VISLINK

LIVEGEAR

NewStream

Multi-mode Mobile Transmit System

User and Technical Manual

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General Safety Information The following safety requirements, as well as local site requirements and regulations, must be observed by personnel operating and maintaining the equipment covered by this manual to ensure awareness of potential hazards. 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. If not installed and used in accordance with the instruction manual, it 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.

About this Manual This manual is intended for use by qualified operators, installers, and service personnel. Users of this manual should already be familiar with basic concepts of radio, video, and audio. For information about terms in this manual, see *Glossary of Terms and Abbreviations [*Part No. 400576-1]. Pay special attention to Notes, Cautions, and Warnings.

- Read NOTES for important information to assist you in using and maintaining the equipment
- Follow CAUTIONS to prevent damage to the equipment.
- Follow WARNINGS to prevent personal injury or death.

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Safety Instructions

- Always use the correct power source during operation to avoid damaging the product.
- Rough handling of the product may cause physical damage or malfunction.
- It is not recommended to use NewS*tream* in harsh weather conditions or very low or high temperatures.
- To ensure that the warranty remains valid, please do not disassemble the unit.

Internal Battery

The NewS*tream* IDU contains one lithium coin battery for the maintenance of the time and date function.

- This battery is rechargeable and should last the life of the NewS*tream.*
- The battery is nonreplaceable. Contact the factory should you experience an issue with the time and date functionality.

WARNING:

If you modify the product without authorization from Vislink, you will void the warranty.

CAUTION:

Risk of explosion if battery is replaced by an incorrect type.

Dispose of used batteries properly.

Unpacking the NewS*tream* Transmitter

Before you install your new equipment, carefully unpack your new equipment to avoid accidental damage.

- Locate all parts and accessories and verify that they are listed on the packing list. DO NOT discard the container or packing material until you have inspected the equipment and are sure there is no shipping damage. The container and packing must be available in case you need to file a damage claim with the shipping carrier.
- Inspect the equipment for damage and ensure that it is clean and dry.
- Inspect the cables, connectors, switches, and displays to ensure that they are not broken, damaged or loose.

If you discover damage after unpacking the system, report the damage as follows:

- Immediately file a claim with the shipping carrier.
- Forward a copy of the damage report to Vislink Customer Service.
- Contact Vislink Customer Service to determine the disposition of the equipment. Refer to the section on the last pages: *Support for Your Vislink Product*.

Introduction

NewS*tream* is a rack-mounted microwave van transmit system designed to combine transmission technologies into a single 2 RU chassis platform. It is designed to make the gathering and transmission of news events a seamless and comprehensible task. NewS*tream* offers multi-mode operations which can include:

- ENG [Electronic News Gathering]
- SNG [Satellite News Gathering (Upgrade Option)]
- CNG [Cellular News Gathering (Upgrade Option)]

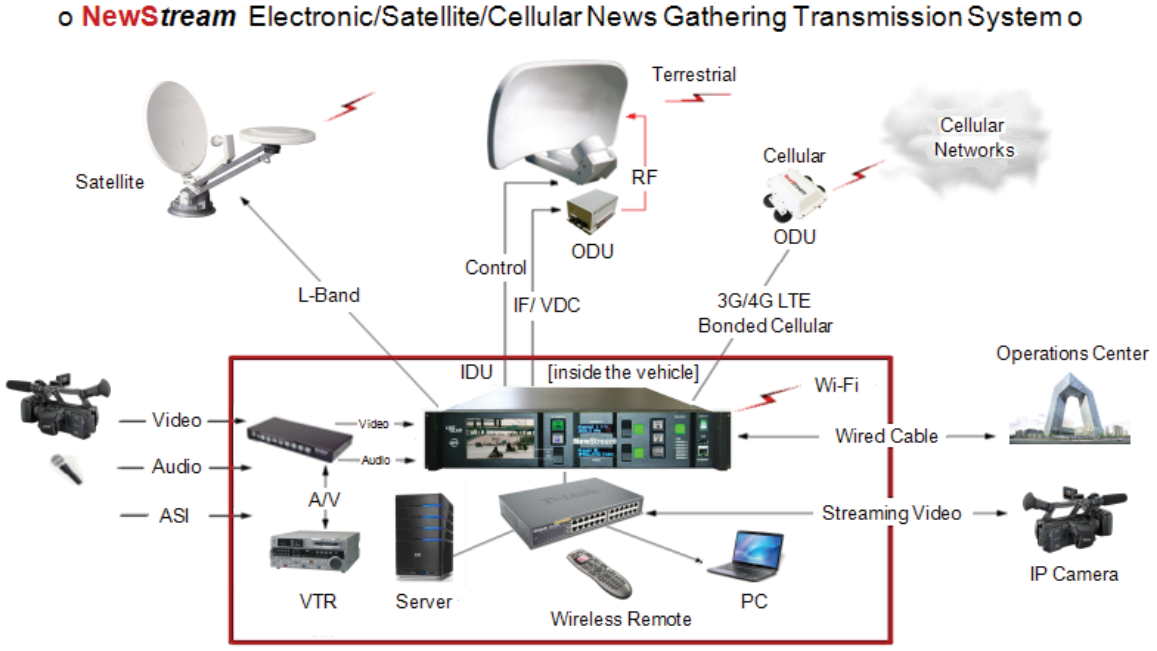
The LiveGear Receiver [LGR-1000] is a playout device that receives NewS*tream* IP transmissions via the Internet and provides an HD/SD-SDI output. Up to six New-S*tream* transmitters can be received simultaneously using one LiveGear Receiver.

You can also use the VMS-1100 video media server to transcode the IP transport stream from the LiveGear Receiver for delivery to laptops, desktops, smartphones and tablets.

Advanced Vislink algorithms provide efficient, robust, and persistent video transmissions of unmatched quality. NewS*tream* aggregates multiple 3G/4G LTE cellular channels and optimizes data throughput. This mobile unit delivers consistently smooth and dependable pictures and sound despite the occasional cellular traffic surge or spotty signal.

Leading-edge H.264 adaptive bitrate encoding technology provides remarkable video resolution with minimal latency. NewS*tream* transmits at approximately half of the data rate required by MPEG-2 based systems. Lost or stalled data packets are seamlessly compensated for with Vislink's exclusive predictive forward error correction algorithms. This feature provides unparalleled signal integrity throughout your entire event coverage.

Figure 1: NewS*tream* Functional Diagram



Features

- The award-winning NewS*tream* system offers multi-mode operation which can include:
  - ENG [Electronic News Gathering]
  - SNG [Satellite News Gathering]
  - CNG [Cellular News Gathering]
- Transmission Integrity – Consistent Microwave, Cellular and Satellite transmission is possible using the NewS*tream* system. Multiple aggregated 3G/4G LTE internal modems are optimized to provide regulated and consistent video transmission data throughput. NewS*tream* utilizes up to six cellular modems to improve persistence and network diversity. Service providers may be mixed and matched to provide optimum network performance according to regional network coverage. Data rates for each modem channel are continuously adapted to meet the real-time network transfer rate. An additional modem provides Internet connectivity to communicate across all active modems.
- Video Quality – Efficient adaptive bit rate algorithms maximize video data throughput producing remarkable video resolution with minimal latency in the presence of dynamic cellular network fluctuations.
- HD/SD Broadcast Video Quality: User - selectable MPEG-2 4:2:2/4:2:0 [ENG/SNG] or H.264 [AVC] 4:2:0 [CNG] encoding profiles. Video Inputs for the NewS*tream* system include composite and HD/SD-SDI video.
- Reliability – Using wireless 3G/4G LTE cellular, Wi-Fi satellite backhaul communication infrastructures, NewS*tream* delivers video/audio signals when and where you want them.
- Power Capabilities – NewS*tream* can operate continuously using your van's DC-to-AC inverter outlet.
- Configuration Options – Use a laptop with an Internet connection to configure NewS*tream* from its Web interface. Wireless configuration is possible using a PC, tablet or smartphone when the NewS*tream* IDU is connected to a wireless access point.
- Incorporates dual mode ENG/SNG [upgrade option]: DVB-S and DVB-S2 modulation with 10 MHz high stability reference crystal oscillator.
- Common Multi-mode Modulator and Encoder
- Simplified User Interface: Ergonomic programmable multi-function OLED pushbutton switches minimize front panel controller congestions.
- Cost effective, space saving, comprehensive multi-purpose outside broadcasting microwave transmission system.
- Incorporates leading-edge wireless technologies

Features [continued]

- Compact, space-efficient 2RU x 19” EIA all-inclusive rack mount design for ENG, CNG and SNG control [CNG and SNG are Upgrade Options].
- Preserves legacy BAS ENG Van Transmission functionality: the NewS*tream* system allows use of existing ENG Nycoil Assemblies configured for Type N, TNC or Triax connections.
- Space Efficient ENG ODU: 2, 4, 7, 13, 2/7 GHz mast-mounted single enclosure with built-in RF coaxial relay for omni-directional antenna selection.
- Broadband Cellular ODU: Lightweight mast or roof-mounted cellular ODU equipped with multiple bonded cellular modems and integral high-gain broadband cellular antennas.
- ENG Encoding: MPEG-2, H.264 HD/SD, 4:2:2/4:2:0
- CNG Encoding: H.264 AVC high-profile @ level 4.1 adaptive bit-rate coding [ABR] encoding. [Upgrade Option]
- SNG Encoding: MPEG-2, H.264 HD/SD, 4:2:2/4:2:0 [Upgrade Option]
- ENG Modulation: COFDM [DVB-T]
- CNG Modulation: COFDMA, CDMA
- SNG Modulation: DVB-S QPSK, DVB-S2
- Audio: Four embedded SDI MPEG-2 layer II and two Analog stereo pairs
- Access – The VMS-1100 base system transcodes and streams out to multiple-edged viewing devices such as smartphones, tablets and laptop computers.

Figure 2: NewS*tream* Outdoor Unit Application

System Description

The NewS*tream* compact video transmitter system provides reliable and flexible microwave modulation, Cellular/Wi-Fi and MPEG2,/H.264 encoding functions. The NewS*tream* system includes an Indoor Unit [IDU] consisting of the 19-inch wide, 2-rack unit [2RU] high, rack-mounted transmitter, as shown in Figure 3, and a mast-mounted Microwave Outdoor Unit [ODU] or RF Unit [RFU]. The ODU is also known as an RF head and/or Cellular Outdoor Unit [C-ODU] on-roof mounted units.

The NewS*tream* IDU is typically mounted in a standard 19-inch [48.3 cm] rack for mobile installations and the ODU is mounted on an antenna mast. The IDU contains the baseband circuitry, power supply and control modules. It accepts a wide variety of audio and video inputs, both analog and digital and generates a 70 MHz IF for legacy heads and 950 MHz IF for NewS*tream* heads.

The IDU can be locally controlled from its front panel or remotely from a PC, tablet or smartphone over an IP connection using the NewS*tream'*s Web browser graphical user interface [GUI].

The IDU directs overall system control such as video encoding, modulation and power distribution. The NewS*tream* transmitter supports Cellular video streaming, MPEG2 HD and SD encoding, H.264 HD/SD encoding, AES/EBU and Analog audio, ASI input and output, as well as various modulations and rates.

Figure 3: NewS*tream* Indoor Unit

The NewS*tream* transmitter system [ENG] supports both single and dual band operation. The IDU can interact with legacy MTX ODUs or new improved performance NewS*tream* ODUs which can be single or dual band in the same ODU housing.

NewS*tream* is a video transmission system with digital modulation capabilities which provides a sophisticated user interface with an adjustable color LCD display panel with touch screen control. An analogous Web interface enables remote control of the system.

A fully equipped NewS*tream* system is High Definition-ready and provides a robust HD link from the field to the studio with several digital video input formats accepted. In addition, NewS*tream* accepts analog audio inputs.

NewS*tream* ODUs can be single or dual band configurations and come in many different RF bands. These ODUs contain integrated RF up-conversion circuitry and high power RF amplifiers for maximum power and signal quality. With the new demands for digital modulation, the ODUs have been optimized for improved Modulation Error Ratio/Error Vector Magnitude [MER/EVM] performance with COFDM transmission.

Operational Modes

The following NewS*tream* IDU and ODU I/O connections are available:

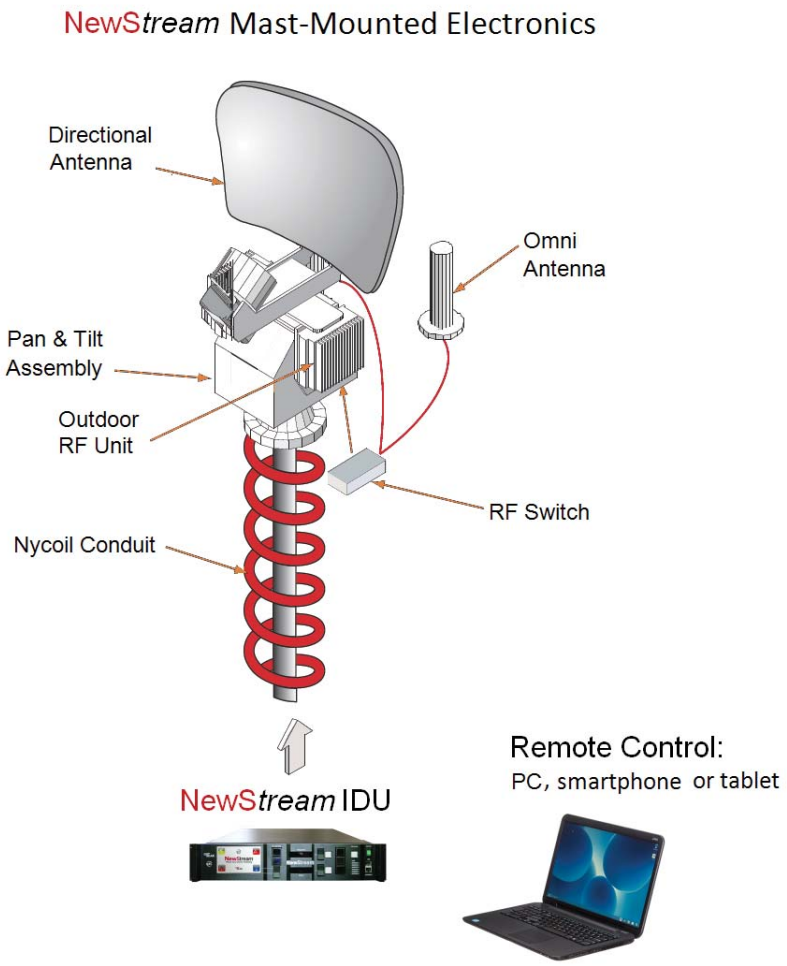
- Video and Audio:
  - HD/SD SDI video input. One dedicated BNC connector.
  - Analog composite video input. One dedicated BNC connector.
  - AES/EBU Audio input. Two AES/EBU channels supported through DB25 connector.
  - Analog Audio input. Two analog stereo pairs supported through DB25 connector.
  - Unbalanced 75 Ohm audio input. One AES audio supported through DB25 connector.
- Transport Stream:
  - ASI Transport Stream MPEG2 format input. One dedicated BNC connector.
- Data Interfaces:
  - USB interface. One USB connector on system front.
  - Ethernet interfaces. Total of three Ethernet RJ-45 connectors.
  - Serial interface. Two serial inputs/outputs supported through DB9 connector; one DB15 serial connector exclusively for Wayside Data.
- ODU to IDU interfaces [one each]:
  - Ethernet Interface via Multimedia over Coax Alliance [MoCA] RF interfaces.
  - ODU 1 port provides either 950 MHz or 70 MHz depending on type of ODU [i.e. legacy or NewS*tream*].
  - ODU 2 port provides 70 MHz for legacy ODU when dual band legacy ODUs are in use. Note that legacy and NewS*tream* ODUs cannot be connected simultaneously.
  - Satellite Device attached to L-Band out
  - Test Loopback device attached to L-Band Monitor
  - Cellular ODU attached to Cellular ODU port

NOTE: *Features not implemented in the version that you have purchased are listed as **upgrade options**. Contact your Vislink representative for more information.*

The ODU shown in Figure 4, performs the signal up-conversion from 70 MHz IF to RF [2 GHz or 7 GHz] and provides signal amplification, as required.

The NewS*tream* IDU is typically mounted in a standard 19-inch [48.3 cm] rack for mobile installations and the ODU is mounted on an antenna mast. The IDU contains the baseband circuitry, power supply and control modules. It accepts a wide variety of audio and video inputs, both analog and digital and generates a 70 MHz IF output from the rear panel and 70 MHz IF for control of a legacy ODU. The IDU also accepts ASI from external encoders.

Figure 4: NewS*tream* System Components



The IDU can be controlled locally from the front panel controls or it can be controlled remotely. The IDU can be controlled from a PC at a remote location, such as a studio, via the Google Chrome Web browser. A PC, tablet or smartphone can also be used to provide remote control of the IDU during mobile operations.

All installations include an antenna, either directional, omni-directional or both. A legacy Vislink RF switch can used on the antenna mast to select the antenna required or a built-in RF switch when using NewS*tream* ODUs can also be used. Antenna feed power and control is available at the ODU via an 8 pin circular connector.

When using the mast-mounted antenna[s], a Nycoil conduit sheath covers the wiring harness between the IDU and the ODU, as shown in Figure 4. The wiring harness carries the DC power, IF control, and antenna band and polarization switching control. Additional wiring is contained in the Nycoil conduit sheath for controlling the antenna pan and tilt mechanism and for implementing additional functions such as off-air monitors, mast lights, etc.

Operating Controls

All controls are located on the front panel of the NewS*tream* IDU. Transmitter functions are controlled using the OLED buttons and switches, as shown in Figure 5. The Liquid Crystal Display [LCD] touchscreen controls Remote/Local control, firmware upgrades and IP addressing of the IDU.

Figure 5: NewS*tream* IDU Front Panel Operating Controls

The LCD with touch screen, buttons and function keys are used to select control and diagnostic menu screens for both the IDU and the ODU. Option buttons displayed on the LCD are used to control Preset selection, RF band selection, channel selection, antenna selection, antenna polarization, transmitter operation, power [low, high or adjustable], and to monitor the status of the IDU and ODU. The option buttons displayed on the LCD may be selected using either the color LCD display panel touch screen or the function keys. Table 1 lists the functions and displays of the controls.

NOTE: *When the IDU is shut down all the component variables are saved at the last state with which the IDU was configured. The exceptions to this are the following states: Microwave Power Amplifier, Satellite RF Carrier and Cellular Cell Transmit which always default to* ***Off*** *on IDU powerup.*

Table 1: NewS*tream* Front Panel Operating Controls & Connections

Control/ Connection	Type	Button Text	Functions
A: Liquid Crystal Display	Capacitive Touch TFT 5 in. [diag.] display	n/a	This LCD displays: • confidence video monitor; • alarm & status information; • microwave & satellite RF Power readout; • setup screens to configure IP address, local / remote mode and firmware updates
B: RF Power Adjust	Rocker Switch	n/a	The **Microwave Mode** rocker switch allows: • adjustment of Radio Frequency Power up & down. The **Satellite Mode** rocker switch allows: • adjustment of L-Band Power up & down.
C: Microwave/ Satellite Switch	OLED Multi-function Pushbutton Switch	**PA HI** **PA LOW** **MOD ON** **MOD OFF**	The **Microwave** button allows: • setting of RF Power to High, Low • indicates PA ADJ [i.e. ADJ = Adjustable] mode. The **Satellite Mode** button allows: • setting of state change of Modulation to on or off.
D: Microwave/ Satellite Switch	OLED Multi-function Pushbutton Switch	**PA ON** **PA OFF** **CW ON** **CW OFF**	The **Microwave Mode** button allows: • setting of Power Amplifier to on or off. The **Satellite Mode** button allows: • setting of RF Carrier on or off.
E: Frequency Display	16x2 OLED Display	n/a	The **FREQUENCY** display shows: • active frequency & channel number; • allows scrolling through pre-stored frequency & channel plan [using rocker switch G].
F: Preset Display	16x2 OLED Display	n/a	The **PRESET** display shows: • active preset name & number and operating mode; • allows scrolling through pre-stored presets or operating modes [using rocker switch H].
G: Frequency Selection	Rocker Switch	n/a	This switch allows scrolling through a pre-stored frequency & channel plan.
H: Preset Selection	Rocker Switch	n/a	This switch allows scrolling through pre-stored presets or operating modes
I: Enter Frequency	Illuminated Pushbutton Enter Switch	n/a	This button provides a means to select a new frequency.
J: Enter Preset	Illuminated Pushbutton Enter Switch	n/a	This button provides a means to select a new preset value.
K: Antenna Polarity Selection Switch	OLED Multi-function Pushbutton Switch	**Pol V** **Pol H** **Pol RC** **Pol LC**	The Antenna Polarity [Pol] selection button: • V - sets Vertical Antenna Polarity; • H - sets Horizontal Antenna Polarity; • RC - sets Right Circular Antenna Polarity; • LC - sets Left Circular Antenna Polarity.
L: Antenna Selection Switch	OLED Multi-function Pushbutton Switch	**ANT 1** **ANT 2**	The Antenna selection button: • ANT 1 - selects Antenna 1; • ANT 2 - selects Antenna 2.

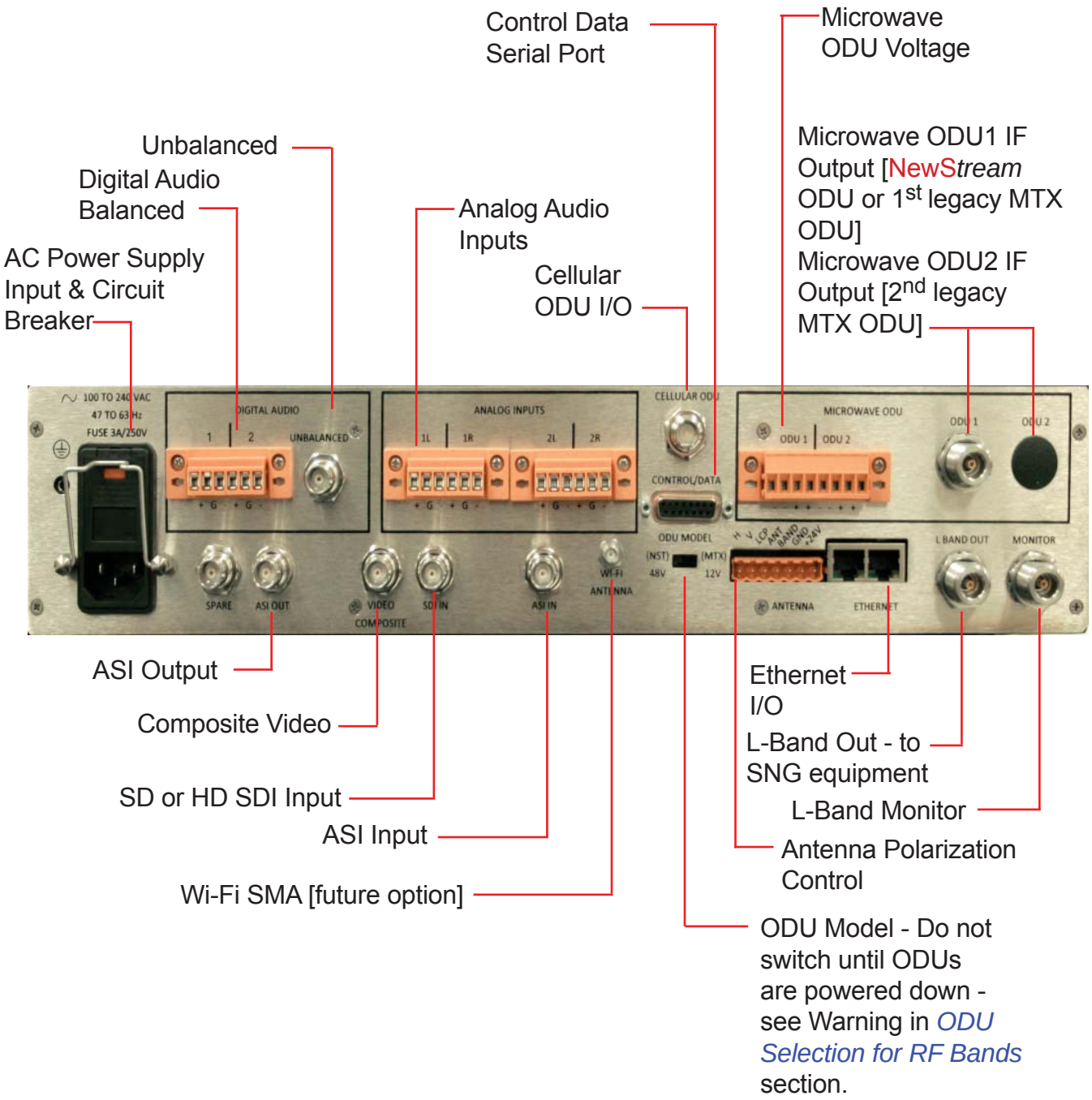
Table 1: NewS*tream* Operating Controls & Connections [continued]

Control/ Connection	Type	Button Text	Functions
M: RF Band Selection Switch	OLED Multi-function Pushbutton Switch	**Indicates the current band**	The RF Band selection button: This band depends upon the type of ODU that is connected.
N: Cellular Control	LED Indicators	n/a	These indicators display the status of the transmission strength of the six cellular modems. The LEDs are lit: • green to indicate LTE/4G cellular transmission, which is the optimum;
O: Start or Stop Cellular Transmission	Illuminated Pushbutton Enter Switch	n/a	This button provides a means to start or stop cellular transmission. This button also indicates: • when lit - Cellular modems are transmitting & • when unlit - Cellular modems are in stand-by mode.
P: ON/OFF:	Rocker Style Power Switch	n/a	This button applies or removes power to the NewS*tream* transmitter.
Q: ETHERNET Port	Ethernet connection plug	n/a	This port provides a connection to access a Web browser via a PC or mobile device for setup control & monitoring.
R: USB Port	USB connection plug	n/a	The USB Connector provides a connection to upgrade system firmware.

Connections

Connections to the NewS*tream* transmitter are shown in the illustration below. The Video input BNC connector, external antenna, power switch and SIM slots are located on the right side of NewS*tream*.

Figure 6: NewS*tream* IDU Rear Panel Connections/Controls



IDU Local Operation

The NewS*tream* IDU front panel provides monitoring and control of the entire system. The Liquid Crystal Display [LCD] touchscreen provides menu screens for the set-up, control and diagnostic status of both the IDU and ODU [see Figure 5 item A]. The LCD also provides a preview monitor of the source video that is being transmitted by ENG, SNG or CNG. If you are not in a sub-menu, the preview video is displayed. If there is no video feed, the screen is blank. To change the control from Remote to Local, use the **Configuration Mode** touchscreen, and example of which is shown in Figure 20.

In addition to the main control LCD there are presets and frequency displays where current preset mode and operation frequency are presented. Dedicated Organic Light-Emitting Diode [OLED] buttons, rocker switches and lighted Enter buttons allow for modification of preset and frequency [see Figure 5 items E, F, G, H, I and J].

You can interact with the system via the touchscreen display or through function keys. The front panel control display can be used for local control. The Web interface also allows remote control of NewS*tream*. Local control is preferred by operators who do not want others to reconfigure NewS*tream* while they are controlling it; the LCD provides a means to set local control. You can always use the Web interface to access information and to determine status of NewS*tream*, even when the operator has the IDU in local mode. The Web interface is available for control of NewS*tream* only when it has been set to remote control by the local operator.

For quick system setup, dedicated controls exist on the front panel such as: preset selection, operating frequency selection and ODU controls. When you press the On/Off button on the front of NewS*tream* [see Figure 5 item P], NewS*tream* begins the boot up process. This process starts with the On/Off button illuminating green and the touchscreen displaying a Vislink logo. The start up time is approximately 40-45 seconds.

Once NewS*tream* is fully booted up, the touchscreen displays the video preview, as well as the status indicators. The OLED buttons and 16x2 Frequency and Preset indicators [see Figure 5 items E and F] display the last state configured, except for the buttons that control RF power, which are automatically set to Off upon applying power to the transmitter, and for any major operational change to the system including preset change, frequency change, and band change.

Changing Presets

There are three factory installed presets that you can use to begin operating NewS*tream*. The 16x2 Preset display [see Figure 5 item F] allows you to scroll through the list of loaded presets via the rocker switch [see Figure 5 item H]. The rocker switch always increments the preset number. If you continue to press the switch to the end of the list in one direction, the list wraps around and starts again as you continue pressing the rocker switch. As you scroll through the preset list and select a valid preset, by pressing the Set Preset [Enter] indicator button [see Figure 5 item J], the Enter button begins blinking amber. If an invalid preset is selected due, for instance, to not having the proper modules or license installed in NewS*tream*, then the Set Preset Enter button is lit red.

When you locate the preset that you want to load, press the blinking **Enter Preset** button [Figure 5 item J]. This action automatically turns off any NewS*tream* RF transmitting device [for example: PA On, Carrier On or Cellular On]. The Enter button will not be illuminated indicating that the NewS*tream* operating system has begun loading the selected preset. Once the preset has been loaded, the Enter button is lit green, indicating that the preset is operating normally. The 16x2 Preset display also shows the preset that you have selected. Note that the preset loading state may last ten or more seconds if you are switching from one operating mode to another [for example ENG to SNG].

The top line of the Preset 16x2 display presents PRESET, the preset's number [1-99] and the mode of operation. The second line displays The name that you have assigned it up to 16 characters. If the name is greater than 16 characters, the display will scroll through the entire name and then revert back to the first 16 characters, providing the ability to ensure that the correct preset has been selected.

Preset Naming Using the Preset Display

- ENG and SNG cannot be used at the same time therefore only one active ENG or SNG preset is valid.
- CNG mode can be used simultaneously with ENG / SNG or independently.
- Each preset name displays a prefix of one of the following types:
  - ENG – indicating microwave preset capability
  - SNG – indicating satellite preset capability
  - CNG – indicating cellular preset capability
  - ENG/CNG – indicating simultaneous microwave and cellular operation
  - SNG/CNG – indicating simultaneous satellite and cellular operation
  - MANUAL – indicates that NewS*tream* is not operating in a preset mode. Manual mode can be employed when an operator wants to test a setting without modifying an existing preset.

Preset names can be duplicated in the radio, however NewS*tream* differentiates presets by the index number. It is not recommended to duplicate preset names since it can cause issues with preset reordering. Up to 99 presets can be saved on NewS*tream*.

The first line of the character display shows one of the 6 preset prefixes followed by the preset number. If the mode is manual, then the preset number is not displayed. The second line of the character display shows the preset name, or it shows No Preset if you are in Manual Mode.

Changing Channels

The 16x2 Frequency display presents the current Channel number on the top line, as well as the frequency of the channel on the bottom line [see Figure 5 item E]. The available Channel selection depends on the type of ODU and preset selected [ENG vs SNG]. Refer to the Change ODU [RF Bands] section to learn how frequency bands are selected, and Change Preset to determine how presets are changed.

You can scroll through the available channels in this frequency mapping for this particular frequency and ENG or SNG mode via the rocker switch [see Figure 5 item G]. The rocker increments the channel number. If you press the rocker switch until the end of the list in one direction, the list starts again. The Enter channel button will blink amber when viewing a channel that is different from the currently active channel.

Press the blinking **Enter Channel** button when you locate the desired channel [see Figure 5 item I]. This will automatically turn off any RF transmitting device in NewS*tream* [PA on, Carrier on or Cellular On]. The button is lit green to indicate that NewS*tream* accepted the state change and is operating correctly. The 16x2 Frequency display presents a message: **Channel Loading** on the first line and **Please Wait** on the second line.

Once the channel has been loaded, the amber button is lit green. The 16x2 Frequency display presents the channel that you selected. Should the channel not be set, the Enter channel button will blink red for 5 seconds and then stays red and an alarm will indicate that there was a problem with the channel selection.

USB Interface

The USB interface [see Figure 5 item Q] provides a connection to upgrade system firmware. Refer to *Software Upgrade Process* for more information. You have the option of recovering your NewS*tream* system using the USB port to activate System Failure Recovery. See the *System Failure Recovery Process* for details. You may also use this port to export presets. Refer to *Modify Presets* for more details.

Ethernet Ports

The Ethernet ports provide to access a Web browser via a PC [or mobile devices] for setup control and monitoring [see Figure 5 item R and Figure 6 (Ethernet I/O)]. There is an RJ-45 port on the front panel and two RJ-45 Ethernet connectors on the rear. Any of these three RJ-45 connections can be used to access NewS*tream*'s Web interface.

IDU Information Touchscreen

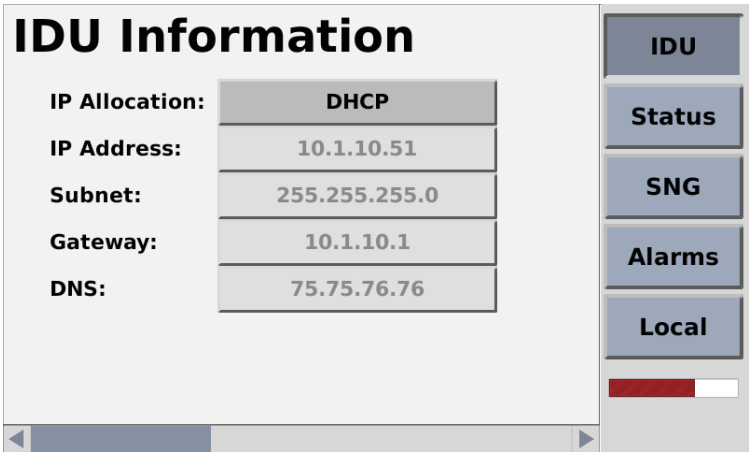
IDU Information

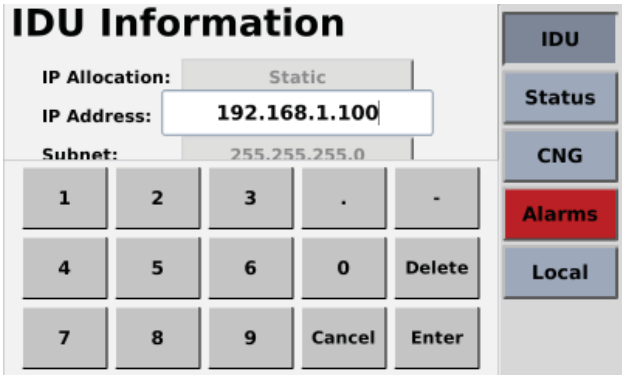
The IDU Network Settings touchscreen displays the following information:

- IP Allocation [Static or Dynamic]
- IP Address
- Subnet
- Gateway
- DNS

For further information about the listed settings, refer to the NewS*tream* *Settings* Web interface section. Refer below to Figure 7 for the IDU Network Information and the Numeric Entry Pad that appears when you press the entry fields. Swipe to the right on the touchscreen to display the IDU Version screen.

Figure 7: NewS*tream* IDU Information Touchscreen - Network Settings & Numeric Entry Pad





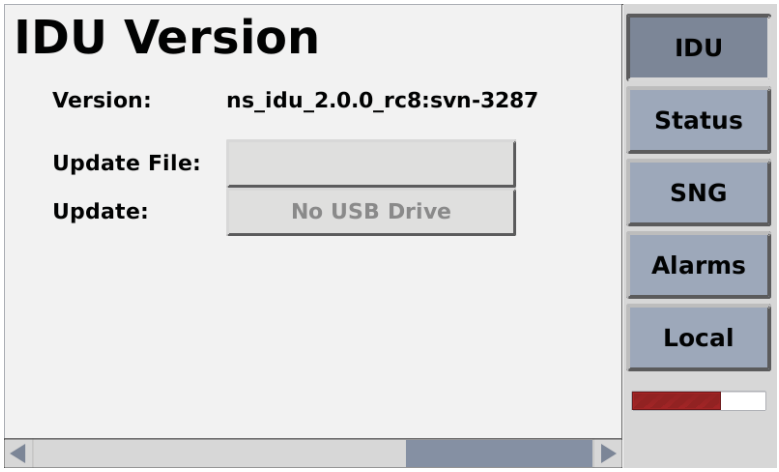
IDU Version

The IDU Software Version and Update touchscreen displays the following information:

- Current IDU software version
- Update option [press the **Begin** button to initiate upgrade]

Both pages can be viewed by swiping the screen and observing the placement of the scroll bar at the bottom of the IDU Information touchscreen, as shown in Figures 7 and 8.

Figure 8: NewS*tream* IDU Information Touchscreen - Software Version & Upgrade



Software Upgrade Process

The following procedure must be strictly adhered to when you are issued an upgrade for the latest firmware.

1. Copy NewS*tream* software file [.nsu file type] to the root of a partitioned USB flash drive [data stick].
2. Insert the flash drive in the USB port on NewS*tream'*s front panel
3. Press the **IDU** button on NewS*tream'*s touchscreen and swipe to the IDU Version touchscreen [refer to Figure 8].
4. Press the **Update File** field until the most current version of NewS*tream'*s software is displayed.
5. Press the **Update** button to start the upgrade.
6. Press **Confirm** if the version shown in the Update File entry field is correct.
7. Next, observe that NewS*tream'*s Logo appears with an Upgrading Software message.
8. Do not remove the USB flash drive until the Update Complete message is displayed. NewS*tream* will restart automatically.
9. Allow this process to repeat and check that the ODU upgrade .nsu is shown in the Update File field, should you also be updating the Cellular ODU.

NOTE: *When upgrading* NewS*tream software, you must use the USB flash drive and front panel operation. While the software upgrade occurs, the IDU front panel OLED buttons and 16x2 Frequency and Preset displays will be unlit and the touchscreen will display the message:* ***Software Update In progress, DO NOT POWER-OFF****.*

System Failure Recovery Process

If NewS*tream* refuse to restart, the following process can be used to recover system functionality.

1. Copy NewS*tream* software file [*recovery.nsu* file] to the root of a partitioned USB flash drive. It will be the only file at the drive root.
2. Insert the USB drive into the front panel port and apply power to the IDU.
3. Press buttons K: Antenna Polarity Selection Switch and M: RF Band Selection Switch simultaneously and hold for at least 5 seconds [refer to Figure 5]. Wait until the System Recovery Mode: **Upgrading Software** message is displayed on the touchscreen.
4. Insert the flash drive and wait for at least 30 seconds. System Recovery Mode: Upgrading Software message will be displayed.
5. Next, observe that NewS*tream'*s Logo page appears with an Upgrading Software message.
6. Do not remove the USB flash drive until the Update Complete message is displayed. NewS*tream* will restart automatically.

Preset Export and Import

Export Process

The Import and Export of Presets can be accomplished from the IDU front panel and under Remote control. Refer to the *Modify Presets* Web interface for more information about the Remote control options. To Export or Save presets from the NewS*tream*'s IDU, insert a flash drive into the front panel USB port and swipe from the IDU Information touchscreen to display to the Presets touchscreen, as shown below. The Presets File button will display the preset configurations that exist on the IDU and as you press the button, each preset is listed within the button.

When you press **Save**, a confirmation screen will appear, as shown in Figure 10. Press **Confirm** to save the presets from the IDU to the flash drive.

Figure 9: NewS*tream* IDU Preset Touchscreen

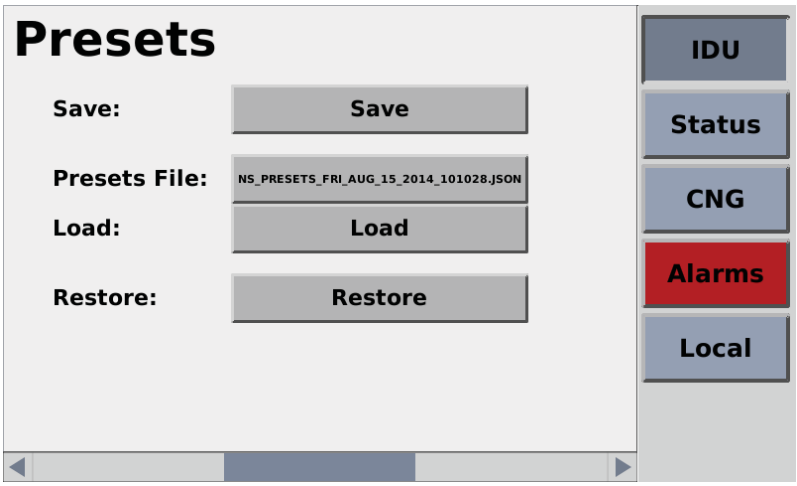


Figure 10: NewS*tream* IDU Save Preset Confirmation Touchscreen

Figure 11 shows the affirmation of your Export of preconfigured settings to the flash drive. With this drive you can distribute the preset files by the drive itself, via email or by saving the presets on a shared server, from which any NewS*tream* operator can access remotely. Press **Continue** to conclude the preset export process.

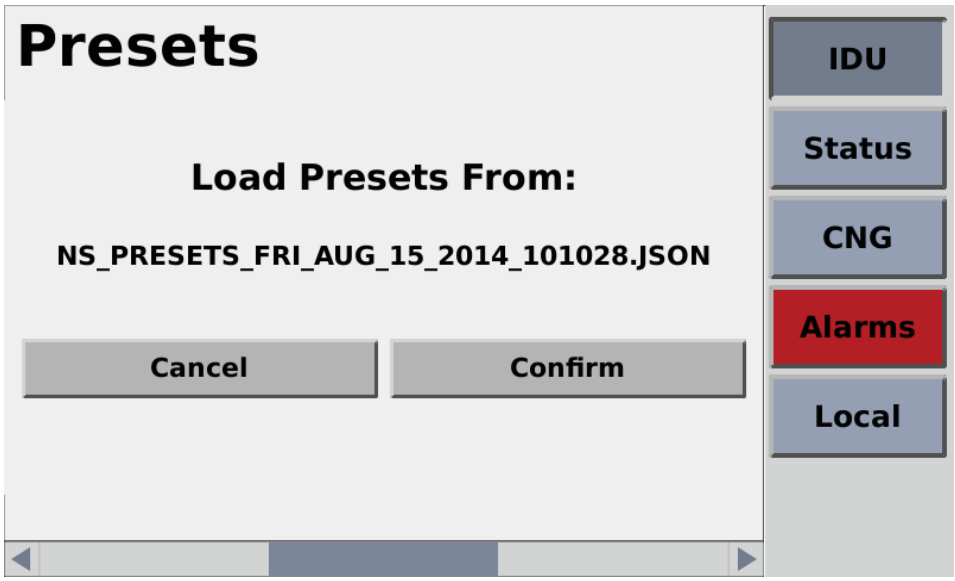
Figure 11: NewS*tream* IDU Presets Saved Success Touchscreen

Import Process

To Import or Load presets to the NewS*tream*'s IDU, insert a flash drive that includes the preset files that you wish to import in the front panel USB port and swipe from the IDU Information touchscreen to display to the Presets touchscreen, as shown in Figure 9. The Presets File button will display the preset configurations that exist on the flash drive and as you press the button, each preset is listed within the button.

When you press **Load**, a confirmation screen will appear, as shown in Figure 12. Press **Confirm** to save the presets from the IDU to the flash drive.

Figure 12: NewS*tream* IDU Load Presets Confirmation Touchscreen



When the presets have been loaded to your IDU, a confirmation of success screen will appear, as shown in Figure 13. Press **Continue** to conclude the preset import process.

Figure 13: NewS*tream* IDU Presets Loaded Success Touchscreen

When you press the **Restore** button, NewS*tream* takes a snapshot of your system each time you apply power to the IDU. If you would like to restore NewS*tream* to the state it was in when you last applied power, click **Restore**. This will overwrite any preset changes that were made since NewS*tream* was last powered on. Press **Confirm** and then **Continue** to conclude the preset import process.

Local Microwave Control

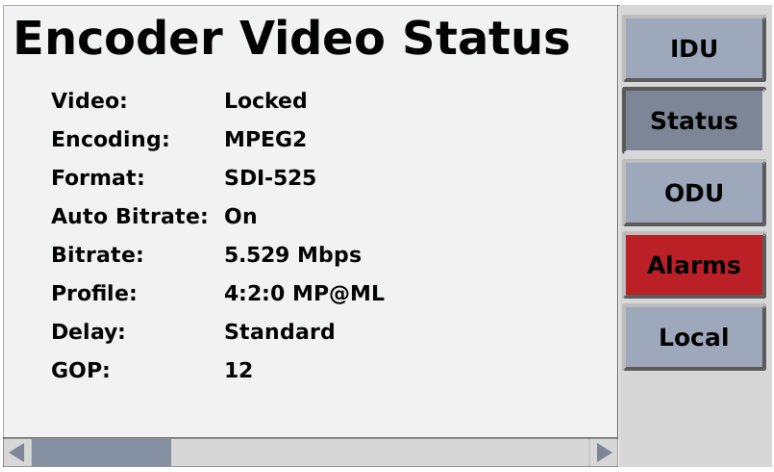
Microwave transmission is implemented using an ENG preset and the NewS*tream* or legacy Outdoor Units. The ENG Status touchscreens are shown below and the ODU Information touchscreen is shown in Figure 14. ODU functional explanations follow along with diagrams of the NewS*tream* and legacy ODUs in Figures A-1 through A-4.

Before starting operation, set the IDU to Remote Mode and go to the Modify Presets Web interface to make unique copies of the ENG, SNG and CNG Presets in order to create customized presets that your operators will use during broadcast. For more information refer to the *Modify Presets* section. For Remote Control operation see the sections below: *Configuration Mode touchscreen* and *Remote Operation Using the Web Interface*

ENG Status

The Microwave Status touchscreens display Video and Audio Encoders, Modulator and Transport Stream Status listings for the current preset. Each of the pages can be viewed using a swiping motion. The scroll bar at the bottom of the Status touchscreens indicates the relative position of each screen. For further information about the listed settings, refer to the *Status* Web interface section. Refer below to Figure 14 -17 for examples of the listed information.

Figure 14: NewS*tream* ENG Encoder Video Status Touchscreen



Local RF Control

There are two OLED buttons and one set of rocker switches that control Radio Frequency functionality [see Figure 5 items C and D].

ENG Mode

The upper RF Control OLED button is used to control the Power Amplifier functionality [see Figure 5 item D]. This button toggles between PA ON to PA OFF. When you press this button, it will show inverted colors until the operation is complete. Should the action take a few seconds to resolve, you have positive acknowledgment that NewS*tream* received input and is loading the state change request. PA ON will display a blue background allowing you to see this indicator at a distance without having to be close enough to read the text.

The lower OLED button toggles between PA HI and PA LO [see Figure 5 item C]. The last state of this button is restored upon system shutdown and startup. Pressing the rocker up or rocker down button under the PA HI/PA LO OLED will put NewS*tream* into PA ADJ mode [see Figure 5 item B]. The power level of PA ADJ will default to full power [zero attenuation] if PA ADJ has not been selected for this ODU Band before, but otherwise entering PA ADJ will recall the last adjustable power setting for this ODU Band.

The PA ADJ state for dual band ODUs [i.e. 2/7 GHz] may display different RF level readings as the adjustment for each RF band, either 2 GHz or 7 GHz, is independent of one another. This will cause the bottom OLED to show PA ADJ [see Figure 5 item B], and will allow the up/down rocker to adjust PA power. While in PA ADJ, pressing the bottom OLED will take the system out of PA ADJ mode, and put it into the last power state.

SNG Mode

The upper OLED button is used to control the Satellite Carrier functionality [Figure 5 item D]. This button toggles between Carrier enabled [CW ON] and CW OFF. When you press this button, it will show inverted colors until the operation is finished.

Similarly, the lower OLED button [see Figure 5 item C] toggles between Modulation disabled, MOD OFF and enabled, MOD ON. Both the OLED button's default states are OFF.

The Encoding Status displays the information shown in Figures 14 and 15. The display layout changes if the Video Encoding Mode is set to External ASI, the remaining Encoder Status fields will show hyphens only. Also, Transport Stream Status will display hyphens as well.

Figure 15: NewS*tream* ENG Encoder Audio Status Touchscreen

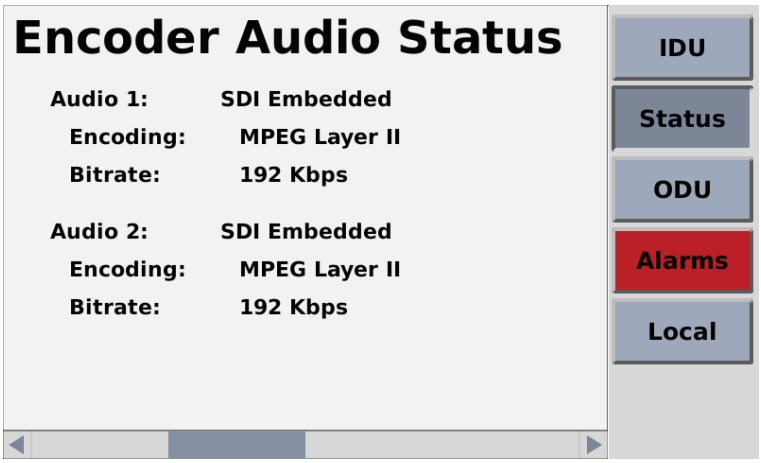
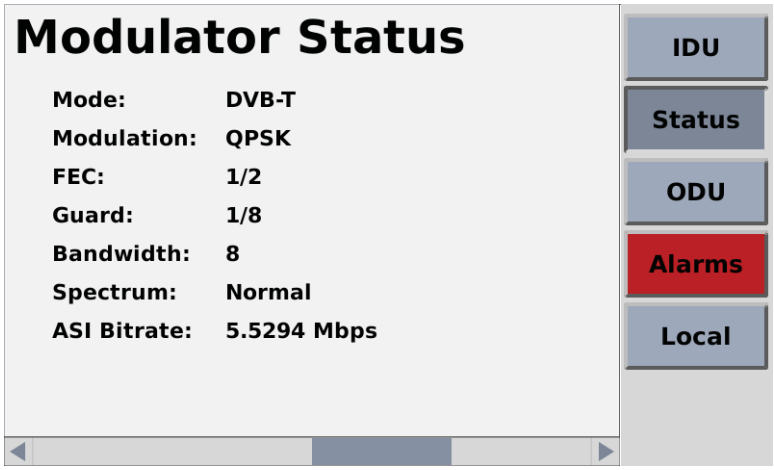
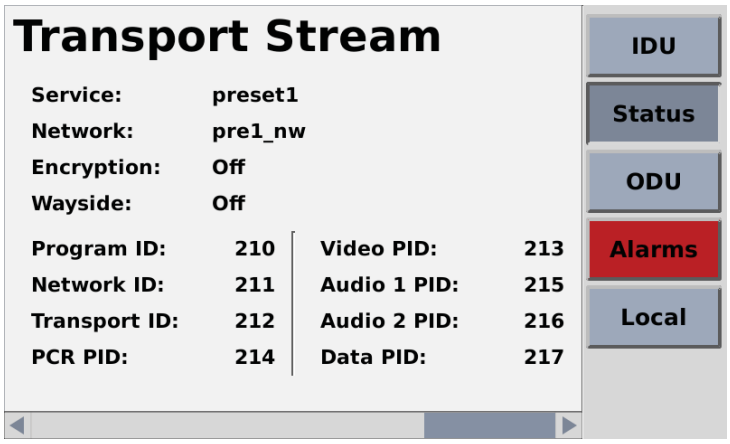


Figure 16: NewS*tream* ENG Modulator Status Touchscreen



The Transport Stream Status listings displays information about the transport stream including PIDs, service name, network name, encryption status, wayside data, and baud rate.

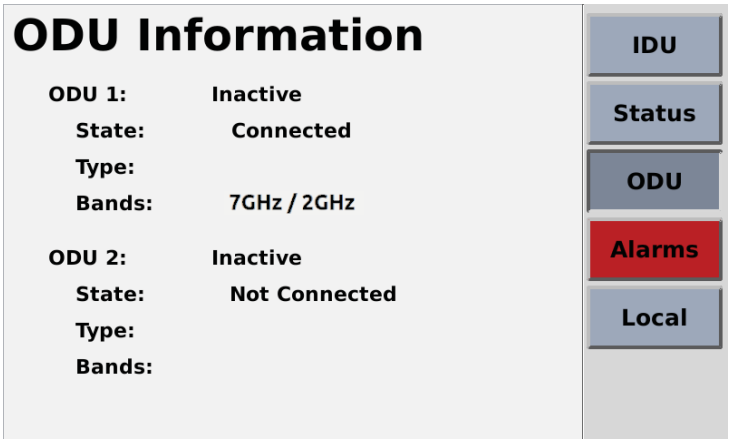
Figure 17: NewS*tream* ENG Transport Stream Status Touchscreen



ODU Selection for RF Bands

There is one OLED button on the NewS*tream* touchscreen that corresponds to the ODU number labeled 1 or 2 on the rear panel, as well as ODU Frequency band that is currently used. NewS*tream* automatically determines which ODU is to be selected. Refer below to Figure 18.

Figure 18: NewS*tream* ODU Information Touchscreen



The ODU button allows you to view with which RF ODU NewS*tream* is communicating. There are a few configurations of ODUs which can be selectable. A rear panel ODU switch is provided to set the NewS*tream* IDU to the correct voltage and IF to communicate with either legacy [MTX 12V] or NewS*tream* ODU [NST 48V] type. You cannot hook up multiple NewS*tream* ODUs to the NewS*tream* IDU.

WARNING: *If the ODU the switch is placed in the wrong position or if you change the ODU type without changing the switch position and restart the IDU this may result in damage to the ODU and inability to communicate with the ODU.*

Toggle Mode RF Band Button Behavior

If the toggle switch is in NewS*tream* ODU mode [NST 48V], and the NewS*tream* ODU is dual band, the RF Band button can be used to specify which band is currently selected. The button shows the RF Band covered by the current selection [2 GHz, 4 Ghz, 7L GHz, 7U GHz, 13 GHz]. If the toggle switch is in NewS*tream* ODU mode and the NewS*tream* ODU is single band, the RF Band only displays the status of the RF band and will not act as a selection button. The button shows the RF Band covered by the current selection [2 GHz, 4 Ghz, 7L GHz, 7U GHz, 13 GHz]. If no ODU is currently detected, then RF Band button displays NO ODU.

Legacy Toggle Mode RF Band Button Behavior

If the toggle switch is in Legacy ODU mode [MTX 12 V], the RF Band button alternates between using ODU 1 and ODU 2 outputs on the back of the IDU, regardless of which ODUs are connected to those ports. When ODU 1 is selected, 70 MHz IF and FSK is be directed to the ODU1 port, and 12 V is sent to ODU 1 power connector. When ODU 2 is selected, 70 MHz IF and FSK is directed to ODU 2 port, and 12 V is sent to ODU 2 power connector.

If an ODU is disconnected, NO ODU is shown in the OLED button, the 16x2 Frequency display is unlit, the button next to it is lit red, and an alarm displays. If the ODU is reconnected, the state of the IDU resumes operations. Pressing the PA Band button switches to the other available ODU port however, the disconnected ODU is not be selectable.

The RF Band button displays the ODU the RF Band covered by the current selection on the bottom line [2GHz, 4Ghz, 7L GHz, 7U GHz, 13GHz]. The 16x2 Frequency also displays the frequency band. If both ODUs are the same head type and frequency band, the RF Band button toggles between ODU 1 and ODU 2 ports but displays the same band information on the button. If no ODU is currently detected, then the RF Band button displays NO ODU.

ODU Disconnect/Reconnect During Operation

The NewS*tream* IDU always monitors the connection between itself and the ODU on the selected port. NewS*tream* automatically detects whether the connection is lost between IDU and ODU within 15 seconds. If connection loss is detected, an alarm displays in the alarm indicator, the RF Band button displays NO ODU, and the 16x2 Frequency display is unlit and the selection LED button is lit red.

In case of a disconnect, the IDU continues to search within the current port for the ODU. If the ODU connection is re-established, then the previous alarm will clear, and the RF Band button will show the RF band of the ODU connected. The 16x2 Frequency display presents the frequencies supported by the head. In the case of multiple bands included within the ODU, the IDU will set the ODU to the band selected before the ODU was disconnected.

Local Antenna control

ENG Mode

The upper Antenna Control OLED button controls Antenna Polarity [see Figure 5 item K]. This button cycles between vertical [V], horizontal [H], right-hand circular [RC] and left-hand circular [LC] polarization. There is minimal delay between switching from one polarity state to another.

The middle OLED button controls a relay to switch between Antenna 1 and Antenna 2. There should not be any delay between switching from one Antenna to another. The ability to switch from Antenna 1 to Antenna 2 is an option that needs to be enabled from the Web interface. If this option is not selected, then pressing the antenna button will not cause the state of NewS*tream* to change.

The lower Antenna Control OLED button controls RF band based on which ODU is connected. See Change ODU [RF Bands] for more detail on this.

SNG Mode

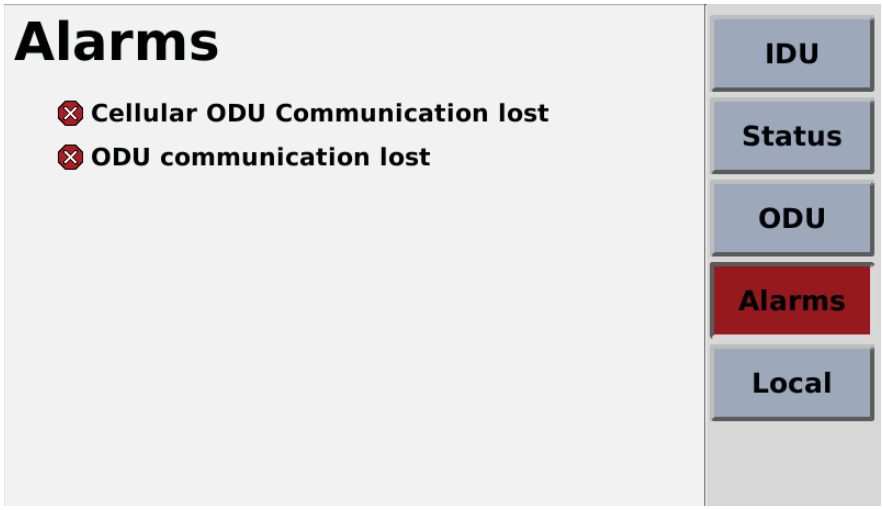
The OLED buttons under Antenna Control are re-purposed as frequency selection arrow keys when a SNG preset is used.

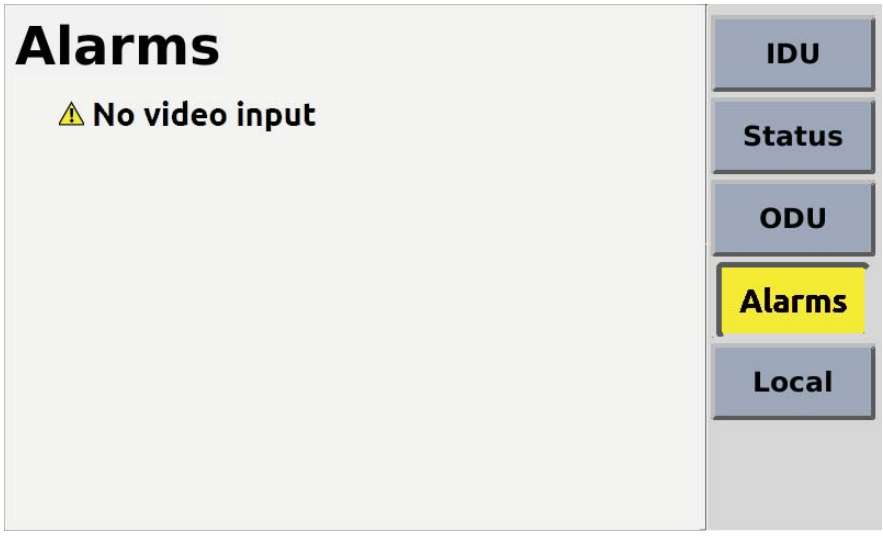
Alarms

The **Alarms** touchscreen displays all the NewS*tream* alerts or alarms. If a critical alarm is present, this button is red [as shown below]; when an alert or warning is present the Alarms button will be amber and with no alarm activated, the button is gray.
Alarm conditions include:

- Video Lock – when video feed is absent,
- Mismatched preset settings
- Internal modules malfunctioning
- Attempt to change mode of operation to an unlicensed option
- Communications with ODU have been lost
- Other ODU alerts and alarms such as temperature conditions

Figure 19: NewS*tream* System Alarms Touchscreen Examples



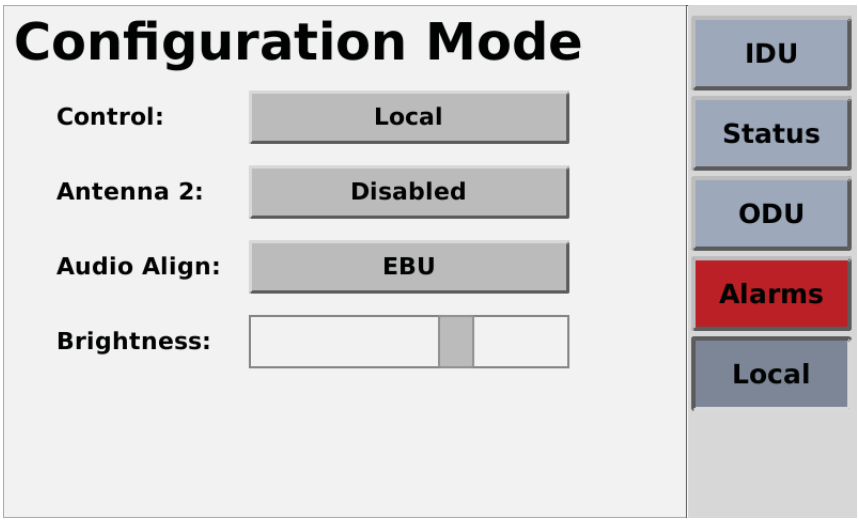


Configuration Mode

The **Configuration Mode** touchscreen displays the current operational state of the NewS*tream* system. The Local/Remote control button allows you to toggle between the two states.

- Local mode – operation and control of the transmitter is done solely from the IDU front panel and read only access is allowed to NewS*tream* via the Web interface.
- Remote mode – operation and control of the system can be executed from the Web interface. The IDU front panel buttons are inactive but the displays, screens and buttons show current states. The Local button changes color and **Remote** appears when the toggle is activated [see example].

Figure 20: NewS*tream* Local/Remote Selection Touchscreen



NOTE: *Setting the unit in **Local** or **Remote** mode is done at the IDU by the operator and must remain in this mode each time the unit is started. When* NewS*tream is in Local mode the IDU will not accept any remote commands however, remote access is allowed for status monitoring.*

The touchscreen also allows you to view the current Antenna [1 or 2 in ENG mode only] and Audio Alignment configuration. There are two Audio Alignment options: EBU or SMPTE. For more information, refer to NewS*tream Settings* under Remote control in the *General Settings* section. There is also a Brightness control for the overall appearance of the screens. Tap the button to the right to brighten the touchscreen display.

Cellular [CNG] Operation

This section describes the operation of the IDU in local and remote control using the touchscreen and the button/LEDs associated with the front panel Cellular portion, as well as the Web interface.

Configuring Cellular Communications

When configuring Cellular Presets, you must type an IP Address to designate the destination for the cellular video stream. The LiveGear Receiver's [LGR] IP address is the destination to communicate with the NewS*tream* IDU. You must also designate the LGR Port and Channel numbers for the cellular video stream. Use the LGR Port and Channel numbers assigned for communication with NewS*tream*. This information can be added to the CNG Presets that you configure with the Web interface in Remote mode. Refer below to the following *Initial Setup* section to assist your Cellular configuration endeavors.

As mentioned for Microwave control, set the IDU to Remote Mode and go to the *Modify Presets* Web interface to make unique copies of the CNG Presets in order to create customized presets that your operators will use during broadcast. For more information refer to the *Modify Presets* section. For Remote Control operation see the sections below: *Configuration Mode touchscreen* and *Remote Operation Using the Web Interface.*

Initial CNG Setup

It is recommended that you pre-configure the transmitter and receiver together in the studio to ensure that the initial settings are analogous. It is also suggested that you test the system with a live video feed prior to sending a transmitter team to a remote location. The initial steps for the configuration procedure are as follows:

Live Gear Receiver [**LGR-1000**] **-** Refer to the *LiveGear Receiver User and Technical Manual* for more information.

- Connect AC Power Supply.
- Connect Video Output [SD/HD OUT / 1 to monitor].
- Connect Ethernet Cable [WAN port to router].
- Set the rear Power Supply switch to **On** position.

NewS*tream* Transmitter

- Install SIM cards [up to 6] in the Cellular ODU if not pre-installed - refer to *Appendix A* for further information.
- Set IDU to Remote control.
- Connect video source [SD or HD SDI Input on the rear panel - refer to Figure 6].
- Connect AC power supply [on the rear panel - refer to Figure 6].

Steps to Stream Video in CNG Mode:

1. Connect a laptop to the 4 port switch on the rear panel and apply power to the LGR by setting the Power Supply rocker switch on the rear panel and by pressing the front panel **Power push button**. Check the LCD to ensure that the initialization process has completed.
2. Browse to the default IP address of the LGR on the LAN at http://**192.168.2.200**. Log in using the UID/PW: **admin**/**admin**.
3. Browse to **Setup > Network Settings**
4. Set your IP address information in the WAN Configuration box and click **Save**.

NOTE: *If you are placing the LGR behind a router/firewall, you will need to forward at a minimum, port 4001 TCP/UDP to the LGR. You can change the LGR's listening port on the Setup > LGR Inputs Web page. If you do change the port, be sure to change the port on NewStream as well.*

5. On the LiveGear Receiver:
   a. Using the touchscreen on the front panel, press the up arrow to display the WAN IP address. This IP address needs to be entered in the Destination Stream address field using the NewStream Web page [see configuration steps below].
   b. Default Listening Ports are: 4001 for Channel 1 or 4002 for Channel 2.
   c. **Save** the settings
   d. Select the **Status** button to return to the Status screen.
6. Apply power to NewStream using power rocker switch on front panel. Wait for the initialization process to complete [approximately 45 seconds]. Allow approximately one minute for NewStream to boot up and optimize the cellular links for broadcast.
7. On the NewStream IDU - first connect an Ethernet cable to an Ethernet port:
   a. Check that the Cellular Status screen shows service for the cell modems with SIM cards installed [refer below to Figure 31 (and Figure 21 in Local mode)]. Power cycle the IDU if the cellular carriers do not connect.
   b. Once NewStream is booted and the modems are connected, select Remote Control mode and open the Web interface and select **Setup** > **Modify Presets**. Select the Copy Preset option on the default CNG Preset if you have not yet configured any CNG Presets to begin configuration. Refer to *Remote Operation Using the Web Interface*, in this manual for more information about NewStream Remote control.
   c. Name the new CNG Preset, click the **Create Preset** button and finally click the Save Preset icon. It is important to note that if you modify the preset name or type, be sure to click the Save Preset icon before customizing additional settings.
   d. Use the Edit Preset icon to customize the newly created preset. Select the Cellular Settings using the icon and chose the **Cell Mode Delay** that most closely matches the type of video that you plan to transmit.
   e. Ensure that the **Destination Stream** IP address is set to the LGR's IP address to which you will stream the video feed.
   f. Select a **Port Number** [#] to set the listening port to stream the video feed.
   g. Select a **Channel** number to set the LGR Channel to stream the video feed.
   h. Adjust the Encoder controls based on the carrier service available.
   i. Set the Cellular **Transport Stream** using the entry fields provided.
   j. Set the Audio Encoding and Input based on the carrier service available.
   k. Select the **Save** button to return to the Modify Presets Web page.
   l. Ensure that you have a secure connection to your video source at the Video Input BNC connector on the rear panel of the NewStream transmitter.
   m. Press NewStream's **Start or Stop Cellular Transmission** button to begin live streaming [see Figure 5 item O].
8. You can view connection status by logging into the LGR Web interface and selecting **Channel 1** on the drop-down menu.

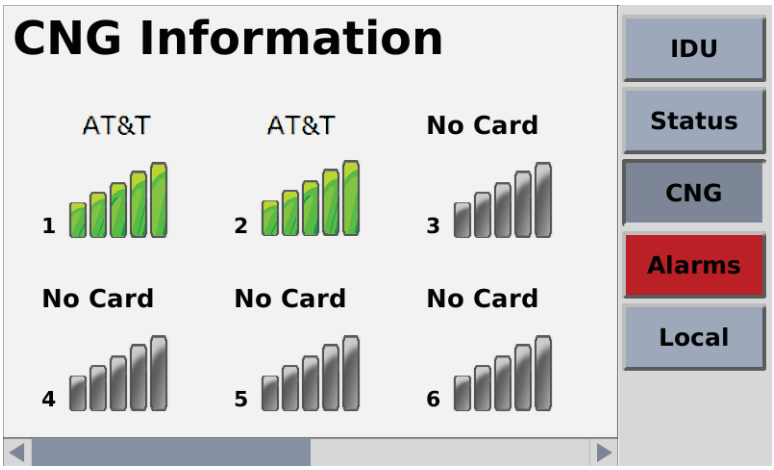
CNG Touchscreens

When the NewS*tream* has the capability of operating in a cellular mode, the touchscreens are labeled **CNG** displaying information and settings specific to cellular transmission. When the NewS*tream* does not detect the cellular ODU, the CNG information screen shows the message **Cellular ODU is loading, please wait**. Once the cellular ODU has booted up and can provide information about its configuration, the message changes to a status screen describing the current connectivity of the modems in the cellular ODU. This CNG Information screen displays the following:

1. A graphical representation of the current RSSI per modem using signal strength bars similar to a phone.
   a. If RSSI > 120 = 5 gray bars
   b. If RSSI > 95 and < 120 = 1 red bar, 4 gray bars
   c. If RSSI > 85 and < 95 = 2 amber bars, 3 gray bars
   d. If RSSI > 75 and < 85 = 3 amber bars, 2 gray bars
   e. If RSSI > 60 and < 75 = 4 green bars, 1 gray bar
   f. If RSSI > 1 and < 60 = 5 green bars
   g. When a modem is not detected the words **No Modem** replace the signal bars graphic.
   h. If a modem is detected but there is no SIM card installed, the words **No Card** replaces the signal bars.
   i. If a modem and a SIM card are detected but not yet not connected to a network, the word **Connecting** replaces the signal bars
2. The name of the carrier to which the modem is connected.
3. The service [3G/4G/LTE] to which the modem is connected.
4. The number of the SIM card slot in which the SIM is inserted.

The CNG Information touchscreen is shown below in Figure 21. This screen displays the relative signal strength information for each of the six modems

Figure 21: NewS*tream* CNG Information Touchscreen



CNG Versions

Use the slider at the bottom of the CNG Information touchscreen to display a listing of CNG Model number, Revision, Software and Encoder firmware version.

CNG Status

The Cellular Status touchscreens display Video Encoder, Transport Stream and Cellular Settings Status for the CNG preset configuration. Each of the screens can be viewed using a swiping motion. The scroll bar at the bottom of the Status touchscreens indicates the relative position of each screen. For further information about the listed settings, refer to the *Status* Web interface section. Refer below to Figures 22 -24 for examples of the information displayed on the CNG Status touchscreens.

Figure 22: NewS*tream* CNG Encoder Video Status Touchscreen

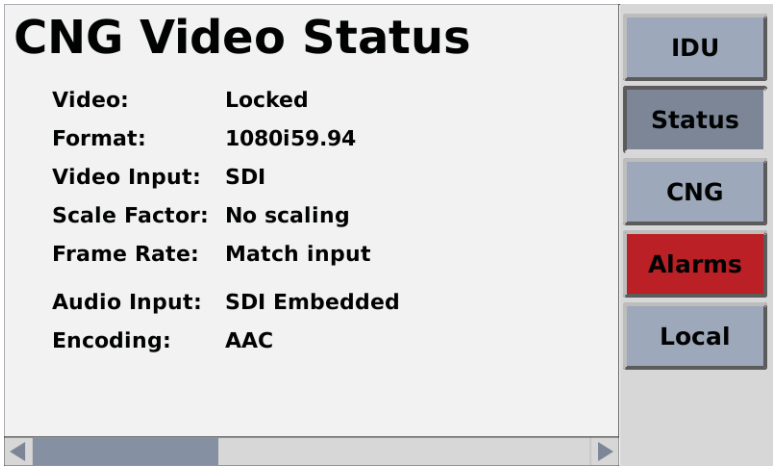


Figure 23: NewS*tream* CNG Cellular Settings Touchscreen

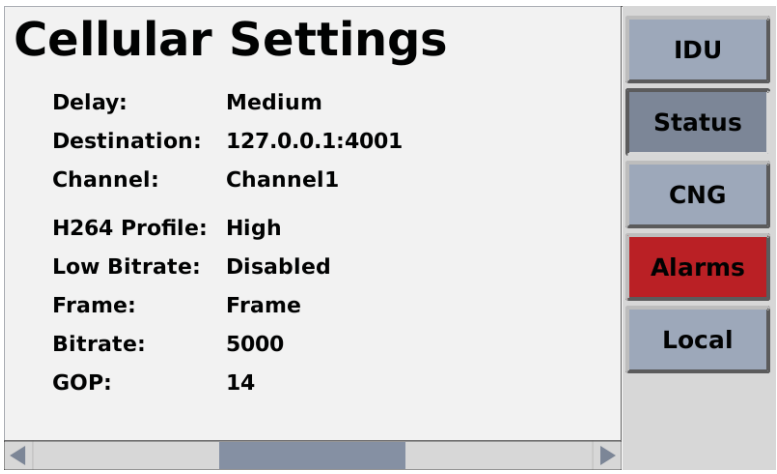
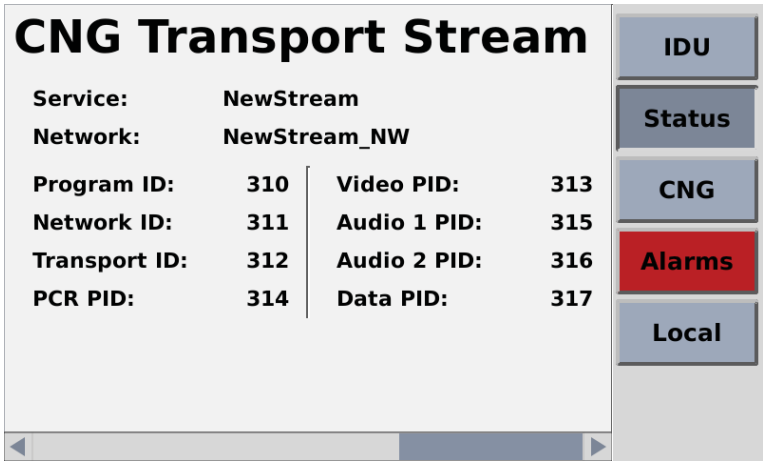


Figure 24: NewS*tream* CNG Transport Stream Status Touchscreen



NewS*tream* Video Cellular Transmitter Data Usage

The monthly operating cost of a NewS*tream* transmitter is entirely dependent upon the consumption of wireless broadband data. Wireless service providers typically offer monthly data packages with a maximum “use-it-or-lose-it” usage capped in gigabytes [GB] before data overuse charges are implemented, usually in 1 GB increments.

A key attribute of H.264 AVC [MPEG-4 Part 10] encoding is that HD quality video can be transmitted at less than half the data rate required by MPEG-2. While broadcast video streaming quality is regarded more subjectively than classic contribution and distribution standards, there are some basic guidelines that you can adopt to determine the appropriate data rate required in a given situation.

The degree of video motion to be encoded directly impacts the upload data rate, typically expressed in megabits per second [Mbps]. For example, low motion 29.97/30 fps [frames per second] video, often referred to as “talking head” video, requires a video encoding data rate ranging between 1.0 - 3.0 Mbps, whereas fast motion video, such as a sporting event, can require data rates as high as 8 Mbps, depending on the resolution [e.g. 720p/1080i] selected. An average data rate of 3.0 Mbps provides approximately 30 hours of video transmission consuming about 40 GB of data. Encoding at 6.0 Mbps consumes up to 80 GB of data, and at 8.0 Mbps, slightly more than 105 Mbps.

NewS*tream* transmits video using up to six wireless network services simultaneously. The system is designed to level load or equally distribute the total amount of data being transmitted [i.e. uploaded] provided that there is equal wireless network availability for each of the modems. In this ideal case, the total data used is equally distributed across each of the six modems. In reality, network connection accessibility varies from one venue to another and is also subject to its availability from a loading perspective.

From a cost savings standpoint, it is judicious to set the maximum video encoding data rate to the lowest level required to support the kind of video being produced. In addition, NewS*tream*'s adaptive bit rate encoding technology automatically reduces the encoding data rate based upon the degree of motion detected, to further enhance data usage conservation.

Satellite [SNG] Operation

NewS*tream*'s satellite system allows you to transmit using your existing equipment. Your Block Up-converter [BUC] is used in the transmission [uplink] of satellite signals. It converts a band of frequencies from a lower frequency to a higher frequency. There are three frequency tuning options in satellite mode: Frequency Tuning in L-Band [Block-upconverter disabled], Frequency Tuning with BUC enabled in Ka, Ku and C bands and with either High or Low side local oscillators. Additionally, you can set up preset frequencies in Remote control categorized by specific channels [Channel tuning].

SNG functionality allows user-definable frequency and power level configuration. SNG modes have fine control of frequencies down to 1 KHz gradations and power outputs down to 0.1 dB gradations. To facilitate this, the up/down/left/right and enter buttons to allow you to easily select frequency and power level in local control on the front panel.

As mentioned for Microwave and Cellular control, set the IDU to Remote Mode and go to the Modify Presets Web interface to make unique copies of the SNG Presets in order to create customized presets that your operators will use during broadcast. For more information refer to the *Modify Presets* section. For Remote Control operation see the sections below: *Configuration Mode touchscreen* and *Remote Operation Using the Web Interface.*

In SNG mode, the three OLED buttons on the right [Figure 5 items K and L] are not used for antenna control. Instead, they have been re-purposed for the Left and Right movement as arrow buttons.

Touchscreen Display for SNG Operation

SNG Sub-menu

When in Satellite Mode, the touchscreen replaces the ODU sub-menu with an SNG sub-menu. Under this sub-menu the following information is displayed:

- Channel Plan Mode or Frequency Tune Mode selection
  - You can select either Channel Plan Mode or Frequency tune mode via this sub-menu.
- Block Up-converter [BUC] LO Frequency - button in the BUC Setup touchscreen
  - Spectrum Non-Inverted or Spectrum Inverted Selection underneath BUC

Power Level Selection

The section that previously showed ENG power level is replaced with a section that shows SNG power output from the NewS*tream* . This section also allows you to set a power level between -40.0dBm and +5.0dBm with resolution up to 0.1 dBm.

Frequency Selection

Block Up-converter Options
When using Block Up-converter Options, you are able to enter the frequency that you want and the spectrum inversion properties of the Block Up-converter. The NewS*tream* tunes the L-Band modulator with the proper calculation. This allows you to enter the LO [Local Oscillator] frequency of the Block Up-converter that you are using, and set which type of LO injection is used by the BUC. Low side LO indicates a non-inverted spectrum and High side LO, an inverted spectrum. See *Satellite Frequency Tune Mode - BUC Enabled - IDU Touchscreen Control*, on the next page, for more infromation. Refer to *Frequency Tuning Example With BUC Enabled* for detailed instructions.

You can also setup as many as 99 Channels that designate specific frequencies and use the Channel Plan option [a.k.a Channel Tuning in remote control] to select them. You must setup these channels via the Web interface. Refer to the *Frequency Plans Page [SNG]* for more information.

Frequency 16x2 Character Display

In Satellite Channel Plan Mode, the two lines of the frequency display window [Figure 5 item E] will show

CH #
Frequency in MHz.

The frequency shown will always be the Frequency output of [BUC LO + L-Band IF if Spectrum Non-Inverting Low Side] or [BUC LO – L-Band IF Spectrum Inverting High Side]. If BUC LO is not entered, use L-Band IF frequency. In Frequency Tune Mode, the two lines of the frequency display window [Figure 5 item E] will show Frequency Tune Mode Frequency in MHz.

The frequency shown here is always the desired frequency output of the BUC. If the Block Up-converter Local Oscillator is not entered, the output will be between 950 -1750 MHz.

Power Rocker Switch

The RF power level is displayed on the touchscreen, in the lower right corner. You can press the RF Adjustment rocker switch up or down [Figure 5 item B] to increment or decrement the power in .5dBm steps. Exact levels can be entered by pressing the **Power** button on the 5” touchscreen display. The rocker will always move to the nearest 0.5dB, even if the last number was set to an in-between power level.

Example: *If you set the power to 0.2dBm on the touchscreen, then press the rocker up button, the power will show 0.5dBm. Likewise, if the power reads 0.2dBm and you press the rocker down button, this will read 0.0 dBm.*

The L-Band power ranges from -40.0d B to +5.0 dB in 0.1dB increments. The power level will always return to the last used power level. A typical application is to set the L-Band power to the correct level [-12dB is typical] to satisfy the satellite amplifier’s input and the control power to the satellite using the amplifiers control panel.

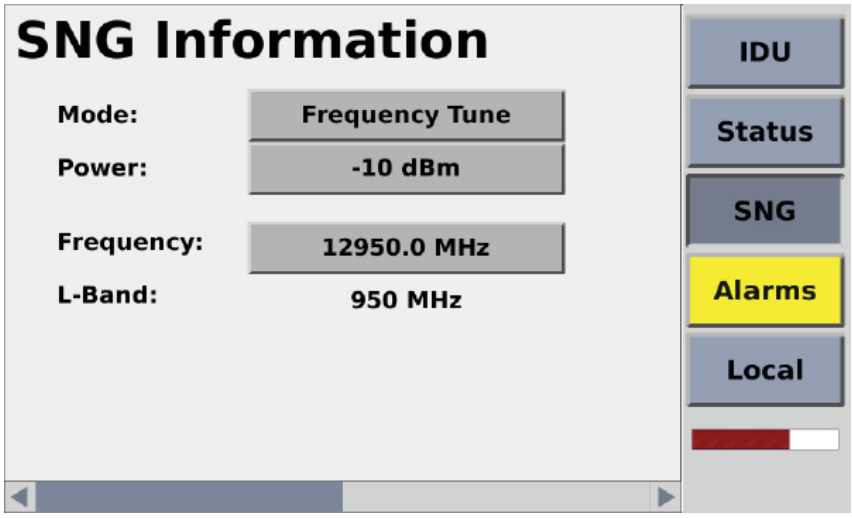
SNG Information - Frequency Tune Mode - IDU Touchscreen Control

To change settings within the **SNG Information** touchscreen, in Local Mode, press the **Mode:** botton to toggle to Frequency Tune Mode [see Figure 25]. Next, press the **Power:** button to display the numeric keypad, type the value in dBm and then press the **Enter** key on the keypad to set the L-Band power level. L-Band power settings range from -40 to 5 dBm. When you press the **CW** [Carrier] button [Figure 5 item D], the power level selected is displayed in the lower right of the touchscreen below the red bar graph, in the lower right of the touchscreen. The CW toggle will disable the Mode and Frequency settings while the Carrier is On.

When you press the **Frequency:** button, the numeric keypad displays allowing you to set the SNG frequency. You must set the Block Up-converter frequency to the correct level, which is dependent on your system's Block Up-converter. Press the **Enter** key shown on the keypad after each of the keypad actions.

If you want to use the IDU front panel buttons and rocker switches to set Satellite frequencies, select an SNG Preset and start with the rocker switch [Figure 5 item G], that controls each digit of frequency, as displayed within the Frequency 16x2 display. You can move the cursor within the Frequency 16x2 display to increment the digits of the numeric display using the left/right arrow buttons [Figure 5 items K and L]. Selecting the frequency setting feature automatically sets the cursor to the leftmost position and causes the Enter button [Figure 5 item I] to start blinking amber. Pressing [Figure 5 item L] right arrow allows movement of the cursor to the right by one digit and then using the rocker switch [Figure 5 item G] you can increment that digit up or down. You can set the cursor to the left by using the left arrow [Figure 5 item K]. When you are satisfied with the entry, press the **Enter** button [Figure 5 item I] to save the new frequency. If no action occurs after 15 seconds, the frequency window reverts to the last frequency set. Frequency settings persist from one power cycle to the next.

Figure 25: NewS*tream* SNG Information Touchscreen - Frequency Tune



SNG BUC Setup - Frequency Tune Mode - IDU Touchscreen Control

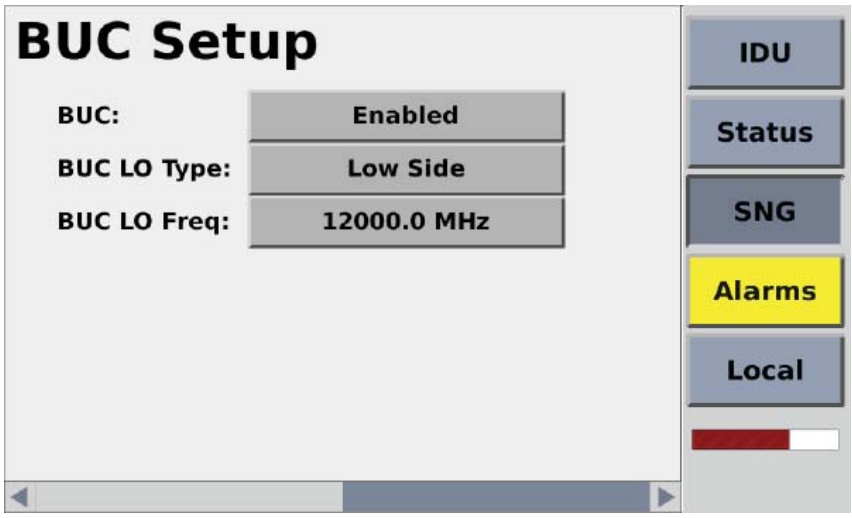
When you swipe the slide control at the bottom of the **SNG Information** touchscreen, the **BUC Setup** touchscreen appears, as shown in the figure below. To Enable the Block Upconverter in Frequency Tune Mode, press the **BUC:** Enable/Disable button, as shown in Figure 26.

When the NewS*tream* IDU is in Frequency Tune Mode, under Local control, the Satellite **BUC Setup** touchscreen allows you to set a frequency in 1 kHz increments on the IDU touchscreen.

This touchscreen also allows you to select **BUC LO Type:** to the Low or High side Local Oscillator. Pressing the **BUC LO Freq.:** button also displays the numeric keypad, allowing selection of the Block Up-converter Local Oscillator frequency.

There is also the RF Adjustment rocker switch [Figure 5 item B] next to the bottom right corner of the touchscreen that is available for power adjustment on the IDU front panel.

Figure 26: NewS*tream* SNG Touchscreen - BUC Setup Frequency Tune Mode



- If a Block Up-converter frequency is entered and the spectrum is non-inverting Local Oscillator [LO] type is Low Side, the frequency range is 950.000 MHz to 1750.000 MHz above the Block Up-converter frequency in 1kHz steps.
- If a Block Up-converter frequency is entered and the spectrum is inverting LO type is High Side, the frequency range is 950.000 MHz to 1750.000 MHz below the BUC frequency in up to 1 kHz steps.

When you select the Frequency Tune mode with the Block Up-converter disabled, your range exists in L-Band [950.00 - 1750.00 MHz] and can be modified in 1 kHz steps as shown below in Figure 26.

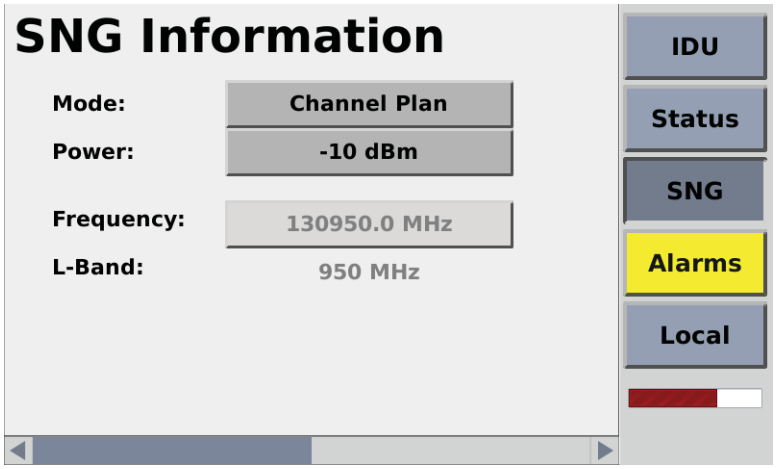
SNG Information - Channel Plan Mode - IDU Touchscreen Control

Press the **Frequency Tune** button to toggle to the **Channel Plan** touchscreen, as shown in Figure 27. When the NewS*tream* is in Satellite Channel Plan Mode, you select a frequency by scrolling through a pre-configured listing of channels. The frequency selection does not link presets and channels.

You can scroll through the list of channels that are pre-configured via the rocker switch [Figure 5 item G] and press the **Enter** button [Figure 5 item I] to select the desired frequency. The Enter button [Figure 5 item I] blinks amber as you scroll through the list, and reverts back to the last known selected frequency if there is no action for 15 seconds. Channel selection persists from one power cycle to the next.

NOTE: *You must first create an SNG Channel Plan via the SNG Frequency Plans Page in **Remote** control to use the channel plan setting under **Local** control with the IDU touchscreen. Refer to the Channel Plan example in the Satellite Frequency Plans [SNG] Web interface section.*

Figure 27: NewS*tream* SNG Information Touchscreen - Channel Plan Mode



When you operate SNG in Channel Plan Mode, the Block Downconverter Setup touchscreen is disabled.

Frequency Tuning Example With BUC Enabled

If the BUC Spectrum Non-Inverting LO Type is Low side, the sum of the NewS*tream* frequency output IF and BUC is equal to:

LO + [L-Band IF from NewS*tream*] = Frequency display

If the BUC LO Type is High Side is Spectrum Inverting, the difference between the frequency output IF and BUC is equal to:

LO – [L-Band IF from NewStream] = Frequency display

As the name implies, Spectrum Non-Low Side LO type Inverting does not invert the Satellite Modulation however, Spectrum Inverting High Side Local Oscillator Type does invert the spectrum. If a Spectrum Inverting Low Side Block Up-converter is selected, the NewS*tream* automatically toggles the spectrum inversion from the selection in the preset. You are not shown this inversion, as the Spectral inversion in the preset reflects your selection. This allows the same set of presets to be used regardless of whether a Low side or High Side Block Up-converter is used.

Example: *In KU Satellite operation, a fixed-spectrum Low Side LO Type non-inverting [BUC] Block Up-converter frequency @ 13,050 MHz is used.*

The KU range is 14,000 - 14,800MHz.

Front Panel State

Enter 13.050 MHz into BUC frequency field and select Spectrum Non-Inverting Low Side LO Type.

- *Desired frequency = 14000 MHz // 13050 MHz + 950 MHz = 14000 MHz // the L-Band IF tunes to [950MHz] =950MHz*
- *Desired frequency =14275 MHz // 13050 MHz + 1255 MHz = 14250 MHz // the L-Band IF tunes to 1255 MHz*

SNG Status

The Satellite Status touchscreens consist of four information displays for the current SNG preset. Each of the pages can be viewed using a swiping motion. The scroll bar at the bottom of the Status touchscreens indicates the relative position of each screen. For further information about the listed settings, refer to the *Status* Web interface section. Refer above to Figures 14 through 17 for examples of the listed information for SNG mode.

Steps to Stream Video in SNG Mode

After configuring SNG Presets, you can continue in Remote mode to create Channel Plans to allow quick selection of frequencies used to begin transmitting video and audio signals. Refer to the Web interface *Frequency Plans Page [SNG]* section below for more information. The following steps must be followed to begin Satellite transmission while in Remote Mode. Each of the steps can also be done using the front panel in Local mode, the buttons and switches used are noted.

1. Configure SNG Presets and then select the preset you will use for broadcast.
In Local mode, you would select using the rocker switch [Figure 5 item H] and then pressing the Enter button [Figure 5 item J].
2. Set frequency tuning mode method:
    a. Frequency Tune BUC disabled [L-Band] - refer to Figure 25.
    b. Frequency Tune BUC enabled [Ka or Ku-bands] - refer to Figure 27.
    c. Channel Plans setup to quickly tune to pre-configured and stored frequency choices - refer to Figure 26.
3. Set the Power level using the RF Level rocker switch to the desired level [Figure 5 item B].
4. Press **CW ON** to enable the carrier and readjust the power level as needed. It is recommended that you start on a lower power level. This action starts unmodulated satellite transmission.
5. Press MOD ON to begin modulated satellite transmission.
6. Either MOD OFF or CW OFF can be pressed to stop transmission.

IDU Touchscreen Last State Displayed

When power is reapplied to the IDU, most of the configuration options of the NewS*tream* IDU return to the last operational state, although there are a few exceptions to this rule. In general, RF energy is not applied upon startup in order to protect downstream ODUs. Instead, any state variables that control RF energy default to the powered down state. All other options retain the last state. The following list describes the state variables explicitly.

Common variables:

- Frequency – Save last state
- Antenna Polarity – Save late state
- Antenna Switch – Save last state
- RF Band – Save last state

Microwave:

- RF Power [Hi/Low/Adj]– Save last state
- Power Amp – Always default to off on powerup

Satellite:

- RF Carrier – Always default to off on power up
- RF Modulation – save last state

Cellular:

- Cell Transmit – Always default to off on powerup

IDU Touchscreen States on Startup or Preset Change

When power is applied to the NewS*tream* IDU, the state of each touchscreen and the associated buttons display the operational state last configured, prior to shut down, with the following exceptions:

- The PA On / Off OLED [ENG], or carrier on / off OLED [SNG] are always set in the off or standby state.
- The Cellular On / Standby button is always set in the standby state.
- The 5” touch screen always starts at the default main screen [as shown in the cover photograph].
- When an ENG or SNG preset is selected and initiated [you must press the **Apply** button on front panel to initiate] the Power Amplifier [PA] or Carrier [CW] OLED will return to the standby state.
- When a frequency is selected and initiated, the PA or CW OLED will return to the standby state.

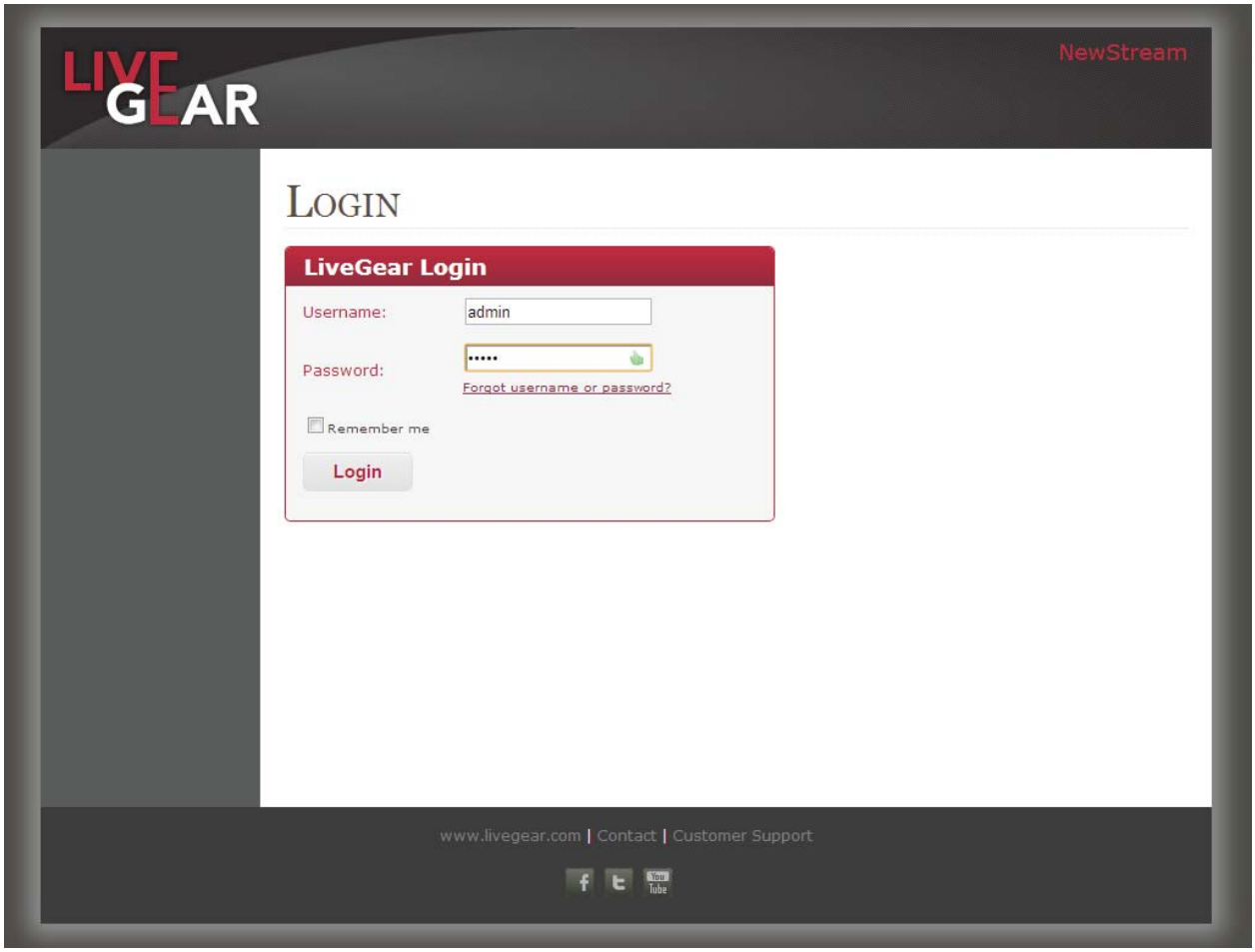
Remote Operation Using the Web Interface

NewS*tream*'s Web interface provides an alternate means of control and configuration for NewS*tream* when the operator selects the Remote control option in NewS*tream*'s touchscreen. Figure 29 displays an example of the Web interface in Remote control for the ENG mode, where multiple operators may configure the NewS*tream* using the Web interface. Figure 31 and 32 display examples of the NewS*tream*'s SNG and CNG Web interface while in Local and Remote control modes. To toggle between Remote and Local control, you must press the **Local** button on the side menu and then the Local button displayed in the **Configuration Mode** touchscreen, as shown in Figure 20.

The **Login** page [see Figure below] is displayed when you access the default IP address http://**192.168.1.10**/. The **Status** page appears once you login [see the figure below]. The default User name and Password is **admin**.

Examples of NewS*tream*'s various Status pages are shown in Figures 29-32. You can also access any Status page by clicking the LIVEGEAR logo. The page displayed is dependent on the preset selected.

Figure 28: NewStream Login Page



Microwave Status Page

The Microwave [ENG] Status Web page displays the following parameters of the NewS*tream* transmitter:

- Current Preset
- RF Control
- Encoding Status
- Modulation Status
- Frequency Control
- Antenna Control
- Cellular Control [Upgrade Option]
- Cell Card Information [Upgrade Option]

When you click the **Current Preset** drop-down, a list of available presets displays, allowing you to select an alternate. Within the RF Control options section, you are able to apply power to the Power Amplifier [PA], the Carrier [CW] and the Modulation control. The Encoding and Modulation Status section displays read-only information. You may apply power to Cellular Transmission. The Frequency Control section provides a means to select Channels and Frequency Bands. The Antenna Control section provides a means to select the ODU antenna and change the ODU antenna's Polarity. The Cellular Card Information section displays the signal strength of each SIM installed within NewS*tream*.

Configure Preset

To display Modify Presets, Frequency Plans, NewS*tream* Settings, Manual Mode and License Manager, you must leave the Status page by clicking the **Setup** button. Refer to the Modify Preset page, as shown in Figure 33. The factory default presets cannot be modified however, you may save them under a different name and then make changes to it using the Modify Presets page. Up to 99 new presets may be created for NewS*tream*.

- Refer to Figures 38 & 39 in the Frequency Plans sections for more information.
- Refer to Figure 41 in the NewS*tream* Settings section for more information.
- Refer to Figures 34 through 37 in the Modify Presets sections for more information concerning creation of custom presets.

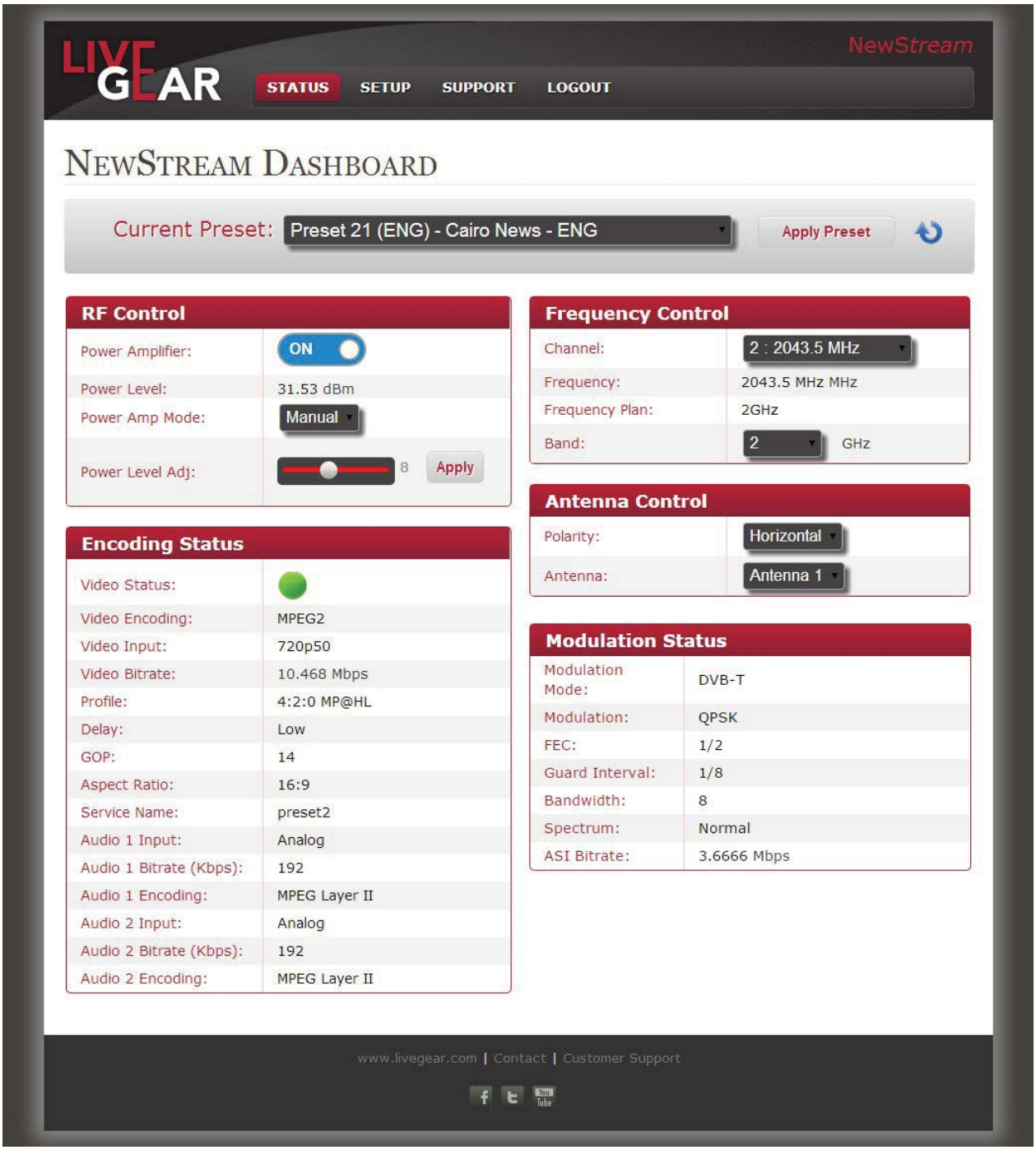
Current Preset

The Current Preset field appears when you use the drop-down to select a previously configured preset. When you click the **Apply Preset** button, the configuration is applied to NewS*tream* and the values that you have selected or modified take effect for the current video transmission.

Refresh Status

The Refresh Status icon provides a means to update the page. Any entries that you have revised such as RF, Frequency or Antenna Controls are reloaded using this option. The Status screen is updated automatically however, under remote control this button ensures that your settings are updated pro-actively.

Figure 29: NewStream Status Page [ENG Remote Control Mode]



Microwave Status Page [Continued]

Radio Frequency Control

Power Amplifier [**ENG**]
This button allows you to augment NewS*tream*'s transmission capabilities by turning on the RF power amplifier. This button is used to toggle the power amplifier between PA Standby and PA ON. The default state is **Off**.

Carrier [**SNG** Upgrade Option]
This button provides a means to toggle the CW carrier On and Off; enabling the carrier frequency output or disabling the carrier frequency output. The default state is **Off**.

Modulation [**SNG** Upgrade Option]
This button allows you to turn Modulation on or off.

P**ower Level** [**ENG**]
This field displays the RF output power in dBm of the microwave ODU.

Power Amplifier Mode
This field allows the selection of a Power Amplifier Radio Frequency Level of:

- High
- Low
- Manual - if manual is selected, the Power level adjust is active and is used to set the RF level in 1 dB steps.

P**ower Level** [**SNG** Upgrade Option]
This field displays the Satellite News Gathering L-Band RF level that is output from the rear panel L-Band connector.

Power Level Adjust
This field displays the Electronic News Gathering Attenuation to which the NewS*tream* is calibrated. You can use the arrow buttons to select an Attenuation level from 0 to 31. The range changes depending on which type of ODU is connected, NewS*tream* or legacy.

Attenuation [**SNG** Upgrade Option]
This field is used to adjust the L-Band power output in 0.5dB steps. You can use the arrow buttons to select an Attenuation level from 0 to 40.

Microwave Status Page [Continued]

Encoding Status

This set of fields present the settings to which the NewS*tream's* Encoder is currently set. These fields are read-only.

Manual mode is accessed by the Setup drop-down menu. For further information refer to the *Manual Mode Pages.*

Video Status

This LED is lit green when video encoder is sending a signal to the designated receiver. It is lit red when Video transmission has stopped or when the video encoder is powered down.

Video Encoding

The Video Encoding field displays one of three options:

- MPEG2
- H.264
- External ASI

Video Input

The Video Input field displays one of the following options:

- NTSC
- NTSC No Pedestal
- PAL
- PAL-M
- PAL-N
- BARS-525
- BARS-625
- 720p50
- 720p59.94
- 1080i50
- 1080i59.94
- SDI-525
- SDI-625
- HD Bars

Video Bitrate

The Video Bitrate value ranges from 0-99.999 Mb/s.

Profile

The Profile field Profile values differ depending on encoding type [H.264 or MPEG2]. The MPEG-2 SD example is:

- 4:2:0 MP@ML
- 4:2:2 P@ML

Microwave Status Page [Continued]

Modulation Status

The Modulation Status fields present NewS*tream*'s microwave settings for the selected preset.

Modulation Mode

This field displays one of the following modulation classes for each microwave preset:

- **COFDM-DVB-T** — Coded Orthogonal Frequency - Division Multiplexing - Digital Video Broadcasting — Terrestrial
- **LMS-T** — Link Modulation Scheme —Terrestrial
- **DVB - S** — Digital Video Broadcasting — Satellite Mode
- **DVB - S2** — Digital Video Broadcasting —Satellite Mode

Modulation

This field displays the following modulation classes for each microwave preset in the Microwave Settings page. Moving up the scale of modulations allows higher throughput but at the cost of robustness:

- **QPSK** — Quadrature phase-shift keying
- **16-QAM** — Quadrature amplitude modulation
- **APSK** — Amplitude Phase-shift Keying [for both 16 and 32-APSK]
- **64 - QAM** — Quadrature amplitude modulation

FEC

Forward Error Correction [FEC] or channel coding is a technique used for controlling errors in data transmission over unreliable or noisy communication channels. This field displays the FEC for the existing microwave preset. Lower fractions are more robust to noise and fading but at the cost of reduced information bandwidth. Common FEC values include:

- 1/4
- 1/2
- 1/3
- 2/3
- 3/4
- 5/6
- 7/8

Guard Interval

The Guard Interval is a method used to prevent interference within distinct transmissions. The Guard Interval configured for the microwave preset is displayed in this field. The Guard Interval values include:

- 1/32
- 1/16
- 1/8
- 1/4

Microwave Status Page [Continued]

Bandwidth
The Bandwidth value configured for the microwave preset is displayed as one of the following:

- 6 MHz
- 7 MHz
- 8 MHz
- 10 MHz
- 20 MHz

Spectrum
The Spectrum field displays either Normal or Inverted.

ASI Bitrate
The Video Bitrate displayed ranges from 0 to 99.999 Mb/s.

Antenna Polarization Control

The Antenna Polarization Control section presents NewS*tream*'s ODU antenna settings for the selected preset. The fields allow selection of ODU Polarity and the antenna to which the polarity is to be applied, as shown in Figure 29.

Polarity
This drop-down field allows you to select from the following:

- Vertical
- Horizontal
- Left Circular[LC]
- Right Circular [RC]

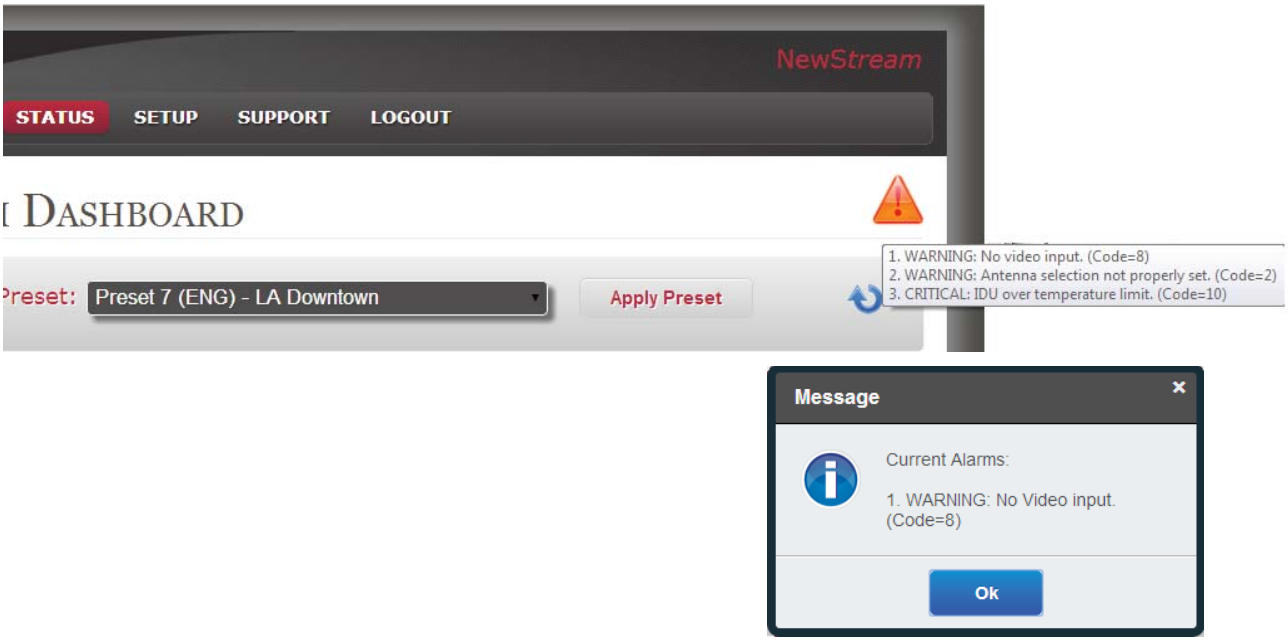
Antenna
This field allows for the selection of ODU 1 or 2. Note that the antenna switch function can be disabled if no antenna switch is being used.

Microwave Status Page [Continued]

Alarm Indicators

When an Alarm is activated on the IDU, it will be indicated on the top, right-hand corner of the Status page, as shown below in Figure 30. The Alarm may indicate a cautionary warning or a critical situation, as shown in the example. Click the **Alarm** icon to display a Warning/Alert dialog box or mouse over the icon to view alarm details, as shown in the example.

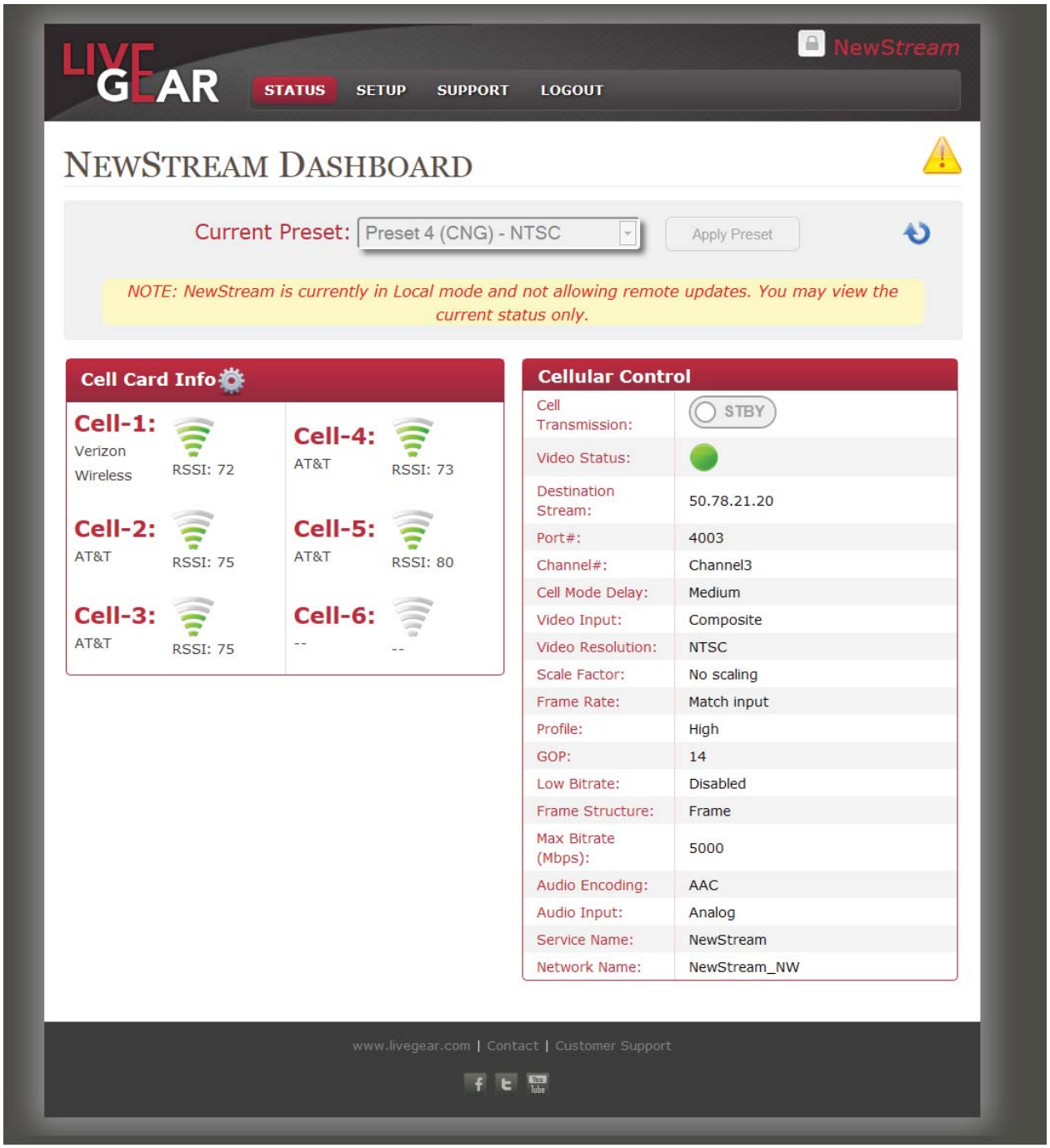
Figure 30: NewStream Alarm Indicator on Status Page and Message Dialog Box



Cellular Status Page

A CNG Preset is displayed in the example below. If you are operating in Remote Control, you are allowed the choice of changing the preset within the Status page or initiating Cellular Transmission. Figure 31 shows the system in Local Control, where the Web page is read-only.

Figure 31: NewStream Status Page [CNG Local Control Mode]



Cellular Status Page [Continued]

Cellular Card Information

This status listing displays each cellular card's RSSI. The RSSI is the relative received signal strength in arbitrary units. RSSI is an indication of the power level being received by the antenna. The lower the RSSI number, the stronger the signal. Refer to the *CNG Touchscreens* section for more information.

When you click the manage icon shown within the Cell Card Info box, the Cell Modem Configuration dialog box displays providing a means of configuring each individual modem of the those available.

Modem #
The Modem number drop-down field allows you to select one of six modems supported by NewS*tream.*

Mode
The Mode drop-down provides the means to select Auto or Custom Mode.

APN
The Access Point Name is a configurable network identifier used by NewS*tream* when connecting to a GSM carrier. The carrier examines the APN identifier to determine the network connection type for the NewS*tream* transmitter. The APN determines which IP addresses are to be assigned to NewS*tream*, which security methods to be used, and how or if, it will be connected to a private network.

Login Name
The Login Name identifies those administrators that are responsible for the maintenance of the NewS*tream* cellular modems. Type your user name in this field to submit your revised modem cofiguration.

Password
Type the Password associated with your Login Name in this field to authenticate the submission.

PIN
This field provides further authentication with a Personal Identification Number.

Submit or **Cancel**
To make any changes to a Cell Modem Configuration, click the Submit button or Cancel to retain existing settings.

Cellular Control

The Cellular Control Status presents NewS*tream*'s cellular settings for the selected preset.

Cellular Transmission
This button allows you to turn Cellular Transmission On or Off. when operating in Remote Controll mode . The default state is STBY. [or Off]

Cellular Status Page [Continued]

Video Status
The Video Status LED idicates the current video transmission state. When lit green, the video signal is being transmitted to the LiveGear Receiver. When lit red, the signal is not being transmitted and an alarm state may be present [refer to Figure 31].

Destination Stream
This field displays the IP Address that designates the destination for the cellular video stream - the LGR's IP address.

Port #
This field displays the Port number, which ranges from 1 to 65,535.

Channel #
This field displays the LGR Channel number, which ranges from 1 to 6.

Cell Mode [Delay]
The NewS*tream* transmitter has three cellular modes of operation: Low, Medium and High delay, offering flexibility for optimizing overall video performance as a function of cellular link connectivity performance.

> **Low** - this delay mode is used in applications where there is very good 3G/4G cellular connectivity. This setting minimizes the overall video buffer size and allows for approximately 1 to 2 seconds of delay over the cellular network. This setting is to be used in areas where there is intermittent or degrading cell connectivity; in these areas there is a larger overall packet jitter which leads to an overflow of the video buffering or the loss of video frames.
> **Medium** - this delay mode offers the optimum video quality and an overall delay of less than 5 seconds while minimizing the loss of video frames. This mode is to be used with acceptable 3G/4G cellular network coverage.
> **High** - this delay mode uses the largest video buffer size to minimize the loss of video frames over the cellular link. Use this mode whenever 4G coverage is not present and 3G services are unreliable. When cell coverage is unknown, High delay should be used initially.

Video Input
This field displays the selection of Composite or SDI Cellular Video Input for the listed preset.

Cellular Status Page [Continued]

Video Resolution
The Video Input Resolution field displays the following values:

- 720p50, 720p60, 720p59.94
- 1080i50, 1080i59.94, 1080i60
- NTSC [National Television System Committee]
- PAL [Phase Alternating Line]

Scaling Factor
The Scaling Factor describes the use of magnification in devices to compensate for differences between size of viewing areas.

Frame Rate
Frame rate, also known as frame frequency and frames per second [FPS], is the frequency or rate at which NewS*tream* unique consecutive images called frames. Frame rate is often expressed in frames per second [FPS] and is also expressed in progressive scan monitors as hertz [Hz].

Profile
The Profile field presents the H.264 settings for video, which are also available for Microwave and Satellite transmission. The Profile field displays one of the following values:

- Baseline
- Main
- High
- High 422

GOP
In MPEG encoding, a Group of Pictures [GOP] specifies the order in which intra-frames are arranged. The GOP is a group of successive pictures within an MPEG-coded film and/or video stream. Each MPEG-coded film and/or video stream consists of successive groups of pictures. The valid range of successive groups of pictures is from 0 to 60.

Low Bitrate
This field displays whether Low Bitrate control is Enabled or Disabled.

Frame Structure
Video frame structure is the division of defined lengths of media, such as a sequence of images in a video, into different field information parts. Video frame structure commonly defines independent key frames, predicted adjacent frames, and bi-directional frmaes created from the comparison of multiple frames. Key frames contain all of the information of an image and the predicted and bi-directional frames contain the difference elements from other frames which results in much lower data that is required to recreate the images.

Cellular Status Page [Continued]

Max Bitrate
This field displays a range of:

- 256 kilobits per second [kbps]
- 500 kbps
- 768 kbps
- 1.0 Megabit per second [Mbps]
- 1.5 Mbps
- 2.0 Mbps
- 2.5 Mbps
- 3.0 Mbps
- 3.5 Mbps
- 4.0 Mbps
- 5.0 Mbps
- 6.0 Mbps
- 7.0 Mbps
- 8.0 Mbps
- 9.0 Mbps
- 10.0 Mbps

Audio Encoding 1 & 2
The Audio Input Encoding types that are displayed in this field include:

- **Off**
- **MPEG Layer II** — MPEG Audio Layer II is a core audio algorithm.
- **AAC** — Advanced Audio Coding

Audio Input
The Audio Input Encoding values that are displayed in this field include:

- **Analog**
- **SDI Embedded** — Serial digital interface [SDI] is a family of video interfaces that have been standardized by SMPTE. For example, ITU-R BT.656 and SMPTE 259M define digital video interfaces used for broadcast-grade video. This mode embeds the audio into the SDI stream.
- **AES-EBU** — The digital audio standard frequently called AES/EBU [aka AES3], is used for carrying digital audio signals between various devices.

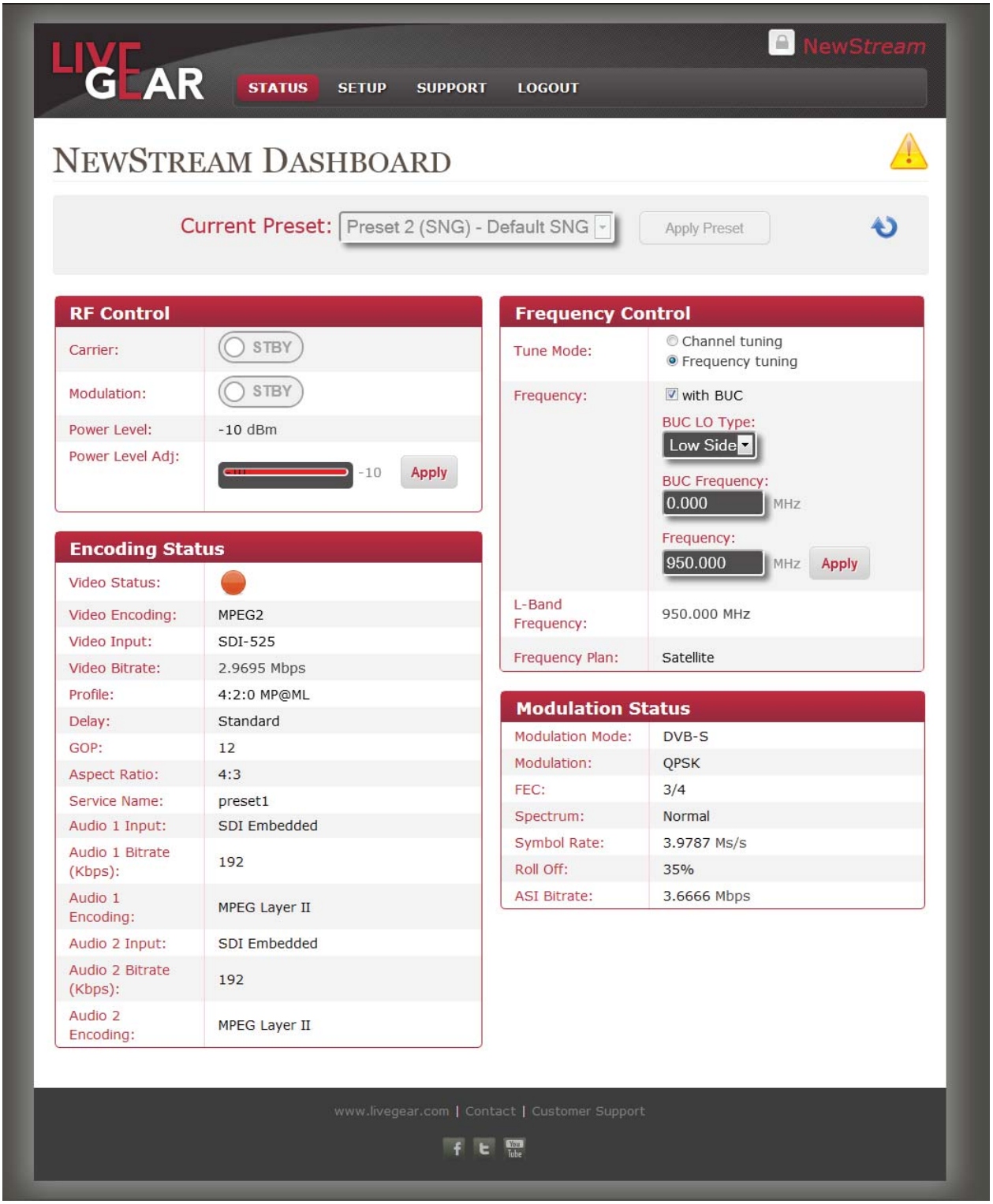
Service Name
This field displays the name of the cellular service provider.

Network Name
The Network Name or SSID, differentiates one WLAN from another, so all Access Points and all devices attempting to connect to a specific WLAN must use the same SSID to enable effective roaming. As part of this association process, a wireless client must have the same SSID as that entered in the Access Point or it will not be permitted to join the BSS.

Satellite Status Page

The Status Web page that displays when you select an SNG preset is shown in the figure below. When in Remote control, you are able to change presets using the Current Preset drop-down and the Appy Preset button.

Figure 32: NewStream Status Page [SNG Remote Control Mode]



Satellite Status Page [Continued]

Radio Frequency Control

Carrier
This button provides a means to toggle the CW carrier On and Off; enabling the carrier frequency output or disabling the carrier frequency output. The default state is **Off**.

Modulation
This button allows you to turn Modulation on or off.

Power Level
This field displays the Satellite News Gathering L-Band RF level that is output from the rear panel L-Band connector.

Power Level
This field displays the Satellite News Gathering L-Band RF level that is output from the rear panel L-Band connector.

Power Level Adjust
This field is used to adjust the L-Band power output in 0.5dB steps. You can use the arrow buttons to select an Attenuation level from 0 to 40.

Encoding Status

This set of fields present the settings to which the NewS*tream's* Encoder is currently set. These fields are read-only.

Video Status
This LED is lit green when video encoder is sending a signal to the designated receiver. It is lit red when Video transmission has stopped or when the video encoder is powered down.

Video Encoding
The Video Encoding field displays one of three options:

- MPEG2
- H.264
- External ASI

Satelitte Status Page [Continued]

Video Input
The Video Input field displays one of the following options:

- NTSC
- NTSC No Pedestal
- PAL
- PAL-M
- PAL-N
- BARS-525
- BARS-625
- 720p50
- 720p59.94
- 1080i50
- 1080i59.94
- SDI-525
- SDI-625
- HD Bars

Video Bitrate
The Video Bitrate value ranges from 0-99.999 Mb/s.

Profile
The Profile field Profile values differ depending on encoding type [H.264 or MPEG2]. The MPEG-2 SD example is:

- 4:2:0 MP@ML
- 4:2:2 P@ML

Delay
The Delay field displays one of these three values:

- Low
- Standard
- Ultra Low

GOP
The values of successive groups of pictures ranges from 0 to 60.

Aspect Ratio
SD formats allow an Aspect ratio of either 4:3 or 16:9. HD formats aloow 16:9 only. The Aspect Ratio field displays one of these two values:

- 4:3
- 16:9

Service Name
This field displays the 16 character service information name for the current preset.

Satelitte Status Page [Continued]

Audio Input 1 & **2**
The Audio Input Encoding values that are displayed in this field include:

- Test Tone
- Analog
- SDI Embedded
- AES-EBU Balanced
- AES-EBU Unbalanced

Audio Bitrate [kbps] **1** & **2**
The Audio Bitrate values for Audio 1 & 2 are displayed in this field.

Audio Encoding 1 & **2**
The Audio Input Encoding types that are displayed in this field include:

- **Off**
- **MPEG Layer I** — MPEG Audio Layer I is a core audio algorithm
- **MPEG Layer II** — MPEG Audio Layer II is a core audio algorithm.
- **Linear PCM** — Pulse-code modulation

Frequency Control

The Frequency Control status provides a means to select the microwave, cellular and satellite Channel and Band and to view the frequency at which NewS*tream* is calibrated. These settings can be modified using the Frequency Plan page, as shown in Figures 31 & 32.

Tune Mode

- **Channel Tuning** - Channel Tuning provides a means to configure preset frequencies that you can employ when in SNG operation from the front panel in Local Control [or also in Remote Control]. These frequencies are set up within Satellite Channels while in Remote control.
- **Frequency Tuning** - This method of frequency selection can gbe done while in Local or Remote control, as described in the touchscreen SNG Operation section above and also in the Frequency Plans Web Page section below. The frequency tuning can be set for Block-upconverter [BUC] Disabled [L-Band] or BUC Enabled, as described below.

Channel
The frequency Channel can be selected using this drop-down field. Channel options depend on the frequency band in which you are operating. There are standard frequencies broadcasters use, or which can be created. The frequency channel displays the list of stored channels for the RF band in use. This field displays the name of the frequency channel that NewS*tream* is set. This field can be modified in the Frequency Settings page in Remote control. Refer to the *Frequency Plans Page [SNG]*.

Satelitte Status Page [Continued]

Frequency

This box displays the BUC Frequency for which NewS*tream* is currently set.

With BUC [Block Up-Converter Enabling]

The block up-converter [BUC] is used in the transmission [uplink] of satellite signals. It converts a band of frequencies from a lower frequency to a higher frequency. Modern BUCs convert from the L-Band to Ku-band, C-band and Ka-band.

- **BUC LO Type:** This field displays the BUC Local Oscillator [LO] Type frequency for which NewS*tream* is currently set. You can select Low or High Side for your SNG system's Local Oscillator.
- **BUC Frequency:** This field displays the BUC Frequency for which NewS*tream* is currently set.
- **Frequency:** This field displays the Frequency for which NewS*tream* is currently set.

L-Band Frequency

The ODUs operate on L-Band with BUC disabled. This field displays the seleced L-Band frequency.

Frequency Plan

This fielld displays Satellite when using a SNG Preset.

Apply

You can reset frequency configurations by clicking the **Apply** button.

Satelitte Status Page [Continued]

Modulation Status

The Modulation Status fields present NewS*tream*'s microwave settings for the selected preset.

Modulation Mode

This field displays one of the following modulation classes for each microwave preset:

- **COFDM-DVB-T** — Coded Orthogonal Frequency - Division Multiplexing - Digital Video Broadcasting — Terrestrial
- **LMS-T** — Link Modulation Scheme —Terrestrial
- **DVB - S** — Digital Video Broadcasting — Satellite Mode
- **DVB - S2** — Digital Video Broadcasting —Satellite Mode

Modulation

This field displays the following modulation classes for each microwave preset in the Microwave Settings page. Moving up the scale of modulations allows higher throughput but at the cost of robustness:

- **QPSK** — Quadrature phase-shift keying
- **16-QAM** — Quadrature amplitude modulation
- **APSK** — Amplitude Phase-shift Keying [for both 16 and 32-APSK]
- **64 - QAM** — Quadrature amplitude modulation

FEC

Forward Error Correction [FEC] or channel coding is a technique used for controlling errors in data transmission over unreliable or noisy communication channels. This field displays the FEC for the existing microwave preset. Lower fractions are more robust to noise and fading but at the cost of reduced information bandwidth. Common FEC values include:

- 1/4
- 1/2
- 1/3
- 2/3
- 3/4
- 5/6
- 7/8

Spectrum

The Spectrum field displays either Normal or Inverted.

Satellite Status Page [Continued]

Symbol Rate
Symbol Rate [aka baud or modulation rate] is the number of symbol changes [i.e. waveform changes or signalling events] made to the transmission medium per second using a digitally modulated signal or a line code. The Symbol Rate is expressed in Mega symbols/second [Ms/s]. The valid range is 1.0000-36.0000 Ms/s.

Roll Off
Roll-off describes the steepness of a transmission function with frequency, in connection with filter circuits in the transition between a passband and a stop band.
Values of Roll-off are expressed in percentages, ranging from:

- 35%
- 25%

ASI Bitrate
The Video Bitrate displayed ranges from 0 to 99.999 Mb/s.

Modify Presets Page

While viewing a Status page, click the Setup button to display the drop-down menu. The menu displays the following options:

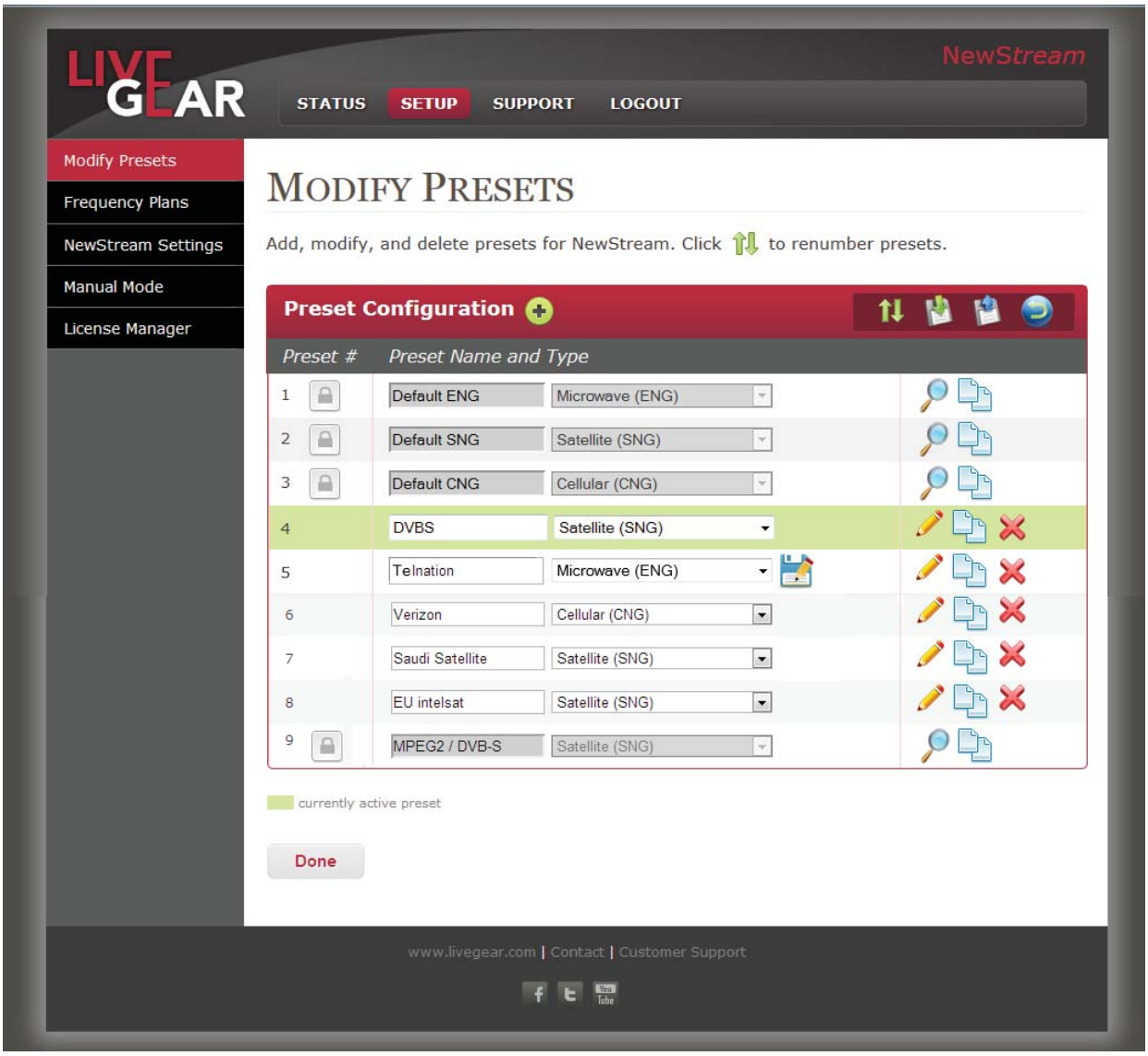
- Modify Presets
- Frequency Plans
- NewS*tream* Settings
- Manual Mode
- License Manager

Select **Modify Presets** to begin creating custom configurations for SNG, ENG and CNG transmission in the page shown in Figure 33. NewS*tream* is configured with three factory default presets with the ability to create up to 99 custom presets. You can modify each preset name and its type in the Modify Presets page, as shown in the figure. You can configure additional settings for each custom preset by clicking the configure preset icon. Presets marked with the padlock symbol are factory defaults and cannot be modified but can be used as a template for your custom presets. The active preset is highlighted.

In the Modify Presets page you can use the Export tool to save custom presets to a file or to other IDUs. Additionally, you can import presets from a directory on your PC, to another IDU or to a USB flash drive using the tool which loads custom presets from a file. This feature can not be implemented while the system is transmitting.

To create customized presets, click the copy tool to add a similar preset with the default parameters. This new preset is listed at the last entry field and you can begin customizing it by clicking the configure preset icon. Confirm that you want to leave the Modify Presets page and you are directed to a set up page that is similar to the page shown in Figure 33. You may rename the copy and save it by clicking the save icon.

Figure 33: NewStream Modify Presets Page



Add Preset

When you click the **Add Preset** button, a **Create Preset** dialog pop up appears, providing a means to type a new preset name and choose a type. Click the **Create Preset** button in this dialog pop up and **Save Changes** in the Modify Preset page.

Preset Configuration

Preset Number [#]

The Preset Number can be reordered. Click and drag the blue circle found in the column to the left of the Preset number [#] column to reorder the preset list. Click **Save Changes** to retain your modification of the Preset Numbers.

Preset Name

Specify an alphanumeric name of up to 32 characters for each preset. You may also use spaces and the following special characters: _ **- ( ) /** for the Preset Names. Note that preset names longer than 16 characters will scroll on the front panel 16 x 2 Preset display to show the complete name and then only show the first 16 characters.

Preset Type

This drop-down field provides a choice of Cellular, Satellite, Microwave or combinations of such for NewS*tream* transmissions. The choices include:

- Microwave [ENG]
- Cellular [CNG]
- Satellite [SNG]
- Microwave & Cellular [ENG/CNG (Upgrade Option)]
- Satellite & Cellular [SNG/CNG (Upgrade Option)]

Export Presets to a File

Use the tool to save custom presets to a file. You can export presets in a directory on your PC, a shared server for other operators to access or on a USB flash drive.

Import Presets from a File

Use the tool to load custom presets from a file. This feature can not be implemented while the system is transmitting. You can import a preset from a directory on your PC, a shared server or on a USB flash drive. See the *Preset Export and Import* section to learn how to Import and Export Presets in Local control.

Restore Preset Configuration

Use the tool to restore preset configuration to the factory defaults and to remove all custom presets.

View Preset Settings

Use the tool to view default preset settings.

Save a Preset

Click the **Save** icon to create a copy of a preset or to save modifications to an existing preset.

Copy a Preset

Use the tool to copy a selected preset. This is the action that allows you to create a customized preset. Once you have copied a default or another customized preset, save

it with a unique name and configure its parameters as needed for your ENG, CNG or SNG broadcasts.

Delete a Preset

Use the tool to delete a selected preset.

Done

Click the **Done** button once you've finished viewing the settings in the Modify Presets page. When you click **Done** no changes will be saved as you leave the page.

Save Changes

To retain any changes to the listed custom presets as well as renumbering changes to the listed custom presets, be sure to click the Save button once you've finished reordering listed presets in the Modify Presets page. This button appears in the Reorder Presets page.

Factory Default Presets

The NewS*tream* IDU is shipped with three default presets:

- Default ENG Microwave preset
- Default SNG Satellite preset
- Default CNG Cellular H.264 preset

The default presets are read-only but you can copy each default preset and rename it for future use and modification. Examples of the settings for the Microwave preset are listed below:

Default ENG Preset

Encoder Settings

Video Settings

Video Encoding: MPEG2
Video In: SDI-525
SDI Horizontal Resolution: 720
Aspect Ratio: 4:3
Closed Captioning: Off
VBI: Off

Encoder Settings

Profile: 4:2:0 MP@ML
GOP: 12 Frames [1-60]
Delay: Standard
Auto Bitrate: On
Video Bitrate: 5.529 Mb/s [0-99.999]
Remux: Off
Spectrum: Invert

Audio Settings

Audio 1 Encoder: MPEG Layer II
Audio 1 Input: SDI Embedded
Audio 1 Mode: Dual Mono
Audio 1 Bitrate: 192 [kbs]
Audio 2 Encoder: MPEG Layer II
Audio 2 Input: SDI Embedded
Audio 2 Mode: Dual Mono
Audio 2 Bitrate: 192 [kbs]

Wayside Data

Format: Off
Baud Rate: 19200

Default ENG Preset [Continued]

Encryption Settings
Encryption Mode: Off
Security Key: [Undefined & Hidden]

Transport Stream
Service Name: preset1
Network Name: pre1_nw
Program ID: [210]
Network ID: [211]
Transport ID: [212]
Video PID: [213]
PCR PID: [214]
Audio A PID: [215]
Audio B PID: [216]
Data PID: [217]

Modulation Settings

Modulation Mode: DVB-T
Spectrum: Normal
Modulation: QPSK
FEC: 1/2
Guard Interval: 1/8
Bandwidth: 8 MHz

Cellular Settings

Cellular
Cell Mode Delay: Low
Destination Stream: 8.8.8.8
Port #: 4001

Video
Video Input: Composite
Resolution: NTSC
Scale Factor: No Scaling
Frame Rate: Match Input

Encoder
Profile [H264]: Baseline
GOP: 35 Frames [1-60]
Low Bitrate: Enabled
Frame Structure: MBAFF
Encoder Bitrate: 50 [0 to 99.999]

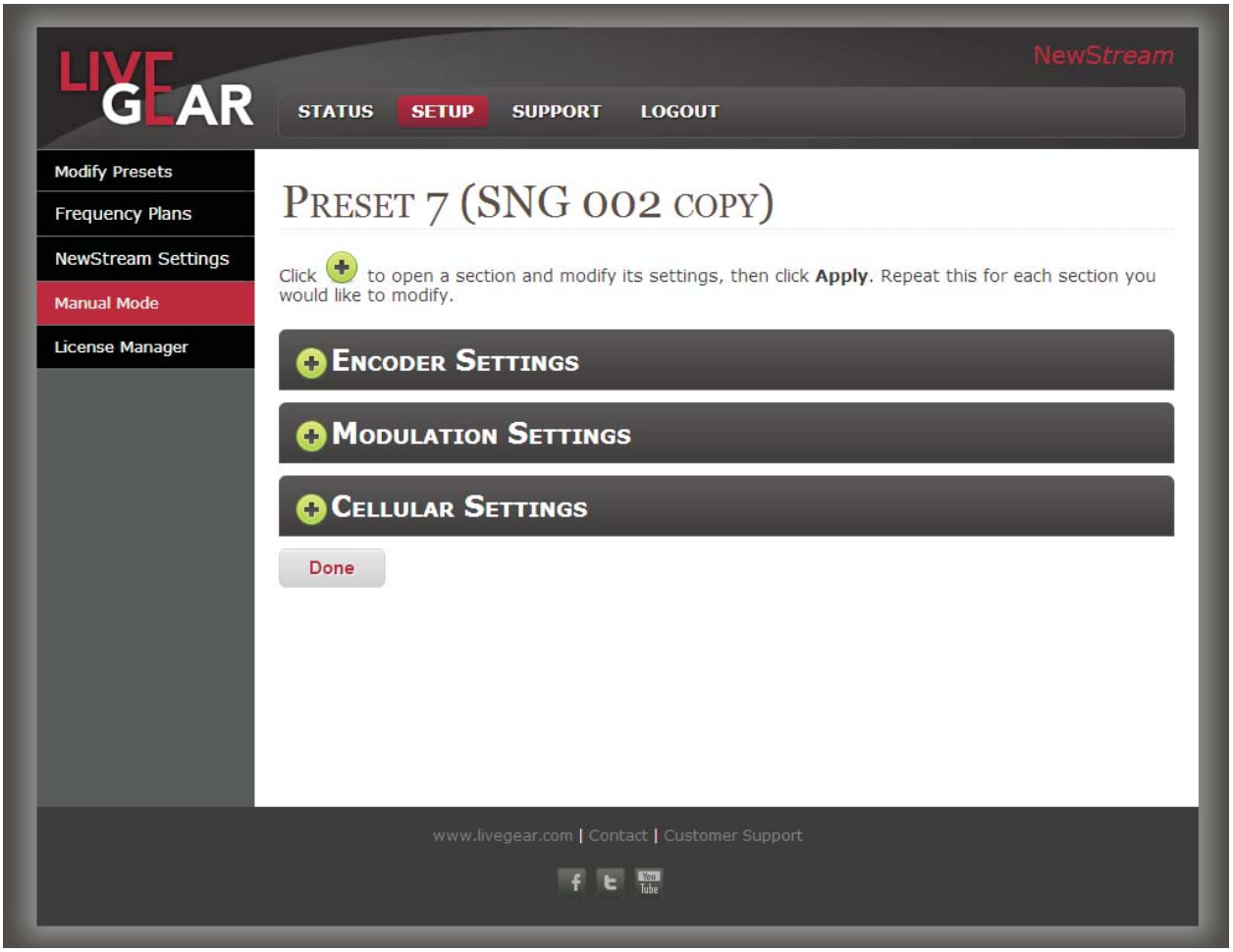
Transport Stream
Service Name: cell_vislink
Network Name: cell_vislink_nw
Program ID: [310]
Network ID: [311]
Transport ID: [312]
Video PID: [313]
PCR PID: [314]
Audio A PID: [315]
Audio B PID: [316]
Data PID: [317]

Audio
Audio Encoding: MPEG Layer II
Audio Input: SDI Embedded

Modify Presets Setup Page

When you select the Modify Presets menu item and confirm this action, the following setup page displays, allowing you to modify the NewS*tream* transmitter's preset. The example shown is a SNG Preset that has been copied from the default SNG Preset [see the figure below]. When you click the button, the Encoder, Modulation or Cellular Settings Modify Presets Web options appear. Note that Modifying Presets is used to revise parameters and have the changes applied immediately, this automatically allows you to adjust NewS*tream*'s operating configuration when transmission parameters change. The Modify Presets feature is designed to provide operational flexibility as needed.

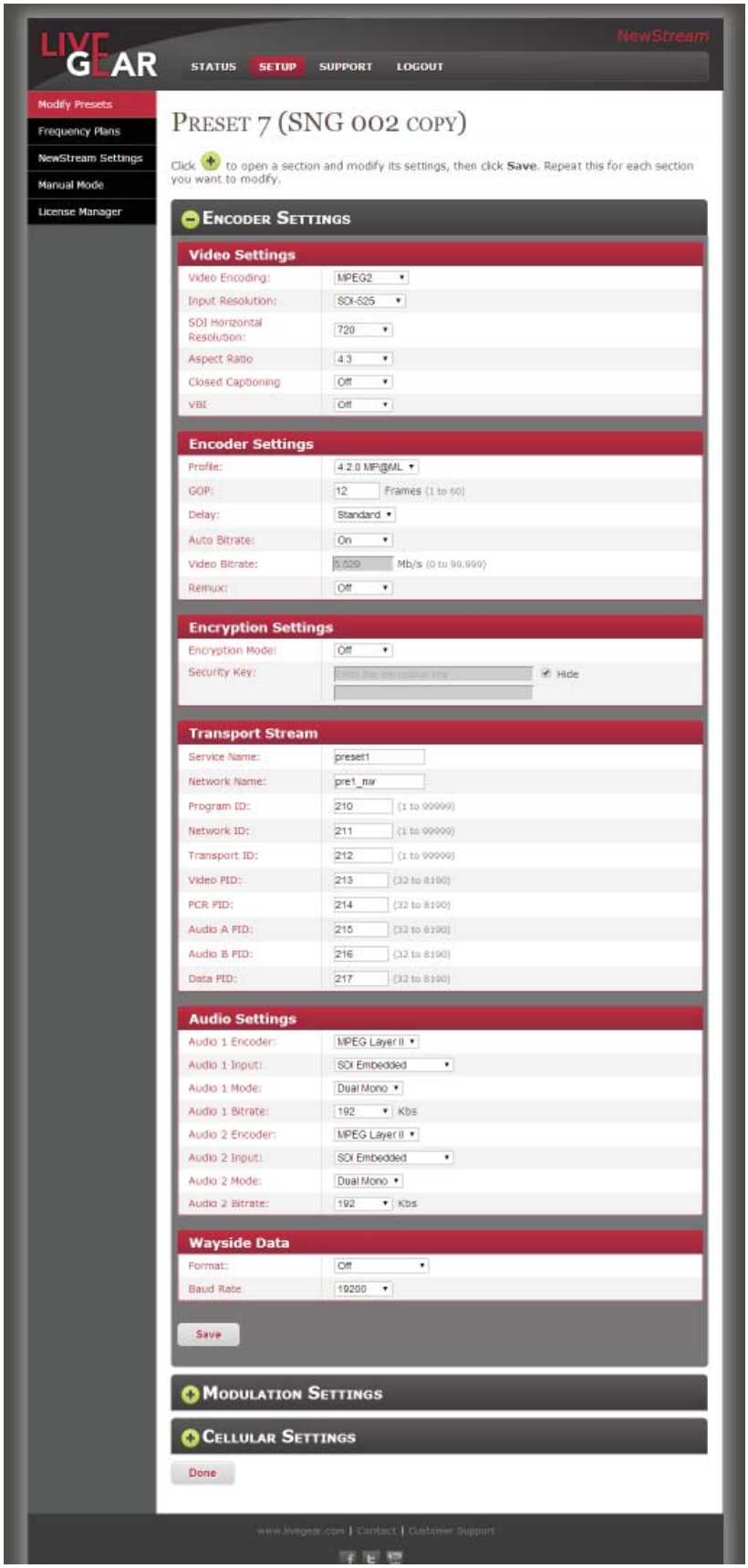
Figure 34: NewStream Modify Presets Setup Page - Collapsed



Modify Presets Encoder Settings

Once expanded, the Encoder Settings appear, as shown in Figure 35. This set of fields allows the configuration of ENG, SNG or CNG options. The encoder settings fields include Video, Audio, Encoder and Encryption settings, as well as Transport Stream and Wayside Data configuration fields.

Figure 35: Modify Presets Encoder Settings Page



Modify Presets Encoder Settings

Video Settings

Video Encoding
The Video Encoding drop-down field allows the selection of one of three options:

- MPEG2
- H.264
- External ASI

Input Resolution
The Video In drop-down field allows the selection of one of the following options:

- NTSC
- PAL
- PAL-M
- PAL-N
- BARS-525
- BARS-625
- 720p50
- 720p59.94
- 1080i50
- 1080i59.94
- SDI-525
- SDI-625
- HD Bars

SDI Horizontal Resolution
The SDI Horizontal Resolution drop-down field allows the selection of one of the following options:

- 720
- 704
- 544
- 528
- 480
- 352

Aspect Ratio
The Aspect Ratio type drop-down field allows the selection of one of three options:

- 4:3
- 16:9

Modify Presets Encoder Settings [Continued]

Closed Captioning
The Closed Captioning drop-down field allows the selection of one of three options:
- Off
- CC-608
- CC-708

VBI
The Vertical Blanking Interval option can be enabled with the selection of On.

Encoder Settings

Profile
The Profile type drop-down field allows the selection of one of two options:
- 4:2:0 MP@ML
- 4:2:2 P@ML

GOP
In MPEG encoding, a Group of Pictures [GOP] specifies the order in which intra-frames are arranged. The GOP is a group of successive pictures within an MPEG-coded film and/or video stream. Each MPEG-coded film and/or video stream consists of successive groups of pictures. The valid range of successive groups of pictures is from 0 to 60. For “Intra Refresh,” enter 0 in this field.

Delay
The Delay type drop-down field allows the selection of one of three options:
- Low
- Standard
- Ultra

Auto Bitrate
The Automatic Bitrate option can be enabled with the selection of On.

Video Bitrate
The Video Bitrate value ranges from 0-99.999 Mb/s

Remux
The Remux option can be enabled with the selection of On.

Modify Presets Encoder Settings [Continued]

Encryption Settings

The Encryption Settings provide the selection of Encryption Mode and the Security Key.

Encryption Mode

This field allows selection of the following Encryption Modes for the microwave preset:

- **BISS1** — Basic Inter-operable Scrambling System, usually known as BISS, is a satellite signal scrambling system.
- **BISSE** — Basic Inter-operable Scrambling System - Encrypted
- **Off**

Security Key

Type a key in this field to apply encryption to NewS*tream* transmissions.

Hide Characters

When the check box is selected, characters will not appear in the Security Key entry field.

Transport Stream

The following entry fields are used by the system to differentiate NewS*tream* Transport Streams.

Service Name

This field provides a means to differentiate the NewS*tream* Transport Stream with a unique Service Name.

Network Name

This field provides a means to differentiate the NewS*tream* Transport Stream with a Network Name.

Program ID

This field provides a means to differentiate the NewS*tream* Transport Stream with a Program Identification [valid IDs range from 1 to 99999].

Modify Presets Encoder Settings [Continued]

Network ID
This field provides a means to differentiate the NewS*tream* Transport Stream with a unique Network Identification [valid IDs range from 1 to 99999].

Transport ID
This field provides a means to differentiate the NewS*tream* Transport Stream with a unique identification [valid IDs range from1 to 99999].

Video PID
This field displays the Video Packet Identification for the NewS*tream* Transport Stream [valid IDs range from 32 to 8190].

PCR PID
This field displays the Program Clock Reference Packet Identification for the NewS*tream* Transport Stream [valid IDs range from 32 to 8190].

Audio A & B PID
This field displays the Audio A and B Packet Identification for the NewS*tream* Transport Stream [valid IDs range from 32 to 8190].

Data PID
This field displays the Data Packet Identification for the NewS*tream* Transport Stream [valid IDs range from 32 to 8190].

Audio Settings

Audio 1 & 2 Encoder
The Audio Encoding parameters that are available in this field include:

- **MPEG Layer I** - MPEG Audio Layer I is a core audio algorithm.
- **MPEG Layer II** - MPEG Audio Layer II is a core audio algorithm.
- **Linear PCM** - Pulse-code modulation
- Off

Audio 1 & 2 Input
The Audio Input parameters that are available in this field include:

- Test Tone
- Analog
- SDI Embedded
- AES-EBU Balanced
- AES-EBU Unbalanced

Modify Presets Encoder Settings [Continued]

Audio 1 & 2 Mode
The Audio Mode parameters that are available in this field include:
- Stereo
- Dual Mono

Audio 1 & 2 Bitrate
This drop-down field presents a range of:
- 128 kilobits per second [kbps]
- 160
- 192
- 224
- 256
- 320
- 384

Wayside Data

Format
The Wayside Data Format parameters that are available in this field include:
- Off
- TTV
- CJM2 (Normal)
- Low Delay CJM2

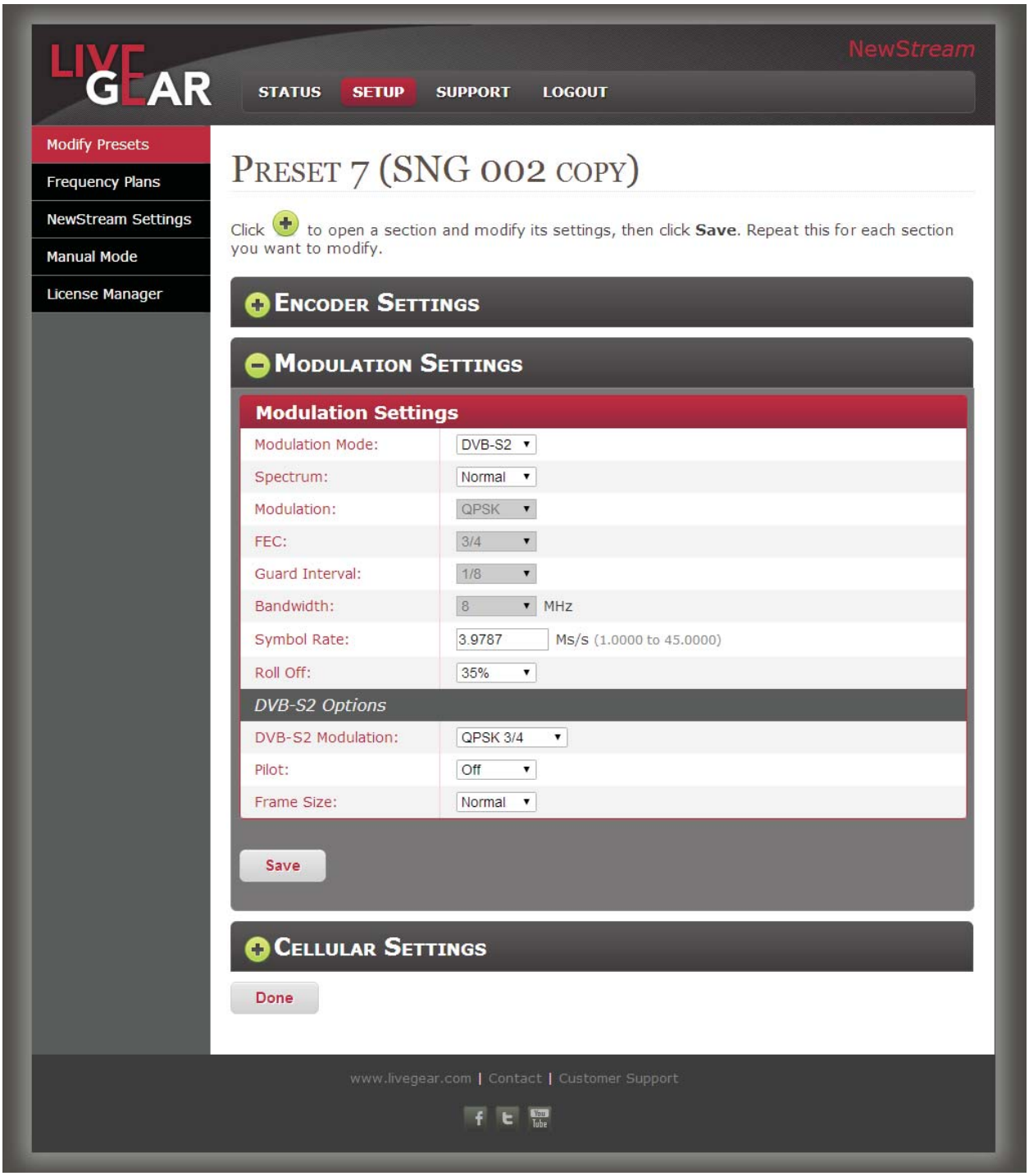
Baud Rate
The Baud Rate parameters that are available in this field include:
- 1200
- 2400
- 4800
- 9600
- 19200
- 38400
- 57600
- 115200

Apply
Click the **Apply** button to configure the encoder settings and submit preset changes to the IDU.

Modify Presets Modulation Settings

The Modulation Settings for preset modification Setup appears as shown in the figure below. This set of fields allows the configuration of ENG or SNG modulation settings. The modulation settings fields include modulation mode, spectrum, FEC, guard interval, bandwidth, symbol rate, roll off and DVB-S2 options configuration fields.

Figure 36: Modify Presets Modulation Settings Page



Modify Presets Modulation Settings [Continued]

Modulation Settings

Modulation Mode

The Modulation Modes that are available are:

- DVB-T
- LMS-T
- DVB-S [SNG only]
- DVB-S2 [SNG only]

Spectrum

The choices for Spectrum are Normal or Inverted.

Modulation

This field displays the following modulation classes that can be selected for each microwave, cellular or satellite preset found in the Modify Presets page. This list is combines the values for both DVB-T and DVB-S modulations. These modulation options will change for ENG, CNG and SNG presets.

- QPSK — Quadrature Phase-Shift Keying
- 16-QAM — Quadrature amplitude modulation
- APSK — Amplitude Phase-shift Keying for both 16 & 32 APSK
- 64-QAM — Quadrature Amplitude Modulation

FEC

Forward Error Correction [FEC] or channel coding is a technique used for controlling errors in data transmission over unreliable or noisy communication channels. This field allows selection of the FEC for the existing microwave preset. The FEC values include:

- 1/2
- 2/3
- 3/4
- 5/6
- 7/8

Guard Interval

The Guard Interval is a method used to prevent interference within distinct transmissions The Guard Interval configured for the microwave preset is displayed in this field. The Guard Interval values include:

- 1/32
- 1/16
- 1/8
- 1/4

Modify Presets Modulation Settings [Continued]

Bandwidth
The 6, 7 and 8 MHz bandwidths are used for DVB-T and that 10 and 20 MHz are used for LMS-T.

- 6 MHz
- 7 MHz
- 8 MHz
- 10 MHz
- 20 MHz

Symbol Rate
Symbol Rate [aka baud or modulation rate] is the number of symbol changes [i.e. waveform changes or signalling events] made to the transmission medium per second using a digitally modulated signal or a line code. The Symbol Rate is expressed in Mega symbols/second [Ms/s]. The valid range is 1.0000-36.0000 Ms/s.

Roll Off
Roll-off describes the steepness of a transmission function with frequency, in connection with filter circuits in the transition between a passband and a stop band. Values of Roll-off are expressed in percentages, ranging from:

- 35%
- 25%

DVB-S2 Options

DVB-S2 Modulation
The DVB-S2 Modulation drop-down menu includes the following options:

- QPSK 1/4, QPSK 1/3, QPSK 2/5, QPSK 1/2, QPSK 3/5, QPSK 2/3,
- QPSK 3/4, QPSK 4/5, QPSK 5/6, QPSK 8/9, QPSK 9/10.
- 8PSK 3/5, 8PSK 2/3, 8PSK 3/4, 8PSK 5/6, 8PSK 8/9, 8PSK 9/10.
- 16PSK 2/3, 16PSK 3/4, 16PSK 4/5, 16PSK 5/6, 16PSK 8/9, 16PSK 9/10.
- 32APSK 3/4, 32APSK 4/5, 32APSK 5/6, 32APSK 8/9, 32APSK 9/10.

Pilot
To assist carrier recovery, DVB-S2 can insert special “pilot symbols” at the physical layer. The Pilot option can be enabled with the selection of On, depending on satellite requirements.

Frame Size
The following Frame Size options are available, depending on satellite requirements:

- Normal
- Short

Apply
The **Apply** button activates the Modulation Settings that you have configured for the NewS*tream* IDU.

Modify Presets Cellular Settings

The Cellular Settings appear as shown in Figure 37. This set of fields allows the configuration of CNG settings. The Cellular Settings fields include Cellular, Video, Encoder, Transport Stream and Audio parameters.

Cellular

Cell Mode Delay
The NewS*tream* transmitter has three cellular modes of operation: Low, Normal and High delay, offering flexibility for optimizing overall video performance as a function of cellular link connectivity performance.

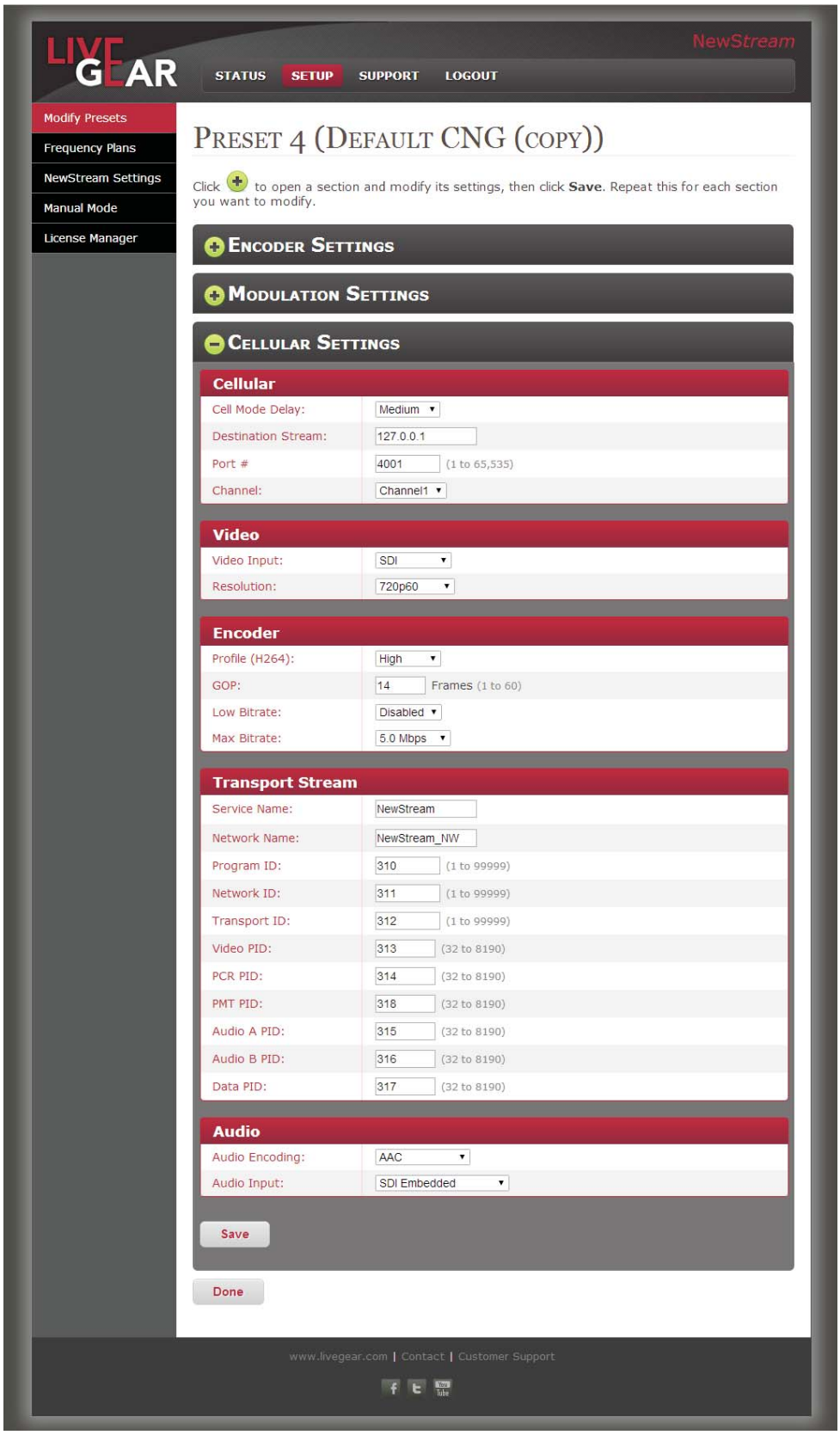
> **Low** – this delay mode is used in applications where there is very good 3G/4G cellular connectivity. This setting minimizes the overall video buffer size and allows for approximately 1 to 2 seconds of delay over the cellular network. This setting is used in areas where there is good cellular connectivity.
>
> **Medium** – this delay mode offers the optimum video quality and an overall delay of less than 3 seconds while minimizing the loss of video frames. This mode is used with acceptable 3G/4G cellular network coverage.
>
> **High** - this delay mode uses the largest video buffer size to minimize the loss of video frames over the cellular link. Use this delay whenever 4G coverage is not present and 3G services are unreliable. It is recommended that you use Robust delay initially when cellular network coverage is unknown. Robust delay may be up to 6 seconds.

Destination Stream
Type an IP Address to designate the destination for the cellular video stream. If you are using the LiveGear Receiver [LGR], use its IP address to communication with NewS*tream*.

Port #
The Port number ranges from 1 to 65,535. Type a Port to designate the destination for the cellular video stream. If you are using the LiveGear Receiver [LGR], use the LGR Port number assigned for communication with NewS*tream*. The default LGR ports are 4001 and 4002.

Channel
This field displays the receiver channel. Type a Channel designated for the destination of the cellular video stream. If you are using the LiveGear Receiver [LGR], use a channel number assigned for communication with NewS*tream*.

Figure 37: Modify Presets Cellular Settings Page



Modify Presets Cellular Settings [Continued]

Video

The video settings for the NewS*tream* transmitter CNG presets include the following parameters.

Video Input

The Video Input drop-down field allows the selection of one of two options:

- SDI
- Composite

Resolution

The Video Input Resolution drop-down selection field provides the following choices:

- 720p50
- 720p59.94
- 720p60
- 1080i50
- 1080i59.94
- 1080i60
- NTSC [National Television System Committee]
- PAL [Phase Alternating Line]

Encoder

Profile [H.264]

The H.264 4:2:0 Profile drop-down field allows the selection of one of the following options:

- Baseline
- Main
- High

GOP

In MPEG encoding, a Group of Pictures [GOP] specifies the order in which intra-frames are arranged. The GOP is a group of successive pictures within an MPEG-coded film and/or video stream. Each MPEG-coded film and/or video stream consists of successive groups of pictures. The valid range of successive groups of pictures is from 0 to 60. For “Intra Refresh,” enter 0 in this field.

Low Bitrate

This field applies Low Bitrate control.

- Enabled
- Disabled

Modify Presets Cellular Settings [Continued]

Max Bitrate
This drop-down field presents a range of:

- 256 kilobits per second [kbps]
- 500 kbps
- 768 kbps
- 1.0 Megabit per second [Mbps]
- 1.5 Mbps
- 2.0 Mbps
- 2.5 Mbps
- 3.0 Mbps
- 3.5 Mbps
- 4.0 Mbps
- 5.0 Mbps
- 6.0 Mbps
- 7.0 Mbps
- 8.0 Mbps
- 9.0 Mbps
- 10.0 Mbps

Transport Stream

The following entry fields are used by the system to differentiate NewS*tream* Cellular Transport Streams.

Service Name
This field provides a means to differentiate the NewS*tream* Transport Stream with a unique Service Name.

Network Name
This field provides a means to differentiate the NewS*tream* Transport Stream with a Network Name.

Program ID
This field provides a means to differentiate the NewS*tream* Transport Stream with a Program Identification [valid range: from 1 to 99999].

Network ID
This field provides a means to differentiate the NewS*tream* Transport Stream with a unique Network Identification [valid range: from 1 to 99999].

Transport ID
This field provides a means to differentiate the NewS*tream* Transport Stream with a unique identification [valid range: from 1 to 99999].

Video PID
This field displays the Video Packet Identification for the NewS*tream* Transport Stream [valid range: from 32 to 8190].

Modify Presets Cellular Settings [Continued]

PCR PID
This field displays the Program Clock Reference [PRC] Packet Identification for the NewS*tream* Transport Stream [valid range: from 32 to 8190].

PMT PID
This field displays the Program Map Table [PMT] Packet Identification for the NewS*tream* Transport Stream [valid range: from 32 to 8190].

Audio A & B PID
This field displays the Audio A and B Packet Identification for the NewS*tream* Transport Stream [valid range: from 32 to 8190].

Data PID
This field displays the Data Packet Identification for the NewS*tream* Transport Stream [valid range: from 32 to 8190].

Audio

Audio Encoding
The Audio Input Encoding parameters that are displayed in this field include:
- **MPEG Layer II** — MPEG Audio Layer II is a core audio algorithm.
- **AAC** — Advanced Audio Coding is the simplest and most widely used and supported Audio Input Encoding.
- **Off**

Audio Input
This drop-down selection provides three options:
- **Analog**
- **SDI Embedded** — Serial digital interface [SDI] is a family of video interfaces that have been standardized by SMPTE. For example, ITU-R BT.656 and SMPTE 259M define digital video interfaces used for broadcast-grade video. This mode embeds the audio into the SDI stream.
- **AES-EBU** — The digital audio standard frequently called AES/EBU [aka AES3], is used for carrying digital audio signals between various devices.

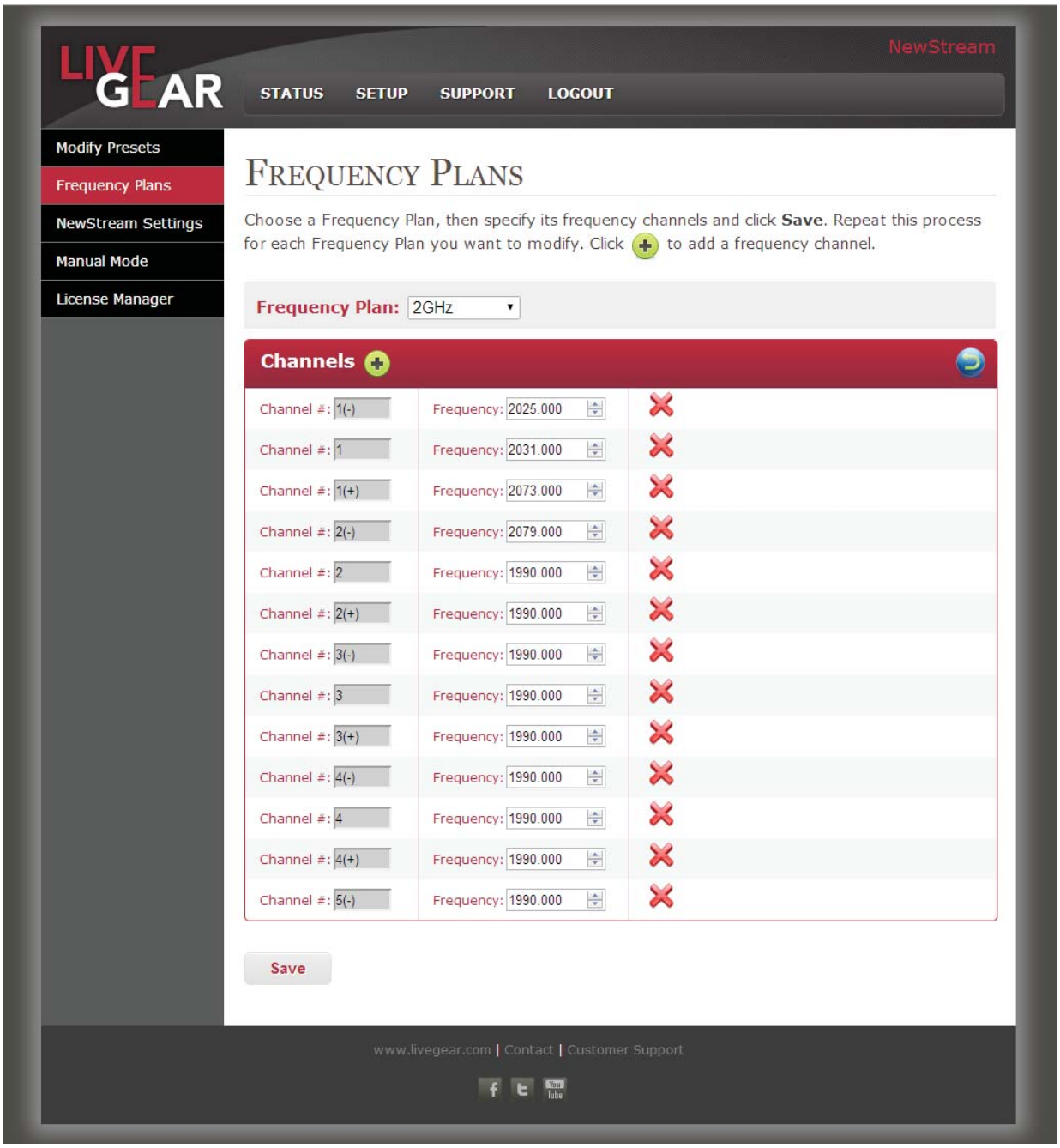
Apply
Click the **Apply** button to configure the cellular settings and submit preset changes to the IDU.

Done
Click the **Done** button once you’ve finished viewing the settings in the Modify Presets page. When you click **Done** nothing will be saved as you leave the page.

Frequency Plans Page [CNG & ENG]

The Frequency Plans page provides a means to specify the Channels and Frequencies for the ENG and CNG Frequency Bands used by the NewS*tream* transmitter during microwave and cellular transmission [see figure below].
Choose a Frequency Band, then specify its frequency channels and click **Save**. Repeat this process for each Frequency Band that you want to modify. Click ⊕ to add a frequency channel.

Figure 38: NewStream Frequency Plans Web Page [ENG/CNG]



NewS*tream* has six separate frequency maps which are selected based on the state of the radio and the type of ODU connected. There are six channel plan maps for ENG and one additional one for Satellite. The Frequency Settings page allows the operator to set or modify the list of channels for any frequency band.

The frequency map is partially determined by the type of the Outdoor Unit [ODU] which is connected to the IDU. Each ODU supports different bands of operation. In the Frequency setup, you are presented with drop-down menu that allows selection of any of the frequency maps. You must select a specific frequency band to configure. By default, the list is populated by the industry standard frequencies that broadcasters use for these bands. You can change the channels to represent these settings anyway that you wish. The same frequency can be applied to multiple channels if you so choose. There is no cross-checking mechanism within NewS*tream*'s software to ensure that each frequency is unique.

You can also add additional channels to the frequency mapping if more channels are needed. The maximum number of channels in a frequency mapping is 22 separate channels, each with (-), ( ), and (+) values, so that a total of 66 separate channels in a frequency mapping are allowed.

Once you are finished changing channels to a frequency map, you must next save the group of frequency maps to a frequency plan that includes a user-assigned name by clicking the **Save** button.

You can create a specific frequency plan for NewS*tream* as part of the configuration cloning. For US-based systems, NewS*tream* contains a frequency plan that broadcasters typically do not revise.

Channels

Restore
Click to restore the current band's channel plan to its original configuration.

Channel Number [#]
The microwave **and cellular** Channel Number range varies for each frequency plan. To add a channel, click the button.

Frequency Plan
NewS*tream* ENG and CNG frequency ranges are:

- 2 GHz BAS [Ranges from 1990-2110 & 2450-2500 MHz]
- 2 GHz Upper [Ranges from 2200-2500 MHZ or 2300-2700 MHz]
- 4 GHz [Ranges from 4400 MHz to 5000 MHz]
- 7 GHz [Ranges from 6425-6525 & 6875-7125 MHz]
- 7 GHz Upper [Ranges from 6900 MHz to 7500 MHz]
- 13 GHz [Ranges from 12700 MHz to 13250 MHz]
- Satellite

Delete a Channel
Use the button to delete a channel and confirm your choice.

Configuration Cloning

Saving Presets

The website provides a separate tab that allows you to save to a file either

- Saved Preset List and information from the radio
  - Maintains order of presets saved on IDU
  - Maintains preset names
  - Maintains preset type and all variables inside the preset
- Entire Frequency plan saved onto the radio, including:
  - 2GHz Plan
  - 4GHz Plan
  - 7GHz Plan
  - 13 GHz Plan
  - Satellite [L-Band] Plan

You are allowed to name either of these files.

Loading

The website provides a place that allows you to load a file to restore either

- Saved Preset List

Frequency Plans Page [SNG]

The Frequency Plans page also provides a means to specify the Channels and Frequencies for the SNG Frequency Bands used by the NewS*tream* transmitter during satellite transmission [refer to Figure 39].

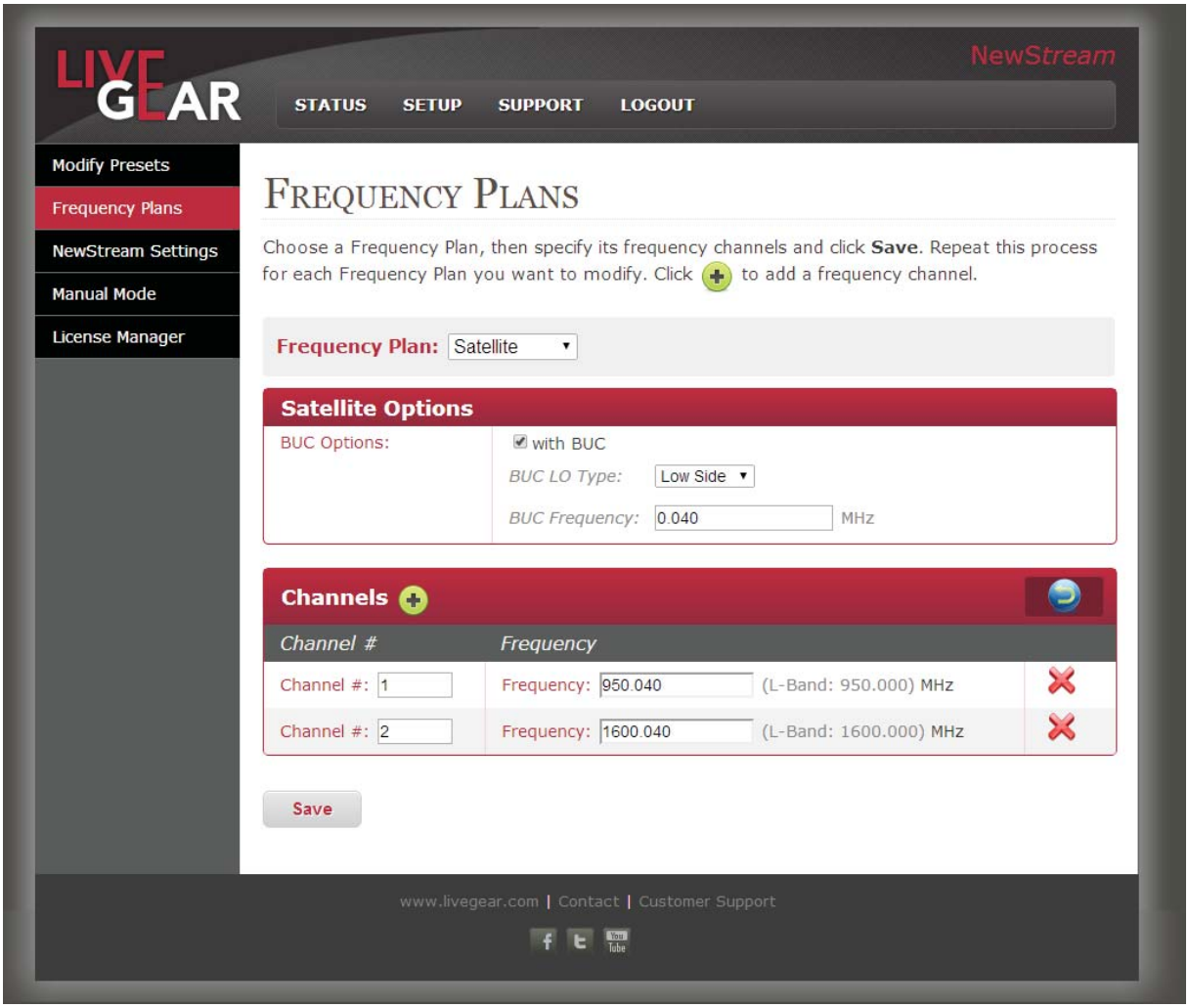
Choose a Frequency Plan, using the drop-down menu and specify its frequency, its channel and whether or not your block up-converter will be used in transmission, then click **Save**. Repeat this process for each Frequency Band that you want to modify. Click ⊕ to add a frequency channel.

Frequency Plan

This field displays the name of the frequency range at which NewS*tream* is calibrated for SNG mode. This field can be selected in the Frequency Plans page as shown in Figure 38. To configure frequencies for satellite transmission you must select the Satellite [L-Band] option that prompts the display of the Web page shown in Figure 39. As described previously, the values include:

- 2 GHz
- 2 GHz Upper
- 4 GHz
- 7 GHz
- 7 GHz Upper
- 13 GHz
- Satellite

Figure 39: NewStream Frequency Plans Web Page [SNG]



Satellite Options

With BUC [Block Up-converter Enabling]

The Block Up-converter [BUC] is used in the transmission [uplink] of satellite signals. It converts a band of frequencies from a lower frequency to a higher frequency. Modern Block Up-converters convert from the L band to Ku band, C band and Ka band. Click the check box to enable this feature.

BUC LO Type

The BUC [Block Up-Converter Enabling] LO [Local Oscillator] Type drop-down provides a means of selecting between low side and high side, where low is the standard and default setting.

BUC Frequency

This field displays the BUC Frequency for which your up-converter will communicate with the NewS*tream* system. This frequency starts at 0 and can be raised in 1 kHz increments using the entry field.

When you choose the Block Up-converter option and press **Save**, you may encounter the **Invalid Fields Message** [see the example below in Figure 40]:

Invalid fields. Please review and make sure all Channel and Frequency fields contain valid data. Each Frequency must be in the range: 950.000 to 1750.000. Channel numbers must range from 1-99.

Once you have selected the proper ranges, a dialog box appears asking you to confirm your entries:

Are you sure you want to save this channel plan and overwrite the existing one?

Click **Yes** to continue and to save the updated or new Satellite Channel Plan.

Channel Number [#]

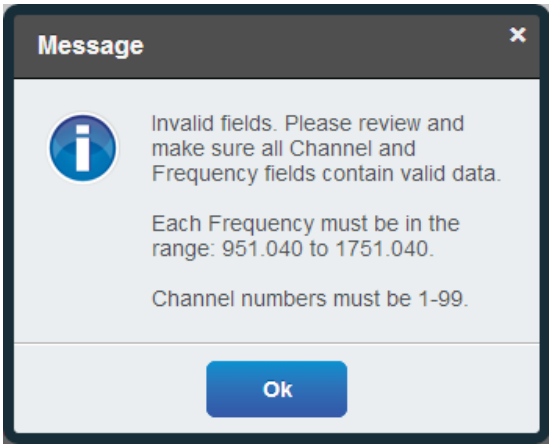
Channel Number [#]
The satellite Channel Number range varies for each frequency plan. To add a channel, click the button. To delete a channel, click the button and confirm your action. Each channel displays the frequency range as shown in the example.

Frequency
The frequency is displayed for the channel and can be modified using your keypad. The frequency that you type must conform to the valid range and will not be accepted if it does not [see Figure 40].

NOTE: *You must create a Channel via this Web page, in **Remote** control, to access the channel plan setting under **Local** control using the IDU touchscreen. Refer to the Channel Plan example in the Satellite [SNG] Operation touchscreen section for an example of this selection process.*

Save
Click the **Save** button to retain your new Channel Plans.

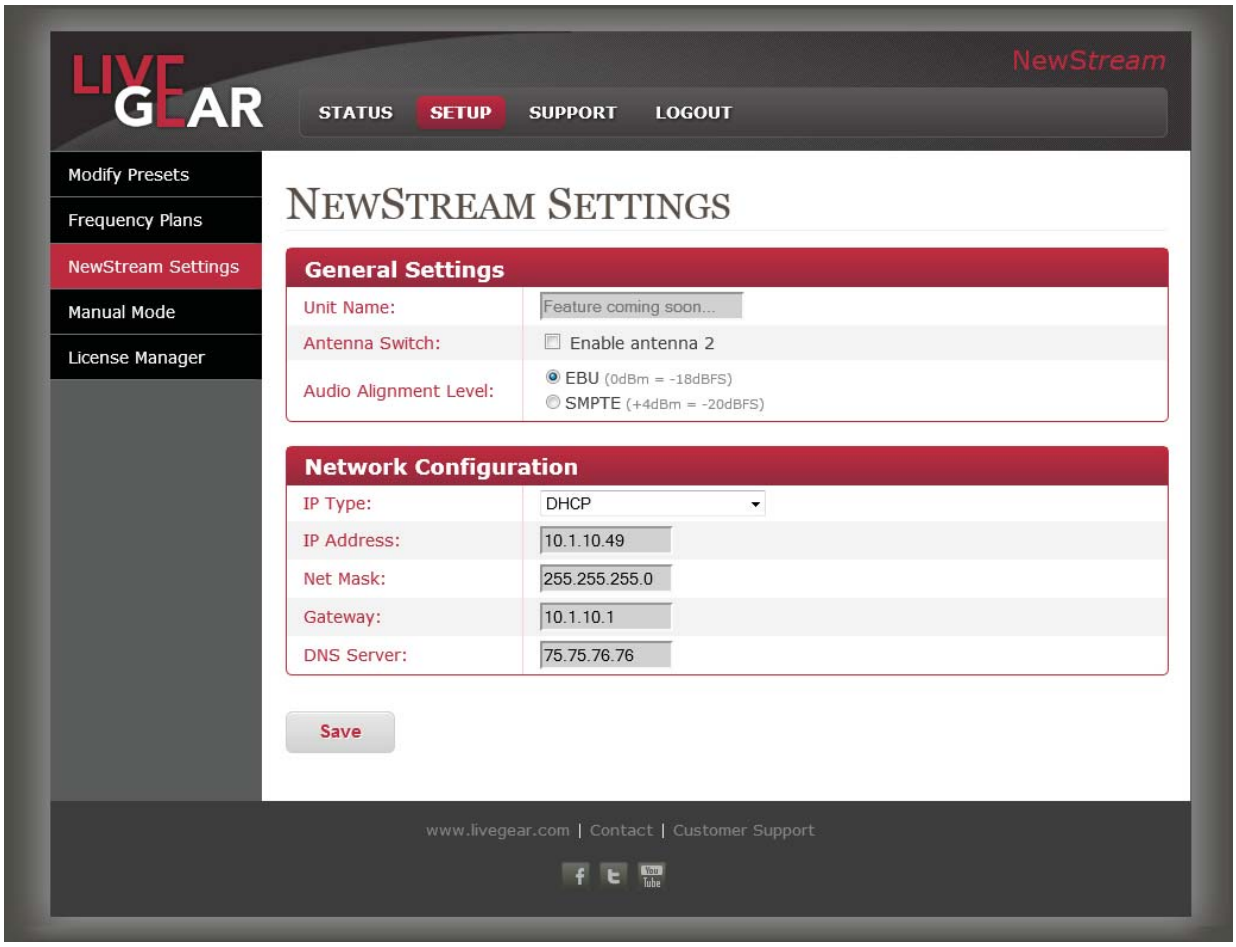
Figure 40: NewStream Invalid Fields Message



NewStream Settings Page

When the NewStream Settings button is selected on the NewStream transmitter Web page, the following Wide Area Network [WAN] Configuration entry fields are displayed, defining the NewStream transmitter's IP Network [see below].

Figure 41: NewStream Network Settings Page



General Settings

Unit Name

This field indicates the NewStream unit name [future option]

Antenna Switch

The Antenna Switch check box allows you to select Antenna 2 for the microwave [ENG] operational antenna. When this check box is not selected, Antenna 1 is the default ODU.

Audio Alignment Level
The Audio Alignment radio buttons provide a means to select from EBU for standard European transmissions or SMPTE, the standard for North American transmissions. The ranges in dBm are shown below:

- EBU [0dBm = -18dBFS]
- SMPTE [+4dBm = -20dBFS]

Network Configuration

IP Type
The Internet Protocol Type drop-down entry field provides the choice of either Static or DHCP [Dynamic Host Configuration Protocol] to configure the NewS*tream* transmitter. Internet Protocol addresses are assigned to a host either at the time of booting, or permanently, by fixed configuration of its hardware or software. Fixed, or persistent configuration uses a Static IP address.

DHCP is a network protocol used to configure network devices to communicate on an IP network. A DHCP client uses DHCP protocol to acquire configuration information, such as an IP address, a default router and one or more DNS server addresses from a DHCP server. The DHCP client then uses this information to configure its host. Once the configuration process is complete, the host is able to communicate on the Internet.

IP Address
The Internet Protocol Address that is displayed for the NewS*tream* transmitter can be modified. Click within the field and type the value of the address that you want to modify. Click **Save Changes** to retain the IP Address. When NewS*tream* uses the DHCP type, this field displays the IP address received by the DHCP server.

Net Mask
A sub-network, or subnet, is a logical subdivision of an IP Network. All computers that belong to a subnet are addressed with a common, identical, most-significant bit-group in their IP address. This results in the logical division of an IP address into two fields: a network or routing prefix and the rest field or host identifier. The rest field is an identifier for a specific host or network interface. Special gateways called routers exchange traffic between sub-networks. Such routers constitute the logical or physical boundaries between the subnets.

To change the Net Mask address, type the new value and click **Save** to retain the Subnet Mask. When NewS*tream* uses the DHCP type, this field displays the Subnet Mask received by the DHCP server.

Gateway
The Gateway address, or Default Gateway, is a router interface connected to the Local Area Network [LAN] used to send packets from the LAN. Click within the field and type the value of the Gateway address that you want to use. Click **Save** to retain the Gateway address. When NewS*tream* uses the DHCP type, this field displays the Gateway received by the DHCP server.

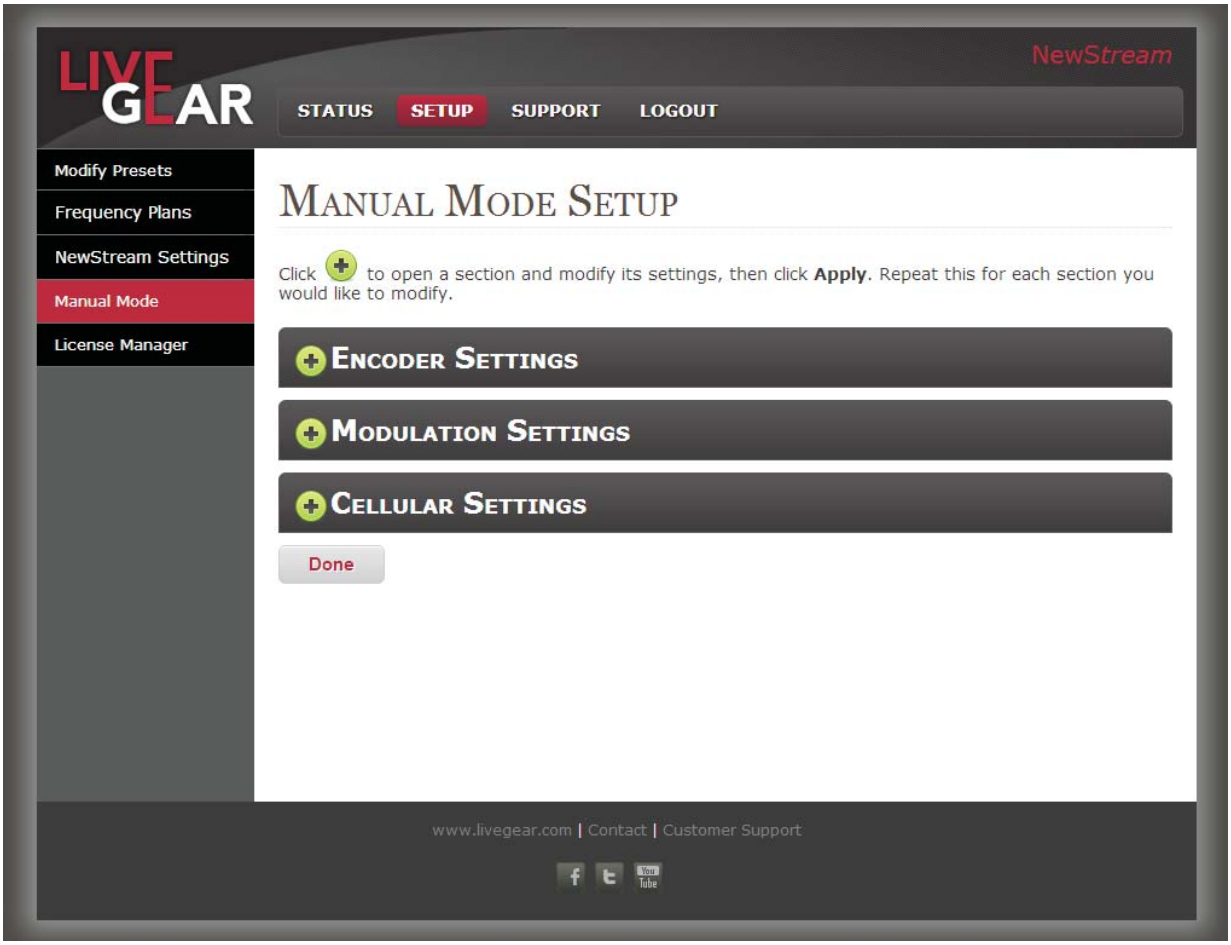
DNS Server
Domain Name System [DNS] Server hosts a network service for providing responses to queries against a directory service. It maps a human-recognizable identifier to a system-internal, numeric, identification or addressing component. This service is performed by the server according to a network service protocol. The most important function of the DNS Server is the translation or resolution of human-memorable domain names and hostnames into the corresponding numeric Internet Protocol Addresses. Click within the field and type the value of the DNS address that you want to use. Click **Save** to retain the DNS Server address. When NewS*tream* uses the DHCP type, this field displays the DNS Server address received by the DHCP server.

Manual Mode Pages

When you are operating NewS*tream* and you want the option of manual control, you must begin with the type of preset that you want to regulate. For instance, to manually control CNG mode, you must begin operations using a CNG preset. Setting Cell Mode Delay in Manual Mode is exclusive to setting the device into CNG operation; thus Manual Mode Modulation settings would not be applicable. Manual Mode could be used to temporarily change parameters and have the changes applied immediately, automatically placing NewS*tream* into Manual Mode which is designed to be used to change preset configurations without modifying a saved preset. Manual Mode can be used to test transmission options.

Generally, use of Manual Mode is intended for technician troubleshooting and setup and not for use in field operations. For more information concerning the entry fields available, refer to the *Modify Presets* section. The collapsed Manual Mode Setup page is shown in the figure below.

Figure 42: Manual Mode Settup Page



License Manager Page

When the License Manager button is selected on the NewS*tream* Web interface, the following licensing details are displayed, as shown in the example Figure 43. To enable newly licensed features, enter the License Key and click the **Set Key** button. Use the button to refresh the **Features** lists. The License column displays whether the features are available or not .

Licensed Features

ENG Modulation Features

- DVB-T
- LMS-T - 10 MHz
- LMS-T - 20 MHz

SNG Modulation Features [Upgrade Option]

- DVB-S QPSK
- DVB-S 8PSK/16QAM
- DVB-S2 QPSK/8PSK
- DVB-S2 16/32 APSK

MPEG-2 Encoder Features

- MPEG-2 SD - 4:2:0
- MPEG-2 SD - 4:2:2
- MPEG-2 HD - 4:2:0
- MPEG-2 HD - 4:2:2

Encryption Features

- BISS-1/E

Input Features

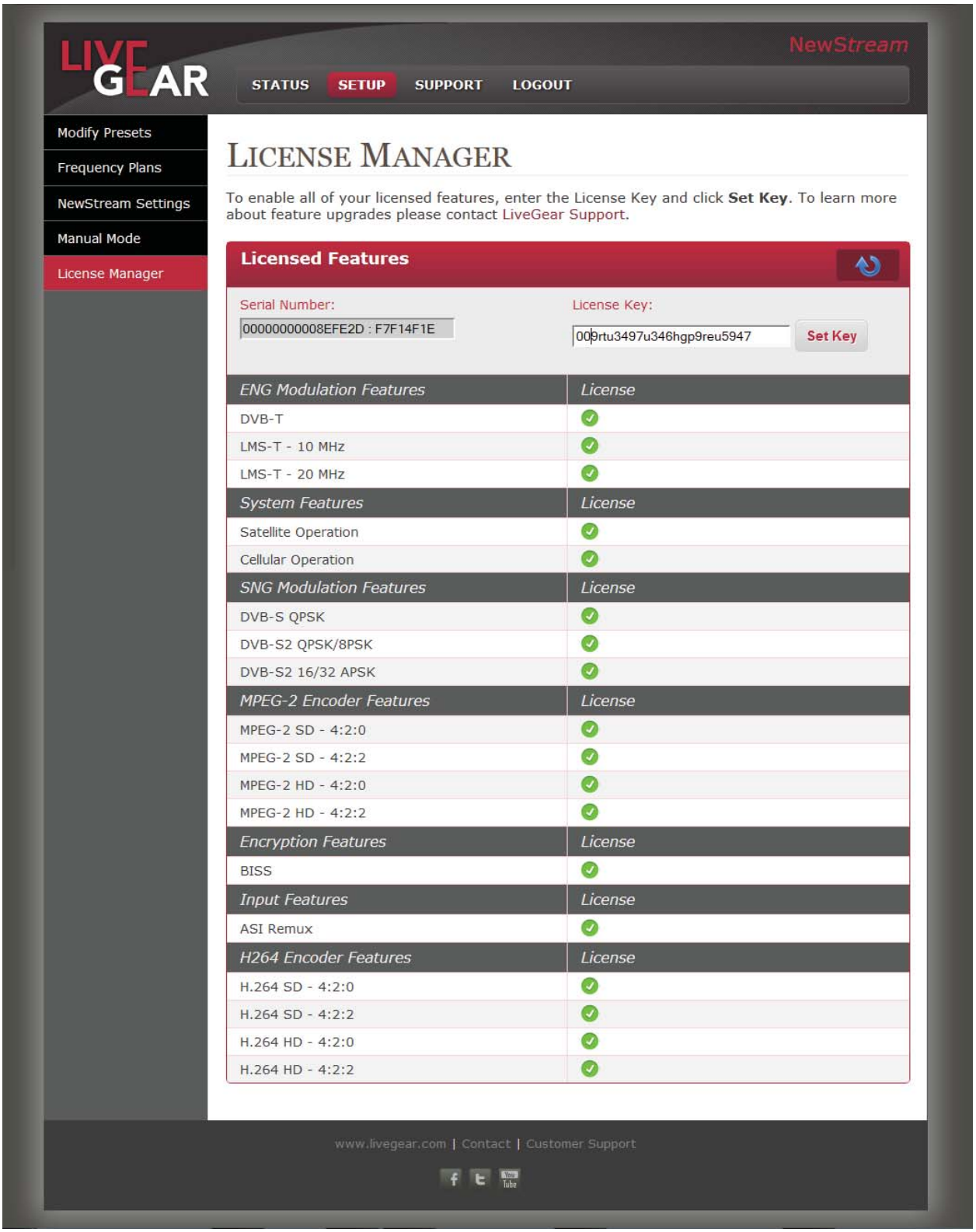
- ASI Remux

H.264 Encoder Features

- H.264 SD - 4:2:0 [ENG/SNG/CNG]
- H.264 SD - 4:2:2 [ENG/SNG]
- H.264 HD - 4:2:0 [ENG/SNG/CNG]
- H.264 HD - 4:2:2 [ENG/SNG]

If NewS*tream* does not have a license for a particular function, the Web interface displays those particular options as not available. If an attempt is made to load a preset that contains the use of a license key which is not enabled, then the NewS*tream* system displays a warning on the LCD. Similarly, if an attempt is made to load a preset that contains use of a license key that is not enabled on the system, within the Web interface, a pop-up displays support information that enables you to call for licensing support. To learn more about feature upgrades please contact LiveGear Support.

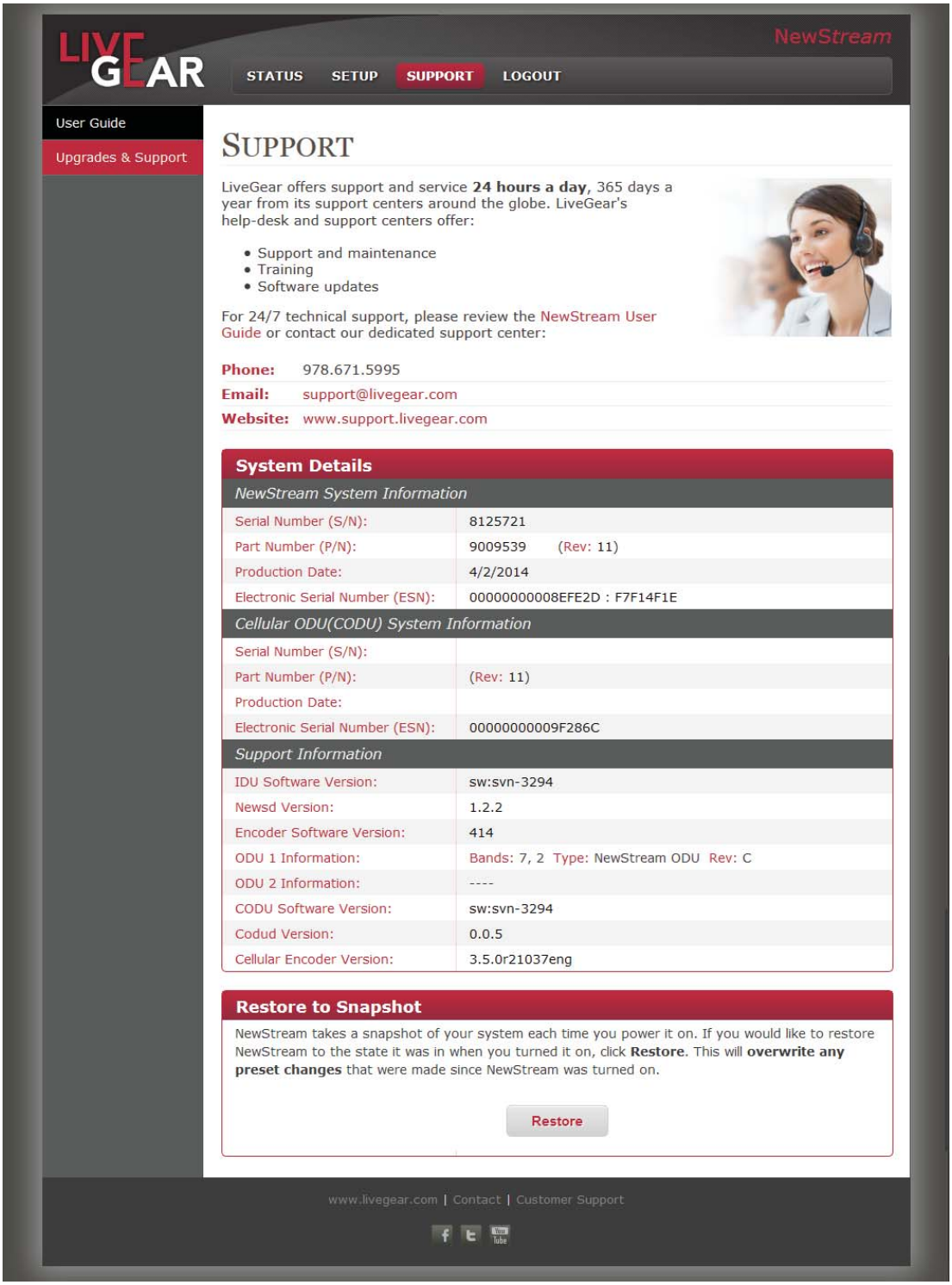
Figure 43: NewStream License Manager Web Page



Support Page

When the Support button is selected on the NewS*tream* transmitter Web interface, select the Upgrades & Support button to display the Support Web page that lists the System Details and Support Information, as shown in the example below. You may also select the User Guide button to retrieve this manual.

Figure 44: NewStream Support Web Page



System Details

NewStream System Information

- Serial Number [S/N] – displays the serial number that identifies your NewStream transmitter.
- Part Number [P/N] – displays the part number that identifies your NewStream transmitter.
- Production Date – displays the date on which your NewStream was created.
- Electronic Serial Number [ESN] – displays the serial number that identifies your NewStream transmitter.

Cellular ODU [CODU] System Information

- Serial Number [S/N] – displays the cellular ODU serial number that identifies your NewStream transmitter.
- Part Number [P/N] – displays the cellular ODU part number that identifies your NewStream transmitter.
- Production Date – displays the date on which your NewStream cellular ODU was created.
- Electronic Serial Number [ESN] – displays the cellular ODU serial number that identifies your NewStream transmitter.

Support Information

- IDU Software Version – displays the software version for your NewStream IDU.
- Newsd Version – displays the software version for your NewStream Newsd system.
- Encoder Software Version – displays the software version for your NewStream's encoder.
- ODU 1 Information – displays the frequency bands, ODU type and revision for equipment installed on the ODU 1 ports.
- ODU 2 Information – displays the frequency bands, ODU type and revision for equipment installed on the ODU 2 ports
- Codud Version – displays the software version for your NewStream's Codud encoder.
- Cellular Encoder Version – displays the software version for your NewStream's cellular encoder.

Restore to Snapshot

NewStream takes a snapshot of your system each time you apply power to the IDU. If you would like to restore NewStream to the state it was in when you last applied power, click **Restore**. This will overwrite any preset changes that were made since NewStream was last powered on.

Specifications

NewStream	ENG	CNG	SNG
Outdoor Unit [ODU]-RF	Mast-mounted [single enclosure]	Mast-mounted [single enclosure]	Optional - Roof-mounted NewSwift, Mantis
2-2.5 GHz	8 Watts @ QPSK, 16 QAM	N/A	N/A
4.5-5.0, 6.4-7.1, 6.9-7.5 GHz	5 Watts @ QPSK, 16 QAM	N/A	N/A
12.7-13.25 GHz	1.5 Watts @ QPSK	N/A	N/A
CDMA, UMTS, HSPA+, LTE	N/A	6-modems, Bonded	N/A
IDU to ODU interconnection	RG-6/U minimum or better	RG-58/U or RG-59/U	LMR - 400 or equivalent
Size and Weight, ODU	7" W x 10" L x 6" H, 16 lbs. [max. @ 2/7 GHz]	10" W x 14" L x 5" H, 10 lbs.	10" W x 14" L x 5" H, 10 lbs
Temperature	-20º to +50ºC	-20º to +50ºC	-20º to +50ºC
Indoor Unit [IDU]	Rack-mount chassis, single		
Operator Controls	[5] Programmable OLED [organic light-emitting diode] push-button switches, [2] rocker-style switches, [3] LED push-button switches, [1] On/Off push-button switch		
Displays	[1] Capacitive color touch TFT 5.0" diagonal 800 x 480 white LED back light display, [2] 16 x 2 segment monochromatic blue OLEDs		
Presets	Up to 99 User-configurable	3 Operating Modes-Interview, Standard, Mobility	Up to 99 User-configurable
Rear panel I/O	BNC- [ASI In, ASI Out, SDI In, CV in, 75 Ω audio, spare] Weidmuller - [analog audio 1L/1R, 2L/2R, digital audio D1, D2, MW ODU power, Ant.] Type N or Triax [ODU 2/7 GHz or 2 GHz and 7 GHz legacy MTX ODUs] Type N- [L-Band Mod. & L-Band Mon.], TNC- [to cellular ODU] Miscellaneous- [1] SMA Wi-Fi, [3] RJ045 Ethernet, [1] 115 VAC IEC C14, [1] DB-9 data, [1] USB		
Size and Weight, IDU	17.0" W x 16.2" L x 3.5" H [2RUx 19" EIA standard rack-mount], 16 lbs./7.26 kg		
Prime operating power	115/230 VAC, 2.0 A [typ.]		
Temperature	-10º to +40º C		
Modulation	COFDM [DVB-T]	OFDMA, CDMA	DVB-S QPSK, DVB-S2 QPSK
Optional Modulations	LMS-T 10/20	N/A	DVB-S2 8PSK, 16/32 APSK
Video Input Formats	HD/SD-SDI		
Video Resolutions	HD & SD		
High Definition	1080i, 1080p, 720p		
Standard Definition	720 x 480i [NTSC], 720 x 576i [PAL]		
Video Encoding Profile	MPEG-2, H.264 HD/SD, 4:2:2/4:2:0	H.264 AVC HD/SD 4:2:0 High Profile @ Level 4.1	MPEG-2, H.264 HD/SD, 4:2:2/4:2:0
HD Encoding Rate@4:2:2 [MPEG-2]	8.0 to 30 Mbps	N/A	8.0 to 80 Mbps
HD Encoding Rate@4:2:0 [MPEG-2]	8.0 to 30 Mbps	N/A	8.0 to 380 Mbps
SD Encoding Rate@4:2:2 [MPEG-2]	2.0 to 50 Mbps	N/A	2.0 to 50 Mbps
SD Encoding Rate@4:2:0 [MPEG-2]	1.5 to 15 Mbps	N/A	1.5 to 15 Mbps
HD Encoding Rate@4:2:2 [H.264]	1.5 to 20 Mbps	750 kbps to 10 Mbps	1.5 to 20 Mbps
HD Encoding Rate@4:2:0 [H.264]	1.5 to 20 Mbps	128 kbps to 10 Mbps	1.5 to 20 Mbps
SD Encoding Rate@4:2:2 [H.264]	1.5 to 15 Mbps	750 kbps to 10 Mbps	1.5 to 20 Mbps
SD Encoding Rate@4:2:0 [H.264]	1.5 to 15 Mbps	128 kbps to 10 Mbps	1.5 to 15 Mbps
Audio Encoding	2- analog stereo/4-mono, AES/EBU - up to 4 pairs embedded in SDI	1-analog stereo/2-mono, AES/EBU [AAC] - up to 2 pairs embedded in SDI	2- analog stereo/4-mono, AES/EBU - up to 4 pairs embedded in SDI
Audio Input [Analog]	+8 dBm [avg.] @ 600 Ω bal.		
THD @ 1 kHz TT	<0.1% to +18 dBm max.	0.3% to +18 dBm max.	<0.1% to +18 dBm max.
S/N [Signal to Noise]	>66 db RMS	>65 db RMS	>66 db RMS
Frequency Response	0.03-18 KHz ± 1.0 dB	0.03-12 KHz ± 1.0 dB	0.03-18 KHz ± 1.0 dB
AES Input [digital]	1.0 V P/P @ 75 Ω unbalanced	N/A	1.0 V P/P @ 75 Ω unbalanced

Appendix A: Microwave and Cellular ODU Configurations

Microwave ODU Wiring Harness

The minimum recommended AWG cables are 4-conductor 20 AWG or 2-conductor 16 AWG for new installations, although additional customer-specific cables may be required for applications such as mast-lighting, off-air antennas, mast-cams, etc. In addition, NewS*tream* is backwards compatible with legacy CodeRunner CR2 and MTX5000 van transmit Nycoil installations.

Selecting Function Cables

To select the cables for your wiring harness, select the functions that you require and match the individual cables that are applicable to the particular requirements. These cables should be included in the harness.

NewS*tream* provides antenna polarity controls and serial control over the IF interconnect cable plus feed power and polarity for the antenna connection to the ODU or the IDU. For a new installation, the 8 pin connection on the ODU will be used. A short jumper cable can be used for the antenna connection, therefore no cables need to be specified inside the Nycoil conduit for the antenna.

NewS*tream* simplifies the ODU cabling due to the higher voltage [48V] used to power the ODU. The minimum recommended cables are:

- 4 conductor 20AWG Type N
- 2 conductor 16AWG Type N or
- Belden 8232 Triax cable

Cellular ODU Wiring Harness

The Cellular ODU uses a single coax type cable - RG59 or RG6 with TNC connectors. Note that both 48 V DC power and data are passed over this coax cable.

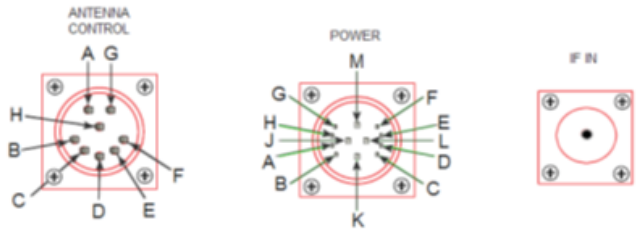
Microwave ODU Connection Pinouts

The NewS*tream* ODU power and antenna control pinouts for the Type “N” connector are shown below in Table A-1. The IDU and ODU can be connected using an existing wiring harness after inspection.

The existing, standard ODU connectors at the ODU end of the wiring harness will connect directly to your NewS*tream* ODU. Verify that all connections have been completed and verify the connections at the IDU end of the wiring harness are completed.

Table A-1: ODU Power and Antenna Control Pinouts

ODU Antenna Control & Power Pinouts



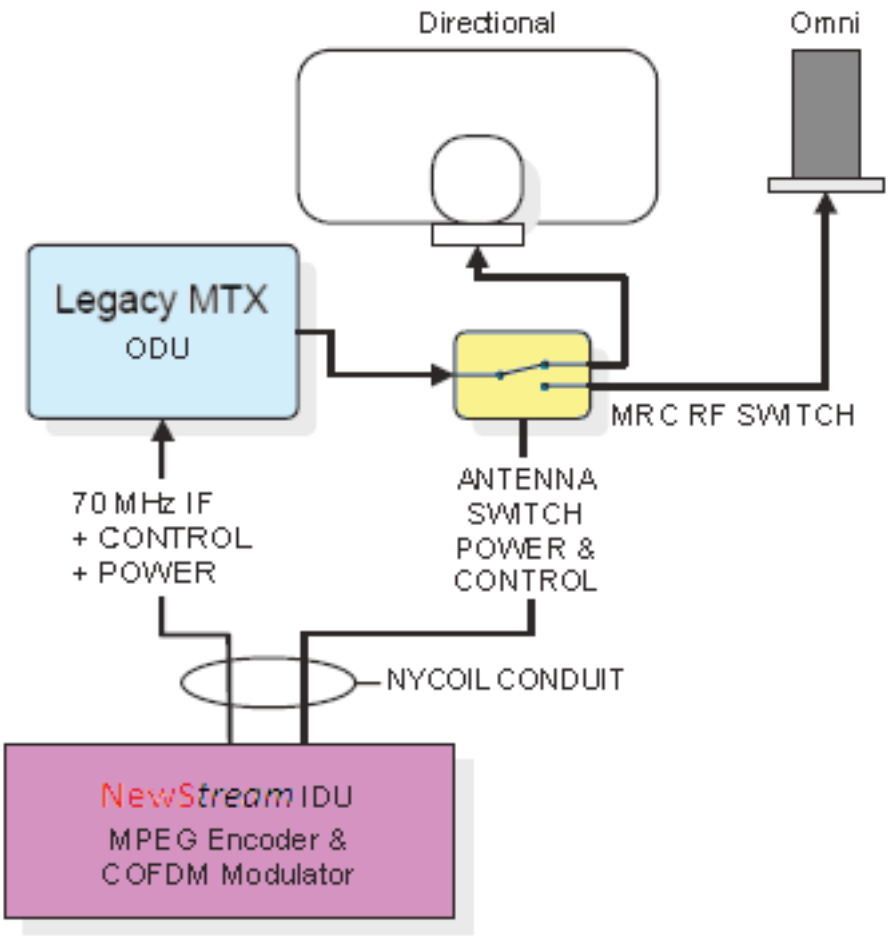
Antenna Control 8 Pin Connector	Signal	Power 12 Pin Connector	Signal
A	LC	J	+ VDC
B	H	K	+ VDC
C	V	L	GND
D	ANT	M	GND
E	BAND		
F	28V		
G	GND		
H	NC		

Legacy Microwave ODU Antenna Configurations

Legacy Single-Band/Dual Antenna Transmission

The legacy NewS*tream* transmitter antenna configuration for single-band transmission using either an omni antenna or a directional antenna with one IDU and one ODU is shown in the figure below. The RF switch allows switching between the two types of antennas.

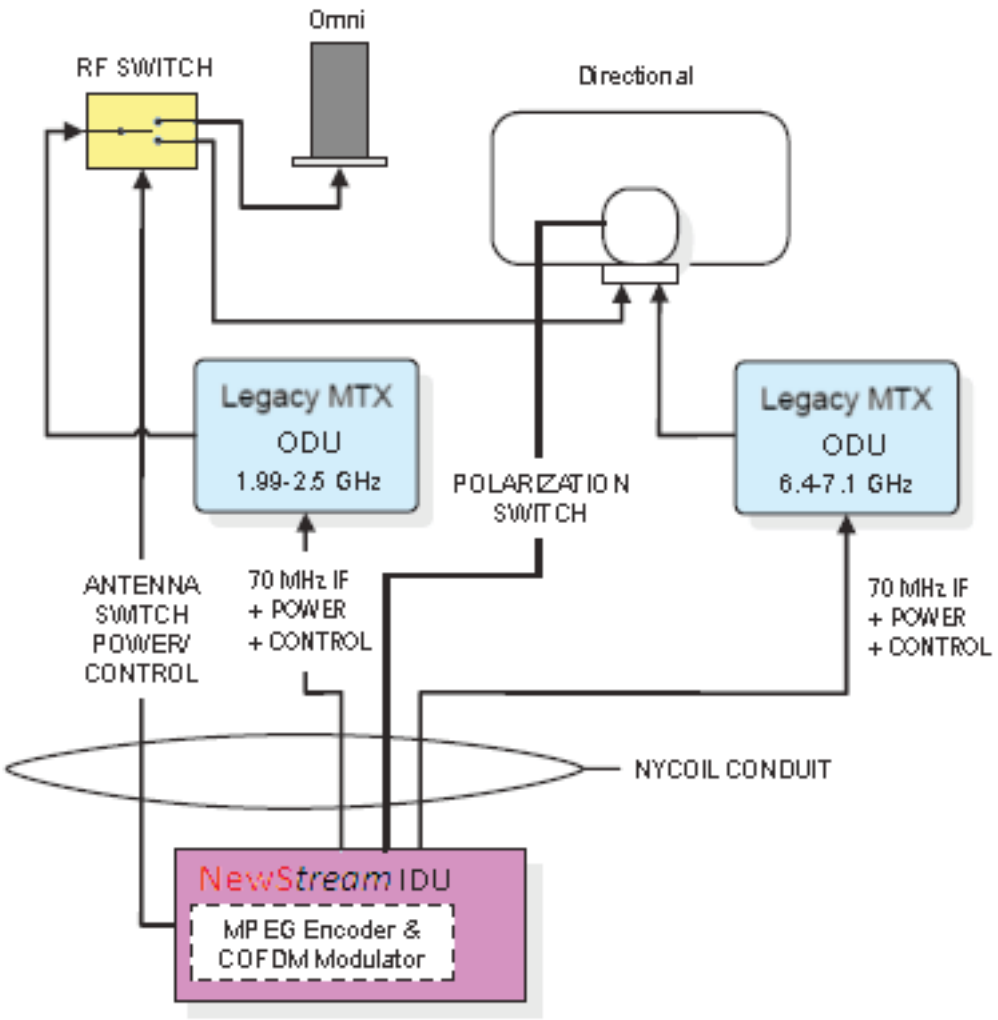
Figure A-1: Legacy Single Band Transmission with 2 Antennas



Legacy DuaL-Band Non-Simultaneous Transmission

The figure below illustrates the legacy antenna configuration for non-simultaneous transmission using one IDU and two ODUs. In this example, the ODUs are operating on 2 GHz and 7 GHz bands. In addition, an RF switch allows switching between an omni and a directional antenna.

Figure A-2: Legacy Dual Band Non-Simultaneous Transmission

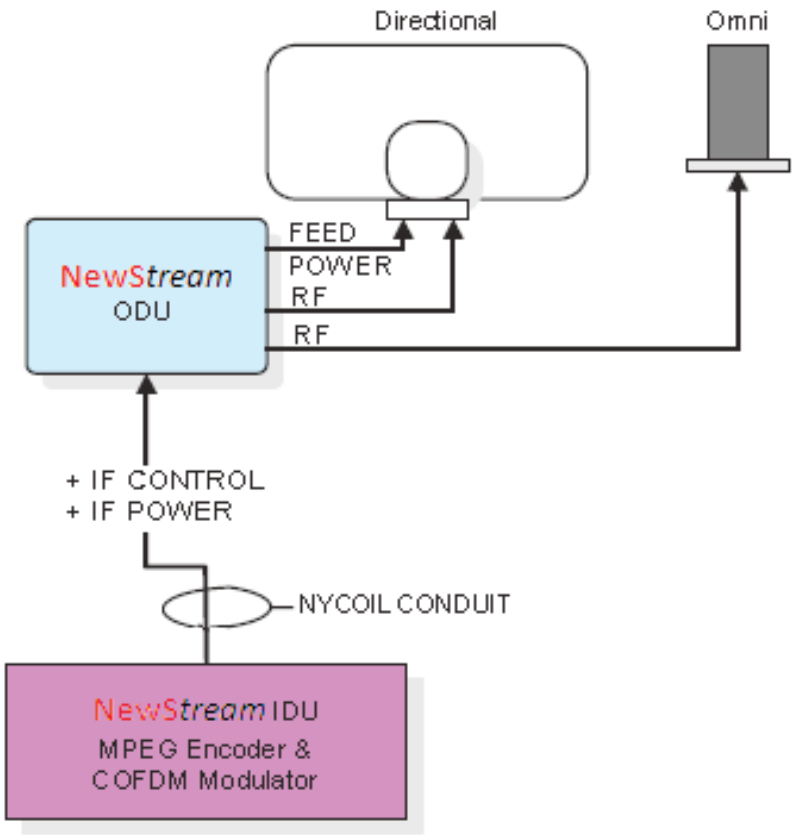


NewStream Microwave ODU Antenna Configurations

NewStream Single-Band/Dual Antenna Transmission

The NewStream transmitter antenna configuration for single-band transmission using either an omni antenna or a directional antenna with one IDU and one ODU is shown in the figure below. The NewStream transmitter provides a control to switch between an omni and a directional antenna.

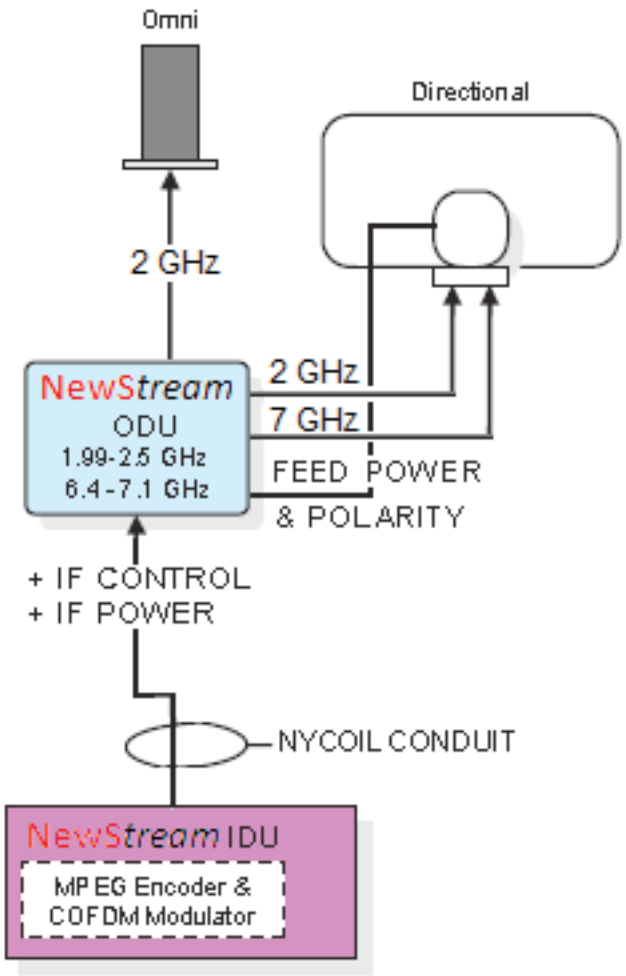
Figure A-3: Single Band Transmission with 2 Antennas



NewStream DuaL-Band Non-Simultaneous Transmission

The figure below illustrates the antenna configuration for non-simultaneous transmission using one IDU and one dual band ODU. In this example, the ODUs are operating on 2 GHz and 7 GHz bands. The internal antenna switches the 2GHz RF power to either antenna 1 or antenna 2, the 7GHz does not have an antenna switch.

Figure A-4: Dual Band Non-Simultaneous Transmission



Cellular ODU Connections

The NewS*tream* cellular antenna system includes a TNC 75 Ω coaxial connection to the ODU 1 output found on the NewS*tream* rear panel and a series of installation slots for mini-SIM cards [refer to the figure below]. Refer to the *SIM Application Guide* section below for more information.

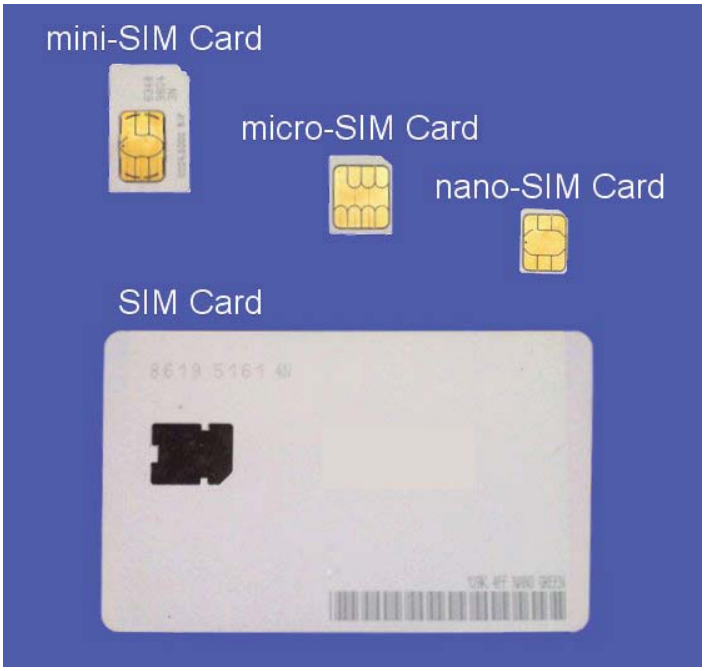
Figure A-5: Cellular ODU Connections

SIM Application Guide

Cellular Wireless Data or SIM cards are a critical component associated with the NewS*tream* transmitter. A Subscriber Identity Module or SIM is an integrated circuit that stores the International Mobile Subscriber Identity [IMSI] and key used to identify and authenticate subscribers on mobile telephony devices.

The removable SIM Card can be transferred between different mobile devices. NewS*tream* uses up to six mini-SIM cards which are the same thickness as full-size SIM cards but their length and width are 25 mm × 15 mm [0.98 x 0.59 inches]. For scale, the original SIM card has dimensions that are similar to that of a typical credit card. Refer below to the relative size of the mini-SIM.

Figure A-6: SIM Card Sizes



A SIM card contains:

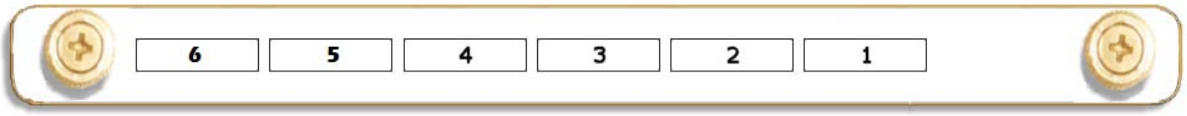
- its unique serial number [ICC ID]
- International Mobile Subscriber Identity [IMSI]
- security authentication and ciphering information
- temporary information related to the local network
- a list of the services the user has access to
- two passwords: a personal identification number [PIN] for ordinary use and a personal unblocking code [PUK] for PIN unlocking

The primary advantage of cellular wireless data is that you have access to the Internet from any location, indoors or outdoors, throughout your carrier's data coverage area. A disadvantage – as is prevalent with cellular telephones – is that cellular coverage can be attenuated in remote areas.

SIM Installation Slots

The Cellular cards or SIMs, are installed in the ports shown below. Be sure to power down NewS*tream* before installing or removing SIM cards.

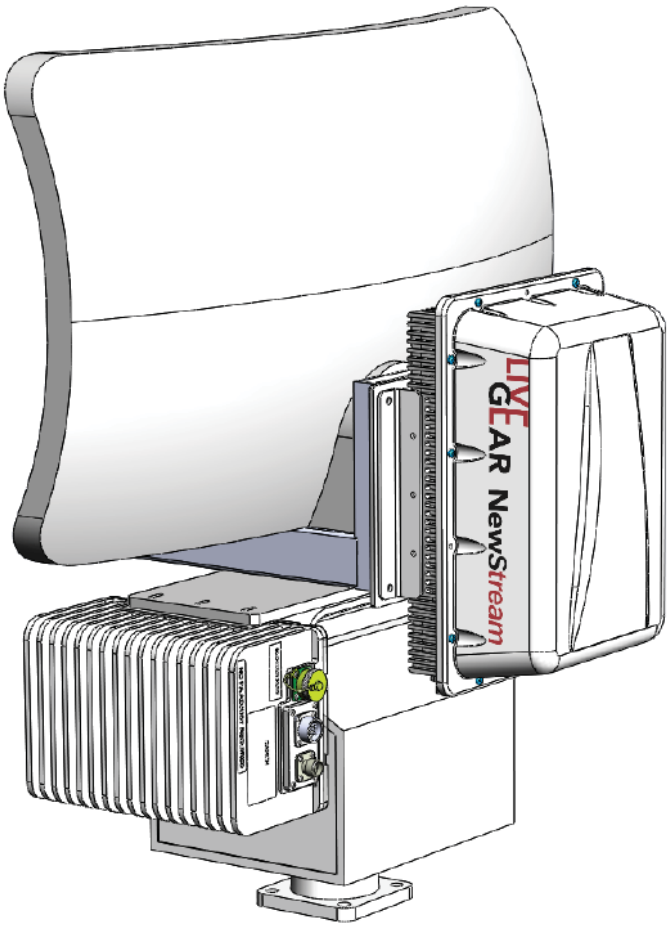
Figure A-7: Cellular ODU SIM Card Slots Cover



Cellular ODU Mounting

It is recommended that your NewS*tream* cellular antenna system be installed in a configuration similar to that shown in Figure A-8. It must not be mounted in front of or beside the microwave antenna and to avoid interference, the microwave system must be powered down before using the cellular equipment. Metallic objects must also be kept at least one foot [30.5 cm] from the sides of the cellular ODU.

Figure A-8: Recommended Cellular ODU Mounting Configuration



Glossary

Term	Definition
1080i	1080i is a standard HDTV video format. 1080 represents 1080 lines of vertical resolution and the letter i represents “interlaced” or non-progressive scan. 1080i usually assumes a wide screen aspect ratio of 16:9, implying a horizontal resolution of 1920 pixels and a frame resolution of 1920 x 1080, or 2.07 million pixels.
16-QAM	16-state Quadrature Amplitude Modulation The signal [video + audio] is imposed onto the 70 MHz carrier by varying both the phase and the amplitude of the signal while keeping the frequency constant. There are 16 possible combinations of phase and amplitude that can be used to carry information.
3G	3G represents the third generation of mobile telecommunications technology. 3G telecommunication networks support services that provide an information transfer rate of at least 200 kbit/s.
4G	4G represents the fourth generation of mobile phone mobile communication technology standards. It is a successor to the third generation [3G] standards. A 4G system provides mobile ultra-broadband Internet access, for example to laptops with USB wireless modems, to smartphones, and to other mobile devices. Conceivable applications include amended mobile web access, IP telephony, gaming services, high-definition mobile TV, video conferencing, 3D television, and cloud computing.
64-QAM	64-state Quadrature Amplitude Modulation The signal [video+audio] is imposed onto the 70 MHz carrier by varying both the phase and the amplitude of the signal while keeping the frequency constant. There are 64 possible combinations of phase and amplitude that can be used to carry information.
720p	720 represents 720 lines of vertical resolution and the letter p represents non-interlaced or progressive scan. When broadcast at 60 frames per second, 720p features the highest temporal [motion] resolution possible under the ATSC standard. Progressive scanning reduces the need to prevent flicker by filtering out fine details, so spatial [sharpness] resolution is much closer to 1080i than the number of scan lines would suggest.
802.11	IEEE 802.11 is a set of medium access control and physical layer specifications for implementing wireless local area network [WLAN] computer communication in the 2.4, 3.6, 5 and 60 GHz frequency bands.
8-PSK	8-Phase Shift Keying 8-PSK is a digital modulation class that conveys data by changing, or modulating, the phase of a reference signal or carrier wave.
AAC - LC	Advanced Audio Coding - Low Complexity AAC is a standardized, lossy compression and encoding scheme for digital audio. Low Complexity [LC] encoding is the simplest and most widely used and supported.

Term	Definition
ABR	Adaptive Bit-rate ABR encoding dynamically adjusts an encoder's output bit-rate to accommodate available upload speeds across several networks.
Aggregation	Aggregation refers to the reconstruction and reordering of separate, packetized, video transport streams into a single coherent video stream, as the streams arrive at an IP - addressed destination. As an example, a LiveGear Receiver aggregates video feed from an NewS*tream* transmitter for decoding. Similarly, the VMS-1000 also aggregates a video signal for distribution over the Web.
APN	Access Point Name APN is a configurable network identifier used by a mobile device when connecting to a GSM carrier. The carrier examines the APN identifier to determine the network connection type for the NewS*tream* transmitter. The APN determines which IP addresses should be assigned to NewS*tream*, which security methods should be used, and how or if, it should be connected to a private network.
ASI	Asynchronous Serial Interface ASI refers to a streaming data format that often carries an MPEG Transport Stream. This serial communications interface operates at up to 270 Mbit/sec. ASI is generally used in field news-gathering operations.
Band [RF]	This refers to the RF band to which the AirCam is calibrated. To receive RF signals an antenna is used by the AirCam with a radio tuner to adjust to a particular frequency range within the RF band. This tuning is accomplished using a resonator – a circuit with a capacitor and an inductor forming a tuned circuit. The resonator amplifies oscillations within a particular frequency band, while reducing oscillations at other frequencies outside the band.
BAS	Broadcast Auxiliary Service
BER	Bit Error Ratio The Bit Error Rate is the percentage of bits that have errors relative to the total number of bits in the signal. The rate is an indication of how often a packet or other data unit has to be retransmitted because of an error.
BISS-1	Basic Inter-operable Scrambling System-1 BISS is a satellite signal scrambling system. BISS-1 transmissions are protected by a 12 digit hexadecimal session key that is agreed by the transmitting and receiving parties prior to transmission. The key is entered into both the encoder and decoder. The key forms part of the encryption of the digital television signal Any receiver with BISS support and the correct key will be able to decrypt the signal.

Term	Definition
BISS-E	Basic Inter-operable Scrambling System-Encrypted BISS-E is an variation of the scrambling system where the decoder has stored one secure BISS-key entered by for example, the rights-holder. This key is unknown to the decoder's user. The user is sent a 16-digit hexadecimal code which is entered as a session key. This session key is then mathematically combined internally to calculate a BISS-1 key that can decrypt the signal.
BNC	Bayonet lock coaxial connector [Compare to TNC]
Bonding	The combination of several cellular network channels together creating single, virtual high-speed connection.
BUC	Block Up-converter A block up-converter [BUC] is used in the transmission [uplink] of satellite signals. It converts a band of frequencies from a lower frequency to a higher frequency. Modern BUCs convert from the L band to Ku band, C band and Ka band. Older BUCs convert from a 70 MHz intermediate frequency [IF] to Ku band or C band.
CDMA Modem	Code Division Multiple Access Modem A CDMA Modem uses a digital radio system that transmits streams of bits [PN codes]. CDMA permits several radios to share the same frequencies. Unlike TDMA [Time Division Multiple Access], a system used in 2G GSM, all radios can be active all the time, because network capacity does not directly limit the number of active radios. CDMA cellular communication standard is most commonly used in North America.
COFDM	Coded Orthogonal Frequency-Division Multiplexing COFDM is a method of encoding digital data on multiple carrier frequencies. COFDM is a frequency-division multiplexing [FDM] scheme used as a digital multi-carrier modulation method. It is deemed coded because of the use of forward error correction [FEC]. A large number of closely spaced orthogonal sub-carrier signals are used to carry data on several parallel data streams or channels. Each sub-carrier is modulated with a conventional modulation scheme, such as quadrature amplitude modulation or phase-shift keying, at a low symbol rate, maintaining total data rates similar to conventional single-carrier modulation schemes in the same bandwidth. COFDM-based transmitters with diversity receivers use DVB-T, which was originally designed for high power stationary UHF transmitters fed highly compressed video by rack mount encoders and stationary domestic receivers.
Composite [Baseband]	A band or grouping of frequencies and/or subcarriers, including video, occupied by the signal in a radio transmission system. Also called Baseband.

Term	Definition
Decoder Buffer Length	The Decoder Buffer Length is the size of the buffer fed to the decoder when using an audio bitrate_cap, expressed in kbps. The buffer_size divided by bitrate_cap represents the size of the buffer in milliseconds; so if you set bitrate_cap to 1000 and buffer_size to 1000, the buffer is effectively 1.0 second. If bitrate_cap is 500 and buffer_size is 1000, the buffer is 2.0 seconds. This factor is typically used only for streaming [RTMP or broadcast] video, not for HTTP delivery of video. Only use this setting if you understand its implications, as it can decrease video quality. This should typically only be used for streaming [or for device playback].
DES	Data Encryption Standard
DHCP	Dynamic Host Configuration Protocol A protocol for automating the configuration of computers that use TCP/IP. Dynamic Host Configuration Protocol is a network protocol used to configure network devices to communicate on an IP network. Internet Protocol addresses are assigned to a host either at the time of booting, or permanently, by fixed configuration of its hardware or software. Persistent configuration is also known as using a Static IP address. In contrast, in situations when the computer's IP address is assigned newly each time, this is known as using a dynamic IP address. Dynamic Host Configuration Protocol is a network protocol used to configure network devices to communicate on an IP network. A DHCP client uses DHCP protocol to acquire configuration information, such as an IP address, a default route and one or more DNS server addresses from a DHCP server. The DHCP client then uses this information to configure its host. Once the configuration process is complete, the host is able to communicate on the Internet.
DNS	Domain Name System A DNS Server hosts a network service for providing responses to queries against a directory service. It maps a human-recognizable identifier to a system-internal, numeric, identification or addressing component. This service is performed by the server according to a network service protocol. The most important function of the DNS Server is the translation or resolution of human-memorable domain names and hostnames into the corresponding numeric Internet Protocol Addresses.
DVB-T	Digital Video Broadcasting - Terrestrial This system transmits compressed digital audio, digital video and other data in an MPEG transport stream, using coded orthogonal frequency-division multiplexing [COFDM or OFDM] modulation. DVB-T offers three different modulation schemes: QPSK, 16QAM and 64QAM.
FEC	Forward Error Correction A type of digital signal processing in which a transmitter encodes redundant data bits in a signal and a decoder in a receiver detects any errors and extracts the original signal.
FTP	File Transfer Protocol A standard Internet protocol commonly used to transfer files from the local computer to a remote web server or to download files from a remote server to the local computer.

Term	Definition
GOP	In MPEG encoding, a Group of Pictures [GOP] specifies the order in which intra-frames are arranged. The GOP is a group of successive pictures within an MPEG-coded film and/or video stream. Each MPEG-coded film and/or video stream consists of successive groups of pictures.
GSM Modem	Global System for Mobile Communications Modem A GSM Modem is a specialized type of modulator/demodulator that accepts a SIM [Subscriber Identity Module] card and operates over a subscription to a mobile operator, as a mobile phone functions. When a GSM modem is connected to a digital device, it uses the GSM modem to communicate over the mobile network. While GSM modems are most frequently used to provide mobile Internet connectivity, many of them can also be used for sending and receiving SMS [Short Message Service (e.g. text message)] and MMS [Multimedia Messaging Service] messages.
Guard Interval	A method used to prevent interference among distinct transmissions.
H.264	H.264/MPEG-4 Part 10 or AVC [Advanced Video Coding] is a standard for video compression and is currently one of the most commonly used formats for the recording, compression and distribution of high definition video.
HD	High Definition [video]
HD-SDI	High Definition Serial Data Interface A serial communications interface operating at 1.5 Gbit/sec.
HSDPA	High-Speed Data Packet Access
HSPA+	Evolved High-Speed Data Packet Access
IFB	Interruptible foldback [IFB], is an intercom cueing system used to monitor and intercede in television and radio broadcasts, public speaking, film and video production and other such endeavors. The IFB intercom circuit consists of a mix-minus program feed sent to a presenter's wired or wireless in-ear monitors [IEMs] through a telephone or radio receiver. This feed can be interrupted and replaced by a producer's or director's intercom microphone. For example, on a television news program, a producer can talk to the news anchors, to tell them when they are live on the air and to begin reading the news, or when to take a break. In electronic news gathering [ENG], IFB transmission can be sent through a telephone hybrid, the station's Multi-channel Television Sound [MTS] PRO channel during live remote broadcasts, or through some other return link in a broadcast auxiliary service. All signals arrive on site with a time delay as they travel through a wire, or during the conversion to radio frequency and then back to electronic audio, or in the conversion from analog to digital signal and back again to the analog realm. To achieve the mix-minus program to the IFB, certain audio elements that originate remotely from the mix point will be eliminated from the mix sent back to the remote site to avoid an echo.

Term	Definition
IMEI	The International Mobile Station Equipment Identity [IMEI] number is used to identify 3GPP [i.e., GSM, UMTS and LTE]. The IMEI number is used by the GSM network to identify valid devices and has no permanent relation to the subscriber. The subscriber is identified by transmission of an IMSI number; stored on the SIM card.
IP Address	An Internet Protocol [IP] address is a 32-bit number [for example, 123.45.67.89 for IP version 4] or a 128-bit number [for IP version 6] that identifies the network device that is sending or receiving information that is transmitted across a local area network [LAN] or the Internet.
LAN	Local Area Network [LAN] is a network that provides data communications to users within a confined geographic area such as a building or complex of buildings; TCP/IP is the typical transport protocol.
LMS-T	Link Modulation Scheme -Terrestrial This modulation type has been designed specifically to allow the data bandwidth required for contribution with more efficient error correction and more effective use of spectrum. LMS-T is particularly suited for rapidly changing channels, so it can be at the higher frequencies 6,7,8 GHz and at higher speeds, where DVB-T is compromised. LMS-T has been used at 574km/h [356mph] on the French TGV, while setting the train speed record.
LQ	Link Quality is a feature provided in COFDM receivers that analyzes signal-to-noise ratio and other important digital signal parameters as supplied by the COFDM demodulator circuit. The Link Quality feature calculates an integer value from 0 [no signal] to 9 [highest possible quality].
LTE	Long Term Evolution LTE is a standard for wireless data communications technology and an evolution of the GSM/UMTS standards. The goal of LTE was to increase the capacity and speed of wireless data networks using new DSP [digital signal processing] techniques and modulations that were developed around the turn of the millennium. A further goal was the redesign and simplification of the network architecture to an IP-based system with significantly reduced transfer latency compared to the 3G architecture. The LTE wireless interface is incompatible with 2G and 3G networks, so that it must be operated on a separate wireless spectrum.
MAC Address [BSSID]	The Media Access Control Address The MAC Address is a unique identifier assigned to network interfaces, such as the NewS*tream* transmitter, for communications on the physical network segment. A Wi-Fi Access Point's MAC address is used as the identifier of a Basic Service Set [BSSID]. The MAC address of the NewS*tream* IDU is also the BSSID for the wireless access point. When prompted, NewS*tream*'s connection information retrieval returns the MAC address and BSSID of the Wi-Fi client, which is displayed in this field.
MIMO	Multiple-Input and Multiple-Output
MPEG	Moving Picture Experts Group A working group of ISO that establishes standards for digital video and audio compression.

Term	Definition
NTSC	National Television System Committee Color television standard used in the US. Provides 525 horizontal lines of resolution. Not compatible with PAL or SECAM.
OFDM	Orthogonal frequency-division multiplexing [OFDM] is a method of encoding digital data on multiple carrier frequencies. OFDM has developed into a popular scheme for wideband digital communication, whether wireless or over copper wires, used in applications such as digital television and audio broadcasting, DSL Internet access, wireless networks, powerline networks, and 4G mobile communications. OFDM is a frequency-division multiplexing [FDM] scheme used as a digital multi-carrier modulation method. A large number of closely spaced orthogonal sub-carrier signals are used to carry data on several parallel data streams or channels. Each sub-carrier is modulated with a conventional modulation scheme [such as quadrature amplitude modulation or phase-shift keying] at a low symbol rate, maintaining total data rates similar to conventional single-carrier modulation schemes in the same bandwidth. The primary advantage of OFDM over single-carrier schemes is its ability to cope with severe channel conditions [for example, attenuation of high frequencies in a long copper wire, narrowband interference and frequency-selective fading due to multipath] without complex equalization filters. Channel equalization is simplified because OFDM may be viewed as using many slowly modulated narrowband signals rather than one rapidly modulated wideband signal. The low symbol rate makes the use of a guard interval between symbols affordable, making it possible to eliminate intersymbol interference [ISI] and utilize echoes and time-spreading [on analogue TV these are visible as ghosting and blurring, respectively] to achieve a diversity gain, i.e. a signal-to-noise ratio improvement. This mechanism also facilitates the design of single frequency networks [SFNs], where several adjacent transmitters send the same signal simultaneously at the same frequency, as the signals from multiple distant transmitters may be combined constructively, rather than interfering as would typically occur in a traditional single-carrier system.
PAL	Phase Alternation Line Color television standard used in many European countries. Provides 625 horizontal lines of resolution. Not compatible with NTSC or SECAM.
PCM	Pulse-Code Modulation PCM is a method used to digitally represent sampled analog signals. It is the standard form of audio in digital applications. The amplitude of the analog signal is sampled regularly at uniform intervals; each sample is quantized to the nearest value within a range of digital steps. PCM streams have two basic properties that determine their fidelity to the original analog signal: • the sampling rate, • the number of times per second that samples are taken; • the bit depth, which determines the number of possible digital values that each sample can take.

Term	Definition
PCR	Program Clock Reference To enable a decoder to present synchronized content, such as audio tracks matching the associated video, at least once each 100 millisecond, a Program Clock Reference [PCR] is transmitted in the adaptation field of an MPEG-2 transport stream packet. The PID with the PCR for an MPEG-2 program is identified by the PCR_PID value in the associated Program Map Table. The value of the PCR is employed to generate a system_timing_clock in the decoder. The STC or System Time Clock decoder provides a highly accurate time base that is used to synchronize audio and video elementary streams. Timing in MPEG2 uses this clock as a reference.
PES	Packetized Elementary Stream PES is a specification in the MPEG-2 parameter that defines carrying of elementary streams [usually the output of an audio or video encoder] in packets within MPEG program stream and MPEG transport stream. The elementary stream is packetized by encapsulating sequential data bytes from the elementary stream inside PES packet headers.
PID	Packet ID Each table or elementary stream in a transport stream is identified by a 13-bit packet ID [PID]. A demultiplexer extracts elementary streams from the transport stream in part by looking for packets identified by the same PID. In most applications, time-division multiplexing is used to decide how often a particular PID appears in the transport stream.
PMT	Program Map Table A PMT contains information about programs. For each program, there is one PMT. While the MPEG-2 standard permits more than one PMT section to be transmitted on a single PID, most MPEG-2 users such as ATSC and SCTE require each PMT to be transmitted on a separate PID that is not used for any other packets. The PMTs provide information on each program present in the transport stream, including the program_number, and list the elementary streams that comprise the described MPEG-2 program. There are also locations for optional descriptors that describe the entire MPEG-2 program, as well as an optional descriptor for each elementary stream. Each elementary stream is labeled with a stream_type value.
QPSK	Quadrature Phase-Shift Keying Phase-shift keying [PSK] is a digital modulation scheme that conveys data by changing, or modulating, the phase of a reference signal or carrier wave. Quadrature Phase-Shift Keying [QPSK] transmits twice the data rate in a given bandwidth compared to Binary Phase-Shift Keying [BPSK] - at the same Bit Error Rate [BER]. The engineering penalty that is paid is that QPSK transmitters and receivers are more complicated than the ones for BPSK. However, with modern electronics technology, the penalty in cost is very moderate. QPSK is also known as 4 - QAM.
Roll-off	Roll-off describes the steepness of a transmission function with frequency, in connection with filter circuits in the transition between a passband and a stop band. It is most typically applied to the insertion loss of the network. It is usual to measure roll-off as a function of logarithmic frequency, consequently, the units of roll-off are either decibels per decade [dB/decade], where a decade is a 10-times increase in frequency, or decibels per octave [dB/8ve], where an octave is 2-times increase in frequency.

Term	Definition
Roll-off [Continued]	The concept of roll-off stems from the fact that in many networks roll-off tends towards a constant gradient at frequencies well away from the cut-off point of the frequency curve. Roll-off enables the cut-off performance of such a filter network to be reduced to a single number. Note that roll-off can occur with decreasing frequency as well as increasing frequency, depending on the band form of the filter being considered. For instance, a low-pass filter will roll-off with increasing frequency, but a high-pass filter or the lower stop band of a band-pass filter, will roll-off with decreasing frequency.
RSSI	Receiver Signal Strength Indicator [relative] This parameter provides each cellular card's or Wi-Fi Access Point's RSSI. The RSSI is the relative received signal strength in arbitrary units. RSSI is an indication of the power level being received by the antenna. The higher the RSSI number, the stronger the signal.
SCM-Q	Superposition Coded Modulation - Quadrature SCM-Q is a modulation scheme designed to use the bandwidth efficient codec, such as H.264, enabling the transfer of the same video quality at up to twice the distance, with a greatly improved Peak-to-Average-Power-Ratio [PAPR]. SCM-Q has variable bandwidth so can also be used for channel sharing.
SDI	Serial Digital Interface A serial communications interface operating at 270 Mbit/sec. SDI can operate at 1.5 Gbit/sec for HD.
SIM Card	Subscriber Identity Module Card A SIM is an integrated circuit that stores the International Mobile Subscriber Identity [IMSI] and key used to identify and authenticate subscribers on mobile telephony devices. A SIM card contains: • its unique serial number [ICC ID] • International Mobile Subscriber Identity [IMSI] • security authentication and ciphering information • temporary information related to the local network • a list of the services the user has access to • two passwords: a personal identification number [PIN] for ordinary use and a personal unblocking code [PUK] for PIN unlocking The primary advantage of cellular wireless data is that you have access to the Internet from any location, indoors or outdoors, throughout your carrier's data coverage area. A disadvantage – as is prevalent with cellular telephones – is that cellular coverage can be attenuated indoors, as well as in remote areas.
SMPTE	Society of Motion Picture and Television Engineers
SNR	Signal-to-Noise Ratio A measure of signal strength and quality that is defined as the ratio of the amplitude of a signal compared to the amplitude of the background noise. SNR is typically measured in decibels [dB].

Term	Definition
SSID	Service Set Identifier The SSID is a case-sensitive, alphanumeric, 32 - character unique identifier attached to the header of packets sent over a wireless local-area network [WLAN] that acts as a password when a mobile device attempts to connect with a Basic Service Set [BSS] which is a component of the IEEE 802.11 WLAN architecture. An SSID is also referred to as a Network Name because essentially it is a name that identifies a wireless network. The SSID differentiates one WLAN from another, so all Access Points and all devices attempting to connect to a specific WLAN must use the same SSID to enable effective roaming. As part of this association process, a wireless client must have the same SSID as that entered in the Access Point or it will not be permitted to join the BSS.
Subnet Mask	A sub-network, or subnet, is a logically visible subdivision of an IP Network. All computers that belong to a subnet are addressed with a common, identical, most-significant bit-group in their IP address. This results in the logical division of an IP address into two fields: a network or routing prefix and the rest field or host identifier. The rest field is an identifier for a specific host or network interface. Special gateways called routers exchange traffic between sub-networks. Such routers constitute the logical or physical boundaries between the subnets.
Symbol Rate	Symbol Rate [aka baud or modulation rate] is the number of symbol changes [i.e. waveform changes or signalling events] made to the transmission medium per second using a digitally modulated signal or a line code. The Symbol rate is measured in baud [Bd] or symbols/second. In the case of a line code, the symbol rate is the pulse rate in pulses/second. Each symbol can represent or convey one or several bits of data. The symbol rate is related to, but should not be confused with, the gross bitrate expressed in bits/second.
TCP/IP	Transmission Control Protocol/Internet Protocol Transmission Control Protocol is a connection-oriented Internet protocol requiring synchronization between the end units [source and destination] for handshaking purposes for guaranteed message delivery that is transmitted over the Internet Protocol, which is the low-level protocol of most internet hardware
TNC	Threaded Neill–Concelman A TNC connector is a threaded version of the BNC connector. The connector has a 50 Ω impedance and operates best in the 0 to 11 GHz frequency spectrum. It has better performance than the BNC connector at microwave frequencies.
WAN	Wide Area Network A network provided by telephone and cell phone companies to provide data communications to users over a large geographic area.
WLAN	Wireless [Wi-Fi] Local Area Network A Wireless Local Area Network links two or more devices using some wireless distribution method and usually providing a connection through an access point to the wider Internet. This provides the mobility to move around within a local coverage area and still be connected to the network. Most modern WLANs are based on IEEE 802.11 standards, marketed under the Wi-Fi brand name.

Notes

Support for Your Vislink Product

You can contact the Vislink Technical Support staff as follows:

24-hour Worldwide Customer Support

E-mail: ussupport@vislink.com
Telephone: +1 978-671-5929, +1 978-671-5995 or
888-777-9221 In the US or Canada

The following contact numbers are also available for LiveGear equipment:

- 978.671.5700 Press #3
- 800.490.5700 Press #3

When you contact Technical Support, include the following information:

- Model number and serial number of the unit [located on a label on the units].
- Approximate purchase date.

There are no supported field repairs for this product. Return the unit for factory repair.

NOTE: *If you attempt field repair, you risk damaging your equipment. If your equipment is under warranty, you may also affect your warranty coverage.*

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