CALIAN®

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DOCSIS Cable Load Generator

Getting Started

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The following abbreviation is used throughout this manual:
Calian DOCSIS Cable Load Generator is abbreviated as CLGD.

Calian, Advanced Technologies
18 Innovation Boulevard, Saskatoon, Saskatchewan, Canada, S7N 3R1
Phone: +1-306-933-1605, E-mail: at.service@calian.com
http://www.calian.com/products/cable-load-generator-clgd

CE & UKCA Declaration of Conformity

This is to certify that:

Rohde & Schwarz	2118.6956.02	DOCSIS Cable Load Generator (CLGD)
Calian	CLGD	DOCSIS Cable Load Generator (CLGD)

complies with the provisions of the Directive of the Council of the European Union on the approximation of laws of the Member States:

- Relating to electrical equipment for use within defined voltage limits (2014/35/EU)
- Relating to electromagnetic compatibility (2014/30/EU)
- Relating to the restriction of the use of certain hazardous substances in electrical and electronic equipment (RoHS) (2015/863/EU)
- Relating to waste electrical and electronic equipment (WEEE) (2012/19/EU)

Conformity is proven by compliance with the following standards:

EMC

EN 61326-1:2013

EN 61326-2-1:2013

EN 55011:2016+A1:2017

EN 61000-3-2:2014

EN 61000-3-3:2013

KN 61000-4-11

Safety

EN 61010-1:2010+A1:2019

CAN/CSA-C22.2 No. 61010-1

UL 61010-1

UKCA

Meets the requirements of h following applicable UK directives and carries the UKCA marking accordingly:

Electrical Equipment (Safety) Regulations 2014

Electromagnetic Compatibility Regulations 2014

The Restriction of the Use of Certain Hazardous Substances in Electrical and Electronic Equipment Regulations 2015

For the assessment of electromagnetic compatibility, the limits of radio interference for Class A equipment as well as the industrial immunity requirements have been used as a basis.

RoHS/WEEE Certificate

This is to certify that:

Rohde & Schwarz	2118.6956.02	DOCSIS Cable Load Generator (CLGD)
Calian	CLGD	DOCSIS Cable Load Generator (CLGD)

complies with the provisions of the Directive of the Council of the European Union on the approximation of laws of the Member States

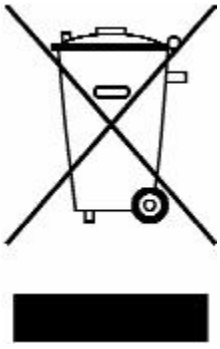
- Relating to the restriction of the use of certain hazardous substances in electrical and electronic equipment (RoHS) (2015/863/EU)
- Relating to waste electrical and electronic equipment (WEEE) (2012/19/EU)

RoHS

Conformity is proven through analysis of each component part within the product typically confirmed by each manufacturer stating compliance.

WEEE

Product labeling is in accordance with EN 50419



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1. Safety Information

The product documentation helps you use the CLGD safely and efficiently. Follow the instructions provided here, keep the product documentation nearby, and offer it to other users.

1.1 Intended use

The CLGD is intended for the development, production and verification of electronic components and devices in industrial, administrative, and laboratory environments. Use the CLGD only for its designated purpose. Observe the operating conditions and performance limits stated in the data sheet.

1.2 Where do I find safety information?

Safety information is part of the product documentation. It warns you about the potential dangers and gives instructions how to prevent personal injuries or damage caused by dangerous situations. Safety information is provided as follows:

- General Safety Instructions are provided below.
- Section 4.3.4 provides safety instructions specific to this product.
- Throughout the documentation, safety instructions are provided when you need to take care during setup or operation.

1.3 Safety Instructions

Products from Calian are manufactured according to the highest technical standards. To use the products safely, follow the instructions provided in this document. Keep this document nearby and offer it to other users.

Use the product only for its intended use and within its performance limits. Intended use and limits are described in the product documentation such as the data sheet, manuals, and the printed "Safety Instructions". If you are unsure about the appropriate use, contact Calian customer service.

Using the product requires specialists or specially trained personnel. These users also need sound knowledge of the user interface and the product documentation which are available in English language only.

Never open the casing of the product. Only service personnel authorized by Calian are allowed to repair the product. If any part of the product is damaged or broken, stop using the product. Contact Calian customer service by email at at.service@calian.com .

Lifting and carrying the product

The maximum weight of the product is provided in the data sheet. To move the product safely, you can use lifting or transporting equipment such as lift trucks and forklifts. Follow the instructions provided by the equipment manufacturer.

Choosing the operating site

Only use the product indoors. The product casing is not waterproof. Water that enters can electrically connect the casing with live parts, which can lead to electric shock, serious personal injury, or death if you touch the casing.

Unless otherwise specified, you can operate the product up to an altitude of 2000 m above sea level. The product is suitable for pollution degree 2 environments where nonconductive contamination can occur. For more information on environmental conditions such as ambient temperature and humidity, see the data sheet.

Setting up the product

Always place the product on a stable, flat, and level surface with the bottom of the product facing down. If the product is designed for different positions, secure the product so that it cannot fall over.

If the product has foldable feet, always fold the feet completely in or out to ensure stability. The feet can collapse if they are not folded out completely or if the product is moved without lifting it. The foldable feet are designed to carry the weight of the product, but not an extra load.

If stacking is possible, keep in mind that a stack of products can fall over and cause injury.

If you mount products in a rack, ensure that the rack has sufficient load capacity and stability. Observe the specifications of the rack manufacturer. Always install the products from the bottom shelf to the top shelf so that the rack stands securely. Secure the product so that it cannot fall off the rack. See Section 4.3.3.

Connecting to power

The product is an overvoltage category II product. Connect the product to a fixed installation used to supply energy-consuming equipment such as household appliances and similar loads. Keep in mind that electrically powered products have risks, such as electric shock, fire, personal injury, or even death.

Take the following measures for your safety:

- Before switching on the product, ensure that the voltage and frequency indicated on the product match the available power source. If the power adapter does not adjust automatically, set the correct value and check the rating of the fuse.

- Only use the power cable delivered with the product. It complies with country-specific safety requirements. Only insert the plug into an outlet with protective conductor terminal.
- Only use intact cables and route them carefully so that they cannot be damaged. Check the power cables regularly to ensure that they are undamaged. Also ensure that nobody can trip over loose cables.
- If the product needs an external power supply, use the power supply that is delivered with the product or that is recommended in the product documentation or a power supply that conforms to the country-specific regulations.
- Only connect the product to a power source with fuse protection of maximum 20 A.
- Ensure that you can disconnect the product from the power source at any time. Pull the power plug to disconnect the product. The power plug must be easily accessible. If the product is integrated into a system that does not meet these requirements, provide an easily accessible circuit breaker at the system level.

Cleaning the product

Use a dry, lint-free cloth to clean the product. When cleaning, keep in mind that the casing is not waterproof. Do not use liquid cleaning agents.

Meaning of safety labels

Potential hazard
Read the product documentation to avoid personal injury or product damage.

Electrical hazard
Indicates live parts. Risk of electric shock, fire, personal injury or even death.

Hot surface
Do not touch. Risk of skin burns. Risk of fire.

Protective conductor terminal
Connect this terminal to a grounded external conductor or to protective ground. This connection protects you against electric shock if an electric problem occurs.

2. Documentation Overview

Getting Started

The Getting Started is provided in PDF format via link to a Calian website provided in a card enclosed with the product. It contains the following information:

- Chapter 1
  - This chapter describes unpacking the instrument, the front and rear panels and getting it ready for operation.
- Chapter 2
  - The chapter gives a brief introduction to the instrument and an overview of its functions
- Chapter 3
  - This chapter describes the options for operating the instrument.

User Manual

The User Manual is provided within the CLGD firmware. It provides the following information:

- Chapter 2
  - This chapter details where the safety information is found.
- Chapter 3
  - This chapter describes each of the transmit modes in detail.
- Chapter 4
  - This chapter describes all the parameters that can be set in the web GUI.
- Chapter 5
  - This chapter describes the details of using SCPI.
- Chapter 6
  - This chapter describes SNMP and how to access the MIB.
- Chapter 7
  - This chapter describes details for feeding the CLGD with data for the QAM channels.
- Chapter 8
  - This chapter provides the CLGD specifications.
- Chapter 9
  - This chapter describes maintenance required for the instrument.

Online Help

The online help provides a copy of both the Getting Started and User Manual in PDF format.

3. Conventions Used in the Documentation

The following conventions are used throughout the CLGD Getting Started.

Typographical conventions

The following text markers are used throughout this documentation:

Convention	Description
“Graphical user interface elements”	All names of graphical user interface elements both on the screen and on the front and rear panels, such as dialog boxes, softkeys, menus, options, buttons, etc., are enclosed by quotation marks.
KEYS	Key names are written in capital letters.
Input	Input to be entered by the user is displayed in italics.
`File names, commands, program code`	File names, commands, coding samples and screen output are distinguished by their font.
"References"	References to other parts of the documentation are enclosed by quotation marks.

Other conventions

- **Remote commands:** Remote commands may include abbreviations to simplify input. In the description of such commands, all parts that have to be entered are written in capital letters. Additional text in lowercase characters is for information only.
- **Select/press/click/toggle:** These terms may refer to any of the described GUI interaction methods, i.e., using a finger on the touchscreen, a mouse pointer in the display, or a key on a keyboard.
- **Important information:** The following graphical inserts are used to provide notes, warnings, cautions, and notices:

Note
Note to provide useful information.

Warning
Warning to take actions or avoid actions to ensure the instrument works correctly.

Caution
Caution to take actions or avoid actions to ensure the safety of the operator(s).

Notice
Notice to take actions or avoid actions to ensure the instrument is not damaged.

4. Putting the Instrument into Operation

4.1 Explanation of the Front Panel

This section provides an overview of the connector and LEDs on the front panel. Each connector and LED are briefly described along with a reference to the chapter(s) containing detailed information about its usage.

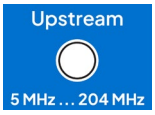
Figure 4-1 CLGD Front Panel

Power LED

Indicates AC power switch is on, and internal power supply is generating DC output.

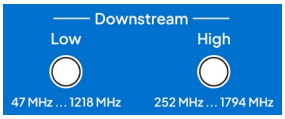
Status LED

Provides an indication of the status of the instrument.



Upstream LED

Provides an indication that the upstream port on the rear panel is active.



Downstream - Low LED

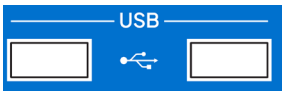
Provides an indication that the downstream-low port on the rear panel is active.

Downstream - High LED

Provides an indication that the downstream-high port on the rear panel is active.

CSO/CTB LED

Provides an indication that the CSO/CTB port on the rear panel is active.



USB Connectors

Provides two USB connectors (type A) that allow the user to attach a Wi-Fi dongle to connect the CLGD to a wireless network.

4.2 Explanation of the Rear Panel

This section provides an overview of the connectors on the instruments rear panel. Each connector is briefly described along with a reference to the chapter(s) containing detailed information about its usage. Specifications for the connectors are contained in the data sheet.

Figure 4-2 CLGD Rear Panel

AC power connector

The instrument is equipped with a universal power supply that accepts an AC voltage range of 85 to 264 VAC at a frequency range of 47 to 63 Hertz. No external switching or modification of the fuse is necessary.

AC power switch

The AC power switch is located to the left of the AC power connector.

AC power fuse

See section “AC Power Fuses” and section 6 of the User Manual.

Control LAN connector

RJ-45 connector allows the user to connect to CLGD to monitor and control it. This connector includes link and activity LEDs.

Data SFP+ Connectors

Two SFP+ connectors are provided for the user to insert an SFP+ module to stream data to the DOCSIS 3.0 and DOCSIS 3.1 carriers.

10 MHz IN Connector

BNC 50 ohm connector input for an external 10 MHz or 10.24 MHz frequency reference

Trigger IN connector

BNC 50 ohm connector input for triggering upstream burst carriers

Trigger OUT connector

BNC 50 ohm connector output trigger relative to the start of an upstream burst carrier

CSO/CTB connector

F-type connector for the CSO/CTB port.

Downstream-High connector

F-type connector for the Downstream-High port.

Downstream-Low connector

F-type connector for the Downstream-Low port.

Upstream connector

F-type connector for the Upstream port.

Note that the allowable range for mating male pin diameters is from 0.56 mm to 1.00 mm for the four F female RF output connectors, damage may occur if an incompatible cable is used. Four connector savers meeting this requirement are provided with the unit to mitigate risk of damage to these F connectors and should always be used.

4.3 Preparing for Operation

The following section describes how to prepare the instrument for operation and how to connect external devices. Please observe the general safety instructions for operating the instrument.

4.3.1 Shipping

NOTICE

The Cable Load Generator DOCSIS (CLGD) is comprised of very sensitive electronic components that are susceptible to damage during shipment if not properly packaged. It is recommended to always use original product shipment packaging when shipping the CLGD anywhere. In instances when the original shipping container is no longer available the CLGD must be packaged in a double walled cardboard box or stronger package with at least 4 inches of expanding foam or new bubble wrap on all sides, edges, corners and faces of the CLGD. The package must have "Handle with Care" and "Do Not Drop" labels affixed to the exterior of the box in a clearly visible manner. If not properly packaged the warranty and standard repair fee are void.

4.3.2 Unpacking the Instrument

- After unpacking the instrument, check the supplied equipment against the delivery note to make sure all items are present.
- Carefully check the instrument for possible damage.
- Should there be any damage, please inform the carrier immediately. Keep the packing material to support your claim.
- The original packaging is also useful for transporting or shipping the CLGD later.

4.3.3 Standalone Operation or Installation in a 19” Rack

The instrument is designed for interior use only. You can set it up as a standalone device or install it in a 19" rack.

To install it in a 19” rack, you must replace the front handles with an appropriate adapter (contact Calian support for more information). You should install brackets on which the CLGD can rest before securing the ears of the front panel to the rack.

4.3.4 Safety Instructions

4.3.4.1 General Safety Instructions

NOTICE

Any noncompliance with these instructions can damage the instrument.

Prior to putting the instrument into operation, check the following:

- The instrument cover is in place and screwed on.
- Vent holes are not obstructed, and air flow is not blocked on the side panels. The spacing from the wall should be at least 1 cm.
- The signal levels at the inputs do not exceed permissible limits.
- The outputs of the instrument are not overloaded or incorrectly connected.
- In particular, please heed the maximum permissible reverse power allowed on the RF outputs and ensure a DC voltage is not applied to the RF output.
- The instrument may be operated only in a horizontal position, and the surface on which it is placed must be level.
- The ambient temperature must be in the range specified in section 4 of the User Manual.

4.3.4.2 Protective Measures against Electrostatic Discharge

NOTICE

Damage to the equipment under test due to electrostatic discharge

In order to avoid damage to the electronic components of the equipment under test (EUT) due to electrostatic discharge when touched, we recommend that you use the appropriate protective equipment.

4.3.4.3 EMC Safety Precautions

NOTICE

Prevent electromagnetic interference

To prevent electromagnetic interference, the instrument must be operated only when closed and with all shielding covers fitted. Only suitable and shielded signal and control cables may be used.

- This applies particularly to cables that are connected to the rear or front panel. Regardless of the data rate and the packet timing of the transport stream, high signal levels can occur at individual points in the signal spectrum. To avoid EMC problems, the cables should have at least 80 dB shielding protection up to 1 GHz. This generally requires the use of cables with double shielding.
- When wiring the LAN interface (100/1000 BASE-T), make sure that a suitable cable (e.g. Category 5e) is used.

4.3.5 Connecting the Instrument to AC Power

The instrument is equipped with a universal power supply that accepts an AC voltage range of 85 to 264 VAC at a frequency range of 47 to 63 Hertz. No external switching or modification of the fuse is necessary. The AC power connector is at the rear of the instrument.

- Use the supplied AC power cable to connect the instrument to the AC power supply. Since the instrument complies with safety class EN61010-1, it should only be connected to a socket with a ground contact.

  A standard EU power cord (with CEE 7/7 plug) is provided with every unit and if the buyer is located outside the EU, a power cord compliant with safety regulations for that location is supplied.
- Set the AC switch on the rear of the instrument to the I position.

4.3.6 AC Power Fuses

Before changing the fuses, switch off the instrument and disconnect it from the power supply.

The instrument is equipped with one fuse (see section 6 of the User Manual). The fuse is located beside the AC power switch (in the AC inlet) on the rear panel of the instrument.

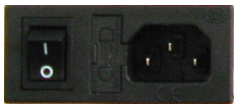
Changing the fuse:

- Open the cover on the fuse box and remove the fuse holder.
- Replace defective fuse and put the fuse holder back into place.
- Close the fuse box cover.

4.3.7 Instrument Startup

Once the instrument has powered up, the unit must boot. During boot up the status LED on the front panel is amber. At completion of boot up the status LED turns green unless a fault has been detected in which case it turns red.

4.3.8 Switching Off the Instrument



- Set the AC switch on the rear of the instrument to the **O** position. None of the LEDs on the front panel should be lit.

Note
If you set the power switch to the O position before the instrument settings have been saved, the current settings will be lost.

CAUTION

Caution
In the event of a hazardous situation, unplug the device from power. Ensure the power plug is easily reachable and accessible at all times.

4.3.9 Functional Check

The CLGD automatically monitors the health of the instrument during power-up and continuously during operation. When the instrument detects a fault the status LED turns red. There are no serviceable parts. This means the unit must be returned to the manufacturer for service.

4.4 Notes on the Operating System and Firmware

The instrument uses a Linux operating system. Access is not provided to the operating system but rather to a webserver through which a user can configure the instrument's network settings. More detailed information is provided in the User Manual.

4.4.1 Installing the Software

Software update instructions are provided in the User Manual.

NOTICE

- Only software authorized by Calian for use in the instrument may be installed. In case of doubt, please contact Calian service.
- Changes to the system are only permissible in agreement with Calian.
- Updating the operating system, e.g. installing a service pack, is not allowed without permission.

Otherwise, the stability and performance of the system may be impaired. Calian shall not assume any liability for faults caused by impermissible manipulations of the system.

4.5 Connecting the Instrument to a Network (LAN)

The instrument is equipped with a network connection and can be connected to an Ethernet LAN (local area network). The instrument can also be remote-controlled and manually operated in the network. Remote operation allows someone to operate the instrument from an external computer situated anywhere in the world. For example, a user working in one part of a building can operate one or more instrument units that are part of a test setup situated in another part of the building. Remote control of the instrument via the LAN interface is described in Chapters 3 and 4 of the User Manual.

Refer to section 2.4 of the User Manual for detailed information about configuring the instrument for connection to a network.

4.5.1 Connecting to the Network

NOTICE

Always coordinate the connection of the instrument to the network with the network administrator. Any errors that occur during the connection process can affect the entire network. Make sure that the instrument is switched off when you connect and disconnect the network cable. This is the only way to ensure that the network connection is reliably detected and any disruptions during the operation of the instrument are avoided.

The instrument is connected to the LAN using a standard RJ-45 cable via the Control LAN interface on the rear of the instrument.

Configuring the instrument for network operation

The network interface functions with 10/100/1000 Ethernet IEEE 802.3u. The TCP/IP network protocol and the associated network services are preconfigured. To exchange data within a LAN, every computer or instrument that is connected must have a unique IP address.

Networks with DHCP

The instrument can be configured for networks using the dynamic host configuration protocol (DHCP). In such networks, the instrument is automatically assigned a free IP address. Depending upon the configuration of the network you may have to contact the network administrator to configure a DHCP server to provide an IP address for the instrument.

Networks that assign fixed (Static) IP

In networks that assign static IP addresses, the network administrator usually handles this process. The fixed IP address must be entered into the unit using an IP connection and a web browser, see point to point connection below or using a zero-conf address. See below.

Zero Conf

Many devices support a method of self configuration, it is often called Zero Conf, Bonjour or mDNS. This is process is specified in RFC 3927. The unit finds a unique address in the block 169.254.0.0 netmask 255.255.0.0. The device can be found by browsing the network. For units with Calian labeling on the front panel and serial numbers above 200000, the device can be found by looking for a name of the form "clgd-*.local" where the * is replaced by the unit serial number. For devices with Rohde & Schwarz labeling on the front panel and serial numbers below 200000, the device can be found by looking for a name of the form "rsclgd-*.local" where the * is replaced by the unit serial number. Open a command prompt and ping the unit with the command *ping clgd-XXXXXX.local* or the command *ping rsclgd-XXXXXX.local* as applicable. The ping command will return an IP address. The computer's network configuration may need to be modified to communicate with the unit. Once the computer's network configuration is properly set, enter the IP address in a web browser.

Point-to-point connections

To set up a single network (a LAN connection between an instrument and a single computer without integration into a larger network), an IP address needs to be assigned to the instrument and the computer. The IP addresses 192.168.10.xxx are available for use here, where xxx can assume values of 2 to 254, and the value for the subnet mask is 255.255.255.0. Either a straight or crossover cable can be used as the instrument automatically detects the configuration of the connected equipment and reconfigures itself to initiate communication.

Network Configuration Reset

In the event the network is misconfigured, or the network configuration is lost, the network configuration can be reset to the factory default. To reset the network configuration:

1. Press the "reset" button located at the rear of the CLGD unit
2. Hold the button for 3 seconds, then release

The unit will now use the factory default network configuration.

5. Brief Introduction

5.1 Feature Set

Full channel loading scenario simulation

- Up to eight 192 MHz DOCSIS 3.1 channels and up to 160 QAM channels
- Any combination of DOCSIS 3.1 and J.83/A/B/C
- Independent setting of frequency, level, FEC, constellation and bandwidth of all channels
- Adjustable uptilt and downtilt
- Internally generated MPEG-2 transport streams or pseudo random bit sequence (PRBS), or external data feed via IP

Upstream cable modem emulation

- DOCSIS 3.1 OFDMA signals with up to 96 MHz bandwidth
- DOCSIS 3.0 TDMA, A-TDMA and S-CDMA signals
- Any combination of DOCSIS 3.1 and DOCSIS 3.0

Signal interference and distortion simulation

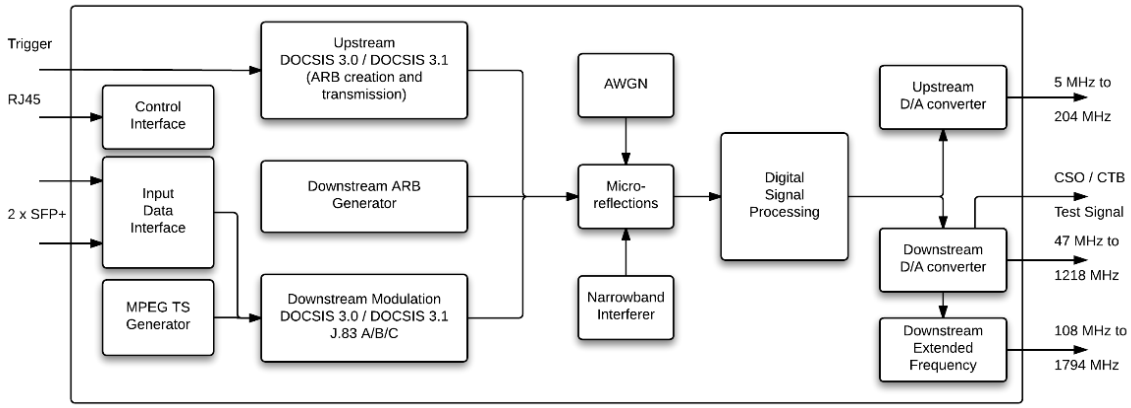
- Microreflections in line with SCTE 40
- Additive white Gaussian noise (AWGN) and impulsive noise
- Superimposed amplitude modulation for simulation of AC hum
- Ingress simulation with narrowband interference signals
- Full Duplex DOCSIS interference simulation

Key Facts

- Frequency range in downstream: 47 MHz to 1218 MHz (extendable to 1794 MHz)
- Frequency range in upstream: 5 MHz to 204 MHz
- DOCSIS 3.1, DOCSIS 3.0, J.83/A/B/C and analog TV
- Up to eight times 192 MHz signal bandwidth for DOCSIS 3.1
- ARB generator bandwidth up to 200 MHz

5.2 Basic Instrument Concept

The CLGD is a multichannel signal generator for simulating a cable TV network with full channel loading. It generates broadband data signals for DOCSIS 3.1 as well as digital and analog TV channels. In the downstream or upstream, signals can be freely combined, allowing users to simulate virtually any conceivable channel loading scenario in the lab.



The CLGD has three modes: Mixed, DOCSIS 3.1, and Upstream. In Mixed mode, three sub-modes of DOCSIS 3.0 modulation are also supported: J83B, J83C, and DVBC. In all DOCSIS 3.0 modulation modes, channels are configured at baseband in blocks of 16 channels; however, each channel is individually agile at RF between 47 MHz and 1008 MHz. Any DOCSIS 3.0 channel can be switched to a narrowband ARB file for playback. This mode also supports transmission of wideband ARB and DOCSIS 3.1 carriers.

In DOCSIS 3.1 mode, additional DOCSIS 3.1 carriers are available but no DOCSIS 3.0 modulation. All DOCSIS 3.1 carriers are up to 192 MHz bandwidth and are configured individually with frequency spectrum support up to 1218 MHz (or 1794 MHz with extended RF license). This mode still supports the use of wideband ARB transmission.

The Upstream mode allows users to create ARB files that simulate DOCSIS 3.0 A-TDMA and S-CDMA and DOCSIS 3.1 OFDMA cable modem burst transmissions. These ARB files can then be transmitted between 5 MHz and 204 MHz and triggered to transmit in response to inputs on the Trigger In connector.

The flexible multichannel signal generation capabilities of the CLGD enable it to simulate network loading in a reproducible manner, making it ideal for testing tuners, cable modems, and upstream CMTS receivers. The influence of QAM and TDMA/S-CDMA signals in adjacent channels on DOCSIS 3.1 signal reception is a research topic of great interest. The CLGD makes such simulations realistic by adding different types of interference such as AWGN, phase noise, reflections and narrowband interference in all modes.

The complex signal generation process can be conveniently controlled from a PC or via a web interface. Remote control through SCPI commands enables the generator to be used in automatic test systems. The CLGD can be adapted to various application requirements thanks to its software option concept.

6. Operating the Unit

6.1 Operating Concept

Getting Started

Modulator cable connections checklist:

- AC power
- Downstream-Low output connected to test equipment (e.g., spectrum analyzer, receiver, video analyzer).
- Control LAN connector connected to computer or network
- Optional: SFP+, 10 MHz external reference

When the unit is powered ON, default configuration is Mixed Mode J.83/B channel. Transmit is OFF. The user can configure and control the device from the Web GUI, SCPI or SNMP interface.

Factory Set IP Address

- The factory defaults for the CLGD network configuration are:
  - IP Address = 192.168.10.1
  - Net Mask = 255.255.255.0
  - Gateway = 192.168.10.1

Once connection can be established with the CLGD, network settings can be changed via the web GUI. Consult your network administrator if you cannot connect to CLGD.

The CLGD offers high flexibility in configuring a cable TV frequency plan and as a result has a large number of parameters to setup for both its baseband blocks and channels. The CLGD can be operated:

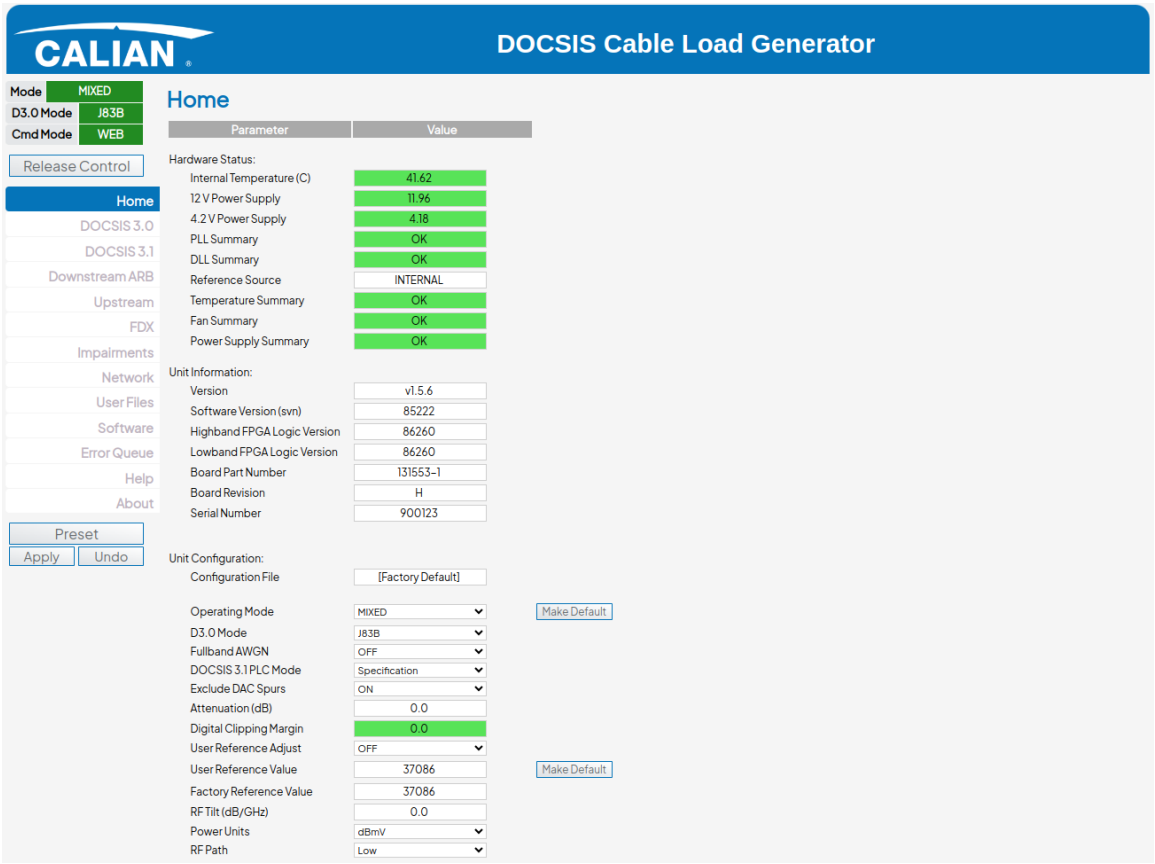
- from a PC using Web GUI
- using SCPI (see the User Manual)
- over SNMP (see the User Manual).

6.1.1 Operation from a PC using the Web GUI

With a conventional browser access the CLGD web GUI by:

- Entering its IP address in the URL field (Refer to section 1.5)
- Entering its zero-conf IP address in the URL field

The user will see the screenshot below composed of the left and right panes.



6.1.1.1 Left Pane

The left pane of the GUI is always visible and it:

- Displays CLGD transmit mode (MIXED, DOCSIS 3.1, or UPSTREAM)
- Displays DOCSIS 3.0 mode (J83B, J83C, or DVBC)
- Displays Command Mode (entity in control of CLGD) (Web GUI, SCPI or SNMP)
- Contains a button labeled either
  - Take Control
  - Release Control
- Contains a menu that controls the information displayed in the right pane.
- A set of buttons (e.g., Apply, Undo) consistent with the selected right pane

CLGD Transmit Mode

In **MIXED** mode DOCSIS 3.0, DOCSIS 3.1, and ARB file transmission are available. Narrowband ARB files can be assigned to any DOCSIS 3.0 channel and wideband ARB files up to 200 MHz can also be played out anywhere in the downstream spectrum (see the User Manual). In this mode there are 4 DOCSIS 3.1 (2 without the extended Downstream RF license) channels available, but only 3 that can be played below 1218 MHz. DOCSIS 3.0 operates between 47 MHz and 1,002 MHz in one of 3 different modes:

- J83B, offering 160 channels of ITU-T J.83 Annex B
- J83C, offering 160 channels of ITU-T J.83 Annex C
- DVBC, offering 120 channels of DVB-C (ITU-T J.83 Annex A).

All DOCSIS 3.0 channels are individually flexible to be placed at any frequency in the acceptable operating range, and have individual carrier power control, but baseband parameters are configured in blocks of 16 channels.

In **DOCSIS 3.1** mode there are up to 5 DOCSIS 3.1 channels available (8 with the extended Downstream RF license). Also available in this mode is ARB file playback.

In **UPSTREAM** mode ARB files can be created for A-TDMA, S-CDMA, and OFDMA burst DOCSIS transmissions. Upstream also enables the transmission of ARB files over the upstream frequency range of 5 MHz to 204 MHz.

In **FDX** mode, three DOCSIS 4.0 Full-Duplex sub-bands are available each supporting concurrent OFDM, OFDMA/ARB/CW Sounding, and AWGN transmission. Additional OFDM and DOCSIS 3.0 channels are available outside of the three sub-bands.

Command Mode

Only one entity is allowed to have control of the CLGD at a given time. That means only that entity is allowed to change CLGD settings. All entities are allowed to read settings and status at the same time. CLGD responds to requests from all entities in a serial fashion to display settings and status.

SNMP is the default entity in control. If SCPI establishes connection with the CLGD it becomes the controlling entity and has a higher priority than SNMP. If a web GUI user establishes a connection, the web GUI is allowed read-only access. If a web GUI user wants to become the controlling entity, it has the highest priority, and the user needs only to click the Take Control button (see below).

Button – Take/Release Control

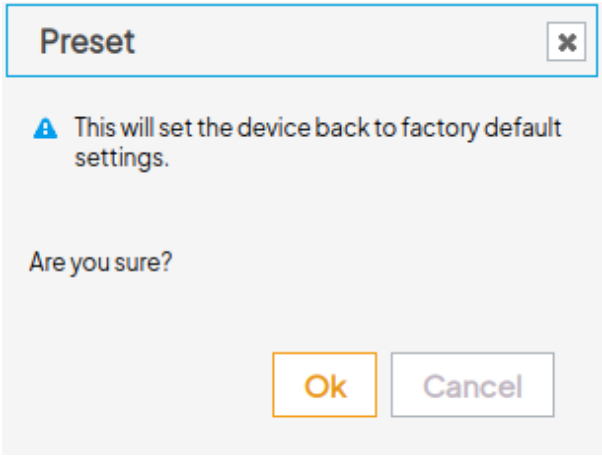
When a web GUI user clicks the “Take Control” button, that web GUI becomes the controlling entity. If a web GUI with control has no activity for 30 minutes, control of the CLGD automatically reverts back to the previous user.

When a web GUI user wishes to relinquish control, the user clicks the “Release Control” button.

If a second web GUI uses opens a window on the same CLGD, he can take over control from the previous web GUI user with the “Take Control” button.

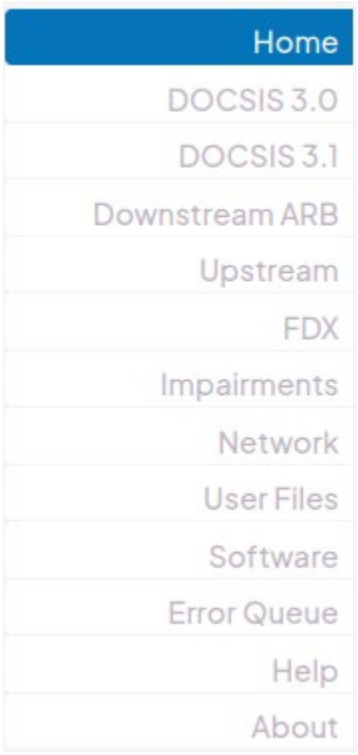
Preset

When the user clicks the “Preset” menu item the unit gets set back to factory presets after the user confirms this action in a pop-up window (below).



Menu for Right Pane Information

The user uses the menu in the left pane to change the information displayed in the right pane. Each menu item selection is discussed in the next section.

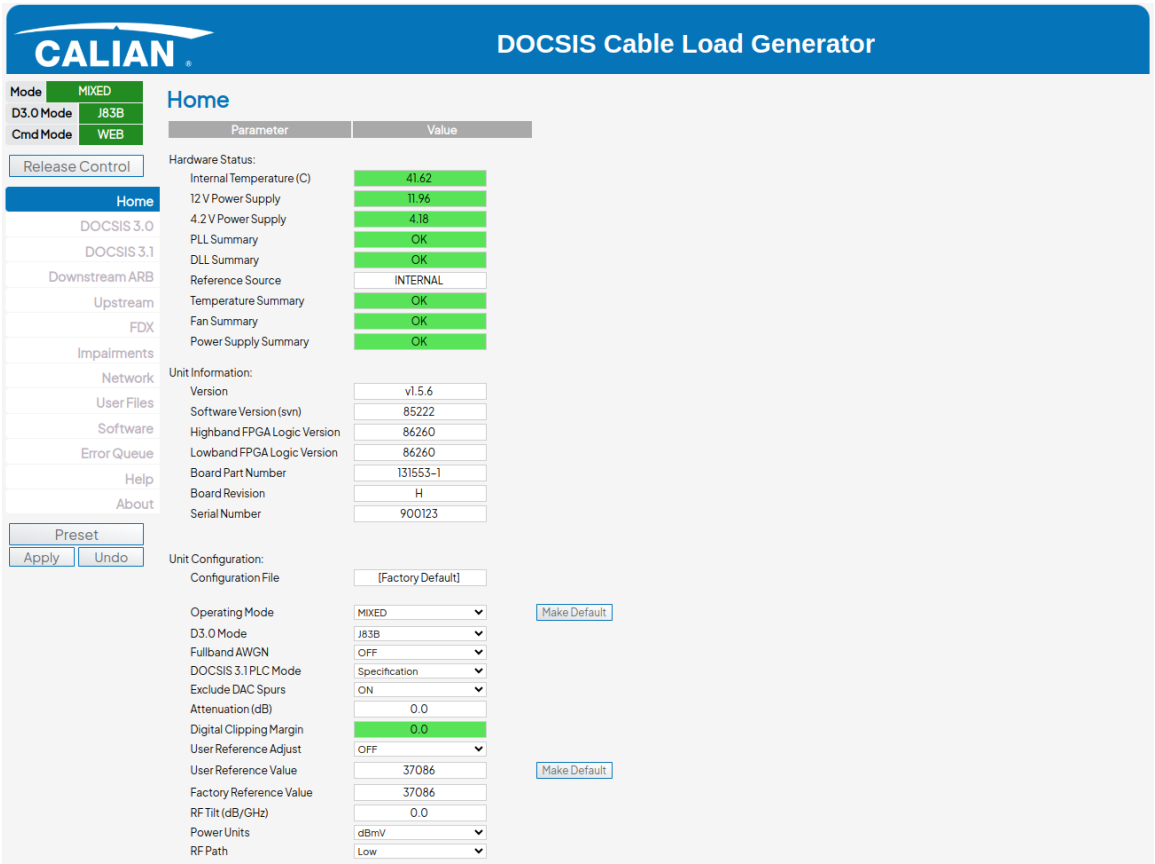


6.1.1.2 Right Pane

The parameters displayed in each of the right pane windows and related buttons are described in detail in section 2 of the User Manual.

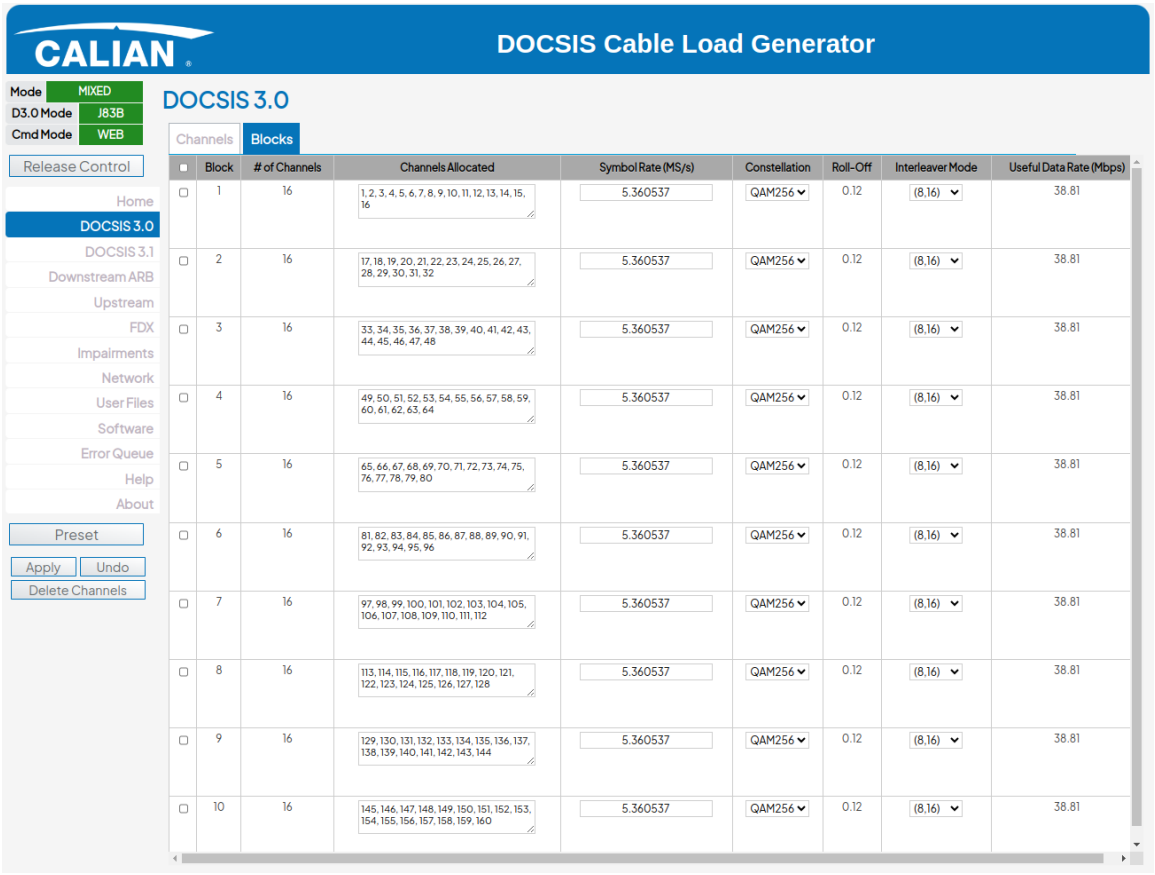
Home

When the user clicks the “Home” menu item the right pane changes to that pictured in the screenshot shown below.



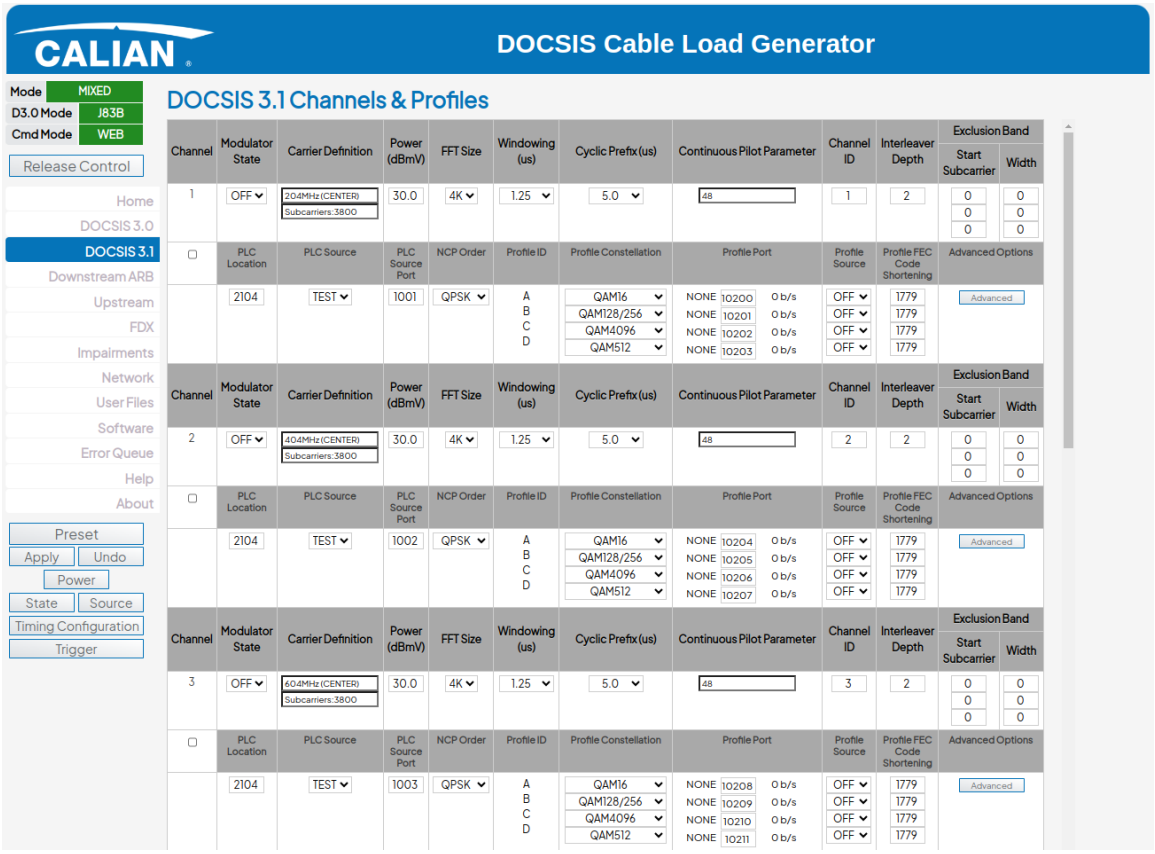
DOCSIS 3.0

When the user clicks the “DOCSIS 3.0” menu item the right pane changes to that pictured in the screenshot below with the “Blocks” tab selected.



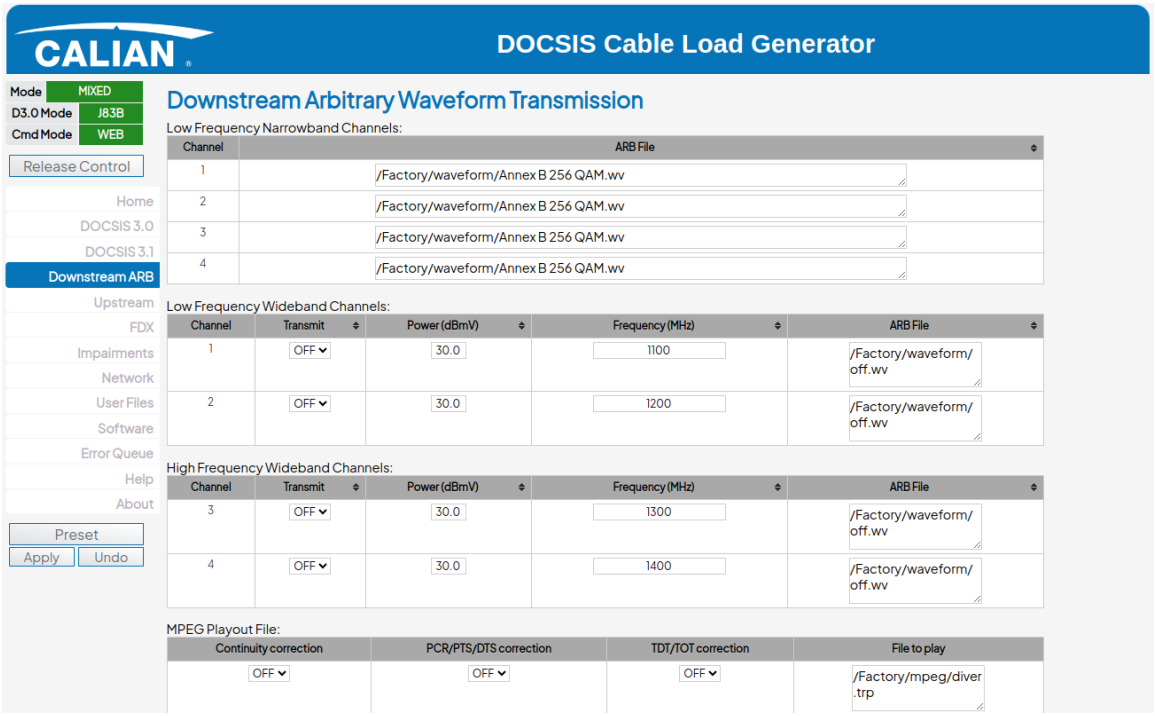
DOCSIS 3.1

When the user clicks the “DOCSIS 3.1” menu item the right pane changes to that picture in the screenshot shown below.



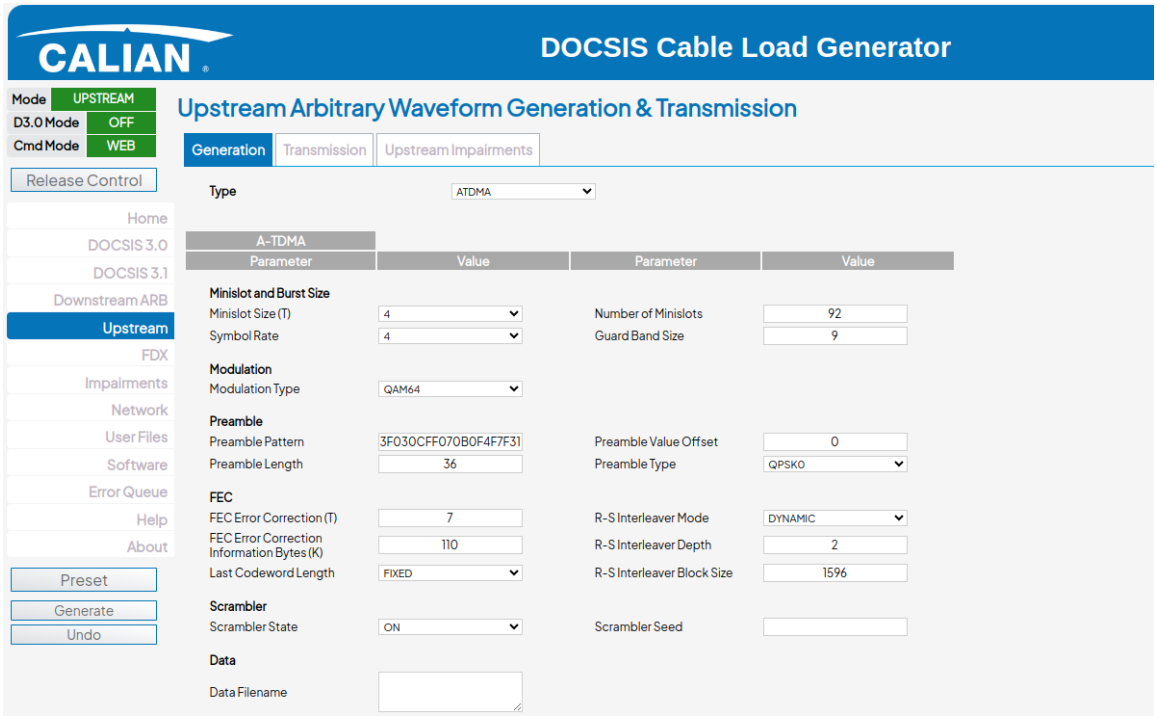
Downstream Arbitrary Waveform Transmission

When the user clicks the “Downstream ARB” menu item the right pane changes to that pictured in the screenshot shown below.

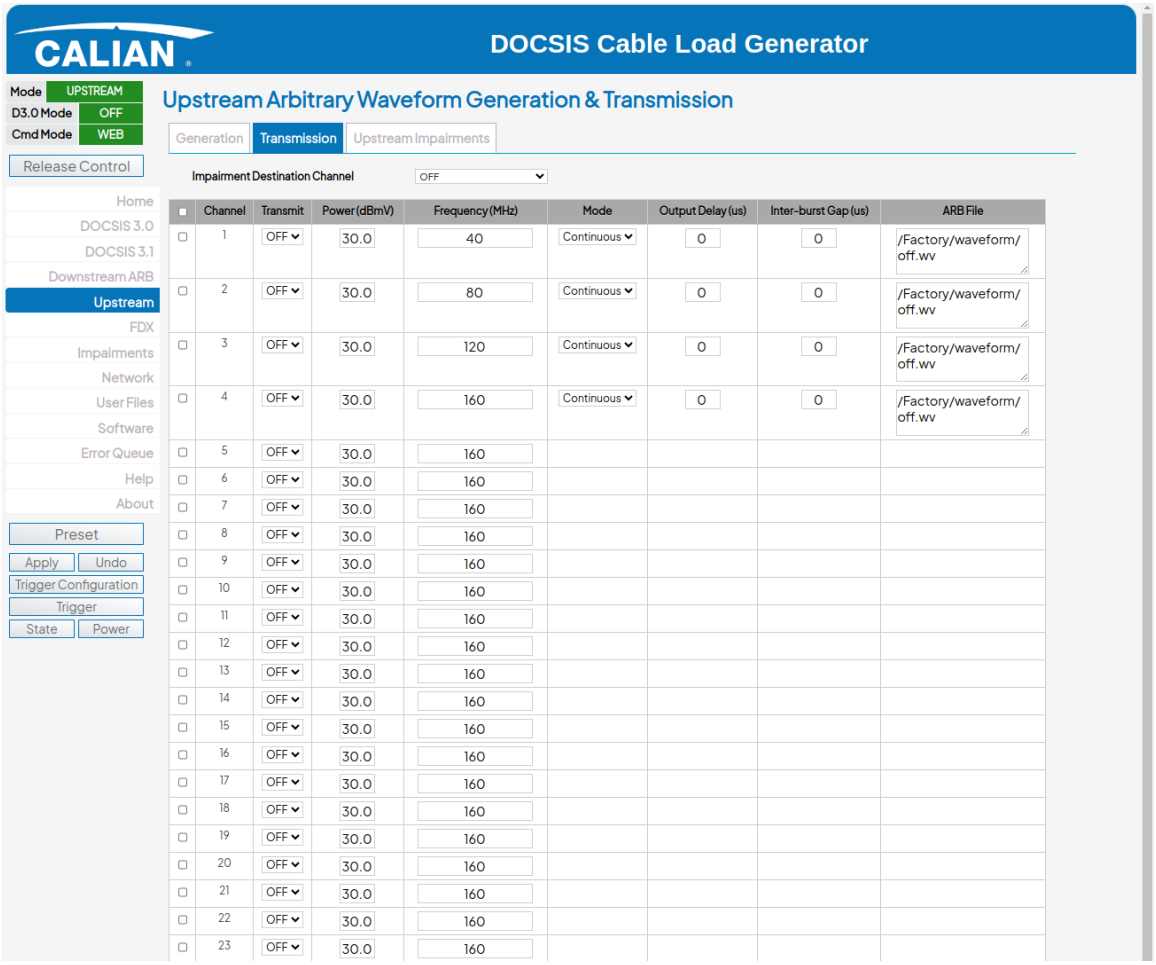


Cable Modem Emulation

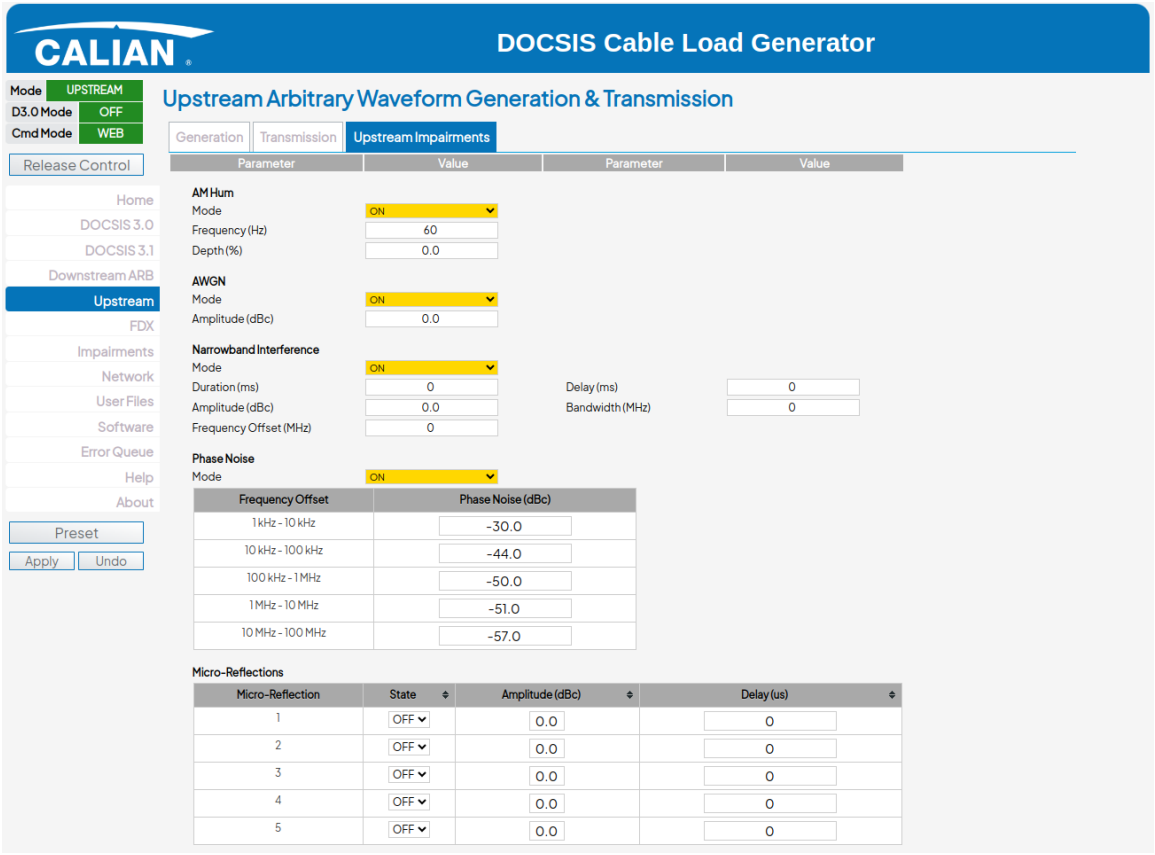
When the user clicks the “Upstream” menu item the right pane changes to that pictured in the screenshot showing the “Generation” tab shown below.



Clicking on the “Transmission” tab on the top changes to the screenshot shown below.

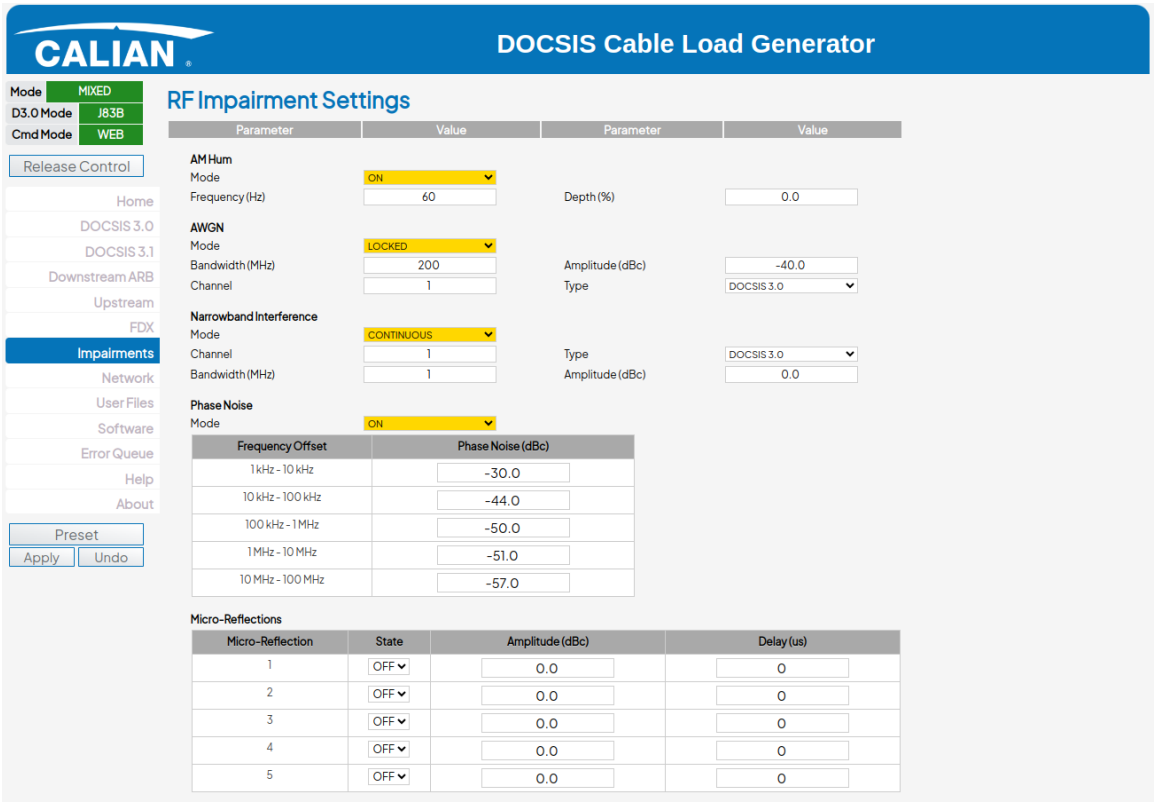


Clicking on the “Upstream Impairments” tab on the top changes to the screenshot shown below.



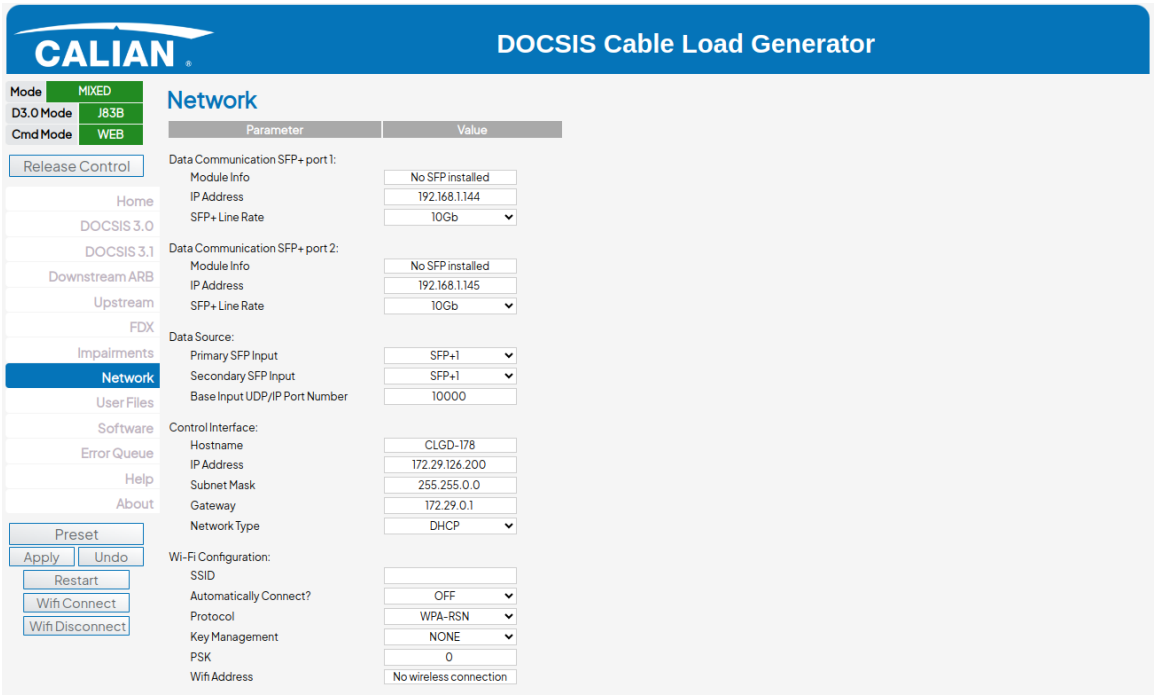
RF Impairments

When the user clicks the “Impairments” menu item the screen changes to the screenshot shown below. These impairments are applied to downstream signals.



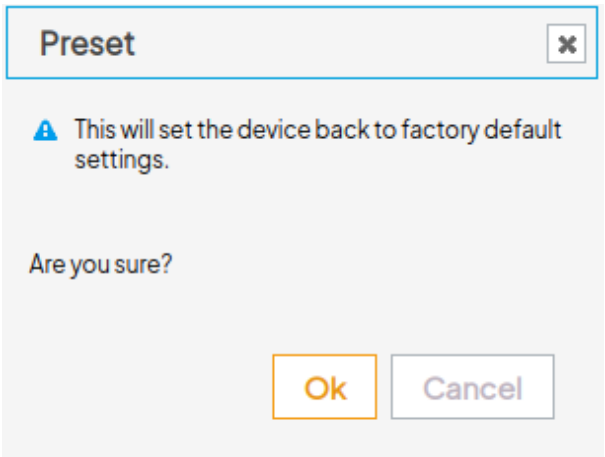
Network Settings

When the user clicks the “Network” menu item the right pane changes to the screenshot shown below.



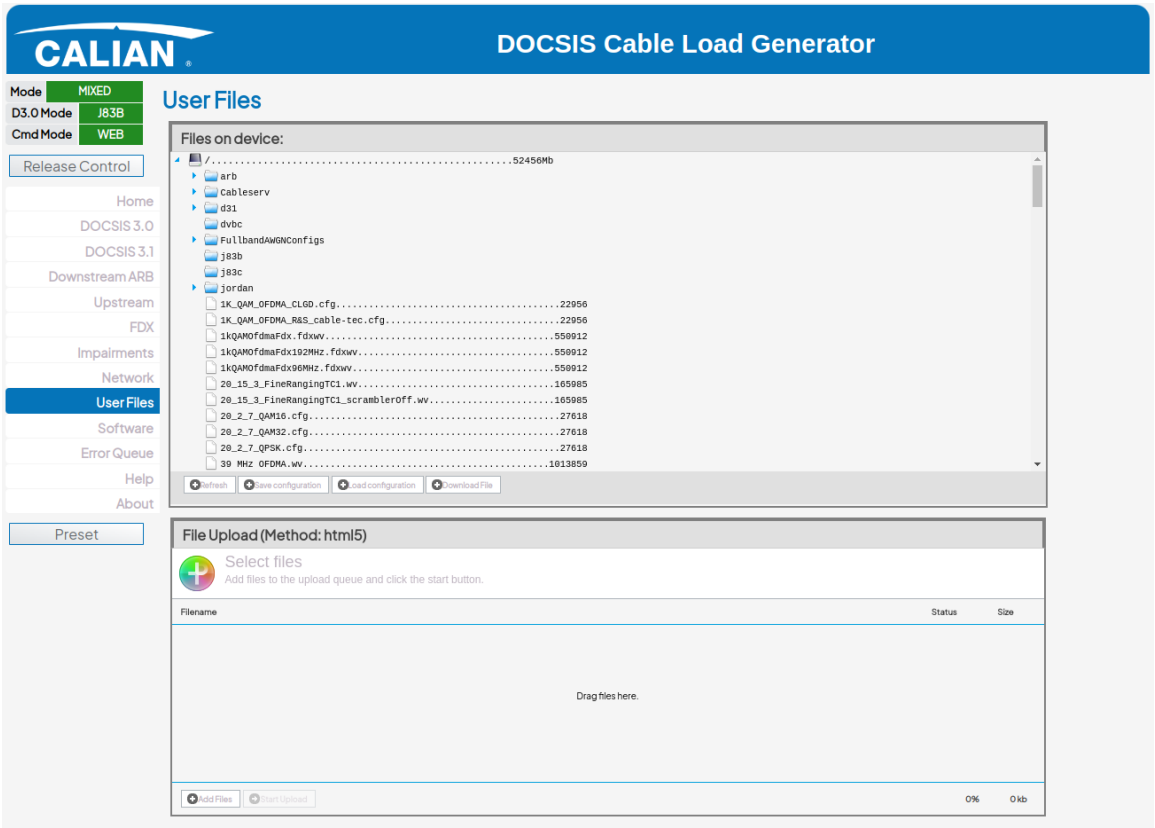
Preset

When the user clicks the “Preset” button the unit gets set back to factory presets after the user confirms this action in a pop-up window (below).



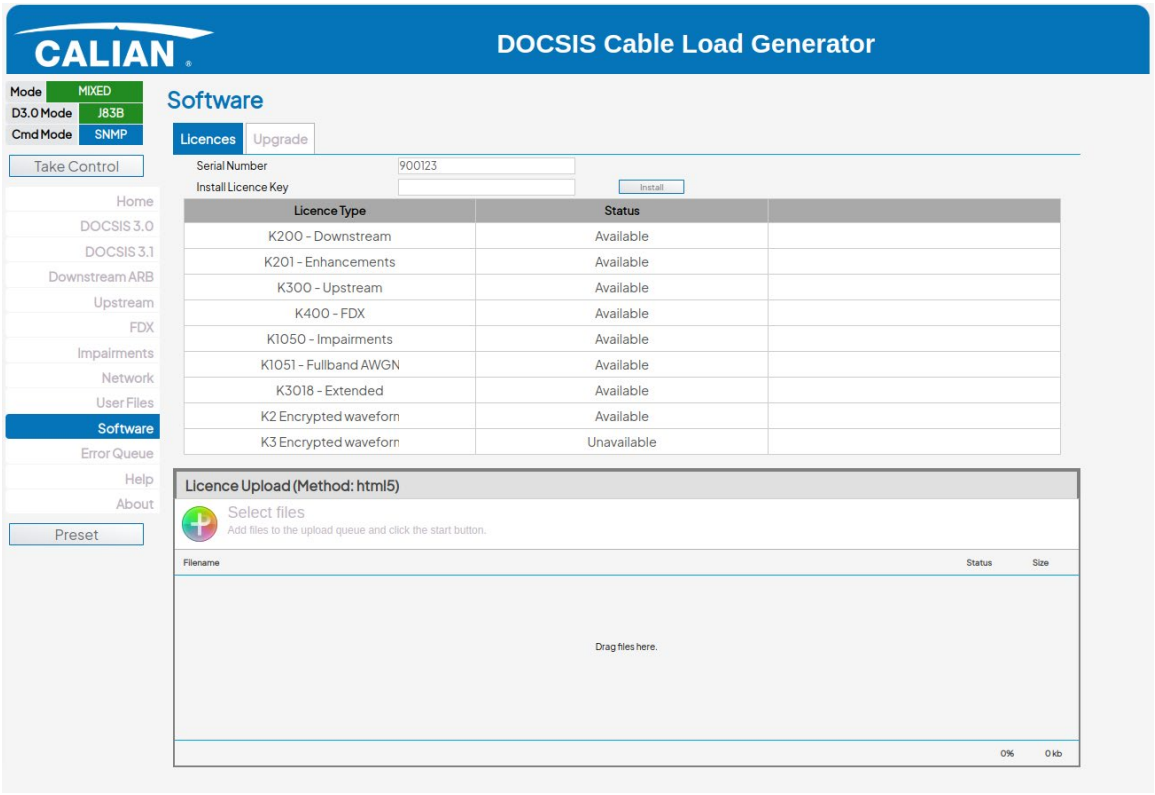
User Files

When the user clicks the “User Files” menu item the right pane changes to the screenshot shown below.



Licenses

When the user clicks the “Licenses” menu item the right pane changes to the screenshot shown below.



Help

When the user clicks the “Help” menu item the right pane displays:

- Getting Started link – clicking this link displays the guide in pdf
- User Manual link – clicking this link displays the manual in pdf
- CALIAN-COMMON-MIB.mib link or RS-COMMON-MIB.mib link – clicking this link downloads the MIB to the PC “Downloads” directory. From there it can be integrated with an SNMP agent or browser.
- CLGD-MIB.mib link or RS-CLGD-MIB.mib link – clicking this link downloads the MIB to the PC “Downloads” directory. From there it can be integrated with an SNMP agent or browser. Both CALIAN-COMMON-MIB.mib and CLGD-MIB.mib, or RS-COMMON-MIB.mib and RS-CLGD-MIB.mib, are required to access SNMP monitor and control functions of the CLGD. The applicable set of MIBs depends on the serial number and front-panel branding of the unit.
- Linux license – clicking this link displays the applicable license.
- GPL license – clicking this link displays the applicable license.
- LGPL license – clicking this link displays the applicable license.
- OpenSSL license – clicking this link displays the applicable license.