

- **Network ID:** Network ID allows for clusters of radios to operate in the same channel but remain independent. A radio with a given Network ID will only communicate with other radios with the same Network ID. The Network ID is limited to alphanumeric characters, spaces, and the special character '-'. Character limit is 32 characters.
- **Link Distance:** Set to an approximate maximum distance between any two nodes in meters, e.g., 5000 for 5km (default). It is important to set the link distance to allow enough time for packets to propagate over the air. Failing to set the link distance to an approximate maximum distance can result in over the air collisions and a degradation of performance. It is recommended to set the link distance 10-15% greater than the actual maximum distance. Please note that this value should be set the same on all radios in the network.
- **Total Transmit Power:** This defines the total power of the signal (power is divided equally between the radio antenna ports). There is also an option to 'Enable Max Power' which will allow the radio to push to the highest TX power it can support. This will be slightly different on each radio.
- **Routing Mode:** Please note radios on Legacy and Large Network will NOT interoperate. Large network routing was designed to allow networks with a higher node count. However, there are marginal benefits even if operating smaller networks.
- **Apply:** Apply the new values. Values will change back to the default setting after reboot.
- **Save and Apply:** Apply the new values and set the new values as the default.
- **Apply Network:** Apply the new values to all nodes currently on the network.
- **Save and apply network:** Apply the new values and set the new values as the default to all nodes currently on the network.

Modulation Modes and Receiver Sensitivity

- Note that listed sensitivity values were measured using a controlled and cabled setup. Actual results may vary by +/- 2dB. Table assumes link distance of 5000m. 10ms, 20ms, and 40ms burst time for 20, 10, and 5MHz bandwidth respectively. 1600 byte Fragmentation Threshold.
- * Modes supported under the AUTO MCS option.
- * Modes supported under the EXTENDED AUTO MCS option in addition to AUTO MCS modes.
- * Modes currently not supported

NSS	MCS	Coding Rate	PHY Throughput (Mbps)	UDP User Throughput (Mbps)	SC4400/3500/3800 Sensitivity	SC4200/3822 SL4200 Sensitivity
1	0	BPSK 1/2	0.41	0.27	-108	-105
1	1	QPSK 1/2	0.81	0.55	-106	-103
1	2	QPSK 3/4	1.22	0.82	-103	-100
1	3	16-QAM 1/2	1.63	1.10	-101	-98
1	4	16-QAM 3/4	2.44	1.65	-98	-95
1	5	64 QAM 2/3	3.25	2.20	-93	-90
1	6	64 QAM 3/4	3.66	2.47	-91	-88
1	7	64 QAM 5/6	4.06	2.75	-86	-83
2	8	BPSK 1/2	0.81	0.55	-106	-103
2	9	QPSK 1/2	1.63	1.10	-103	-100
2	10	QPSK 3/4	2.44	1.65	-100	-97
2	11	16-QAM 1/2	3.25	2.20	-97	-94
2	12	16-QAM 3/4	4.88	3.30	-94	-91
2	13	64 QAM 2/3	6.50	4.35	-90	-87
2	14	64 QAM 3/4	7.31	4.75	-88	-85
2	15	64 QAM 5/6	8.13	5.10	-83	-80

Table 22 MCS vs. Sensitivity Chart (1.25MHz Bandwidth)*

NSS	MCS	Coding Rate	PHY Throughput (Mbps)	UDP User Throughput (Mbps)	SC4400/3500/3800 Sensitivity	SC4200/3822 SL4200 Sensitivity
1	0	BPSK 1/2	0.81	0.55	-104.5	-101.5
1	1	QPSK 1/2	1.63	1.10	-102.5	-99.5
1	2	QPSK 3/4	2.44	1.65	-99.5	-96.5
1	3	16-QAM 1/2	3.25	2.20	-97.5	-94.5
1	4	16-QAM 3/4	4.88	3.30	-94.5	-91.5
1	5	64 QAM 2/3	6.50	4.40	-89.5	-86.5
1	6	64 QAM 3/4	7.31	4.95	-87.5	-84.5
1	7	64 QAM 5/6	8.13	5.5	-82.5	-79.5
2	8	BPSK 1/2	1.63	1.10	-102.5	-99.5
2	9	QPSK 1/2	3.25	2.20	-99.5	-96.5
2	10	QPSK 3/4	4.88	3.30	-96.5	-93.5
2	11	16-QAM 1/2	6.50	4.40	-94.5	-91.5
2	12	16-QAM 3/4	9.75	6.60	-90.5	-87.5
2	13	64 QAM 2/3	13.00	8.70	-86.5	-83.5
2	14	64 QAM 3/4	14.63	9.50	-84.5	-81.5
2	15	64 QAM 5/6	16.25	10.20	-79.5	-76.5

Table 23 MCS vs. Sensitivity Chart (2.5MHz Bandwidth)*

NSS	MCS	Coding Rate	PHY Throughput (Mbps)	UDP User Throughput (Mbps)	SC4400/3500/3800 Sensitivity	SC4200/3822 SL4200 Sensitivity
1	0	BPSK 1/2	1.63	1.03	-102	-99
1	1	QPSK 1/2	3.25	2.06	-100	-97
1	2	QPSK 3/4	4.88	3.09	-97	-94
1	3	16-QAM 1/2	6.50	4.12	-95	-92
1	4	16-QAM 3/4	9.75	6.18	-92	-89
1	5	64 QAM 2/3	13.00	8.25	-87	-84
1	6	64 QAM 3/4	14.63	9.28	-85	-82
1	7	64 QAM 5/6	16.25	10.30	-80	-77
2	8	BPSK 1/2	3.25	2.06	-100	-97
2	9	QPSK 1/2	6.50	4.12	-97	-94
2	10	QPSK 3/4	9.75	6.18	-94	-91
2	11	16-QAM 1/2	13.00	8.25	-91	-89
2	12	16-QAM 3/4	19.50	12.38	-88	-85
2	13	64 QAM 2/3	26.00	16.21	-84	-81
2	14	64 QAM 3/4	29.25	17.62	-82	-79
2	15	64 QAM 5/6	32.50	18.94	-77	-74

Table 24 MCS vs. Sensitivity Chart (5MHz Bandwidth)*

NSS	MCS	Coding Rate	PHY Throughput (Mbps)	UDP User Throughput (Mbps)	SC4400/3500/3800 Sensitivity	SC4200/3822 SL4200 Sensitivity
1	0	BPSK 1/2	3.25	2.48	-99	-96
1	1	QPSK 1/2	6.50	4.96	-97	-94
1	2	QPSK 3/4	9.75	7.40	-94	-91
1	3	16-QAM 1/2	13.00	9.90	-92	-89
1	4	16-QAM 3/4	19.50	14.80	-89	-86
1	5	64 QAM 2/3	26.00	19.90	-84	-82
1	6	64 QAM 3/4	29.25	22.40	-82	-80
1	7	64 QAM 5/6	32.5	24.0	-77	-78
2	8	BPSK 1/2	6.50	4.96	-97	-94
2	9	QPSK 1/2	13.00	9.90	-94	-91
2	10	QPSK 3/4	19.50	14.80	-91	-88
2	11	16-QAM 1/2	26.00	19.90	-89	-86
2	12	16-QAM 3/4	39.00	29.90	-85	-82
2	13	64 QAM 2/3	52.00	39.70	-81	-79
2	14	64 QAM 3/4	58.50	43.50	-79	-77
2	15	64 QAM 5/6	65.00	48.10	-74	-75

Table 25 MCS vs. Sensitivity Chart (10MHz Bandwidth)*

NSS	MCS	Coding Rate	PHY Throughput (Mbps)	UDP User Throughput (Mbps)	SC4400/3500/3800 Sensitivity	SC4200/3822 SL4200 Sensitivity
1	0	BPSK 1/2	6.5	4.92	-96	-93
1	1	QPSK 1/2	13.00	9.82	-94	-91
1	2	QPSK 3/4	19.50	14.73	-91	-88
1	3	16-QAM 1/2	26.00	19.65	-89	-86
1	4	16-QAM 3/4	39.00	29.47	-86	-83
1	5	64 QAM 2/3	52.00	39.29	-82	-79
1	6	64 QAM 3/4	58.50	44.20	-80	-77
1	7	64 QAM 5/6	65.00	47.45	-78	-75
2	8	BPSK 1/2	13.00	9.82	-94	-91
2	9	QPSK 1/2	26.00	19.65	-91	-88
2	10	QPSK 3/4	39.00	29.47	-88	-85
2	11	16-QAM 1/2	52.00	39.29	-86	-83
2	12	16-QAM 3/4	78.00	57.04	-82	-79
2	13	64 QAM 2/3	104.00	75.00	-79	-76
2	14	64 QAM 3/4	117.00	85.00	-77	-74
2	15	64 QAM 5/6	130.00	94.00	-75	-72

Table 26 MCS vs. Sensitivity Chart (20MHz Bandwidth)*

**Sensitivity numbers reflect “typical” values. Actual sensitivity will vary by band.*

5.2.2 Bidirectional Amplifier (not available on SL4200)

The BDA Support page is used to configure the radio to work with an external bi-directional amplifier. These settings

should be configured before connecting the amplifier to the radio.

- **BDA Mode:** You can enable or disable the BDA mode here.

Basic Settings:

BDA Gains for Channels 1-4: Enter the gain (dB) for the power amplifier connected to each channel of the radio. This is sometimes labeled as Tx gains.

- **LNA Gains for Channels 1-4:** Enter the gain (dB) for the LNA connected to each channel of the radio. This is sometimes labeled as Rx gains.
- **Maximum BDA Output Power Per Channel (dBm):** Enter the maximum output power for each PA. If the dBm is not listed, you should be able to calculate this from the Watt rating of the amp.
- **Apply:** Apply the new values but does not save them to flash.
- **Save and Apply:** Save the new values to flash and apply.

5.2.3 Serial/USB Setup

SILVUS
TECHNOLOGIES

Local Radio Configuration ▾
RF ▶
Networking ▶
Bidirectional Amplifier
Serial/USB Setup
PTT/Audio
Network Configuration ▶
Spectrum Dominance ▶
Security ▶
Tools and Diagnostics ▶
Configuration Profiles ▶

Serial/USB Setup ⓘ

Serial Port Mode RS-232

R5-232 Serial Port Settings

Baud Rate	115200	Data Bits	8
Parity	None (N)	Stop Bits	1
Software Flow Control	Disable	Transport Protocol	UDP
Peer IP	172.20.255.110	Peer Port	1234

Serial Port Setup (Native)

USB Port 1	Radio Host	USB Port 2	Host
Please reboot the radio if the USB cable type (Host/Client) * has changed.			

APPLY SAVE AND APPLY

IP: 172.20.100.72
VIP: Disabled
Node Label: node25672_100.72
Temperature: 41°C
Voltage: 12.00 V
Total Traffic: 85.296 Mbps
Night Mode:

Serial Port Setup:

Each StreamCaster is equipped with one user configurable serial port. A special power cable and null modem cable are required for access to the radio's serial port. A brief description of each parameter is given below.

- **Serial Port Mode:** The user can select one of four available modes for the serial port: *GPS*, *RS232*, *Debug*, and *Disabled*.

- **GPS:** In GPS mode, an external serial GPS module can be connected to and powered from the serial port of the radio. A *gpsd* service daemon running on the node will make the GPS information available to any user on the network from TCP/IP port 2947. For more information on *gpsd* please see: <http://catb.org/gpsd/>

In addition, GPS information can be pushed to the radio via the Ethernet or pulled by the radio from a remote device. If using a remote device to obtain GPS, set the GPS mode to remote, the GPS Server IP to the IP address of the remote device, and the Port. The radio will try to connect via TCP to server on local subnet. It will expect data in GPSc format. If GPS information is pushed to the radio via Ethernet, the radio will listen on specified port and expect GPS data as NMEA Formatted UDP packets.

- **RS-232:** The RS-232 mode provides a wireless serial connection between any two serial devices connected to StreamCaster radios on the network. In this mode, the user must configure the RS-232 protocol parameters shown in **Figure 39 Serial/USB Setup Page** above. The transport protocol for the serial data can be set as either TCP or UDP. For data that is sensitive to latency such as command and control data, UDP is recommended. For data that cannot tolerate any data loss, such as telemetry data, TCP is recommended.
 - The Peer IP should be the IP address of the radio on the other end of the RS-232 communication.
 - The Peer IP can be the native or virtual IP address but must be consistent at both ends.
 - Baud rate must match the baud rate of data being sent from the device.
 - Note – An additional 'null modem' cable may be needed at either end, depending upon whether connected device is acting as a terminal or as a control (DTE or DCE)
- **Debug:** The debug mode is used to gain terminal access to the StreamCaster radio and is available for debug or interface purposes (API commands). The user's terminal client should be set to a baud rate of 115200 for console access to the radio.
- **Disabled:** This mode completely disables the serial terminal of the radio.

- **Serial Server:** This will have the same parameter inputs as the RS-232, but will not have a peer IP or transport protocol. This is because you are not trying to connect to just one peer IP. The transport protocol is automatically configured for TCP. On the client side of this connection, ethernet will be used and so the serial port is not configured. It is recommended to configure the serial port as GPS or disabled.
- **Apply:** Apply the new values but does not save them to flash.
- **Save and Apply:** Save the new values to flash and apply.

USB Status (3822/4200/4400):

The USB port on the 3822/4200/4400 can auto-detect whether the connected device is a USB host or client device. The USB cable should not be unplugged while the radio is running.

5.2.4 PTT (push-to-talk) (not available on SL4200)

The screenshot shows the 'Push-to-Talk (PTT) & Audio' configuration page in the Silvus StreamCaster MIMO Radio web interface. The interface is dark-themed with a sidebar on the left containing navigation links: Local Radio Configuration, RF, Networking, Bidirectional Amplifier, Serial/USB Setup, PTT/Audio (highlighted), Network Configuration, Spectrum Dominance, Security, Tools and Diagnostics, Configuration Profiles, and Misc Settings. The main content area is titled 'Push-to-Talk (PTT) & Audio' and includes a 'PTT Status' toggle switch set to 'On'. Below this is a 'Push-to-Talk Voice Groups' section with 16 individual PTT Group settings (PTT Group 1 to PTT Group 16). Each group has a text input field and a status indicator (Active or Inactive). PTT Group 1 is set to '239.0.0.190' and 'Active1', while all other groups are 'Inactive'. The 'PTT/Audio Settings' section includes controls for Mic Type (CONDENSER), Audio Encoder Type (Variable Rate Codec), Audio Codec Rate (30 kbps), Mic Volume (80), Speaker Volume (80), Beep Volume (100), PTT Aggregation Delay (180 ms), and Dual PTT/COS (Disable). A warning message states: 'When PTT button is pressed during an incoming call, a warning beep will be played. This will control the volume of the Beep as a percent (%) of the speaker volume above. Pressing the PTT button thrice within 1s will override the incoming call.' The 'PTT HQ Link Notifications' section shows a link ID of 'node25605_10149', a refresh button, and a slider for SNR Levels (set to 3). Other settings include Notification Volume (100) and a checkbox for 'Repeat notifications when no link to HQ' (unchecked). At the bottom are 'APPLY' and 'SAVE AND APPLY' buttons. The right sidebar displays system information: IP: 172.20.122.95, VIP: Disabled, Node Label: Conference Room, Temperature: 38°C, Voltage: 11.80 V, and Night Mode (checked).

The PTT page can be used to configure talk groups (Multicast Groups) and speaker/mic settings for PTT enabled radios. Radios will only communicate with other radios that are subscribed to the same 'Multicast

Group'. Radios can be active in multiple talk groups. PTT will always send its multicast traffic using MANET Multicast method. PTT traffic will use port 1234.

Multicast Group – Input the IP address of the multicast group. Radios will only communicate to radios within the same group. There are three different modes to select which dictate how a radio behaves within a group:

- **Active:** Radio may send and receive PTT audio on this group.
- **Inactive:** Group is disabled, no PTT audio will be sent or received.
- **Monitor:** Radio may listen to PTT audio from other users on this group, but may not talk.

Mic Type – Supported MIC types are Moving Coil or Condenser. The input amplification is adjusted based on the Mic Type chosen on this page

Mic Bias Voltage – Options are 90% (3V) or 65% (2.15V).

Audio Encoder Type – Default option is 'Variable Rate Code (OPUS)'. 'G.722 (high quality)' and 'G.711' are also supported for backwards compatibility

Speaker Volume – Moving slider adjusts the gain on the speaker

Mic Volume – Moving slider adjusts the gain on the microphone

Beep Volume + PTT Override – When the PTT button is pressed while another user is speaking, a warning beep will be played. This setting controls the volume of the Beep as a percent (%) of the speaker volume above. Pressing the PTT button three times (and holding on the third) within 1s will allow a user to override the channel and speak.

PTT Aggregation Delay – Lower values will have lower latency and higher values will have higher efficiency. Measured in milliseconds.

Dual PTT/COS – This allows Dual PTT functionality for some mic handsets to talk on two talk groups at the same time. COS is to allow ROIP functionality.

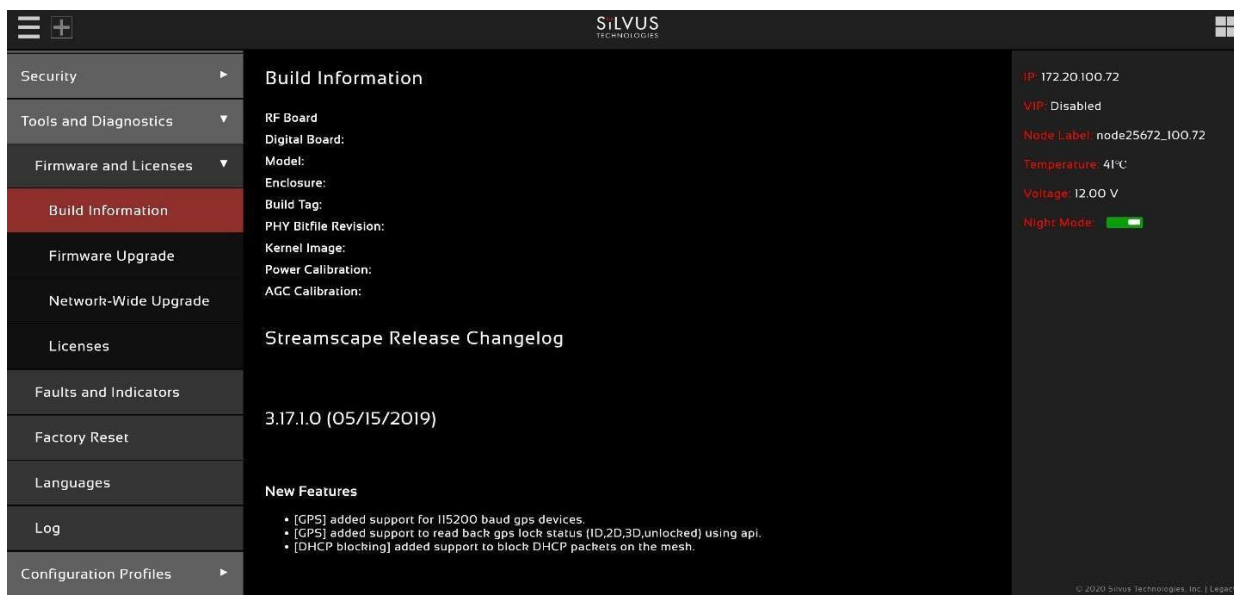
PTT HQ Link Notifications – When the PTT button is pressed twice within 1s, an audio notification will read out the SNR level to the user-specified HQ node. If the level transitions option is enabled, the notification will be played automatically when the SNR crosses the specified thresholds. The SNR thresholds can be set by first choosing the number of levels desired, and then moving the sliders accordingly.

5.3 Tools and Diagnostics

In this section, you will find the sections of the GUI that will provide you with details about the firmware version of the radio. You will also have the option to upload new firmware, as well as access some faults/indicators, factory reset, change languages, and a log tracking some security access to the radio.

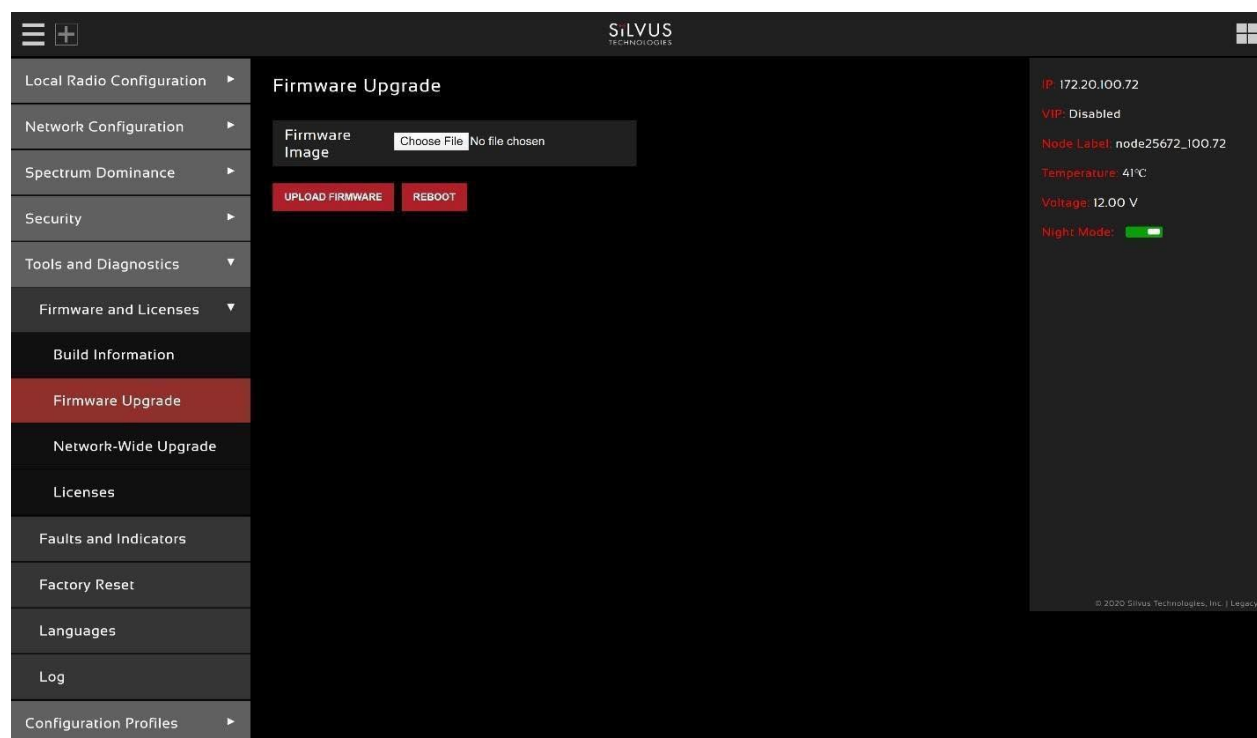
5.3.1 Firmware and Licenses

5.3.1.1 Build Information



The 'Build Information' page provides information about the hardware and firmware loaded onto the radio, as well as the changelog of the currently loaded and past firmware revisions. The current firmware version loaded on the radio will be listed under Build Tag line on this page.

5.3.1.2 Firmware Upgrade

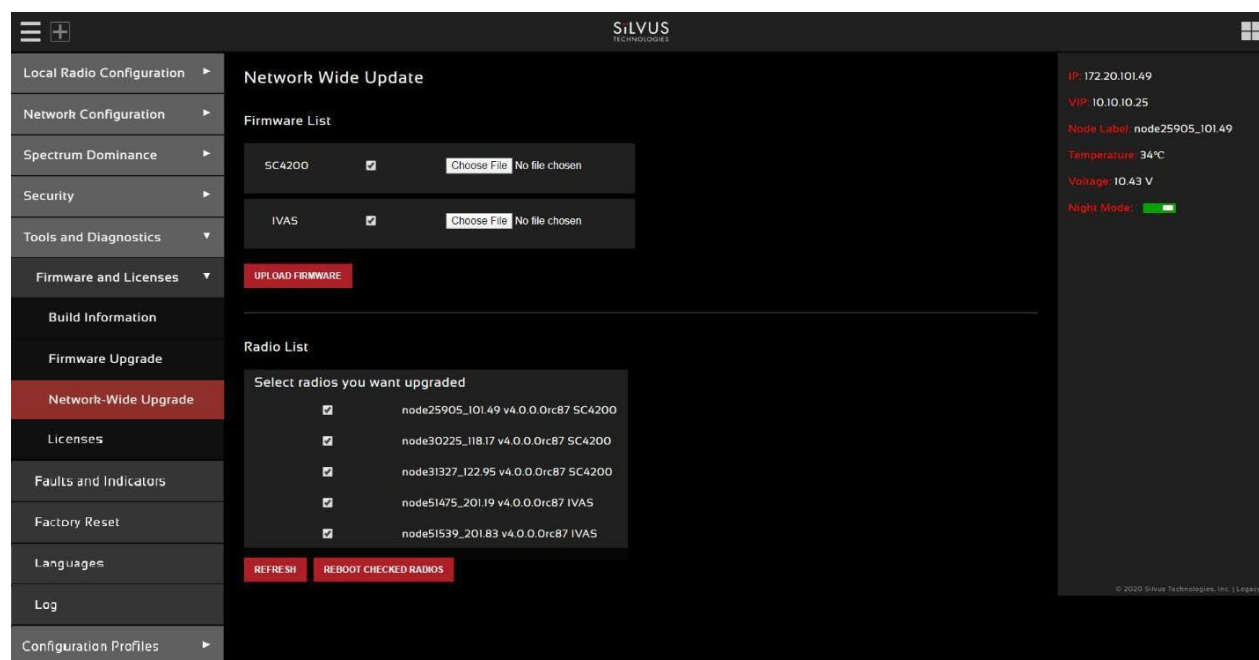


The firmware can be upgraded by simply choosing the upgrade image from your desktop and uploading it to the radio. This field can be used to upgrade the radio root file system, linux kernel, or uboot.

In firmware version 4.0.3.10 the user manual was removed from the GUI. In firmware version 4.0.3.14 it has been made an option to reload the user manual back into the radio via the firmware upgrade page. Load the user manual image into the firmware image file selector and click upload firmware. This will load the user manual back into the radio.

5.3.1.3 Network-Wide Upgrade

Starting with firmware version 3.12.6.8, multiple radios within the same network can be upgraded all at once. Users can simply choose the appropriate firmware file for the corresponding radio models to apply the upgrade to all the



radios in the network. Currently, this feature is not available in HTTPS mode.

Radio Login Authentication

Select radios in the unauthenticated list below that have been configured with the same login password, enter password, and click "Submit". Continue until all radios have been authenticated.

Enter Password

SUBMIT

Unauthenticated Radios

☐ Select all
☐ 172.20.101.49

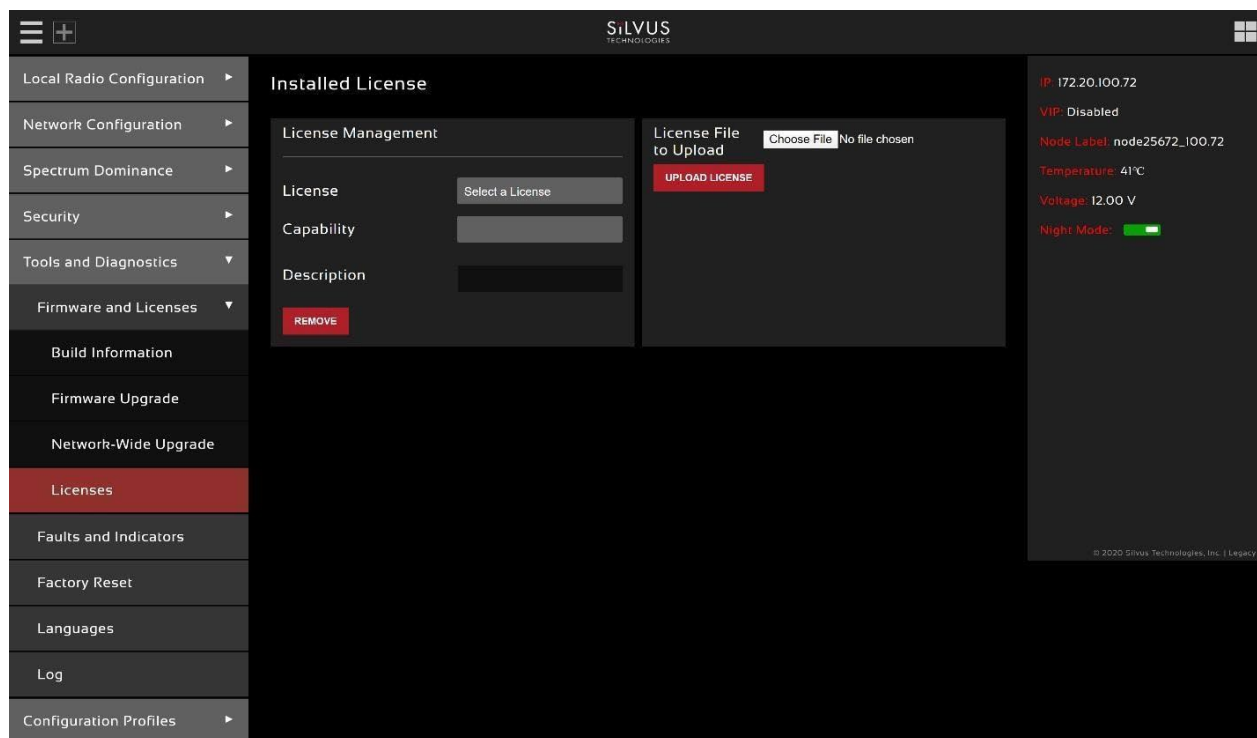
Authenticated Radios

172.20.118.17
172.20.122.95
172.20.201.19
172.20.201.83

If you attempt a network wide update, and the login authentication is enabled on some radios, you will need to enter the radio's login authentication password in order to proceed. The window asking for the password can be seen on **Figure 85 Radio Login Authentication during Network-Wide Upgrade** above.

5.3.1.4 Licenses

Features such as encryption levels and frequency ranges can be enabled by licenses obtained from Silvus. New license keys can be uploaded to the radio on this page. Upload license button will load the license selected to the local radio only. The broadcast license button will load licenses to all radios on the network. Please note that the license files are targeted on an IP specific basis, so the license you use with this feature must incorporate all IP radios



in the mesh. If there is a radio without the IP in that license, the upload will fail for that particular radio only.

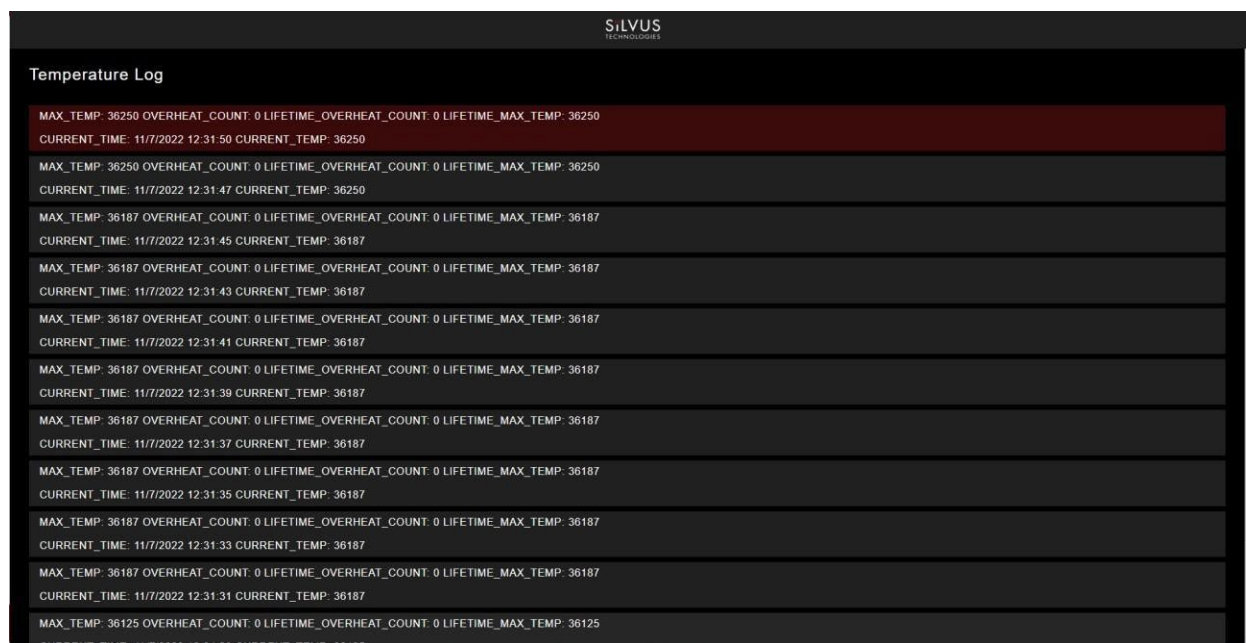
5.3.2 Faults and Indicators

The screenshot displays the 'Faults and Indicators' configuration page in the Silvus StreamCaster MIMO Radio Basic User Manual. The page is organized into several sections, each with its own set of configuration options.

- Temperature Reporting Configuration:** This section includes fields for 'Reporting Mode' (set to 'Disable reporting'), 'Reporting IP' (10.1.1.3), 'Reporting Port' (30000), 'Reporting Period (s)' (5), 'Min. Threshold (C)' (75), and 'Max. Threshold (C)' (85). There is also a 'Node Temperature Log' section with a 'VIEW LOG' button.
- RSSI Reporting Configuration:** This section includes a 'Reporting' checkbox (checked), 'Reporting IP' (10.1.1.4), 'Reporting Port' (30000), and 'Reporting Period (ms)' (10).
- LED Configuration:** This section includes a 'Status Reporting' checkbox (checked) and a 'Brightness Control' slider (set to 'Low').
- Voltage Monitor:** This section includes a 'Reporting Mode' dropdown (set to 'Disable'), 'Reporting IP', 'Reporting Port', 'Reporting Period (s)', 'Min. Threshold (V)', and 'Max. Threshold (V)'. The current voltage is displayed as 'Voltage: 202 mV'.
- Broadcast Discovery:** This section includes a 'Discovery' checkbox (checked), 'Reporting Interval (ms)', 'Destination IP', 'Source Port', 'Destination Port', and 'Destination MAC Address'.

At the bottom of the page, there are three buttons: 'APPLY', 'SAVE AND APPLY', and 'DOWNLOAD INFO'. The right sidebar shows real-time status information, including IP (172.20.11.22), VIP (IPv4) Disabled, VIP (IPv6) Disabled, Node Label (node2838_11.22), Temperature (41°C), Voltage (12.00 V), GPS Mode (Unlocked), GPS Coordinates (38.13562516339005, -77.30518992521), Night Mode (checked), and Scrollbars (checked).

The Faults and Indicators page allows the user to specify an IP and Port number for Temperature and RSSI (Receiver Signal Strength Indication) reports to be delivered to. This is useful for users that intend to feed this information into some other platform for analysis and recording. Section 9 gives more information on the format of streaming reports. You can also click on the node temperature log to open another window that shows the current output of what the temperature report would output. See below **Figure 88 Temperature log example**.



MAX_TEMP	OVERHEAT_COUNT	LIFETIME_OVERHEAT_COUNT	LIFETIME_MAX_TEMP	CURRENT_TIME	CURRENT_TEMP
36250	0	0	36250	11/7/2022 12:31:50	36250
36250	0	0	36250	11/7/2022 12:31:47	36250
36187	0	0	36187	11/7/2022 12:31:45	36187
36187	0	0	36187	11/7/2022 12:31:43	36187
36187	0	0	36187	11/7/2022 12:31:41	36187
36187	0	0	36187	11/7/2022 12:31:39	36187
36187	0	0	36187	11/7/2022 12:31:37	36187
36187	0	0	36187	11/7/2022 12:31:35	36187
36187	0	0	36187	11/7/2022 12:31:33	36187
36187	0	0	36187	11/7/2022 12:31:31	36187
36125	0	0	36125	11/7/2022 12:31:29	36125

Figure 42 Temperature log example

Temperature Thresholds

In addition to receiving temperature reports, this page can be used to set minimum and maximum temperature thresholds for the radio. The StreamCaster™ family of radios is equipped with on board temperature sensors which are monitored to prevent overheating. Once a radio reaches the maximum temperature threshold, the radio will begin to reduce its transmission time until the temperature falls below the minimum temperature threshold. By default, the min and max values are 75C and 85C respectively.

RSSI Reporting Configuration

This setting allows the users to report the RSSI values every few milliseconds base on users setting.

LED Configuration

This setting allows the user to disable or enable the LED on the faceplate of the radio. Also has a slide bar to control LED brightness level.

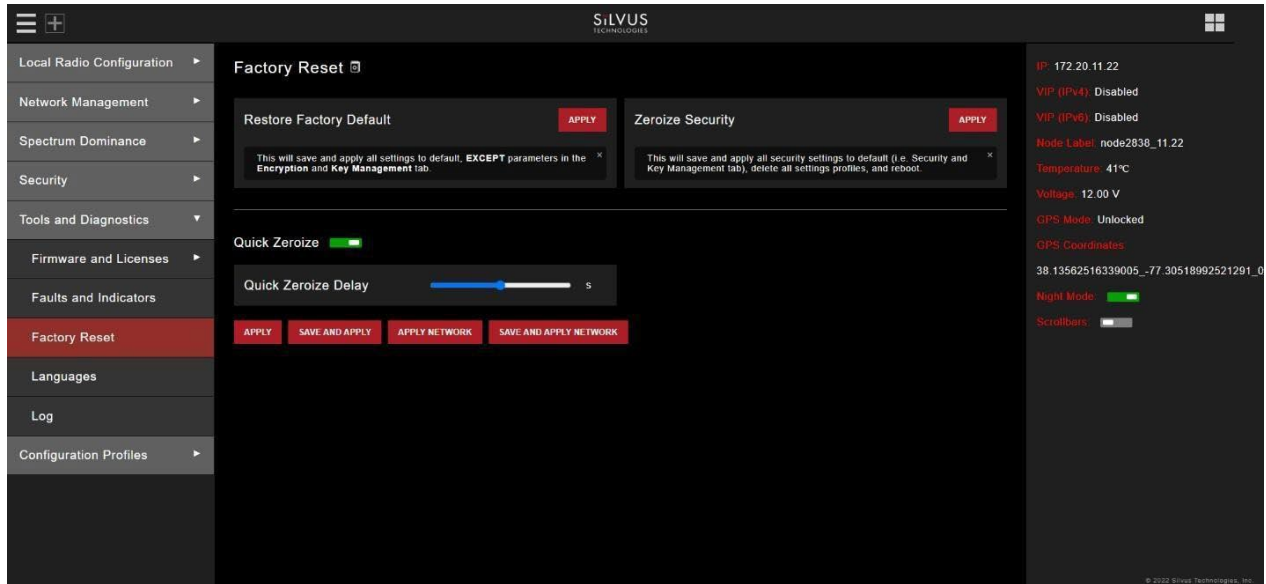
Voltage Monitor

Radios built on or after Jan 1, 2015 have the ability to monitor the input voltage, displayed here.

Broadcast Discovery

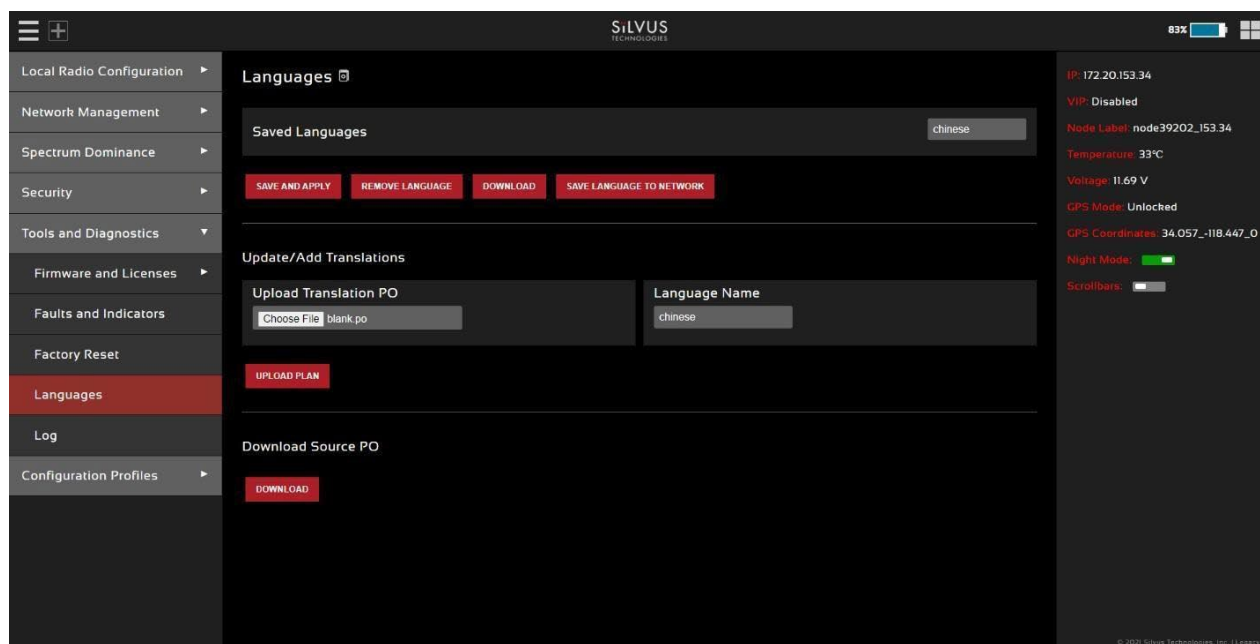
This feature is used to send radio information packets periodically to a server. Information sent will include the node ID, virtual IP address, frequency, and bandwidth of the radio.

5.3.3 Factory Reset

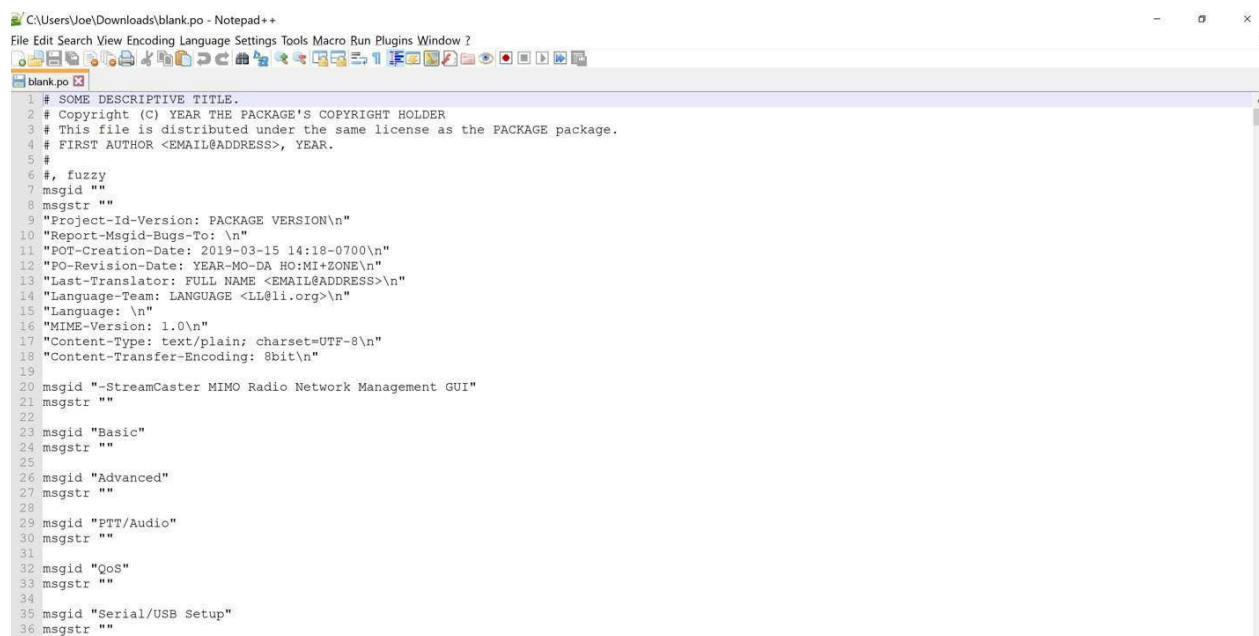


- **Restore Factory Default:** Restores all settings to default except those related to security (such as login passwords, encryption keys, FIPS mode, etc.). This is useful if the user changed some advanced settings and now they don't know how to get to the defaults.
- **Zeroize Security:** This will set login passwords and all security keys to their defaults. This includes the Encryption Key, SSH Login Key, SSH Host Key, HTTPS Certificate, and Encryption Key Volatile. It will also erase all settings profiles. Also, if FIPS mode is off, it will turn off HTTPS and login mode. The current FIPS mode will not be changed. Zeroize will require a reboot in order to ensure all settings are zeroized. If zeroize was initiated through the GUI, the radio will automatically reboot.
- **Quick Zeroize:** When enabled, the radio zeroize process will commence after the zeroize delay when the multi-position switch is turned to the "Z" position. When disabled the radio multi-position switch must be turned from the off position to "Z" during the boot sequence to initialize zeroize. The quick zeroize delay will wait to trigger the zeroize for the specified time.

5.3.4 Languages



In this tab you will be able to edit and update the GUI into any language you choose. To do this, you would download the Source PO File as per the button on the bottom of this page. Once you have the source PO file, you can open it to edit in any plain text editor, however it may be easier to read in Notepad++.



```

1 # SOME DESCRIPTIVE TITLE.
2 # Copyright (C) YEAR THE PACKAGE'S COPYRIGHT HOLDER
3 # This file is distributed under the same license as the PACKAGE package.
4 # FIRST AUTHOR <EMAIL@ADDRESS>, YEAR.
5 #
6 #, fuzzy
7 msgid ""
8 msgstr ""
9 "Project-Id-Version: PACKAGE VERSION\n"
10 "Report-Msgid-Bugs-To: \n"
11 "POT-Creation-Date: 2019-03-15 14:18-0700\n"
12 "PO-Revision-Date: YEAR-MO-DA HO:MI+ZONE\n"
13 "Last-Translator: FULL NAME <EMAIL@ADDRESS>\n"
14 "Language-Team: LANGUAGE <LL@li.org>\n"
15 "Language: \n"
16 "MIME-Version: 1.0\n"
17 "Content-Type: text/plain; charset=UTF-8\n"
18 "Content-Transfer-Encoding: 8bit\n"
19
20 msgid "-StreamCaster MIMO Radio Network Management GUI"
21 msgstr ""
22
23 msgid "Basic"
24 msgstr ""
25
26 msgid "Advanced"
27 msgstr ""
28
29 msgid "PTT/Audio"
30 msgstr ""
31
32 msgid "QoS"
33 msgstr ""
34
35 msgid "Serial/USB Setup"
36 msgstr ""

```

Figure 45 Example Source PO file for custom languages

To create a language profile in another language other than English, please follow below steps:

1. Enter the translated words from msgid into the msgstr"" after the original word or phrase.
2. Save the revised source PO file
3. Enter the language you have translated the words for into the field labeled Language Name.
4. Click on choose file and select the source PO file that you revised and saved.
5. Click on upload plan.
6. After the plan has been uploaded, you should be able to select which language plan you would like to use under the drop-down menu of saved languages.
7. Select the language you would like viewed in the GUI, click save and apply.

To remove a previously saved language, please see below steps:

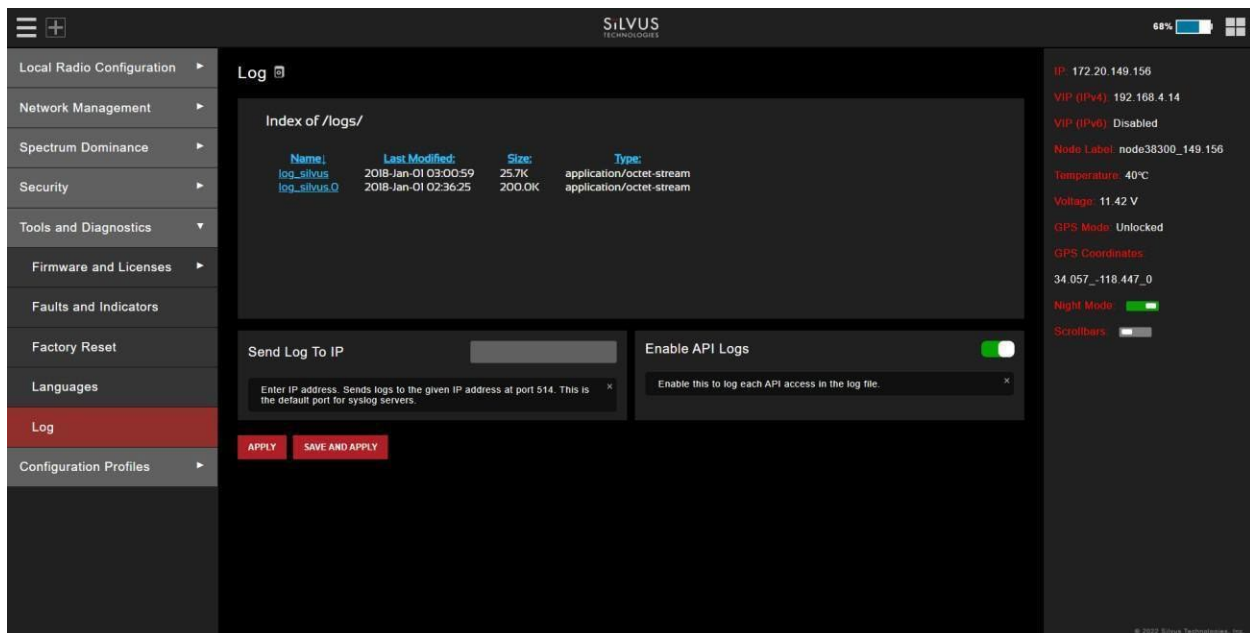
1. select the language that you want to remove from the drop-down menu of saved languages.
2. Click on remove language button to remove the selected saved language. That saved language will no longer be an option for you to view.

In order to download a previously loaded language file, see below steps:

1. Select the language file from the drop-down menu of saved languages.
2. Click on the download button. You will download the source PO file that is associated with the language you selected under saved languages.

When a new firmware edition for the Silvus radio is released, there may be new texts that will require updated language translation. In order to update the po file in a new firmware edition you would need to download the old translated file, then the new blank po file from the new firmware edition. The new appended entries should be seen at the bottom of the new po file. Copy paste these new entries to your translated file (append), and translate new entries.

5.3.5 Log



The log tab tracks some security events that happen within the radio. Below is a list of events that the log keeps track of:

- Successful/unsuccessful login attempts when login authentication is turned on.
- Visits to the license tab (shown as secureinterface6.sh), upgrade tab (secureinterface3.sh) and encryption tab.

- Enable API log to include a detailed log of API access.

You can enter an ip address in the "Send Log to" text box. This will send the logs to that ip at port 514. It is compatible with Syslog servers.

Example of the log can be seen below.

```

1 Jan 1 00:01:05 lighttpd[1108]: 127.0.0.1 "Login Attempt" 200 56 127.0.0.1 http Success Login
2 Jan 1 00:43:18 lighttpd[1108]: 172.20.254.245 "GET /js/encryption.js?_1560791360722 HTTP/1.1" 200 31830 172.20.101.54 http
3 Jan 1 00:01:35 lighttpd[1112]: 172.20.20.20 "GET /js/encryption.js?_1564508679735 HTTP/1.1" 200 31830 172.20.101.54 http
4 Jan 1 00:01:37 lighttpd[1112]: 172.20.20.20 "GET /cgi-bin/secureinterface6.sh HTTP/1.1" 200 10186 172.20.101.54 http
5 Jan 1 00:01:41 lighttpd[1112]: 172.20.20.20 "GET /cgi-bin/secureinterface6.sh?license_file_select=2&capability=0&remove_license=Remove HTTP/1.1" 200 10246
6 Jan 1 00:01:42 lighttpd[1112]: 172.20.20.20 "GET /cgi-bin/secureinterface6.sh HTTP/1.1" 200 9076 172.20.101.54 http
7 Jan 1 00:42:08 lighttpd[1116]: 172.20.101.54 "Login Attempt" 200 100 172.20.101.54 http Fail Login
8 Jan 1 00:43:46 lighttpd[1116]: 127.0.0.1 "Login Attempt" 200 100 localhost http Fail Login
9 Jan 1 00:28:36 lighttpd[1133]: 172.20.12.3 "GET /js/encryption.js?_1564518887541 HTTP/1.1" 200 31847 172.20.101.54 http
10 Jan 1 00:29:09 lighttpd[1133]: 172.20.12.3 "GET /cgi-bin/secureinterface3.sh HTTP/1.1" 200 3042 172.20.101.54 http
11 Jan 1 00:29:23 lighttpd[1133]: 172.20.12.3 "GET /cgi-bin/secureinterface6.sh HTTP/1.1" 200 9100 172.20.101.54 http
12 Jan 1 00:42:21 lighttpd[1133]: 172.20.12.3 "GET /js/admin.js?_1564519712566 HTTP/1.1" 200 7978 172.20.101.54 http
13 Jan 1 00:42:45 lighttpd[1133]: 172.20.12.3 "GET /js/encryption.js?_1564519736909 HTTP/1.1" 200 31847 172.20.101.54 http
14 Jan 1 00:08:16 lighttpd[1126]: 172.20.12.12 "GET /js/encryption.js?_1564682536671 HTTP/1.1" 200 31847 172.20.101.54 http
15 Jan 1 00:10:49 lighttpd[1126]: 172.20.12.12 "GET /cgi-bin/secureinterface6.sh HTTP/1.1" 200 9100 172.20.101.54 http
16 Jan 1 00:18:31 lighttpd[1126]: 172.20.12.12 "GET /js/encryption.js?_1564683152177 HTTP/1.1" 200 31847 172.20.101.54 http
17 Jan 1 00:19:22 lighttpd[1126]: 172.20.12.12 "GET /js/encryption.js?_1564683203086 HTTP/1.1" 200 31847 172.20.101.54 http
18 Jan 1 00:30:27 lighttpd[1126]: 172.20.12.12 "GET /js/encryption.js?_1564683867601 HTTP/1.1" 200 31847 172.20.101.54 http
19 Jan 1 00:39:55 lighttpd[1126]: 172.20.12.12 "GET /js/encryption.js?_1564684435262 HTTP/1.1" 200 31847 172.20.101.54 http
20 Jan 1 02:12:57 lighttpd[1126]: 172.20.12.12 "GET /js/encryption.js?_1564690017639 HTTP/1.1" 200 31847 172.20.101.54 http
21 Jan 1 02:13:26 lighttpd[1126]: 172.20.12.12 "GET /js/encryption.js?_1564690046246 HTTP/1.1" 200 31847 172.20.101.54 http
22 Jan 1 02:13:37 lighttpd[1126]: 172.20.12.12 "GET /js/encryption.js?_1564690058110 HTTP/1.1" 200 31847 172.20.101.54 http
23 Jan 1 02:13:49 lighttpd[1126]: 172.20.12.12 "GET /js/encryption.js?_1564690069281 HTTP/1.1" 200 31847 172.20.101.54 http
24 Jan 1 02:14:34 lighttpd[1126]: 172.20.12.12 "GET /js/encryption.js?_1564690115019 HTTP/1.1" 200 31847 172.20.101.54 http
25 Jan 1 02:33:12 lighttpd[1126]: 172.20.12.12 "GET /js/encryption.js?_1564691233087 HTTP/1.1" 200 31847 172.20.101.54 http
26 Jan 1 02:34:45 lighttpd[1126]: 172.20.12.12 "GET /js/encryption.js?_1564691325288 HTTP/1.1" 200 31847 172.20.101.54 http
27 Jan 1 02:34:57 lighttpd[1126]: 172.20.12.12 "GET /js/encryption.js?_1564691338099 HTTP/1.1" 200 31847 172.20.101.54 http
28 Jan 1 02:58:16 lighttpd[1126]: 172.20.12.12 "GET /js/encryption.js?_1564692736617 HTTP/1.1" 200 31847 172.20.101.54 http
  
```

The first data listed in the log is the date and time that the occurrence happened. You can manually input the date and time of the radio under the Network Manager>Map Overlay tab under CoT feature. However, upon a reboot, the time will no longer be accurate.

Please disregard the lighttpd [xxxx] as this will be likely removed in updated firmware versions. The format of the details listed in the log after lighttpd [xxxx] is as follows:

"a b c d e http/https"

a = IP address of remote host

b = HTTP request-line

c = HTTP status code

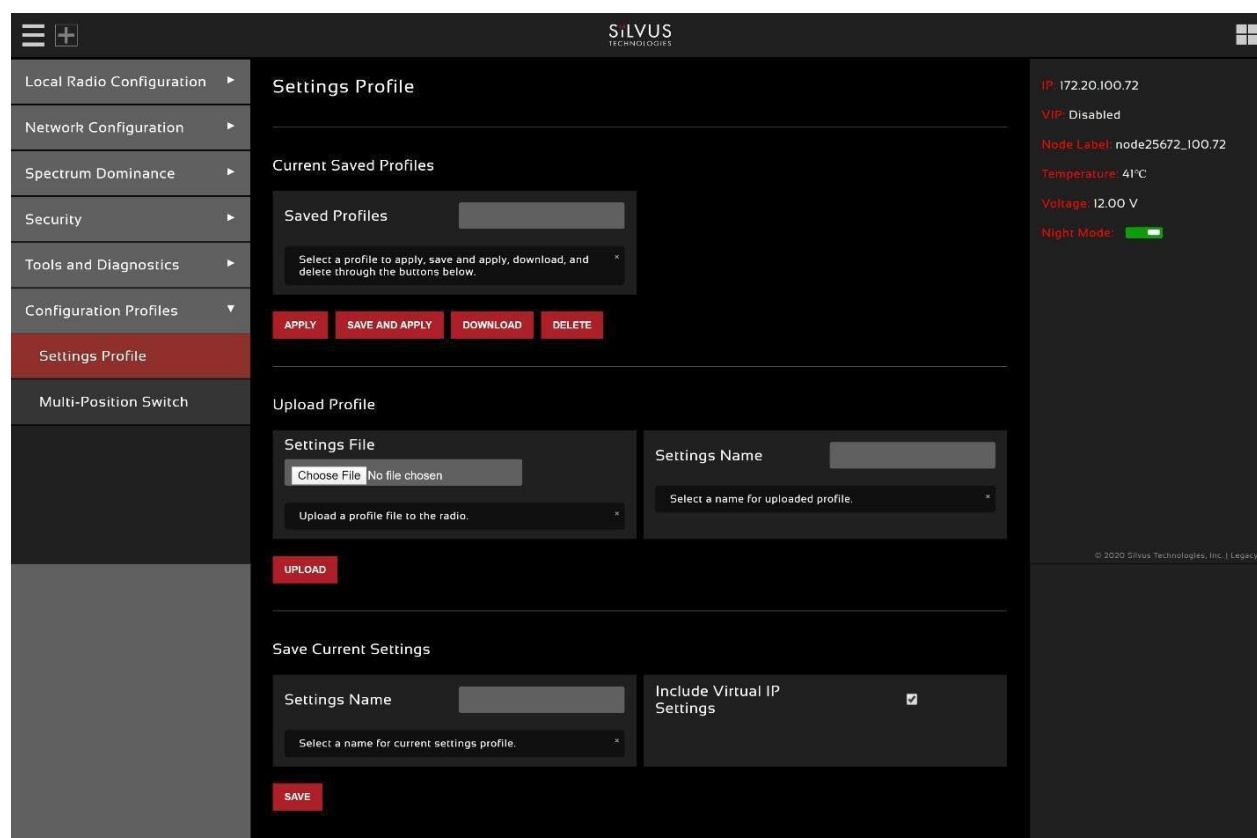
d = bytes sent for the body

e = HTTP request host name

5.4 Configuration Profiles

Under the configuration profiles section you will be able to configure profile settings for the radio, and save them to a file to distribute to other radios. You will also be able to customize the multi-position switch in this section.

5.4.1 Settings profile



Current Saved Profiles: Select a saved profile and apply the settings to use the selected profile. The profile stored can be downloaded or deleted.

- **Upload Profile:** Select a downloaded profile from the computer and upload to the radio as a saved profile.
- **Save Current Settings:** Store the current settings on to the radio for future access. Note that the FIPS mode setting is not saved in the profile. You must manually enable/disable it after applying the profile.

5.4.2 MPS (Multi-Position Switch) (not available on SL4200)

Multi-Position Switch

MPS ☒

Switch Configurations

	1	2	3	4	5	6	7	8	9	10	11	12	13
Fragmentation Threshold	800	1600	800	1600	800	1600	800	1600	800	1600	800	1600	800
Burst Time	9001	9002	9003	9004	9005	9006	9007	9008	9009	9010	9011	9012	9013
Frequency	2230	2230	2210	2230	2210	2230	2210	2230	2210	2230	2210	2230	2210
Bandwidth	5	10	5	10	5	10	5	10	5	10	5	10	5
Link Distance	5001	5002	5003	5004	5005	5006	5007	5008	5009	5010	5011	5012	5013
Training Symbols	2	1	2	1	2	1	2	1	2	1	2	1	2
Network ID	Skew1	Skew2	Skew3	Skew4	Skew5	Skew6	Skew7	Skew8	Skew9	Skew10	Skew11	Skew12	Skew13
Total Transmit Power	11	12	13	14	15	16	17	18	19	20	21	22	23
PTT Talk Group	238.0.0.101	238.0.0.102	238.0.0.103	238.0.0.104	238.0.0.105	238.0.0.106	238.0.0.107	238.0.0.108	238.0.0.109	238.0.0.200	238.0.0.201	238.0.0.202	238.0.0.203
PTT Speaker Volume	81	72	73	74	75	76	77	78	79	80	81	82	83
Radio Mode	0	0	0	0	0	0	0	0	0	0	0	0	0
Routing Beacon MCS	2	7	8	7	8	7	8	7	8	7	8	7	8
Routing Beacon Period	1001	1002	1003	1004	1005	1006	1007	1008	1009	1010	1011	1012	1013

APPLY SAVE AND APPLY

The Multi-Position Switch allows you to change various settings of the radio by using the new physical switch position, no web GUI required (This is not available on all radios).

You must first configure the settings you want to correspond with each switch position. Switch positions 1 through 13 are listed in a table with parameters listed that can be configured. To show more configuration parameters click the red boxed gear icon to the top right of the table. Configuration parameters will be shown as seen in below **Figure 96 additional configuration parameters for MPS**.



Available parameters that can be configured by the MPS include link distance, total transmit power, routing beacon period, fragmentation threshold, training symbols, burst time, routing beacon MCS, radio mode, frequency, bandwidth, network ID, PTT talk group, and PTT speaker volume. Position 1 will always be associated with the parameters originally saved in the radio. Once MPS parameters have been saved into the table, click save and apply to save the settings to the radio. MPS switch parameters will be checked once every second.

When the MPS switch is turned, the LED light on the radio will quickly flash green. This means the settings are being applied for this position. When the LED stops quickly flashing, the settings have been applied.

Any time settings are updated from the GUI without using the MPS page (i.e. Basic Tab, PTT/Audio Tab), position 1 will be updated with those results. The blue highlighted column shows the current position of the physical switch.

If the radio boots up in position “Z” (second to last position on the MPS), the radio will perform a physical MPS zeroize function. This action will reset all passwords, reset all settings in the Security tab to default, and will perform a factory reset on all other settings. After zeroize has been completed, a radio reboot will be required to ensure all settings are zeroized.

6. Streaming Response

Some users may be interested in streaming specific information from the radio e.g. RSSI, noise floor, temperature, etc. After enabling the response, they need using the above commands, the radio will transmit the desired information in the form of UDP packets to a specific IP address and port. The format of each report message will be in the type-length-value format as shown below:

TYPE LENGTH VALUE TYPE LENGTH VALUE ...

- TYPE and LENGTH will be 16-bit unsigned integers in network-endian format.
- TYPE indicates the kind of information being transmitted. Pre-defined types are listed later in this document.
- LENGTH indicates the length of the VALUE field in bytes, including the terminating null byte.
- VALUE will be ASCII-encoded text terminated with a null byte ('\0').
- A single report will comprise of a set of type-length-value fields beginning with a “begin” report type. It will have a type which is specific to the type of report being generated, length of 1 byte and a value of an empty string (""). Note the empty string is still null terminated.
- Each report will end with an end of report which has type 1 (type = end of report, length = 1, value = "").
- The empty string listed above has a NULL character and has length 1. Any length number in the streaming report includes the NULL character
- A UDP packet may contain more than one report.
- The UDP packets have a maximum size of 1400 bytes.

6.1 RSSI and Noise Floor Reporting

The type/length/value for RSSI and noise floor reporting are listed in the following table:

Report Type	Data Type	Information
5009	Empty string ""	Begin of RSSI report
5010	Float	Revision number for RSSI report
5011	String	172.20.xx.xx IP of radio
5012	String	Virtual IP of radio
5000	Integer	Raw signal power of first antenna, represented in full dBm steps.
5001	Integer	Raw signal power of second antenna represented in full dBm steps.
5002	Integer	Raw signal power of third antenna represented in full dBm steps.
5003	Integer	Raw signal power of fourth antenna represented in full dBm steps.
5004	Integer	Raw noise power represented in full dBm steps.
5005	32-bit integer	Sync signal power (from digital domain, see note below).
5006	32-bit integer	Sync noise power (from digital domain, see note below).
5007	16-bit integer	Node ID of the transmitter radio that triggered the receiver to send an RSSI report packet.
5008	32-bit integer	Report sequence number, increments for every report, resets after 9999.
1	Empty string ""	End of report.

Table 27 RSSI Reporting Format

Note:

The sync noise and power (types 5005, 5006) are special values obtained after packet processing in the digital domain. They cannot be directly compared to the raw signal and noise values. To obtain an SNR from these values the user needs to run the below formula on these values:

X = sync signal power;

Y = sync noise power;

$Z = (Y - X) / 51$

$SNR_mw = (X - 12 * Z) / (64 * Z)$

$SNR_db = 10 * \log(SNR_mw) / \log(10)$

SNR_db is the SNR in dB and it is averaged across all antennae.

The SNR obtained above is more accurate when the real SNR goes below 10 dB. Above 10 dB, the SNR obtained from the raw signal and noise values are more accurate.

Below is an example of the RSSI report:

Report Type	Length	Information
5009	1	""
5010	4	"1.0"
5008	5	"2333"
5000	5	"-43"
5001	5	"-31"
5002	5	"-28"
5003	5	"-66"
5004	5	"-190"
5005	8	"8604568"
5006	8	"8861322"
5007	5	"1025"
1	1	""

Table 28 Sample RSSI Report

The corresponding raw UDP dump in hexadecimal format is attached below. For the purpose of easier reading, each byte is separated by a space, and each item is separated by a new line. The real streaming report is continuous without any spaces or newlines and is currently 109 bytes long.

13 ffffff91 0 1 0

13 ffffff92 0 4 31 2e 30 0

13 ffffff90 0 5 32 33 33 33 0

13 ffffff88 0 5 20 2d 34 33 0

13 ffffff89 0 5 20 2d 33 31 0

13 ffffff8a 0 5 20 2d 32 38 0

13 ffffff8b 0 5 20 2d 36 36 0

13 ffffff8c 0 5 2d 31 39 30 0

13 ffffff8d 0 a 20 20 38 36 30 34 35 36 38 0

13 ffffff8e 0 a 20 20 38 38 36 31 33 32 32 0

13 ffffff8f 0 5 31 30 32 35 0

0 1 0 1 0

6.2 Temperature Reporting

The type, length and value for temperature reporting are listed in the following table:

Report Type	Data Type	Data
8	Empty string ""	Begin of temperature report.
9	Float	Revision number for temperature report.
2	Integer	Current Temperature on the radio.
3	Integer	Maximum Temperature reached on the radio after last booting.
4	Integer	Overheat Count: number of times the radio temperature has exceeded temp_reporting_max_threshold.
1	Empty string ""	End of report

Table 29 Temperature Reporting Format

6.3 Voltage Reporting

The type, length and value for voltage reporting are listed in the following table:

Report Type	Data Type	Data
4001	START REPORT	Indicates start of voltage monitoring report
1	END REPORT	Indicates end of report
4003	REVISION_REPORT	Indicates revision of this report, currently always "1.1"
4004	CUR_VOLTAGE_REPORT	Current voltage value as a floating point string
4005	MIN_VOLTAGE_REPORT	Minimum voltage seen so far, as a floating point string
4006	MAX_VOLTAGE_REPORT	Maximum voltage seen so far, as a floating point string
4007	UNDERVOLTAGE_COUNT_REPORT	Number of times voltage dropped below min threshold, as an integer string
4008	OVERVOLTAGE_COUNT_REPORT	Number of times voltage spiked above max threshold, as an integer string.

Table 30 Voltage Reporting Format

7. FCC Notice

7.1 Common Notes

7.1.1 FCC Final Product Certifications:

This equipment has been tested and found to comply with the limits for a class B digital device pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation. This equipment generates, uses and can radiate radio frequency energy and if not installed and used in accordance with the instructions, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:

- * Reorient or relocate the receiving antenna.
- * Increase the separation between the equipment and receiver.
- * Connect the equipment into an outlet on a circuit different from that to which the receiver is connected.
- * Consult the dealer or an experienced radio/TV technician for help.

In order to maintain compliance with FCC regulations, shielded cables must be used with this equipment. Operation with non-approved equipment or unshielded cables is likely to result in interference to radio and TV reception. The user is cautioned that changes and modifications made to the equipment without the approval of the manufacturer could void the user's authority to operate the equipment. To satisfy RF exposure requirements, this device and its antennas must operate with a separation distance of at least 20 cm from all persons and must not be co-located or operating in conjunction with any other antenna or transmitter.

7.1.2 FCC Modular Certifications (OEM):

User Manual (Customer end-product)

Any user documentation that accompanies the end-product must include the following information in a location that is easily read:

- To comply with FCC's RF radiation exposure requirements, the antenna(s) used for this transmitter must be installed such that a minimum separation distance of 20 cm is maintained between the reader (antenna) & user's/nearby people's body at all times and must not be collocated or operating in conjunction with another antenna or transmitter.
- **WARNING:** The Federal Communications Commission warns that changes or modifications of the radio module within this device not expressly approved by Silvus Technologies, Inc. could void the user's authority to operate the equipment.

NOTE: This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation. This equipment generates, uses and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:

- Reorient or relocate the receiving antenna.
- Increase the separation between the equipment and receiver.
- Connect the equipment into an outlet on a circuit different from that to which the receiver is connected.
- Consult the dealer or an experienced radio/TV technician for help

NOTE: 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 equipment in a residential area is likely to cause harmful interference in which case the user will be required to correct the interference at his own expense.

7.2 FCC Identifier: N2S-SC3500

Silvus Model #: SC3500-243541

Equipment Class: Digital Transmission System

The following parameters must be used to be compliant to the appropriate FCC requirements:

Antenna: 3dB Omni (AOV3T245515575)

Bandwidth: 20MHz

Maximum Output Power across Frequency Range #1: 495.28mW from 2427MHz to 2447MHz

Maximum Output Power across Frequency Range #2: 493.62mW from 5745MHz to 5830MHz

7.3 FCC Identifier: N2S-SC3822

Silvus model #: SC3822-245580

Equipment Class: Digital Transmission System

The following parameters must be used to be compliant to the appropriate FCC requirements:

Antenna: 3dB Omni (AOV3T245515575)

Bandwidth: 20MHz

Maximum Output Power across Frequency Range #1: 268.64mW from 2420MHz to 2450MHz

Maximum Output Power across Frequency Range #2: 329.02mW from 5760MHz to 5810MHz

7.4 FCC Identifier: N2S-SC42-245

Silvus model #: SC4210-245-BB, SC4240-245-BB

Equipment Class: Digital Transmission System

The following parameters must be used to be compliant to the appropriate FCC requirements:

Antenna: 2.1dBi Omni Antennas (AOV2S230515)

Bandwidth: 10MHz

Maximum Output Power @ Frequency #1: 810.17mW @ 2430MHz

Maximum Output Power @ Frequency #2: 795.3mW @ 2440MHz

7.5 FCC Identifier: N2S-SC44-245

Silvus model #: SC4410-235-SBST, SC4480-235-SBST

Equipment Class: Digital Transmission System

The following parameters must be used to be compliant to the appropriate FCC requirements:

Antenna: 2.1dBi Omni Antennas (AOV2S230515)

Bandwidth: 10MHz

Maximum Output Power @ Frequency #1: 582.1mW @ 2430MHz

Maximum Output Power @ Frequency #2: 523.6mW @ 2440MHz

7.6 FCC Identifier: N2S-SC42-520

Silvus model #: SC4240E-520-BB

Equipment Class: Digital Transmission System

The following parameters must be used to be compliant to the appropriate FCC requirements:

Antenna: 6dBi Omni Antennas (Peak Antennas CO520-6-LS)

Bandwidth: 20MHz

Maximum Output Power @ Frequency #1: 414.03mW @ 5220MHz

Maximum Output Power @ Frequency #2: 498.92mW @ 5240MHz

7.7 FCC Identifier: N2S-SC44-520

Silvus model #: SC4480E-520-SBST

Equipment Class: Digital Transmission System

The following parameters must be used to be compliant to the appropriate FCC requirements:

Antenna: 6dBi Omni Antennas (Peak Antennas CO520-6-LS)

Bandwidth: 20MHz

Maximum Output Power @ Frequency #1: 241.48mW @ 5220MHz

Maximum Output Power @ Frequency #2: 246.52mW @ 5240MHz

7.8 FCC Identifier: N2S-SC42E-245

Silvus model #: SC4210E-245-EB

Equipment Class: Digital Transmission System

The following parameters must be used to be compliant to the appropriate FCC requirements:

Antennas: 2.1dBi Omni Antennas (Silvus AOV2D230515) & 4dBi Omni Antennas (Silvus AOV4S235)

Bandwidth: 10MHz

Maximum 10MHz Bandwidth Output Power @ Frequency #1: 789.84mW @ 2430MHz

Maximum 10MHz Bandwidth Output Power @ Frequency #2: 790.06mW @ 2440MHz

Bandwidth: 20MHz

Maximum 20MHz Bandwidth Output Power @ Frequency #1: 123.82mW @ 2440MHz

7.9 FCC Identifier: N2S-SC42E-235470

Silvus model #: SC4240EP-235470-BB, SC4240EP-235470-EB,
SC4240EP-235470F-BB, SC4240EP-235470F-EB

Equipment Class: Digital Transmission System

The following parameters must be used to be compliant to the appropriate FCC requirements:

- Operating Frequency: 2416MHz—2457MHz
- Antennas: 2.15dBi Omni Antennas (AOV2D235515G-TM)
- Bandwidth: 10MHz
- Maximum output power for 10MHz @ operating frequency
- spectrum should not exceed 27dBm/0.5W/antenna
- Maximum Total Output Power @ F-low: 834mW @ 2416MHz
- Maximum Total Output Power @ F-mid: 738mW @ 2440MHz
- Maximum Total Output Power @ F-high: 684mW @ 2457MHz

7.10 FCC Identifier: N2S-SC44E-235470

Silvus model #: SC4480E-235470-SBST, SC4480E-235470F-SBST

Equipment Class: Digital Transmission
System

The following parameters must be used to be compliant to the appropriate FCC requirements: Antennas: 2.5dBi Omni Antennas (Silvus part# 1001-071)

- Bandwidth: 10MHz
- Maximum 10MHz Bandwidth Output Power @ Frequency #1: 912mW @ 4945MHz
- Maximum 10MHz Bandwidth Output Power @ Frequency #2: 933.25mW @ 4965MHz
- Maximum 10MHz Bandwidth Output Power @ Frequency #3: 912mW @ 4985MHz
- Maximum output power for 10MHz @ operating frequency spectrum should not exceed 24dBm/antenna

7.11 FCC ID: N2S-SL42-245

Silvus model #: SL4210-245-SB

Equipment Class: Digital Transmission System

Antennas: 2.1dBi Omni Antennas (Silvus part# 1001-071)

Bandwidth: 1.25, 2.5 or 5MHz

Maximum 5MHz Bandwidth Output Power @ Frequency #1: 950.6mW @ 2412MHz

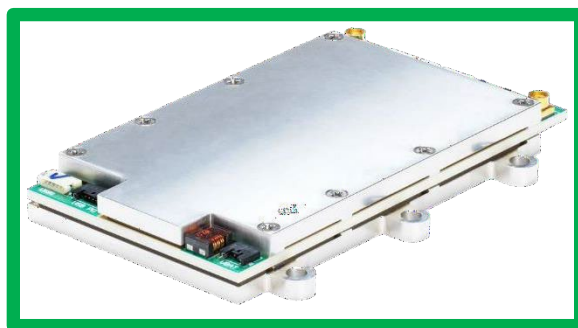
Maximum 5MHz Bandwidth Output Power @ Frequency #2: 862.98mW @ 2440MHz

Maximum 5MHz Bandwidth Output Power @ Frequency #3: 968.28mW @ 2462MHz

Maximum output power for 5MHz @ operating frequency spectrum should not exceed 27dBm/antenna

7.12 FCC ID: N2S-SL4210-245-OEM (Modular Certification)

The product SL4210-245-O is approved for modular certification by FCC under the following ID:
FCC ID: N2S-SL4210-245-OEM



- Equipment Class: Digital Transmission System
- Frequency band: S-band, 2200-2500 MHz
- Maximum output power/antenna: 0.5W, 27dBm
- Bandwidth: 1.25, 2.5 or 5MHz
- Maximum 5MHz Bandwidth Output Power @ Frequency #1: 749.9mW @ 2412MHz
- Maximum 5MHz Bandwidth Output Power @ Frequency #2: 674.5mW @ 2440MHz
- Maximum 5MHz Bandwidth Output Power @ Frequency #3: 623.7mW @ 2462MHz
- Maximum output power for 5MHz @ operating frequency spectrum should not exceed 27dBm/0.5W/antenna
- Recommended Antennas: 2.1dBi Omni Antennas (Silvus part# AOV2D230515G-TM) or equivalent for FCC 2.109 & 15.247 RF Exposure compliance
- DC supply: the customer provides DC power from their own DC supply source; the supply should be fused for 5-amp circuit.

Modular approval allows installation in different end-use products by an OEM with limited or no additional testing or equipment authorization for the transmitter function provided by the SL4210-245-O:

- ❖ No additional transmitter compliance testing is required if the module is operated with an approved antenna.
- ❖ No additional transmitter compliance testing is required if the module is operated with the same general type of antenna listed as approved in the SL4210-245-O documentation.
- ❖ Acceptable antennas must be of equal or less far field gain than the antenna previously authorized under the same FCC ID and must have similar in band and out of band characteristics.

The end-product must comply with all applicable FCC equipment authorizations, regulations, requirements and equipment functions not associated with the SL4210-245-O.

Compliance must be demonstrated to regulations for other transmitter components within the host product, to requirements for unintentional radiators (Part 15B), and to additional authorization requirements for the non-transmitter functions.

The OEM applying the SL4210-245-O is required to include all FCC statements and warnings detailed in the following sections to the end-product labeling and in the finished product manual.

7.12.1 OEM Accessories

Accessories for the SL4200 OEM unit are detailed below:

Silvus PN	Description
SC42E-OEM-2	RF connector, right angle SMP (f) to TNC (f); 38 mm length
SC22-OEM-6	RF connector right angle SMP (f) to SMA (f); 21 mm length
SC22-OEM-6-75mm	75 mm length
SC22-OEM-6-150mm	150 mm length
SC22-OEM-6-155mm	155 mm length
SC22-OEM-6-240mm	240 mm length
SC22-OEM-6-750mm	750 mm length
SL42-OEM-CK	Mating connector kit (6 connectors, less RF, with extra crimp pins)
SL42-OEM-L200	Status LED (200 mm wire leads; Red/Green color)
SL42-OEM-S0	2-pos On/Off rotary switch (no wires, contacts only)

Table 31 SL4200 OEM Accessories

7.12.2 Interface Connections

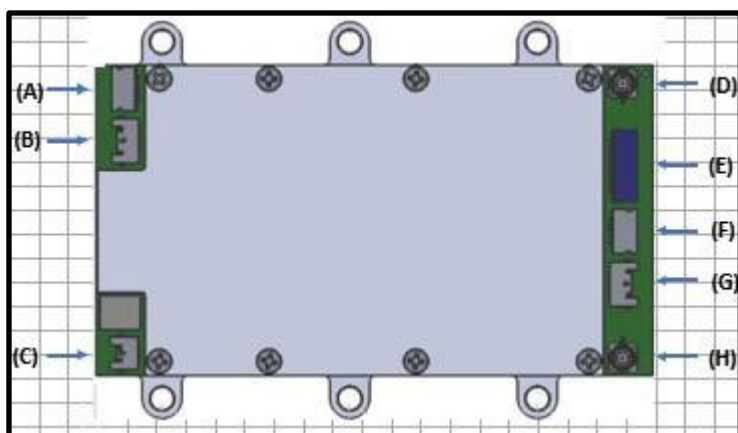


Fig Ref	PCB Nom	Description	Connector Type	Vendor	MPN Mating Connector
A	USB1	USB1	Header RA 5-POS (1mm)	JST Sales	SHLP-05V-S-B
B	USB PD	USB-PD (9V only)	Header RA 4-POS (1mm)	Molex	50376404013
C	VBAT	VBAT (9V - 32V)	Header RA 3-POS (1mm)	Molex	50376403013
D	1	RF-1	SMP Straight Jack (Male)	Amphenol	See accessories
E	RS232	Serial & Misc	Header RA 10-POS (1mm)	JST Sales	SHLP-10V-S-B
F	USB0	USB0	Header RA 5-POS (1mm)	JST Sales	SHLP-05V-S-B
G	ONOFF	Status LED/Power Switch	Header RA 4-POS (1mm)	Molex	50376404013
H	2	RF-2	SMP Straight Jack (Male)	Amphenol	See accessories

Table 32 SL4200 Interfaces

Connection pin-outs are detailed in [StreamCaster Lite SL4200 OEM Integration](#).

7.12.3 DC Power Consumption & Heat Management requirements

The SL4200 OEM radio has a maximum native RF output power of 500 mW/antenna. Power consumption varies from 4.8 Watts (not transmitting) to 17 Watts depending on the transmit duty cycle, transmit power, frequency band used and if USB devices are connected. Average power consumption will be proportional to the transmit duty cycle. Peak power is 25 Watts (2.8A @ 9VDC, 2.1A @ 12 VDC) @burst transmissions for 100 micro-seconds.

When using a USB-C PD power source, the source must be rated to supply 3.0A @ 9 VDC. The external power source must be sized to meet this peak requirement. When using VBAT input the voltage range is 9.0 to 32.0 VDC. However, the radio is most power efficient when operating at 15VDC.

The recommended heat management details are in the [StreamCaster Lite SL4200 OEM Integration Manual](#).

7.13 FCC ID: N2S-SC421-235

Silvus model #: SC4210EP-235-BB, SC4210EP-235F-BB, SC4210EP-235-EB, SC4210EP-235F-EB
Equipment Class: Digital Transmission System

The following parameters must be used to be compliant to the appropriate FCC requirements:

Antennas: 2.1dBi Omni Antennas (Silvus part# AOV2D230515, vendor pn# 1001-071)

Band: 2.4GHz ISM

Bandwidth: 10MHz

Maximum 10MHz Bandwidth Output Power: 177.83mW @ 2440MHz

Maximum output power for 10MHz @ operating frequency spectrum should not exceed 20dBm/antenna

7.14 FCC ID: N2S-SC424-235

Silvus model #: SC4240EP-235-BB, SC4240EP-235F-BB, SC4240EP-235-EB, SC4240EP-235F-EB
Equipment Class: Digital Transmission System

The following parameters must be used to be compliant to the appropriate FCC requirements:

Antennas: 2.1dBi Omni Antennas (Silvus part# AOV2D230515, vendor pn# 1001-071)

Band: 2.4GHz ISM

Bandwidth: 10MHz

Maximum 10MHz Bandwidth Output Power: 177.83mW @ 2440MHz

Maximum output power for 10MHz @ operating frequency spectrum should not exceed 20dBm/antenna

7.15 FCC ID: N2S-SC42A-235

Silvus model #: SC42A0EP-235-BB, SC42A0EP-235F-BB, SC42A0EP-235-EB, SC42A0EP-235F-EB
Equipment Class: Digital Transmission System

The following parameters must be used to be compliant to the appropriate FCC requirements:

Antennas: 2.1dBi Omni Antennas (Silvus part# AOV2D230515, vendor pn# 1001-071)

Band: 2.4GHz ISM

Bandwidth: 10MHz

Maximum 10MHz Bandwidth Output Power: 190.55mW @ 2440MHz

Maximum output power for 10MHz @ operating frequency spectrum should not exceed 20dBm/antenna

7.16 FCC ID: N2S-SC421-235467

Silvus model #: SC4210EP-235467-BB, SC4210EP-235467F-BB,
SC4210EP-235467-EB, SC4210EP-235467F-EB

Equipment Class: Digital Transmission System

The following parameters must be used to be compliant to the appropriate FCC requirements:

Antennas: 2.1dBi Omni Antennas (Silvus part# AOV2D230515, vendor pn# 1001-071)

Band: 2.4GHz ISM

Bandwidth: 10MHz

Maximum 10MHz Bandwidth Output Power: 186.21mW @ 2440MHz

Maximum output power for 10MHz @ operating frequency spectrum should not exceed 20dBm/antenna

7.17 FCC ID: N2S-SC424-235467

Silvus model #: SC4240EP-235467-BB, SC4240EP-235467F-BB,
SC4240EP-235467-EB, SC4240EP-235467F-EB

Equipment Class: Digital Transmission System

The following parameters must be used to be compliant to the appropriate FCC requirements:

Antennas: 2.1dBi Omni Antennas (Silvus part# AOV2D230515, vendor pn# 1001-071)

Band: 2.4GHz ISM

Bandwidth: 10MHz

Maximum 10MHz Bandwidth Output Power: 165.96mW @ 2440MHz

Maximum output power for 10MHz @ operating frequency spectrum should not exceed 20dBm/antenna

7.18 FCC ID:N2S-SC424-235470

Silvus model #: SC4240EP-235470-BB, SC4240EP-235470-EB,
SC4240EP-235470F-BB, SC4240EP-235470F-EB

Equipment Class: Digital Transmission System

The following parameters must be used to be compliant to the appropriate FCC requirements:

Operating Frequency: 2416MHz—2457MHz

Antennas: 2.15dBi Omni Antennas (AOV2D235515G-TM)

Bandwidth: 10MHz

Maximum output power for 10MHz @ operating frequency spectrum should not exceed 27dBm/0.5W/antenna

Maximum Total Output Power @ F-low: 834mW @ 2416MHz

Maximum Total Output Power @ F-mid: 738mW @ 2440MHz

Maximum Total Output Power @ F-high: 684mW @ 2457MHz

7.19 FCC ID: N2S-SC42A8-235467

Silvus model #: SC42A8EP-235467-BB, SC42A8EP-235467F-BB,

SC42A8EP-235467-EB, SC42A8EP- 235467F-EB

Equipment Class: Digital Transmission System

The following parameters must be used to be compliant to the appropriate FCC requirements:

Antennas: 2.1dBi Omni Antennas (Silvus part# AOV2D230515, vendor pn# 1001-071)

Band: 2.4GHz ISM

Bandwidth: 10MHz

Maximum 10MHz Bandwidth Output Power: 173.78mW @ 2440MHz

Maximum output power for 10MHz @ operating frequency spectrum should not exceed 20dBm/antenna

7.20 FCC ID: N2S-SC441-235

Silvus model #: SC4410E-235-SBST, SC4410E-235F-SBST

Equipment Class: Digital Transmission System

The following parameters must be used to be compliant to the appropriate FCC requirements:

Antennas: 2.1dBi Omni Antennas (Silvus part# AOV2D230515, vendor pn# 1001-071)

Band: 2.4GHz ISM

Bandwidth: 10MHz

Maximum 10MHz Bandwidth Output Power: 169.82mW @ 2440MHz

Maximum output power for 10MHz @ operating frequency spectrum should not exceed 17dBm/antenna

7.21 FCC ID: N2S-SC448-235

Silvus model #: SC4480E-235-SBST, SC4480E-235F-SBST

Equipment Class: Digital Transmission System

The following parameters must be used to be compliant to the appropriate FCC requirements:

Antennas: 2.1dBi Omni Antennas (Silvus part# AOV2D230515, vendor pn# 1001-071)

Band: 2.4GHz ISM

Bandwidth: 10MHz

Maximum 10MHz Bandwidth Output Power: 190.55mW @ 2440MHz

Maximum output power for 10MHz @ operating frequency spectrum should not exceed 17dBm/antenna

7.22 FCC ID: N2S-SC44K-235

Silvus model #: SC44K0E-235-SBST, SC44K0E-235F-SBST,
SC44K0E-235-LBST, SC44K0E-235F-LBST

Equipment Class: Digital Transmission System

The following parameters must be used to be compliant to the appropriate FCC requirements:

Antennas: 2.1dBi Omni Antennas (Silvus part# AOV2D230515, vendor pn# 1001-071)

Bandwidth: 10MHz

Maximum 10MHz Bandwidth Output Power: 165.96W @ 2440MHz

Maximum output power for 10MHz @ operating frequency spectrum should not exceed 17dBm/antenna

7.23 FCC ID: N2S-SC441-235467

Silvus model #: SC4410E-235467-SBST, SC4410E-235467F-SBST

Equipment Class: Digital Transmission System

The following parameters must be used to be compliant to the appropriate FCC requirements:

Antennas: 2.1dBi Omni Antennas (Silvus part# AOV2D230515, vendor pn# 1001-071)

Bandwidth: 10MHz

Maximum 10MHz Bandwidth Output Power: 204.17mW @ 2440MHz

Maximum output power for 10MHz @ operating frequency spectrum should not exceed 17dBm/antenna

7.24 FCC ID: N2S-SC448-235467

Silvus model #: SC4480E-235467-SBST, SC4480E-235467F-SBST

Equipment Class: Digital Transmission System

The following parameters must be used to be compliant to the appropriate FCC requirements:

Antennas: 2.1dBi Omni Antennas (Silvus part# AOV2D230515, vendor pn# 1001-071)

Bandwidth: 10MHz

Maximum 10MHz Bandwidth Output Power: 186.21mW @ 2440MHz

Maximum output power for 10MHz @ operating frequency spectrum should not exceed 17dBm/antenna

7.25 FCC ID: N2S-SC448-235470

Silvus model #: SC4480E-235470-SBST, SC4480E-235470F-SBST

Equipment Class: Digital Transmission System

The following parameters must be used to be compliant to the appropriate FCC requirements:

Operating Frequency: 2416MHz—2457MHz

Bandwidth: 10MHz

Antennas: 2.15dBi Omni Antennas (AOV2D235515G-TM)

Maximum output power for 10MHz @ operating frequency spectrum should not exceed 22dBm/0.16W/antenna

Maximum Total Output Power @ F-low: 582mW @ 2416MHz

Maximum Total Output Power @ F-mid: 558mW @ 2440MHz

Maximum Total Output Power @ F-high: 519mW @ 2457MHz

7.26 FCC ID: N2S-SC44KG-235467

Silvus model #: SC44KGE-235467-SBST, SC44KGE-235467F-SBST,
SC44KGE-235467-LBST, SC44KGE-235467F-LBST

Equipment Class: Digital Transmission System

The following parameters must be used to be compliant to the appropriate FCC requirements:

Antennas: 2.1dBi Omni Antennas (Silvus part# AOV2D230515, vendor pn# 1001-071)

Bandwidth: 10MHz

Maximum 10MHz Bandwidth Output Power: 194.98mW @ 2440MHz

Maximum output power for 10MHz @ operating frequency spectrum should not exceed 17dBm/antenna

7.27 FCC ID: N2S-SC424-235-OEM (Modular certification)

The products SC4210P-235-O, SC4240P-235-O are approved for FCC modular certification by FCC ID: N2S-SC424-235-OEM.



Silvus radios models #: SC4210P-235-O, SC4210P-235F-O, SC4240P-235-O, SC4240P-235F-O

- Equipment Class: Digital Transmission System
- Operating Frequency: 2418MHz—2462MHz
- Bandwidth: 10MHz
- Maximum Total Output Power @2418MHz: 995mW
- Maximum Total Output Power @2440MHz: 919.4mW
- Maximum Total Output Power @2462MHz: 973mW
- Maximum output power for 10MHz @ operating frequency spectrum should not exceed 27dBm/0.5W/antenna
- Recommended Antennas: 2.4dBi Omni Antennas (Silvus part# AOV2S192G-TM) or equivalent for FCC 2.1091 & 15.247 RF Exposure compliance
- DC supply: the customer provides DC power from their own DC supply source; the supply should be fused for a 5-amp circuit.

Modular approval allows installation in different end-use products by an OEM with limited or no additional testing or equipment authorization for the transmitter function provided by the SC4210P-235-O, SC4240P-235-O:

- No additional transmitter compliance testing is required if the module is operated with an approved antenna.
- No additional transmitter compliance testing is required if the module is operated with the same general type of antenna listed as approved in the SC4210P-235-O, SC4240P-235-O documentation.
- Acceptable antennas must be of equal or less far field gain than the antenna previously authorized under the same FCC ID and must have similar in-band and out of band characteristics.

The end-product must comply with all applicable FCC equipment authorizations, regulations, requirements and equipment functions not associated with the SC4210P-235-O, SC4240P-235-O.

- Compliance must be demonstrated to regulations for other transmitter components within the host product, to requirements for unintentional radiators (Part 15B), and to additional authorization requirements for the non-transmitter functions.

The OEM applying the SC4210P-235-O, SC4240P-235-O is required to include all FCC statements and warnings detailed in the following sections to the end-product labeling and in the finished product manual.

Product Label:

A statement must be included on the exterior of the final OEM product which communicates that the device identified by the FCC ID number is contained within the product. Include the statement:

- Contains FCC ID: N2S-SC424-235-OEM

Additionally, the OEM must include the following statements on the exterior of the finished product:

- This device complies with Part 15 of the FCC Rules. Operation is subject to the following two conditions: (1) this device may not cause harmful interference, and (2) this device must accept any interference received, including any interference that may cause undesired operation.

DC Power Consumption & Heat Management requirements:

The OEM stack consumes 5W-24W depending on the transmit duty cycle, transmit power, and frequency band used. All hot components are tightly coupled to the metal shields via thermal pad material. The digital board (larger board on bottom) consumes a fixed 5W of power. The remainder of power is consumed by the RF board (top board). It is recommended that heat sinks are used on both sides of the OEM.

7.28 FCC ID: N2S-SC42A-235-OEM (Modular certification)

The product SC42A0P-235-O is approved for FCC modular certification by FCC ID: N2S-SC42A-235-OEM.



Silvus radio model #: SC42A0P-235-O, SC42A0P-235F-O

- Equipment Class: Digital Transmission System
- Operating Frequency: 2419MHz--2454MHz
- Bandwidth: 10MHz
- Maximum Total Output Power @2419MHz: 965mW
- Maximum Total Output Power @2440MHz: 902.2mW
- Maximum Total Output Power @2454MHz: 976mW
- Maximum output power for 10MHz @ operating frequency spectrum should not exceed 27dBm/0.5W/antenna
- Recommended Antennas: 2.4dBi Omni Antennas (Silvus part# AOV2S192G-TM) or equivalent for FCC 2.1091 & 15.247 RF Exposure compliance
- DC supply: the customer provides DC power from their own DC supply source; the supply should be fused for a 5-amp circuit.

Modular approval allows installation in different end-use products by an OEM with limited or no additional testing or equipment authorization for the transmitter function provided by the SC42A0P-235-O:

- No additional transmitter compliance testing is required if the module is operated with an approved antenna.
- No additional transmitter compliance testing is required if the module is operated with the same general type of antenna listed as approved in the SC42A0P-235-O documentation.
- Acceptable antennas must be of equal or less far field gain than the antenna previously authorized under the same FCC ID and must have similar in-band and out of band characteristics.

The end-product must comply with all applicable FCC equipment authorizations, regulations, requirements and equipment functions not associated with the SC42A0P-235-O.

- Compliance must be demonstrated to regulations for other transmitter components within the host product, to requirements for unintentional radiators (Part 15B), and to additional authorization requirements for the non-transmitter functions. The OEM applying the SC42A0P-235-O is required to include all FCC statements and warnings detailed in the following sections to the end-product labeling and in the finished product manual.

Product Label

A statement must be included on the exterior of the final OEM product which communicates that the device identified by the FCC ID number is contained within the product. Include the statement:

- Contains FCC ID: N2S-SC42A-235-OEM

Additionally, the OEM must include the following statements on the exterior of the finished product:

- This device complies with Part 15 of the FCC Rules. Operation is subject to the following two conditions: (1) this device may not cause harmful interference, and (2) this device must accept any interference received, including any interference that may cause undesired operation.

DC Power Consumption & Heat Management requirements

The OEM stack consumes 5W-24W depending on the transmit duty cycle, transmit power, and frequency band used. All hot components are tightly coupled to the metal shields via thermal pad material. The digital board (larger board on bottom) consumes a fixed 5W of power. The remainder of power is consumed by the RF board (top board). It is recommended that heat sinks are used on both sides of the OEM.

7.29 FCC ID: N2S-SL52-245-OEM (Modular certification)

The following Silvus radios models are approved for modular certification by FCC under the following ID:

FCC ID: N2S-SL52-245-OEM

- ❖ SL5220-139235-O, SL5220-139235F-O
- ❖ SL5210-139235-O, SL5210-139235F-O
- ❖ LC5220-139235-O, LC5220-139235F-O
- ❖ LC5210-139235-O, LC5210-139235F-O
- ❖ LC52.50-139235-O, LC52.50-139235F-O
- ❖ SL5220-235-O, SL5220-235F-O
- ❖ SL5210-235-O, SL5210-235F-O
- ❖ LC5220-235-O, LC5220-235F-O
- ❖ LC5210-235-O, LC5210-235F-O
- ❖ LC52.50-235-O, LC52.50-235F-O

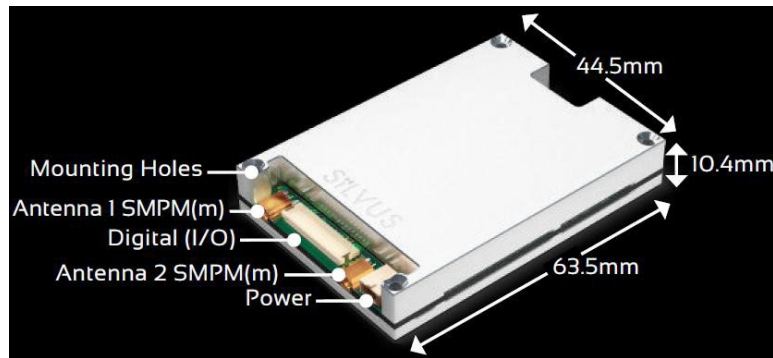


Figure 53 SL/LC5200 OEM Connector Diagram

- Equipment Class: Digital Transmission System
- Frequency band: 2.4GHz, ISM-band
- Bandwidth: 10 & 20MHz
- Frequency range:
 - Tx BW=20MHz, F-mid=2440MHz only, no frequency range
 - Tx BW=10MHz, 2416-2457MHz
- Maximum output power:
 - Maximum 20MHz Bandwidth Output Power @ 2440MHz: 0.979W
 - Maximum output power for 20MHz @ operating frequency spectrum should not exceed 27dBm/0.5W/antenna
 - Maximum 10MHz Bandwidth Output Power @ 2416MHz: 0.241W
 - Maximum 10MHz Bandwidth Output Power @ 2440MHz: 0.247W
 - Maximum 10MHz Bandwidth Output Power @ 2457MHz: 0.25W

- Maximum output power for 10MHz @ operating frequency spectrum should not exceed 24dBm/0.25W/antenna
- Recommended Antennas: ~2.5dBi Omni Antennas (Silvus PN# AOV2S192G-TM) or equivalent for FCC 2.109 & 15.247 RF Exposure compliance
- DC supply: the customer provides DC power from their own DC supply source; the supply should be fused for 5-amp circuit.

Modular approval allows installation in different end-use products by an OEM with limited or no additional testing or equipment authorization for the transmitter function provided by the SL/LC52xx-139235/F-O:

- ❖ No additional transmitter compliance testing is required if the module is operated with an approved antenna.

No additional transmitter compliance testing is required if the module is operated with the same general type of antenna listed as approved in the SL/LC52xx-139235/F-O documentation.

- ❖ Acceptable antennas must be of equal or less far field gain than the antenna previously authorized under the same FCC ID and must have similar in band and out of band characteristics.

The end-product must comply with all applicable FCC equipment authorizations, regulations, requirements and equipment functions not associated with the SL/LC52xx-139235/F-O.

Compliance must be demonstrated to regulations for other transmitter components within the host product, to requirements for unintentional radiators (Part 15B), and to additional authorization requirements for the non-transmitter functions.

The OEM applying the SL/LC52xx-139235/F-O are required to include all FCC statements and warnings detailed in the following sections to the end-product labeling and in the finished product manual.

7.29.1 Product Label

A statement must be included on the exterior of the final OEM product which communicates that the device identified by the FCC ID number is contained within the product. Include the statement:

- Contains FCC ID: **N2S-SL52-245-OEM**

Additionally, the OEM must include the following statements on the exterior of the finished product:

- This device complies with Part 15 of the FCC Rules. Operation is subject to the following two conditions: (1) this device may not cause harmful interference, and (2) this device must accept any interference received, including any interference that may cause undesired operation.

7.29.2 OEM Accessories

Accessories for the SL5200 OEM unit are detailed below:

Silvus PN	Description
SL52-OEMCBL-PWR-12I	12-inch SL5200 OEM 2-pin (m) Switchcraft power cable.
SL52-OEMCBL-IO-ESU-18I	18-inch SL5200 OEM data cable. Provides Ethernet, Serial, and USB OTG (micro-B) connection
SL52-OEMCBL-IO-ESUH-18I	18-inch SL5200 OEM data cable. Provides Ethernet, Serial, and USB Host (Type A female) connection. (Radio=Host)
SL52-OEMCBL-IO-ESUC-18I	18-inch SL5200 OEM data cable. Provides Ethernet, Serial, and USB Client (Type A male) connection. (Radio=Client)
SL52-RF-RASM-TNC-12I	RF Cable 12-inches, RA SMPM jack, straight TNC (f) flange version
SL52-RF-RASM-SMA-12I	RF Cable 12-inches, RA SMPM jack, straight SMA (f) bulkhead version (IP67 rated on SMA)

Table 33 SL/LC5200 OEM Accessories

7.29.3 Interface Connections



Figure 54 SL/LC5200 OEM Connector Diagram

Fig 5 Ref	PCB Nom	Description	Connector Type	Vendor	MPN Mating Connector
A	J9001	I/O Connector	SM14B-SHLS-TF(LF)(SN)	JST Sales	SHLP-14V-S-B ¹
B	J9002	Power Connector	SM02B-SFKH-TF	JST Sales	SFKR-02V-S ²
C		Debug Connector (Factory use only)			

Table 34 SL/LC5200 Interfaces and Connector Types

notes:

¹ JST crimp contact MPN is SSSL-003T-P0.2

² JST crimp contact MPN is SSFH-001T-P0.5

Connection pin-outs are detailed in [StreamCaster Lite SL/LC5200 OEM Integration Guide](#).

7.29.4 DC Power Consumption & Heat Management requirements

1W TX power configuration

In the 1W configuration, Tx power is 0.5W/ant, the peak power draw is estimated to be 1.5A@12VDC. While the radio is actively transmitting at 1W TX power, it consumes 10W. While the radio is listening on air, it consumes 3.6W. Average power consumption could range from 3.6W to 10W, depending on the transmission duty cycle.

2W TX power configuration

In the 2W configuration, Tx power is 1W/ant, the peak power draw is estimated to be 2.3A@12VDC. While the radio is actively transmitting at 2W TX power, it consumes 15W. While the radio is listening on air, it consumes 3.6W. Average power consumption could range from 3.6W to 15W, depending on the transmission duty cycle.

The recommended heat management details are in the [StreamCaster Lite SL/LC5200 OEM integration Guide](#).

8 EU-CE Markings

8.1 (-206 models)

The following Silvus Technologies models are declared to conform to CE Mark requirements: Silvus P/N:

SC4240-206-EB, SC4480-206-SBST, SC4240E-206-EB, SC4480E-206-SBST, SC4240E-206-BB

Relevant standards:

ETSI EN 302 064 V2.1.1 (2016-09), Wireless Video Links, Harmonized Standard

ETSI EN 301 489-1 V2.2.0 (2017-03), EMC, Common Technical Requirements

ETSI EN 301 489-28 V1.1.1 (2004-09), EMC, Specific conditions for wireless digital video links

EN 60950-1, Information Technology Equipment, Safety

Frequency range: 2025-2110 MHz

Maximum RF power: In compliance with EN302-064, for Tx BW=10MHz, the output power must not exceed 23dBm/200mW per channel.

Antenna: 2.15dBi Omni Antennas (AOV2D230515)

Cable: Silvus cable assembly (SC22-PRICBL02-6)

External Bandpass Filter:

Microwave Filter Co. model 3813

(a filter of equivalent performance may also be used, contact Silvus Technologies customer support for more information)

AC Adapter (if used): EDAC Power Electronics EA10523C-120 (this adapter is approved for indoor use only) (this adapter was certified by the manufacturer to IEC 60950-1)

External DC supply: If the customer provides DC power from their own source, the supply should be fused for a 5-amp circuit.

Safe Working Distance:

Maintain safe working distance of minimum 20cm. For more details, refer to TUV report no. SD72128709-0617A-0617C, "Radio Frequency Exposure Verification of the Silvus Technologies Inc. StreamCaster SC420-206 and SC4480 Tactical MIMO Radio EN 62311 January 2008" (copy of

report available upon request). The CE Mark Technical File is available upon request for inspection.

To satisfy RF exposure requirements, this device and its antennas must operate with a separation distance of at least 20 cm from all persons and must not be co-located or operating in conjunction with any other antenna or transmitter, except in accordance with RED RF Exposure requirements.

This equipment has been constructed so that the product complies with the requirement of with Article 10(2) as it can be operated in at least one Member State as examined and the product is compliant with Article 10(10) as it has no restrictions on putting into service in all EU member states.

See restrictions mentioned in ERC Recommendation 25-10, Table 7-C2, for guidance of restrictions applicable to specific countries.

Table 7-C2: additional information regarding the national conditions for the identified tuning ranges for video PMSE applications - Band C2

Frequency Band	Country	Implementation	Conditions/remarks
C2 2025-2110 MHz	AUT	L* [†]	Max. 10MHz Channels, max. 20dBW eirp, 2070-2090 MHz: Restricted to Broadcasters only. 2090-2110 MHz: Restricted to fire brigades and private users
	AZE	Y*	On a secondary basis
	BIH	L	PBS old MW link systems for PMSE. Military use in 2025-2110 MHz
	BUL	Y	ECC Report 219. Available for Cordless Cameras, Portable video links and Mobile video links
	CZE	Y*	The band may be used in the coordination with the Ministry of Defence of the Czech Republic. https://www.ctu.eu/sites/default/files/obsah/ctu-rsup-p_06_09-2014-07_en.pdf , new version is available only in czech https://www.ctu.cz/sites/default/files/obsah/ctu-vyzva-k-uplatneni-pripominek-k-navrhu-opatreni-obecne-povahy-casti-planu-vyuziti-radioveho-spektra-c-pv-p/6/xx.2017-yy-pro-kmitoctove-pasmo-1900-2200-mhz/obrazky/pv-p6-2017.pdf
	D	N	Deviations from the specifications in the Frequency Plan (FreqP) could be permitted for a limited time in accordance with §58 TKG. This is provided that the frequency usages indicated in the Frequency Ordinance (FreqV) and the Frequency Plan are not adversely affected (for more details see: https://www.bundesnetzagentur.de/cdn_1412/DE/Sachgebiete/Telekommunikation/Unternehmen_Institutionen/Frequenzen/SpezielleAnwendungen/Kurzzeitteilungen/kurzzeitteilungen-node.html)
	DNK	Y*	
	E	N	Band not available
	EST	L*	2075.25-2110 MHz SAP/SAB. See Regulation of Ministry of Communication and Economical Affairs 21.05.2013 No 35. Otherwise governmental use.
	F	L* [†]	Temporary licenses, e.i.r.p. max = 10 dBW. Use of 10 MHz bandwidth centered on 2055 MHz and 2095 MHz for ground-to-ground link and 10 MHz bandwidth centered on 2065 MHz and 2105 MHz for air-to-ground link. Coordination required between assigning authorities (la Défense and Space) regarding the use of the other available bands in order to avoid harmful interference. ARCEP Decision 2016-1130
	FIN	L* [†]	Cordless cameras, temporary use on a case- by-case basis. Standard EN 302064. Other use includes military use and space operation
	G	Y* [†]	Technology and application neutral but typically used for wireless cameras, typically licensed at 100 mW e.r.p.
	GEO	L*	
	GRC	L* [†]	Cordless Cameras. Portable/Mobile video links. 2087.5- 2108.5 MHz : not available (exclusive use by security services)
	HNG	N	Band not available (governmental use). However, the band may be used for short-term PMSE use if the user demand makes it necessary at certain occasions like main events. In this case the authority handles the requests on a case-by-case basis and if the frequency use can be authorised the users receive an individual license
	HOL	L*	2070-2110 MHz for ENG-OB only

Possible implementation status: Y = the whole band is available for PMSE L = Limited availability N = the band is not available for PMSE * - Individual licence may be required † – restrictions apply (e.g. geographical restrictions)

EU DECLARATION OF CONFORMITY

Number: *STDOC1001*

Name and address of the Manufacturer

Silvus Technologies, Inc.,
10990 Wilshire Blvd., Suite #1500
Los Angeles, CA 90024 U.S.A

This declaration of conformity is issued under the sole responsibility of the manufacturer.

Object of the declaration

Product information

StreamCaster SC4240-206-EB, SC4480-206-SBST, SC4240E-206-EB, SC4480E-206-SBST

Additional information

SW version : v3.12.6.4 for SC4240-206-EB and SC4480-206-SBST
HW version : C5 for SC4240-206-EB, B1 for SC4480-206-SBST

SW version : v3.17.1.1 for SC4240E-206-EB and SC4480E-SBST
HW version : C7 for SC4240E-206-EB and B1 for SC4480E-SBST

The object of the declaration described above is in conformity with the relevant Union harmonisation legislation:

- References to the relevant harmonised standards used or references to the technical specifications in relation to which conformity is declared

Radio Equipment Directive 2014/53/EU

EN 301 489-1 V2.1.1
EN 301 489-28 V1.1.1
EN 302 064 V2.1.1
EN 60950-1:2006+A11:2009+A1:2010+A12:2011+A2:2013
EN62311:2008

RoHS Directive 2011/65/EU

EN 50581:2012

The notified body

Name: TÜV SÜD American
Number:1929

performed

- a conformity assessment of the technical construction file

and issued the certificate

CB-19-0102

Additional information

N/A

Signed for and on behalf of: Silvus Technologies

Authorised Representative:

Name and Surname / Function:

Weijun Zhu, Vice President of Engineering

Date of issue:

8-12-2019



EU DECLARATION OF CONFORMITY

Number: *STDOC1001*

Name and address of the Manufacturer

Silvus Technologies, Inc.,
10990 Wilshire Blvd., Suite #1500
Los Angeles, CA 90024 U.S.A

This declaration of conformity is issued under the sole responsibility of the manufacturer.

Object of the declaration

Product information

StreamCaster SC4240E-206-BB

Additional information

SW version : v3.17.1.1
HW version : B7

The object of the declaration described above is in conformity with the relevant Union harmonisation legislation:

- References to the relevant harmonised standards used or references to the technical specifications in relation to which conformity is declared

Radio Equipment Directive 2014/53/EU

EN 301 489-1 V2.1.1
EN 301 489-28 V1.1.1
EN 302 064 V2.1.1
EN
60950-1:2006+A11:2009+A1:2010
+A12:2011+A2:2013
EN62311:2008

RoHS Directive 2011/65/EU

EN 50581:2012

The notified body

Name: TÜV SÜD American
Number:1929

performed

- a conformity assessment of the technical construction file

and issued the certificate

CB-19-0102

Additional information

N/A

Signed for and on behalf of: Silvus Technologies

Authorised Representative:

Name and Surname / Function:

Weijun Zhu, Vice President of Engineering

Date of issue: *1-7-2020*



1/1

8.2 (-139 Models)

The following Silvus Technologies models are declared to conform to CE Mark requirements:

Silvus P/N: SC4240EP-139-BB, SC4240EP-139-EB, SC4480E-139-SBST

Relevant standards:

ETSI EN 302 064 V2.1.1 (2016-09), Wireless Video Links, Harmonized Standard

ETSI EN 301 489-1 V2.2.0 (2017-03), EMC, Common Technical Requirements

ETSI EN 301 489-28 V1.1.1 (2004-09), EMC, Specific conditions for wireless digital video links

EN 62368-1, Product Safety Standard

Frequency range: 1350-1440 MHz

Maximum RF power: In compliance with EN302-064, for Tx BW=20MHz, the output power must not exceed 30dBm/1W per channel.

Antenna: 2.1dBi Omni Antennas (AOV2S192)

Cable: Silvus cable assembly (SC22-PRICBL02-6)

External Bandpass Filter:

Microwave Filter Co. model 3813

(a filter of equivalent performance may also be used, contact Silvus Technologies customer support for more information)

AC Adapter (if used): EDAC Power Electronics EA10523C-120 (this adapter is approved for indoor use only) (this adapter was certified by the manufacturer to IEC 60950-1)

External DC supply: If the customer provides DC power from their own source, the supply should be fused for a 5-amp circuit.

Safe Working Distance:

Maintain minimum safe working distance between radios & users by models below:

- SC42xx-139, >38cm

- SC44xx-139, >76cm

For more details, refer to TUV report no. 7217985B, "Radio Frequency Exposure Verification of the Silvus Technologies Inc. StreamCaster SC4240EP-139 and SC4480E-139 Tactical MIMO Radios. The CE Mark Technical File is available upon request for inspection.

To satisfy RF exposure requirements, this device and its antennas must operate with the separation distances listed above from all persons and must not be co-located or operating in conjunction with any other antenna or transmitter, except in accordance with RED RF Exposure requirements.

This equipment has been constructed so that the product complies with the requirement of with Article 10(2) as it can be operated in at least one Member State as examined and the product is compliant with Article 10(10) as it has no restrictions on putting into service in all EU member states.

See restrictions mentioned in ERC Recommendation 25-10, Table 7-C2, for guidance of restrictions applicable to specific countries.

Table 7-C2: additional information regarding the national conditions for the identified tuning ranges for video PMSE applications - Band C2

Frequency Band	Country	Implementation	Conditions/remarks
C2 2025-2110 MHz	AUT	L*	Max. 10MHz Channels, max. 20dBW eirp; 2070-2090 MHz: Restricted to Broadcasters only; 2090-2110 MHz: Restricted to fire brigades and private users
	AZE	Y*	On a secondary basis
	BIH	L	PBS old MW link systems for PMSE. Military use in 2025-2110 MHz
	BUL	Y	ECC Report 219. Available for Cordless Cameras, Portable video links and Mobile video links
	CZE	Y*	The band may be used in the coordination with the Ministry of Defence of the Czech Republic. https://www.ctu.eu/sites/default/files/obsah/o-ctu/rsup-p_06_09-2014-07_en_.pdf , new version is available only in czech https://www.ctu.cz/sites/default/files/obsah/ctu/yzva-k-uplatneni-pri-pominek-k-navrhu-opatreni-obecne-povaly-casti-planu-vyuziti-radioveho-spektra-c-pv-p/6/xx.2017-yy-pro-kmitoctove-pasmo-1900-2200-mhz/obrazky/pv-p6-2017.pdf
	D	N	Deviations from the specifications in the Frequency Plan (FreqP) could be permitted for a limited time in accordance with §58 TKG. This is provided that the frequency usages indicated in the Frequency Ordinance (FreqV) and the Frequency Plan are not adversely affected (for more details see: https://www.bundesnetzagentur.de/cdn_1412/DE/Sachgebiete/Telekommunikation/Unternehmen_Institutionen/Frequenzen/SpezielleAnwendungen/Kurzzeitteilungen/kurzzeitteilungen-node.html)
	DNK	Y*	
	E	N	Band not available
	EST	L*	2075.25-2110 MHz SAPI/SAB. See Regulation of Ministry of Communication and Economical Affairs 21.05.2013 No 35. Otherwise governmental use.
	F	L*	Temporary licenses, e.i.r.p. max = 10 dBW. Use of 10 MHz bandwidth centered on 2055 MHz and 2095 MHz for ground-to-ground link and 10 MHz bandwidth centered on 2065 MHz and 2105 MHz for air-to-ground link. Coordination required between assigning authorities (la Défense and Space) regarding the use of the other available bands in order to avoid harmful interference. ARCEP Decision 2016-1130
	FIN	L*	Cordless cameras, temporary use on a case-by-case basis. Standard EN 302064. Other use includes military use and space operation
	G	Y*	Technology and application neutral but typically used for wireless cameras, typically licensed at 100 mW e.i.r.p.
	GEO	L*	
	GRC	L*	Cordless Cameras. Portable/Mobile video links. 2087.5- 2108.5 MHz : not available (exclusive use by security services)
	HNG	N	Band not available (governmental use). However, the band may be used for short-term PMSE use if the user demand makes it necessary at certain occasions like main events. In this case the authority handles the requests on a case-by-case basis and if the frequency use can be authorised the users receive an individual license
	HOL	L*	2070-2110 MHz for ENG-OB only

Possible implementation status: Y = the whole band is available for PMSE L = Limited availability N = the band is not available for PMSE * - Individual licence may be required I – restrictions apply (e.g. geographical restrictions)

EU DECLARATION OF CONFORMITY

Number: **10045C000**

Name and address of the Manufacturer

Silvus Technologies, Inc.,
10990 Wilshire Blvd., Suite #1500
Los Angeles, CA 90024 U.S.A

This declaration of conformity is issued under the sole responsibility of the manufacturer.

Object of the declaration

Product information

StreamCaster:
SC4240EP-139-BB, SC4240EP-139-EB, SC4480E-139-SBST

Additional information

SW version : v4.0.2.7 (all models)
HW version : B1: SC4480E-139-SBST
B7: SC4240EP-139-BB
C7: SC4240EP-139-EB

The object of the declaration described above is in conformity with the relevant Union harmonisation legislation:

- References to the relevant harmonised standards used or references to the technical specifications in relation to which conformity is declared

Radio Equipment Directive 2014/53/EU	RoHS Directive 2011/65/EU
EN 301 489-1 V2.1.1 EN 301 489-28 V1.1.1 EN 302 064 V2.1.1 EN 62368-1 EN62311:2008	EN 50581:2012

The notified body

Name: TÜV SÜD America
Number: 1929

performed

- a conformity assessment of the technical construction file

and issued the certificate

NB06 002138 0004 Rev. 00

Additional information

N/A

Signed for and on behalf of: Silvus Technologies Inc

Authorised Representative:



Name and Surname / Function:

WeiJun Zhu, Vice President of Engineering

Date of Issue:

March 2, 2023

8.3 (-235467 Models)

The following Silvus Technologies models are declared to conform to CE Mark requirements:

Silvus P/N: SC4240EP-235467-BB, SC4240EP-235467-EB, SC4480E-235467-SBST

Relevant standards:

ETSI EN 302 064 V2.1.1 (2016-09), Wireless Video Links, Harmonized Standard

ETSI EN 301 489-1 V2.2.0 (2017-03), EMC, Common Technical Requirements

ETSI EN 301 489-28 V1.1.1 (2004-09), EMC, Specific conditions for wireless digital video links

EN 62368-1, Product Safety Standard

Frequency range: S band (2200MHz to 2500MHz)

C-1 band (4400MHz to 4940MHz)

Maximum RF power: In compliance with EN302-064, for Tx BW=20MHz, the output power must not exceed:

- For S-band, 27dBm/0.5W per channel
- For C-band, 24dBm/0.25W per channel

Antenna: 1.8-1.9dBi Dual Bands Omni Antennas (AOV2D235515G)

Cable: Silvus cable assembly (SC22-PRICBL02-6)

External Bandpass Filter:

Microwave Filter Co. model 3813

(a filter of equivalent performance may also be used, contact Silvus Technologies customer support for more information)

AC Adapter (if used): EDAC Power Electronics EA10523C-120 (this adapter is approved for indoor use only) (this adapter was certified by the manufacturer to IEC 60950-1)

External DC supply: If the customer provides DC power from their own source, the supply should be

fused for a 5-amp circuit

Safe Working Distance:

Maintain minimum safe working distance between radios & users by models below:

- SC42xx-235467, >34cm
- SC44xx-235467, >67cm

For more details, refer to TUV report no. 72171985D, "Radio Frequency Exposure Verification of the Silvus Technologies Inc. StreamCaster SC4240EP-235467 and SC4480E-235467 Tactical MIMO Radios. The CE Mark Technical File is available upon request for inspection.

To satisfy RF exposure requirements, this device and its antennas must operate with the minimum separation distances listed above from all persons and must not be co-located or operating in conjunction with any other antenna or transmitter, except in accordance with RED RF Exposure requirements.

This equipment has been constructed so that the product complies with the requirement of with Article 10(2) as it can be operated in at least one Member State as examined and the product is compliant with Article 10(10) as it has no restrictions on putting into service in all EU member states.

See restrictions mentioned in ERC Recommendation 25-10, Table 7-C2, for guidance of restrictions applicable to specific countries.

Table 7-C2: additional information regarding the national conditions for the identified tuning ranges for video PMSE applications - Band C2

Frequency Band	Country	Implementation	Conditions/remarks
C2 2025-2110 MHz	AUT	L [†]	Max. 10MHz Channels, max. 20dBW eirp, 2070-2090 MHz: Restricted to Broadcasters only. 2090-2110 MHz: Restricted to fire brigades and private users
	AZE	Y*	On a secondary basis
	BIH	L	PBS old MW link systems for PMSE. Military use in 2025-2110 MHz
	BUL	Y	ECC Report 219. Available for Cordless Cameras, Portable video links and Mobile video links
	CZE	Y*	The band may be used in the coordination with the Ministry of Defence of the Czech Republic. https://www.ctu.eu/sites/default/files/obsah/o-ctu/rsup-p_06_09-2014-07_en_.pdf , new version is available only in czech https://www.ctu.cz/sites/default/files/obsah/ctu/vyzva-k-uplatneni-pripominek-k-navrhu-opatreni-obecne-povahy-casti-planu-vyuziti-radioveho-spektra-c-pv-pi6xx.2017-yy-pro-kmitoctove-pasmo-1900-2200-mhz/obrazky/pv-p6-2017.pdf
	D	N	Deviations from the specifications in the Frequency Plan (FreqP) could be permitted for a limited time in accordance with §58 TKG. This is provided that the frequency usages indicated in the Frequency Ordinance (FreqV) and the Frequency Plan are not adversely affected (for more details see: https://www.bundesnetzagentur.de/cdn_1412/DE/Sachgebiete/Telekommunikation/Unternehmen_Institutionen/Frequenzen/SpezielleAnwendungen/Kurzzeitteilungen/kurzzeitteilungen-node.html)
	DNK	Y*	
	E	N	Band not available
	EST	L*	2075.25-2110 MHz SAP/SAB. See Regulation of Ministry of Communication and Economical Affairs 21.05.2013 No 35. Otherwise governmental use.
	F	L [†]	Temporary licenses, e.i.r.p. max = 10 dBW. Use of 10 MHz bandwidth centered on 2055 MHz and 2095 MHz for ground-to-ground link and 10 MHz bandwidth centered on 2065 MHz and 2105 MHz for air-to-ground link. Coordination required between assigning authorities (la Défense and Space) regarding the use of the other available bands in order to avoid harmful interference. ARCEP Decision 2016-1130
	FIN	L [†]	Cordless cameras, temporary use on a case- by-case basis. Standard EN 302064. Other use includes military use and space operation
	G	Y [†]	Technology and application neutral but typically used for wireless cameras, typically licensed at 100 mW e.r.p.
	GEO	L*	
	GRC	L [†]	Cordless Cameras. Portable/Mobile video links. 2087.5- 2108.5 MHz : not available (exclusive use by security services)
	HNG	N	Band not available (governmental use). However, the band may be used for short-term PMSE use if the user demand makes it necessary at certain occasions like main events. In this case the authority handles the requests on a case-by-case basis and if the frequency use can be authorised the users receive an individual license
	HOL	L*	2070-2110 MHz for ENG-OB only

Possible implementation status: Y = the whole band is available for PMSE L = Limited availability N = the band is not available for PMSE * - Individual licence may be required † – restrictions apply (e.g. geographical restrictions)

EU DECLARATION OF CONFORMITY

Number: 10046C000

Name and address of the Manufacturer

Silvus Technologies, Inc.,
10990 Wilshire Blvd., Suite #1500
Los Angeles, CA 90024 U.S.A

This declaration of conformity is issued under the sole responsibility of the manufacturer.

Object of the declaration

Product information

StreamCaster:
SC4240EP-235467-BB, SC4240EP-235467-EB, SC4480E-235467-SBST

Additional information

SW version : v4.0.2.7 (all models)
HW version : B1: SC4480E-235467-SBST
B7: SC4240EP-235467-BB
C7: SC4240EP-235467-EB

The object of the declaration described above is in conformity with the relevant Union harmonisation legislation:

- References to the relevant harmonised standards used or references to the technical specifications in relation to which conformity is declared

Radio Equipment Directive 2014/53/EU

EN 301 489-1 V2.1.1
EN 301 489-28 V1.1.1
EN 302 064 V2.1.1
EN 62368-1
EN62311:2008

RoHS Directive 2011/65/EU

EN 50581:2012

The notified body

Name: TÜV SÜD America
Number: 1929

performed

- a conformity assessment of the technical construction file

and issued the certificate

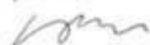
NB06 002138 0005 Rev. 00

Additional information

N/A

Signed for and on behalf of: Silvus Technologies Inc

Authorised Representative:



Name and Surname / Function:

WeiJun Zhu, Vice President of Engineering

Date of Issue:

March 2, 2023

8.4. (-235 Models)

The following Silvus Technologies models are declared to conform to CE Mark requirements:

Silvus P/N:

- **SC4240-235-BB, SC4240-235-EB**
- **SC4240EP-235-BB, SC4240EP-235-EB**
- **SC4480-235-SBST, SC4480E-235-SBST**
- **SC4240E-235-BB, SC4240E-235-EB**

Relevant standards:

- ETSI EN 302 064 V2.1.1 (2016-09), Wireless Video Links, Harmonized Standard
- ETSI EN 301 489-1 V2.2.0 (2017-03), EMC, Common Technical Requirements
- ETSI EN 301 489-28 V1.1.1 (2004-09), EMC, Specific conditions for wireless digital video links
- EN 62311, MPE (Maximum Permissible Exposures)
- EN 62368-1, Product Safety Standard
- EN 50581, RoHS (Restriction of Hazardous Substances)

Frequency range: S band (2200MHz to 2500MHz)

Maximum RF power: In compliance with EN302-064, the output power per channel must not exceed:

- For Tx BW=10MHz, 33dBm/2W per channel
- For Tx BW=20MHz, 27dBm/0.5W per channel

Antenna: 2.4dBi Omni Antennas (AOV2192)

Cable: Silvus cable assembly (SC22-PRICBL02-6)

External Bandpass Filter:

Microwave Filter Co. model 3813
(a filter of equivalent performance may also be used, contact Silvus Technologies customer support for more information)

AC Adapter (if used): EDAC Power Electronics EA10523C-120 (this adapter is approved for indoor use only) (this adapter was certified by the manufacturer to IEC 60950-1)

External DC supply: If the customer provides DC power from their own source, the supply should be fused for a 5-amp circuit.

Safe Working Distance:

Maintain minimum safe working distance between radios & users by models below:

- SC42xx-235, >0.4m
- SC44xx-235, >0.6m

For more details, refer to Nemko SC4240-235-EB & SC4480-235-SBST EN62311 MPE Reports “Radio Frequency Exposure Verification of the Silvus Technologies Inc. StreamCaster SC4240-235 and SC4480-235 Tactical MIMO Radios. The CE Mark Technical File is available upon request for inspection.

To satisfy RF exposure requirements, this device and its antennas must operate with the minimum separation distances listed above from all persons and must not be co-located or operating in conjunction with any other antenna or transmitter, except in accordance with RED RF Exposure requirements.

This equipment has been constructed so that the product complies with the requirement of with Article 10(2) as it can be operated in at least one Member State as examined and the product is compliant with Article 10(10) as it has no restrictions on putting into service in all EU member states.

Table 7-C2: additional information regarding the national conditions for the identified tuning ranges for video PMSE applications - Band C2

Frequency Band	Country	Implementation	Conditions/remarks
C2 2025-2110 MHz	AUT	L*	Max. 10MHz Channels; max. 20dBW eirp; 2070-2090 MHz: Restricted to Broadcasters only. 2090-2110 MHz: Restricted to fire brigades and private users
	AZE	Y*	On a secondary basis
	BIH	L	PBS old MW link systems for PMSE. Military use in 2025-2110 MHz
	BUL	Y	ECC Report 219: Available for Cordless Cameras, Portable video links and Mobile video links
	CZE	Y*	The band may be used in the coordination with the Ministry of Defence of the Czech Republic. https://www.ctu.eu/sites/default/files/obsah/o-ctu/rsup-p_06_09-2014-07_en_.pdf , new version is available only in czech https://www.ctu.cz/sites/default/files/obsah/ctu/vyzva-k-uplatneni-pripominek-k-navyhu-opatreni-obecne-povahy-casti-planu-vyuziti-radioveho-spektra-c-pv-p/6/xx.2017-yy-pro-kmitoctove-pasmo-1900-2200-mhz/obrazky/pv-p8-2017.pdf
	D	N	Deviations from the specifications in the Frequency Plan (FreqP) could be permitted for a limited time in accordance with §58 TKG. This is provided that the frequency usages indicated in the Frequency Ordinance (FreqV) and the Frequency Plan are not adversely affected (for more details see: https://www.bundesnetzagentur.de/cdn_1412/DE/Sachgebiete/Telekommunikation/Unternehmen_Institutionen/Frequenzen/SpezielleAnwendungen/Kurzzeitteilungen/kurzzeitteilungen-node.html)
	DNK	Y*	
	E	N	Band not available
	EST	L*	2075-25-2110 MHz SAP/SAB. See Regulation of Ministry of Communication and Economical Affairs 21.05.2013 No 35. Otherwise governmental use.
	F	L*	Temporary licenses, e.i.r.p. max = 10 dBW. Use of 10 MHz bandwidth centered on 2055 MHz and 2095 MHz for ground-to-ground link and 10 MHz bandwidth centered on 2065 MHz and 2105 MHz for air-to-ground link. Coordination required between assigning authorities (la Défense and Space) regarding the use of the other available bands in order to avoid harmful interference. ARCEP Decision 2016-1130
	FIN	L*	Cordless cameras, temporary use on a case- by-case basis. Standard EN 302064. Other use includes military use and space operation
	G	Y*	Technology and application neutral but typically used for wireless cameras, typically licensed at 100 mW e.i.r.p.
	GEO	L*	
	GRC	L*	Cordless Cameras. Portable/Mobile video links. 2087.5- 2108.5 MHz : not available (exclusive use by security services)
	HNG	N	Band not available (governmental use). However, the band may be used for short-term PMSE use if the user demand makes it necessary at certain occasions like main events. In this case the authority handles the requests on a case-by-case basis and if the frequency use can be authorised the users receive an individual license
	HOL	L*	2070-2110 MHz for ENG-OB only

Possible implementation status: Y = the whole band is available for PMSE L = Limited availability N = the band is not available for PMSE * - Individual licence may be required I – restrictions apply (e.g. geographical restrictions)

ARABIC 38 Additional Restrictions on Band C2

See restrictions mentioned in ERC Recommendation 25-10, Table 7-C2, for guidance of restrictions applicable to specific countries.



Notified Body 0470 – Radio Equipment Directive 2014/53/EU

EU-Type Examination Certificate

0470-RED-253121

In compliance with Radio Equipment Directive 2014/53/EU of the European Parliament and of the Council of 16 April 2014 on the harmonisation of the laws of the Member States relating to the making available on the market of radio equipment, this certificate applies to the product(s)

Product(s): STREAMCASTER MIMO radios
Model(s): SC4240-235, SC4480-235
Variants: See Annex

Placed on the market under the name or trademark of

Silvus Technologies, Inc
10990 Wilshire Blvd #1500,
Los Angeles, CA 90024, USA

This certificate attests that we, as EU Notified Body number 0470, have examined the technical documentation and supporting evidence for the above-listed equipment and found it to comply with the requirements of Annex III Module B of Radio Equipment Directive 2014/53/EU in relation to the following essential requirements covered by the examination:

Article 3.2 in respect to the use of the Radio Spectrum

This is based on an examination of the following Technical Documentation file. Please refer to the Annex for further technical details.

Technical Documentation File: CER221338

Certificate Version: 1.0

Authorized Signatory

Jin Xu, Senior Technical Assessor

Date Issued

5 / 8 / 2025

Day / Month / Year

This certificate has been Issued by Nemko Group AS, Philip Pedersens vei 11, NO-1366 Lysaker, Norway

This certificate remains valid, unless cancelled or revoked, provided the conditions indicated in the subsequent page(s) are complied with and the product remains satisfactory in service. This certificate will not be valid if the applicant makes any changes or modifications to the approved product, which have not been notified to, and agreed in writing with Nemko. Should the specified regulations or standards be amended, the products are to be re-approved prior to being placed on the market. Nemko is designated by the Norwegian Notified Authority as a Notified Body under the terms of the Norwegian regulations. This certificate is issued within the scope of the "Provisions for certification - Electrical products - Radio Equipment Directive 2014/53/EU" (Nemko C355), which is available on request.

Any person not a party to the contract pursuant to which this document is delivered may not assert a claim against Nemko for any liability arising out of errors or omissions which may be contained in said document, or for errors of judgement, fault or negligence committed by personnel in the establishment or issuance of this document, and in connection with any activities for which it may provide.



Annex to EU-Type Examination Certificate

PRODUCT DESCRIPTION

Equipment description: High-throughput wireless MIMO OFDM transceiver
 Model / type: SC4240-235, SC4480-235
 Variant Model(s): Same product as standard radio type with enhanced features:
 SC4240-235-EB
 SC4240-235-BB
 SC4240E-235-EB
 SC4240EP-235-EB
 SC4240E-235-BB
 SC4240EP-235-BB
 SC4480-235-SBST
 SC4480E-235-SBST
 Brand / trade name: Silvus Technologies
 Supply voltage: SC4240-235 9-20 Vdc, 24 W (6.8 Ah Battery)
 SC4480-235 9-20 Vdc, 43 W (6.8 Ah Battery)
 Antenna type: External antenna

TECHNICAL CHARACTERISTICS

Radio Type	Frequency Range	EIRP Power	Modulation
MIMO Coded-OFDM Model: SC4240-235	2200 – 2300 MHz 2300 – 2400 MHz 2400 – 2500 MHz	4 W	OFDM
MIMO Coded-OFDM Model: SC4480-235	2200 – 2300 MHz 2300 – 2400 MHz 2400 – 2500 MHz	8 W	OFDM

TYPE EXAMINATION DOCUMENTATION

Article(s)	Assessed Standards	Test Report	Issued by
3.2	EN 302 084 V2.1.1	346287-1TRFWL	Nemko USA, Inc.

ADDITIONAL DOCUMENTATION

- RED technical file by Silvus Technologies Inc dated: 2018-05-31
- Silvus Technologies Model Difference Letter dated: 2020-03-30

ADDITIONAL INFORMATION

None.

CERTIFICATE REVISION

Revision #	Date	Description
1.0	08/05/2025	Initial Issue



DECLARATION OF CONFORMITY

Number: **10083C000**

Name and address of the Manufacturer

Silvus Technologies, Inc.,
10990 Wilshire Blvd., Suite #1500
Los Angeles, CA 90024 U.S.A

This declaration of conformity is issued under the sole responsibility of the manufacturer.

Object of the declaration

Product information

StreamCaster:
SC4240-235-BB, SC4240-235-EB,
SC4240E-235-BB, SC4240E-235-EB
SC4240EP-235-BB, SC4240EP-235-EB
SC4480-235-SBST, SC4480E-235-SBST

Additional information

SC4240-235: 4W, 9-20V dc, 24W (6.8 Ah Battery)
SC4480-235 8W, 9-20V dc, 43W (6.8 Ah Battery)

The object of the declaration described above is in conformity with the relevant Union harmonisation legislation:

- References to the relevant harmonised standards used or references to the technical specifications in relation to which conformity is declared

Radio Equipment Directive 2014/53/EU

EN 301 489-1 V2.2.3
EN 301 489-28 V2.1.1
EN 302 064 V2.1.1
IEC 62368-1
EN 62311:2008

RoHS Directive 2011/65/EU

EN 50581:2012

The notified body

Name: Nemko
Number: 0470

performed

- a conformity assessment of the technical construction file

and issued the certificate

047-RED-253121

Additional information

N/A

Signed for and on behalf of: **Silvus Technologies Inc.**

Authorised Representative:

Name and Surname / Function:

Weijun Zhu, Vice President of Engineering

Date of Issue: 8/29/2025

9 ISED Canada Notice

9.1 IC: 24980-SC42E245

Silvus model #: SC4210E-245-EB. Note that the SC4210E is a subset of the generic SC4200E, the "1" in the model # indicates it is a 1-watt maximum output power product or if lower the limits found by the ISED testing.

Equipment Class: Digital Transmission System

The following parameters must be used to be compliant to the appropriate ISED requirements:

Antennas: 2.1dBi Omni Antennas (Silvus AOV2D230515) & 4dBi Omni Antennas (Silvus AOV4S235)

Bandwidth: 10MHz

Maximum 10MHz Bandwidth Output Power @ Frequency #1: 789.84mW @ 2430MHz

Maximum 10MHz Bandwidth Output Power @ Frequency #2: 790.06mW @ 2440MHz

Bandwidth: 20MHz

Maximum 20MHz Bandwidth Output Power @ Frequency #1: 123.82mW @ 2440MHz

Modulation and Coding Schemes tested: MCS0 to MCS15

9.2 Software License

A Software License is used to ensure only parameters and limits that are allowed by the ISED certificate shown in section 15.1 can be selected. These parameters include Frequency, Output Power, Modulation and Bandwidth.

9.3 Firmware Encryption

The details of our Firmware Encryption are considered proprietary and are discussed in depth in the submitted document SC4210E-245 Circuit Description v1.2 section 1.5. Also described is the method to ensure only Silvus released firmware and Software License can be loaded on the product. This will ensure only the parameters and limits that are allowed by the Industry Canada certificate shown in section 15.1 can be selected.