging, email notifications, SNMP configuration and all the measurements.

3. Save the project file to disk (e.g., *C:/myproject.xml*).

4. Get the **spectare-2.jar** file by searching for that file name in your browser's cache. Consult your browser documentation to find the directory and/or search your drive. Some browsers allow a **File/Save As** option to save the current page to disk, which will then save **spectare.jar** to the directory.

5. Shut down the GUI browser.

6. From the command line, run:

```
java
-java.util.logging.config.file=<FullPathToJavaLoggingPropertiesFile>
-cp spectare.jar com.sedsystems.decimator.CarrierMonitoring
-IpAddress <YourSpectareIpAddress>
-Port <YourPort> -ProjectFile <FullPathToYourProjectFile>
```

As an example:

```
java -java.util.logging.config.file=C:/spectare.properties -cp spectare.jar
com.sedsystems.decimator.CarrierMonitoring -IpAddress 192.168.10.1 -Port 9784
-ProjectFile C:/myproject.xml
```

7. A sample **spectare.properties** java logging file exists at the bottom of the Spectare Java applet help. Click **System | Help**.

Chapter 4. SNMP

SpectrumVue-2 supports monitoring of operational status through the SNMP interface. MIB definitions are available for translations of the OIDs to readable labels. The SNMP interface provides read-only data concerning the unit operations.

The MIB OID files are available from the HTTP interface of SpectrumVue-2. To get the files, enter the file name for each into the URL field of a browser, and then save the file for your SNMP tools. For example, to access the files using the default IP address, use these URLs:

- http://192.168.10.1/ENTITY-MIB.mib (device identification and version information)
- http://192.168.10.1/SPECTARE- MIB.mib (unit operational status)
- http://192.168.10.1/SEDSYSTEMS-MIB.mib

There is also a carrier monitor applet MIB available via **Carrier Monitor > SNMP > Show MIB**.

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Chapter 5. Technical Specifications

All specifications are at 25 °C unless otherwise noted, and are subject to change without notice.

Parameter	Specification
Measurements	
Power Accuracy	±3.0 dB
Frequency Accuracy	±100 ppm
Resolution Bandwidth	300 Hz to 10 MHz
Frequency Resolution	300 Hz
Averaging	255 averages maximum
Measurement Speed	1200 MHz span, 400 kHz RBW: 3.5 s maximum
RF Inputs	
Connectors	2 x 50 Ω female SMA connectors
Frequency Range	950 to 2150 MHz
Return Loss	-12 dB minimum
Power	-50 to +5 dBm +10 dBm maximum safe level
Port-to-Port Isolation	40 dB minimum
Noise Floor	-90 dBm/Hz typical
Monitor and Control	
Monitor & Control LAN	100 Base-T female RJ45 connector 100 Mbps TCP/IP API, GUI, SNMP
Front Panel LEDs	Power, Status
Rear Panel LEDs	LAN link and activity status
Physical	
Chassis	6.25" x 1.5" x 5.25" WxHxD (158.8 x 38.1 x 133.4 mm)
Weight	1.6 pounds (0.72 kg) 3.2 pounds (1.5 kg) shipping weight

Parameter	Specification
Power	5 VDC ±10%,1.5 A maximum Female micro-B USB connector North American AC power adapter included (120/240 VAC, 50/60 Hz nominal)
ECCN	(TBD)
Environmental	
Temperature	Operating: 10 to 50ºC. Storage: -20 to 60ºC.
Humidity	Operating: 20% to 85% noncondensing Storage: 10% to 95% noncondensing
EMI/EMC	BS EN 61326-1:2013 FCC Title 47, Part 15, Class A

Chapter 6. Maintenance

6.1 Cleaning

Clean the exterior of the chassis with a damp cloth ONLY. DO NOT USE ANY SOLVENTS.

6.2 Maintenance

There is no ongoing maintenance required for SpectrumVue-2.

6.3 Calibration

No calibration is required.

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