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Document No. 9630-101
Revision 4
August 26, 2024

Illuminator

User Manual

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Revision History

Revision	Date	Description
1	November 3, 2022	Initial Release
2	December 20, 2022	Updated Certificates, Updated Licensing, Updated Installer Command Line
3	September 8, 2023	Added Rotating Tiles perspective
4	August 26, 2024	Added Long Term Reporting to Historical Window Added Min and Max holds for Carrier tiles Added Calendar icons to show where there is data Changed data retention upper bound to 5 years

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1. Background / History

Carrier monitoring has been a popular feature in the Decimator product line. The monitoring capability has been provided as a baseline feature within the Decimator and provides a set of analyses that allows a Decimator user to be alerted when a carrier's power changes suddenly or when a carrier is no longer present. This is very helpful for teleport operators and other users to know when the carrier performance has degraded to the point where a technician must be dispatched to take action within the facility. From the carrier monitoring application, spectrum trace and analysis data are logged to the user's PC in a format that can be viewed in third-party applications. However, no utilities are provided to view historical trace data.

The CarrierWatch licensed feature was added to the Decimator D3 in 2016, based on customer feedback that an enhanced user interface would be helpful for carrier analysis. The primary CarrierWatch window is a tiled display that allows up to 100 carriers to be viewed at-a-glance. Besides the live update mode, a historical analysis feature is available to view the trend of the carrier power over time. Also provided is a playback feature to allow accelerated playback of stored traces to investigate anomalies. The CarrierWatch license is tied to a single Decimator and must be operated either from a standalone window or within a dedicated browser tab.

Within Decimator D4, the CarrierWatch feature is labelled Spectator as part of a re-branding exercise. This provides the same great features as the D3 version's CarrierWatch, with the added benefit of the Detector product, providing a constellation plot as well. Since the Spectator/Detector product UI on D4's platform runs in the browser, serialization of the Carrier Monitoring trace and analyses data is stored in an external database web service, provided as an extra download from Calian's SFTP site.

In recent years, Decimator customers have often purchased multiple Decimator units, and several of these customers have expressed interest in having CarrierWatch-like capabilities across all their units, while managing those capabilities from a single control point rather than having to run multiple windows to monitor and control each Decimator individually. This is the key benefit of the Illuminator product over the current, existing Decimator products.

The product name, Illuminator, was carefully chosen as the product is designed to cast light on all your carriers, across the entire network, so you can see everything from a single control point.

2. Overview / Architecture

Figure 2-1 shows an overview of a customer's network that includes the Illuminator software product at the operation center and a number of Decimators out at the teleport or gateway locations. The Illuminator software is provided as a software only package that can reside on a customer server or can also be deployed as a cloud service. The Illuminator software is packaged in a Docker container to allow easy installation and administration on customer server platforms or in the cloud. To connect to the Illuminator software, the customer Decimators must have a license installed so that the Decimator can forward carrier monitoring results to the central site. The licenses can be installed as a firmware upgrade to either D3 or D4 Decimators.

The key difference in the Illuminator software from the existing CarrierWatch / Spectator software is the centralized control of multiple Decimators. This allows all the carriers for several Decimators to be logged and monitored from a single operation point. Multiple workspaces can be configured by the system administrator to allow access to the measurement results for different lists of carriers. Workspace configuration is flexible and can be partitioned by satellite, antenna, lease carrier, service provider, end customer, or other parameters to organize the viewing of carriers by an Illuminator user.

The Illuminator product leverages the features of CarrierWatch and Spectator as much as possible as these features have proven to be popular with customers. Illuminator has the following features in common with those other products:

- View carriers at-a-glance
- Up to 100 carriers in a single window
- Colors indicate when carriers are in alarm
- Display updates in real-time as the carriers are measured
- Zoom into a carrier to play back traces and view the trend plot
    - The trace is displayed as an overlay on top of the multiple carrier display
- A trend plot is available to show the carrier power over time so you can quickly spot any power fluctuations
- Alarm lines indicate when the carrier power has crossed the threshold
- Review previous traces from the trend plot history
- Playback traces to determine whether the power change was sudden or gradual
- Overview of the carrier specifications like expected power and measurement parameters such as span or resolution bandwidth
- The display can be configured in multiple ways – show all carriers, show only alarmed carriers, show a custom list of carriers or show a list of rotating grouped carriers

- The display can be configured to show alarmed carriers only
  - The most recently alarmed carrier is automatically moved to the top-left corner of the screen
  - As carrier issues are resolved, the non-alarmed carriers are no longer shown on the display when the carrier reverts to a nominal state
  - At- a-glance view of the alarmed carriers includes the duration of the alarm so it is clear whether it is a persistent or transient issue
- Focus on priority carriers by creating a custom list of carriers to display by selecting the carriers of interest from the monitoring plan
- Live display can be sized to look good on your monitor or on a large operations center screen
- Generate SNMP traps and e-mail alarm notification
- Automated notifications occur while you watch the overview of all the live carriers
- Save pictures of the overall view or a particular carrier to PNG files
  - Used to generate your carrier reports
  - Can be emailed to external carrier providers

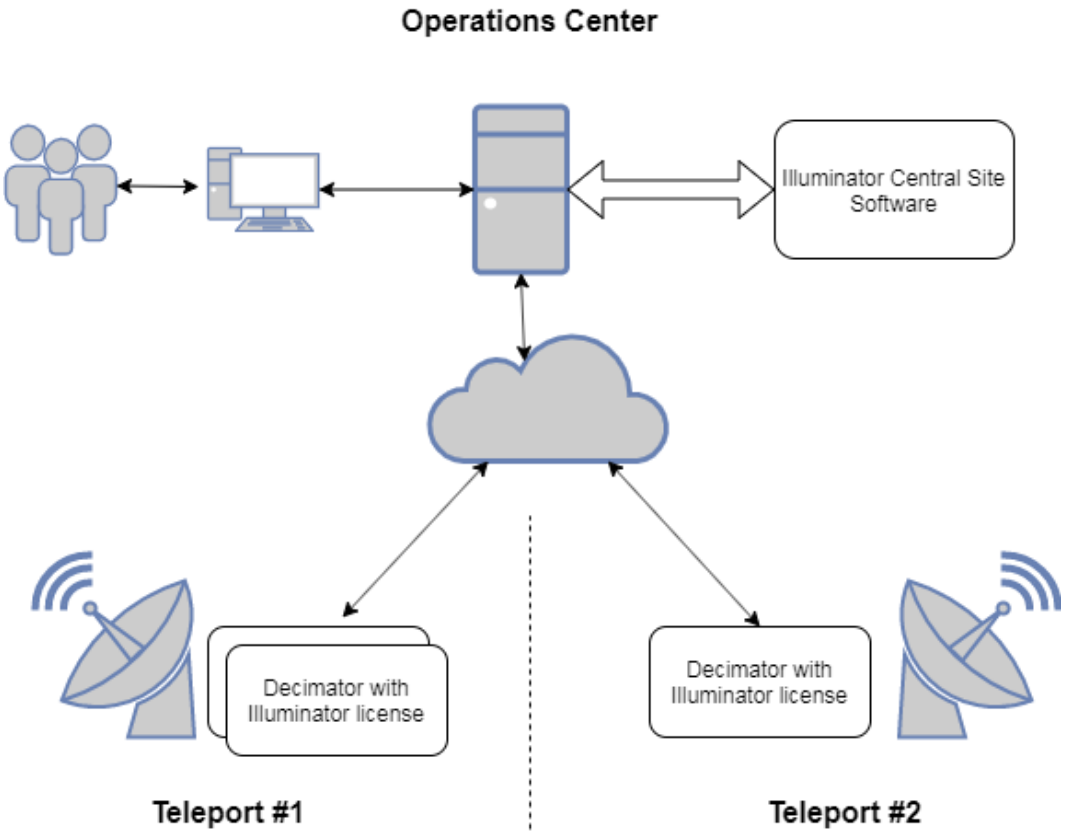


Figure 2-1 Block Diagram

The Illuminator enterprise Carrier Monitoring solution has two main components.

2.1 Illuminator Central Site SW - Major Responsibilities

- Web Server and UI views for the Illuminator
- User Management – Authentication and Authorization
- Workspace configuration storage in a Relational Database
- Measurement storage in a Time Series Database
- Commanding functions to start and stop carrier monitoring
- REST API and a WebSocket interface if you prefer to integrate the Illuminator into your own network solution

2.2 Illuminator Remote Decimator Site SW - Major Responsibilities

- Can be either a D3 or D4 Decimator
- Requires a license for usage by the Illuminator
    - D4
        - Carrier monitoring measuring engine runs on the D4 and commanded by the central site Illuminator software
        - Carrier monitoring engine forwards results back to the central site Illuminator
        - Requires a configured illuminator user to access the Illuminator functionality
    - D3
        - Provides an API for the Illuminator central site software to command and get results from

3. Terminology

The following terminology is used throughout the document:

Terms	Definitions
Analysis	An evaluation of the raw data against some metric to produce a pass or fail result. Analyses options are: • Band Power • Presence of a Carrier • EIRP • C/N • SNR (D4 only) • Center Frequency • Carrier Power
Carrier	Data that is passed over a network at a particular frequency and power level. This is sometimes used interchangeably in the document with Measurement, but the carrier is more the raw form of the data.
Constellation View	This shows the demodulated data of the signal on the I/Q axes
Measurement	Consists of a Carrier settings configuration (I.e., center frequency, span, RBW, etc.) and one or more configured analyses
Project File	A saved configuration of all your settings including measurements to a file. • XML format in D3 • JSON format in D4
Site	A configuration within a Workspace, that consists of a site name, IP Address, remote port, and project file
Spectrum View	This shows the trace of a measured carrier, with power on the vertical axis and frequency on the horizontal axis
Workspace	A configurable space within the Illuminator that consists of one or more sites, where Carrier Monitoring can be commanded, and measurement results can be viewed

4. Overview of the Document

The document consists of two main sections:

- Getting Started (Section 5)
  - Use this section to get up and running within 60 minutes.
  - This will get you installed, configured, and running with measurement data arriving at the central site Illuminator.
  - This section does not consist of a complete set of documentation to describe all the functionality, but just enough to get you up and running. See the Reference section for that level of detail.
- Reference (Section 6)
  - This section consists of a comprehensive detail on how to view each use of the Illuminator software.
  - Some sub-sections in the Getting Started section are repeated here for completeness.

5. Getting Started

Let's get started by first looking at the host hardware requirements and OS Selection for the Central Site Illuminator.

5.1 Host Hardware Requirements and OS Selection

The following is a list of recommended OS and hardware requirements for the Illuminator:

- OS
  - The Illuminator central site software can run on any modern Linux system. Calian highly recommends installing the Illuminator central site software on a modern Ubuntu OS.
- CPU
  - Calian recommends 4 to 8 dedicated CPU cores. These cores are in addition to the cores for the base OS and Docker.
- Memory
  - Calian recommends greater than 8 GB of available memory. Again, this is over and above the memory for your base OS and the needs of Docker.
- Disk Space
  - Calian estimates 2 GB of hard disk space to be consumed daily based on typical measurement rates. The Illuminator has a default data retention policy of 30 days, which can be configured to a minimum of 7 days and a maximum of 5 years. Just remember, you need to consider how much disk space you have and what this retention policy is configured as, so you do not run out of disk space.
- Networking
  - Since the Illuminator Carrier Monitoring Solution is an enterprise solution, you will need to have network access to the remote D3s and D4s through various switches and routers. Contact your network administrator to configure access to these remote devices.

5.2 Summary of All Steps to Get Up and Running

Perform the following activities in the next few sections to get the Illuminator installed, configured, your D3/D4 devices attached to the network, configured, your Carriers defined and your measurement data arriving at the central site Illuminator.

Table 5-1 Summary of All Steps to Get Up and Running

Section	Activity
5.3	Installation of Illuminator SW • Install Docker Engine V2 and Run Docker • Download the Illuminator Central Site Software Installation Script • Run the Illuminator Central Site Software Installation Script
5.4	Start the System and Browse to the UI
5.5	Shut Down the System
5.6	Log In
5.7	Installing the Illuminator License File at the Central Site (one time action)
5.8	Ensure the Spectator and/or Detector License is Installed on the Remote D4 -Remote D3 and D4 Licensing Explained
5.9	Prepare Your Carrier Definitions in Project Files by using the D4 UI from a Remote Decimator Site
5.10	Test with D4 Simulator Software
5.11	Ensure the Illuminator User Account is Present in the Central Site and All Remote D4's with the Same Password (one time action)
5.12	Create a Workspace
5.12.1	Open the Workspace
5.12.2	Add a Site to the Workspace
5.12.3	Test the Round-Trip Connection to the Remote D4
5.12.4	Add Carriers to the Dashboard
5.12.5	Start Carrier Monitoring

5.3 Installation

A summary of the installation steps is as follows:

1. Install Docker and Run Docker
2. Download the Illuminator Central Site Software
3. Run the Illuminator Central Site Software Installation Script, which does the following:
4. Checks to make sure you have Docker installed
5. Extracts the Illuminator Central Site Software
6. Installs the InfluxDB Docker Image
7. Installs the Illuminator Docker Image
8. Lists the Illuminator and InfluxDB Images installed so you can see the Installation worked
9. Prompts you for Customizations in the Docker Compose File to Configure the Illuminator for Your Network
10. Offers to start the Illuminator Central Site Software
11. Pauses for 15 seconds to Allow the Software to Start Up
12. Offers to Launch the Illuminator Central Site UI in the Default Browser

The installation steps are expanded upon in the following sections.

5.3.1 Install Docker and Run Docker

You may need to contact your network administrator as you will need administrative rights to install Docker.

5.3.1.1 Install Docker

Navigate to https://www.docker.com/get-started and install V2 version of Docker engine on your host central site computer. Make sure the version supports the compose command line.

5.3.1.2 Start Docker and Verify Docker is Running

Each variant of Linux may have a unique way of starting Docker. You should consult the Docker and your specific OS documentation to determine best how to ensure that it is running at your computer's bootup after logging in. This way, all the software dependent services are available on system bootup.

For example, to start the Docker service in Linux, from a terminal execute the following:

- sudo systemctl start docker

Again, consult the Docker documentation on your OS for more details. This document does not intend to duplicate the Docker installation guides, as they may change over time.

Verify Docker is running by executing the following from the command line terminal:

- docker --version

You should see output that looks something like the following:

```
> docker --version
Docker version 20.10.21, build baeda1f
```

Your version of Docker may be newer than what is listed above.

5.3.2 Download the Illuminator Central Site Software

Download the Illuminator installer file from Calian. The file is approximately 328 MB in size and comes in the file name format that resembles illuminatorRelease_<*version*>.sh. A specific example of this is illuminatorRelease_1_0_0.sh for version 1.0.0. Place this file somewhere in your user space in a subdirectory called illuminator with a version number on it. Make sure there are no other files in this directory. For example, make a directory called illuminator_1_0_0 and place illuminatorRelease_1_0_0.sh in it.

5.3.3 Run the illuminatorRelease_1_0_0.sh to Install

Open a terminal to this illuminator subdirectory where the illuminatorRelease_1_0_0.sh resides.

From the command line, extract the tar.gz using the command:

- ./illuminatorRelease_1_0_0.sh

The install script does the following:

1. Checks to make sure you have Docker installed
2. Extracts the Illuminator Central Site Software
3. Installs the InfluxDB Docker Image
4. Installs the Illuminator Docker Image
5. Lists the Illuminator and InfluxDB Images installed so you can see the Installation worked

6. Prompts you for Customizations in the Docker Compose File to Configure the Illuminator for Your Network

    a. Illuminator Data directory which houses the following subdirectories:

        i. Measurement Directory (Influx DB files)

        ii. Workspace Configuration Directory (Derby DB files)

        iii. Software Debug Log Directory

        iv. Generated Certificate Directory

    b. Webserver Port

7. Offers to Start the Illuminator Central Site Software

8. Pauses for 15 seconds to Allow the Software to Start Up

9. Offers to Launch the Illuminator Central Site UI in the Default Browser

Table 5-2 provides a brief description of each of these files and directories:

Table 5-2 Description of Illuminator Files and Directories

File Name	Description
influxdb_1_7_8.tar	Influx DB time series database Docker image used to store the measurement results arriving from remote Decimators
illuminator_1_0_0.tar	Illuminator Docker image used to provide the Illuminator central site functionality. Note: This file name will change depending on the version of the software
docker-compose.yml	Startup configuration file used to start the InfluxDB and Illuminator Docker images into running containers. **Note: The installer will prompt you for overrides for several of the settings in this file. Alternatively, you will need to edit this file and save it to configure the Illuminator runtime for your network and directory. Keep reading a few sections below for more details on how to do this.**
readme.txt	A text file describing how to install the Illuminator SW and run it.
startIlluminator.sh	A Linux bash script to start the Illuminator solution specified in the docker-compose.yml file.
stopIlluminator.sh	A Linux bash script to stop the Illuminator solution specified in the docker-compose.yml file.
d4Sim	A directory with the following files: • London.cfg - configuration file with port number in it for London • Paris.cfg - configuration file with port number in it for Paris • Sydney.cfg - configuration file with port number in it for Sydney • illuminator-remote-simulator-all-0.0.0.jar - main Java D4 simulator executable jar • illuminator.jks - Java keystore needed by executable jar • jre/ - Java JRE subdirectory • startSimLondon.sh - bash script to start a D4 simulator using the port number in London.cfg • startSimParis.sh - bash script to start a D4 simulator using the port number in Paris.cfg • startSimSydney.sh - bash script to start a D4 simulator using the port number in Sydney.cfg

Congratulations! Your system should be installed.

5.3.3.1 Other Command Line Uses of the Installation Script

Table 5-3 lists the 4 ways the installation script can be run (including listing help):

Table 5-3 Description of Installer Script Options

Script Running	Description
illuminatorRelease_<*version*>.sh	Runs the Illuminator installer in normal mode, unpacking all the contents of the installer and running the installation to configure your system.
illuminatorRelease_<*version*>.sh -unpack	Unpacks the contents only
illuminatorRelease_<*version*>.sh -viewScript	Does not unpack the content. Only lists what the post unpacking script does after unpacking. The first option above with no command line arguments = second option (-unpack) + third option (-viewScript).
illuminatorRelease_<*version*>.sh -help	Displays all this help information

5.3.3.2 A Breakdown of the Commands Run Within the Installation Script

If any of the commands within the script fail, you can follow along below to understand what the script is doing and perform the installation script commands manually.

5.3.3.2.1 Install InfluxDB Time Series Database Docker Image

From the command line, execute:

- sudo docker load < influxdb_1_7_8.tar

5.3.3.2.2 Install Illuminator Docker Image

From the command line, execute:

- sudo docker load < illuminator_1_0_0.tar

5.3.3.2.3 Verify the Images Are Installed

From the command line, execute:

- sudo docker images

You should see some like the following:

```
> sudo docker images
REPOSITORY          TAG                 IMAGE ID            CREATED
SIZE
illuminator                 1.0.0               eba3b1f8f797        5 minutes
ago         178MB
influxdb                    1.7.8               3fc51302e5aa        12 months
ago         264MB
```

5.3.3.2.4 Edit the Docker Compose File to Configure the Illuminator for Your Network

Open the docker-compose.yml file and edit the three red circled areas in Figure 5-1 if you want to change the location of where the Illuminator saves files on your local machine:

- InfluxDB volume local directory
  - This is the directory where the InfluxDB measurement database will store the measurement results on your local hard drive outside of the running Docker container so that if you start and stop the system, your measurement results will be permanently serialized
  - Currently set to ~/illuminatorData/influxdb
- IlluminatorDB config DB volume local directory
  - This is the directory where the Illuminator saves configuration data, such as workspaces, sites, carriers, and project files on your local hard drive
  - Currently set to ~illuminatorData/illuminatordb
- Software debug log volume local directory
  - This is the directory where the Illuminator saves output debug logs on your local hard drive
  - Currently set to ~/illuminatorData/logs
- Generated certificate volume local directory
  - This is the directory where the Illuminator saves a generated certificate on your local hard drive
  - Currently set to ~illuminatorData/generatedCertificate
- Web Port
  - This is the web port the UI and REST server is available on for the central site Illuminator software
  - Currently set to 5678
- Docker External Port variable
  - This is the IP Address of the host computer where the Illuminator is running. You should make sure this is the externally visible IP address from the remote D4 computers.
  - This is passed to the D4 hardware as a callback IP Address for forwarding measurement results to the Illuminator, I.e., the addMeasurement endpoint on the Illuminator is called by the D4 using this configuration
  - Defaults to the host IP address. You may need to adjust this based on your networking.

```
version: "3.8"
services:
  influxdb:
    network_mode: "host"
    #Port 8086 must be open for this to run.
    volumes:
#     Change this leading left path to point to a directory on your host machine to store the measurement database files
#     Note the leaf directory "influxdb" does not need to exist, the home directory i.e. ~ does though
      - ~/illuminatorData/influxdb:/var/lib/influxdb
    image: "influxdb:1.7.8"

  illuminator:
    network_mode: "host"
    ports:
      - "5678:5678"
    volumes:
#     Change this leading left path to point to a directory on your host machine to store the configuration database files
#     Note the leaf directory "illuminatordb" does not need to exist, the home directory ~ does though
      - ~/illuminatorData/illuminatordb:/root/illuminator/
#     Change this leading left path to point to a directory on your host machine to store the debug log files
#     Note the leaf directory "logs" does not need to exist, the home directory ~ does though
      - ~/illuminatorData/logs:/root/logs/
#     Generated certficates are stored on the host here
      - ~/illuminatorData/generatedCertificate:/root/generatedCertificate/
#     Used by Illuminator for internal use only
      - /etc:/root/etc
      - /sys/block:/root/block
      - /sys/devices:/root/devices
    environment:
#     This 8086 port needs to match the left external port in the influxdb service
      DB_BASE_URL: http://localhost:8086
#      Uncomment this if you want to run HTTP version of the webserver for testing
#      USE_HTTP: "true"
#     This port number needs to match the external port (left most on the ports)
      DOCKER_EXTERNAL_PORT: "5678"
#     This ip address of the host computer where the container is running
#     This is passed to the D4 hardware as a callback IP Address for forwarding measurement results to the Illuminator
#     i.e. the addMeasurement endpoint is called on the Illuminator by the D4 "localhost"
      DOCKER_EXTERNAL_IP_ADDRESS: "localhost"
#     This delay in ms allows the Influx DB to startup and get ready before accessing it
      DOCKER_STARTUP_DELAY: "5000"
    image: "illuminator:0.9.10"
    depends_on:
      - influxdb
```

Figure 5-1 docker-compose.yml file

If you make any changes, make sure you save the docker-compose.yml file.

Congratulations! You have now set up the Illuminator Central Site Software.

5.4 Start the System and Browse to the UI

To start the system, from the command line, execute:

- ./startIlluminator.sh

You can verify that files are being created correctly on your system. You should see some files in each of the following directories (note do not edit or delete these):

- Measurement Database should be created in ~/illuminatorData/influxdb or whatever you configured it to be in the docker-compose.yml file
- Illuminator Cfg Database should be created in ~/illuminatorData/illuminatordb or whatever you configured it to be in the docker-compose.yml file
- Log files should start appearing in ~/illuminatorData/logs or whatever you configured it to be in the docker-compose.yml file
- Generated Certificate files should start appearing in ~/illuminatorData/generatedCertificate or whatever you configured it to be in the docker-compose.yml file

After about 15 seconds the system should be ready to use.

Run the latest version of one of the following browsers and enter https://localhost:5678 in the URL. You can change the localhost to whatever the IP address is on the machine where you have installed the Illuminator solution.

- Chrome
- Firefox
- Edge
- Safari

You should see the following in Figure 5-2.

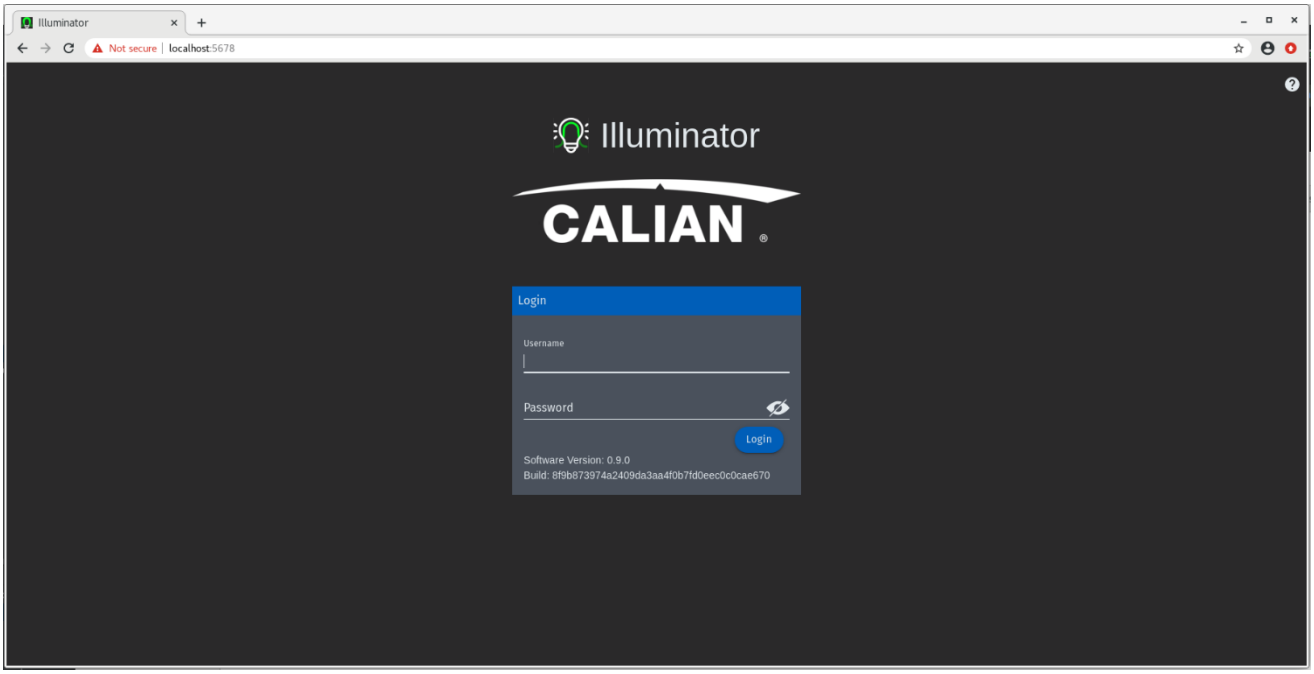


Figure 5-2 Illuminator Login Screen

Once you see this, you know you have installed things correctly, and things are running properly.

5.5 Shut Down the System

To shut down the system, from the command line, execute:

- ./stopIlluminator.sh

5.6 Log In

Out of the box, the Illuminator provides you with a default admin user. To log in, specify the following:

- Username: admin
- Password: admin

5.7 Install the Illuminator License File

The first time you log in, the Illuminator will ask you for a license file (Figure 5-3).

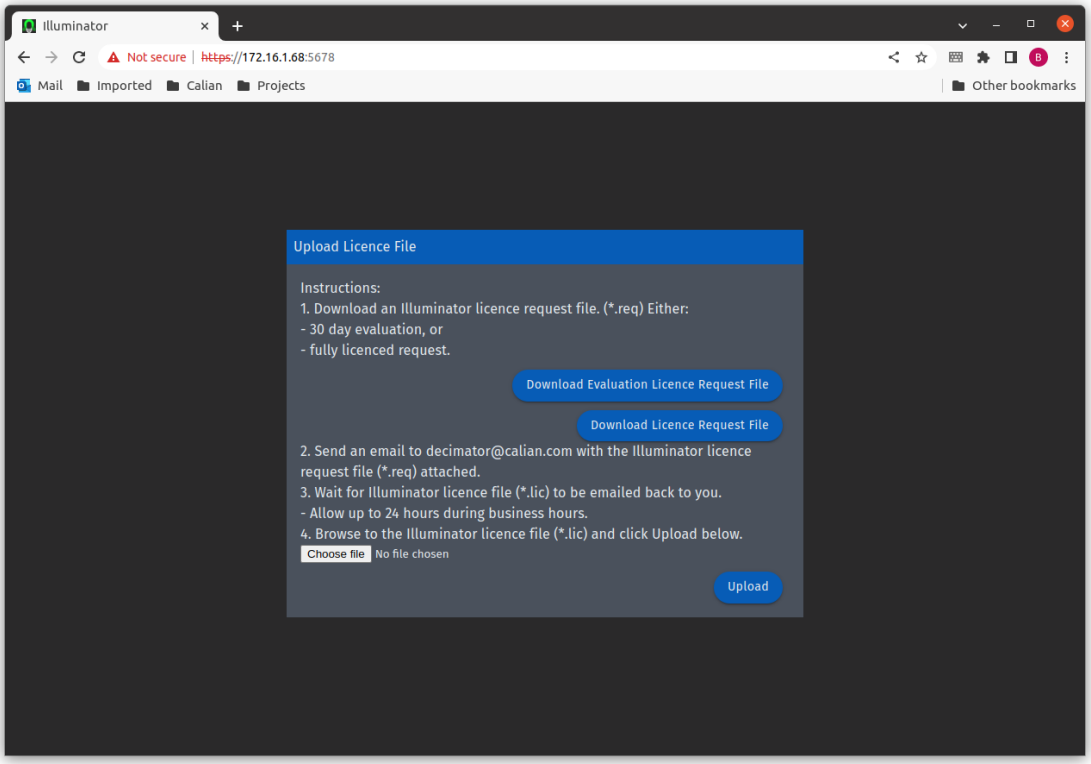


Figure 5-3 Upload License File Dialog

5.7.1 How to Obtain an Illuminator License File

To obtain an Illuminator license file (*.lic):

- Either click Download Evaluation License Request File or Download License Request File button
- The Illuminator will download an Illuminator License Request file (*.req)
- Email this to decimator@calian.com
- Calian will email you back an Illuminator License File (*.lic)

5.7.2 How to Load an Illuminator License File

To load a license file (*.lic) into the Illuminator:

- From the License Entry Dialog, choose the license file to upload by clicking the “Choose file” button
    - Browse to the file and select it

- Click upload

5.7.3 What Happens After an Illuminator License File is Accepted

Once you have passed the license information dialog, you will not have to enter that information again. You will be directed to the Workspaces dialog.

The next few subsections before that provide you with a little more background information about the Illuminator application, and how to prepare your remote carriers defined in D3 and D4 project files for import into your workspaces.

5.8 Ensure the Spectator and/or Detector License is Installed on the Remote D4 - Remote D3 and D4 Licensing Explained

To have the Illuminator Central Site SW work with remote Decimators, not only will a license file be installed at the Central Site, but each remote Decimator will need a license file. Contact Calian at decimator@sedsystems.ca to get more information and to obtain a license if you do not have one.

- On D3 units, you will need to have a CarrierWatch license installed
- On D4 units, you will need (one or both):
  - Spectator license installed (if you want to observe traces only)
  - Detector license installed (if you want to observe constellations only)
  - Or both if you want them both

Consult the D3 and D4 user guides to learn how to install these licenses. This is a one-time setup.

5.9 Prepare Your Carrier Definitions in Project Files by Using the D4 UI from a Remote Decimator Site

Measurement or carrier definitions are not directly editable in the Illuminator software, as these are defined in project files that are imported. The Illuminator leverages the existing project files that are created/edited in both the D3 and D4 UI environments.

The general approach, consistent to creating D3 and D4 project files with measurement definitions in them are:

- Run the D3 or D4 UI
- Navigate to your carrier's center frequency and span. You can configure the RBW, num averages and even the switch port on the Decimator. These all constitute what is called "Carrier State" and this is what is captured in the measurement
- Add a Delta Marker, drag one marker to the left edge of the span, the other to the right edge of the span. Note the band power in the marker table

- Click the “Carrier Monitoring” menu and then click “Add Measurement” left menu item
- In the Add Measurement dialog, enter the following:
  - Measurement name
  - Enabled one or more analyses, in this case we will use the Band Power analysis
  - Enter the nominal value which is the same as what you have currently showing in the Marker Table for Band Power
  - Enter a threshold value which is +/- dB around the nominal value
  - Click Add the add the measurement
- Repeat the above steps for all carriers you want to measure
- You can start carrier monitoring to test things out by clicking the right facing triangle in the left vertical toolbar.
  - The onboard carrier monitoring will cycle through each measurement one at a time, creating a pass/fail result
  - This is ideal for a teleport operator at a single site
  - Click stop to stop the carrier monitoring
  - But let’s get this saved so we can include this in the Illuminator at the central site
- Click “Save/Open” in the right menu
- Click “Save” in the left menu
- The system displays a “Save As” dialog
- Enter a project file name
- This is the project file you will use to import into the Illuminator later
- Remember, all you must do is repeat all these steps for each site you want to monitor

5.9.1 D3

See the D3 User manual to create your measurements and save them to an XML project file. You will use the D3 UI to assist you in this process. You can also view how to do this on YouTube by searching for Decimator, specifically the Carrier Monitoring Video.

5.9.2 D4

See the D4 User manual to create your measurements and save them to a JSON project file. You will use the D4 UI to assist you in this process.

5.10 Test with D4 Simulator Software

You can start the D4 simulator to test things out quicky if you do not have a remote D4. To do this, on the central site software, navigate to the D4sim subdirectory. You can run ./startSimLondon.sh which reads in the London.cfg file. This cfg file has the name of the port which the Illuminator will contact the D4 simulator. When adding the site to the central site Illuminator, you would use the IP Address of “localhost” and that port number defined in the file, 6667.

5.11 Ensure the illuminator User Account is Present in the Central Site and All Remote D4’s with the Same Username and Password

The illuminator user is a special user that is used in the interaction between the Illuminator central site and the remote D4 Decimators. Do not delete this user.

Ensure the illuminator account is present in the system at both of the following:

- Central Site
- Remote D4

Important: You also need to ensure that the illuminator user and same password is specified on both the Central site and the Remote D4 Decimator.

5.11.1 Central Site

After logging in as admin at the Illuminator Central Site, close the Workspaces dialog and select the User Management option in the caption bar.

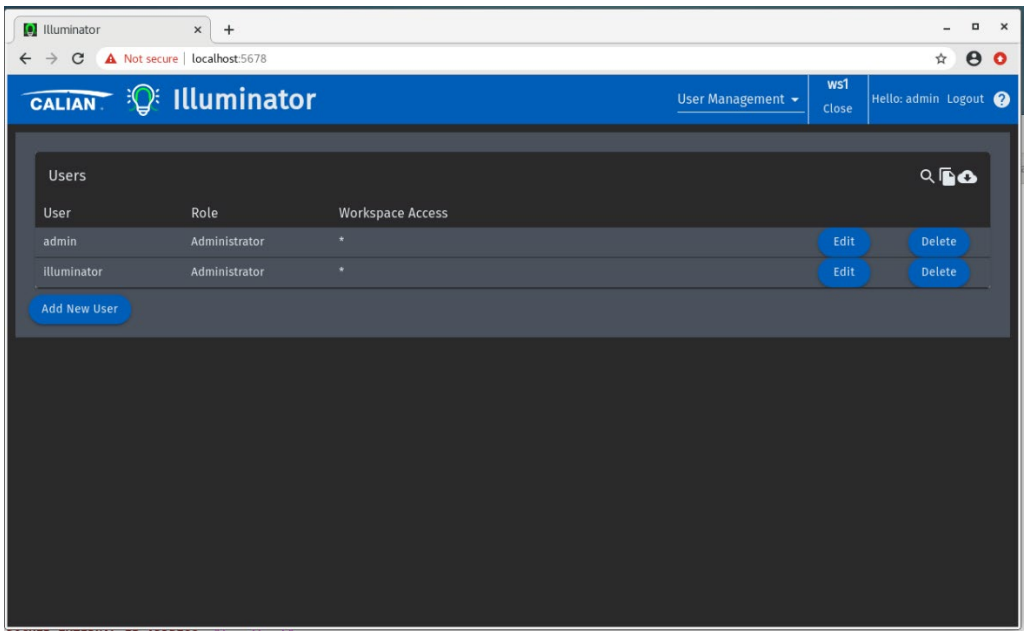


Figure 5-4 User Management

Out of the box, 2 users are provided to you: admin and illuminator

- User 1
  - User: admin
  - Password: admin
- User 2
  - User: illuminator
  - Password: illuminator

If the illuminator user account is not present, consult the User Management sub-section of the Reference section on how to add it.

5.11.2 Remote D4

Consult the D4 User Manual to ensure that the following user is present in the system with the same password as defined in the Illuminator Central Site, that is:

- User: illuminator
- Password: illuminator

5.11.3 Remote D3

Communication between the Illuminator Central Site and the Remote D3 Decimators uses a legacy socket API and does not require any specific user configuration on the Remote D3.

5.12 Create a Workspace

By default, after logging in, users enter the Workspaces view. From here they can see all the Available Workspaces in the Available Workspaces Dialog as shown in Figure 5-5. Only the workspaces the logged in user can see are viewable here. You can read on how to configure this in the User Management subsection of the Reference section.

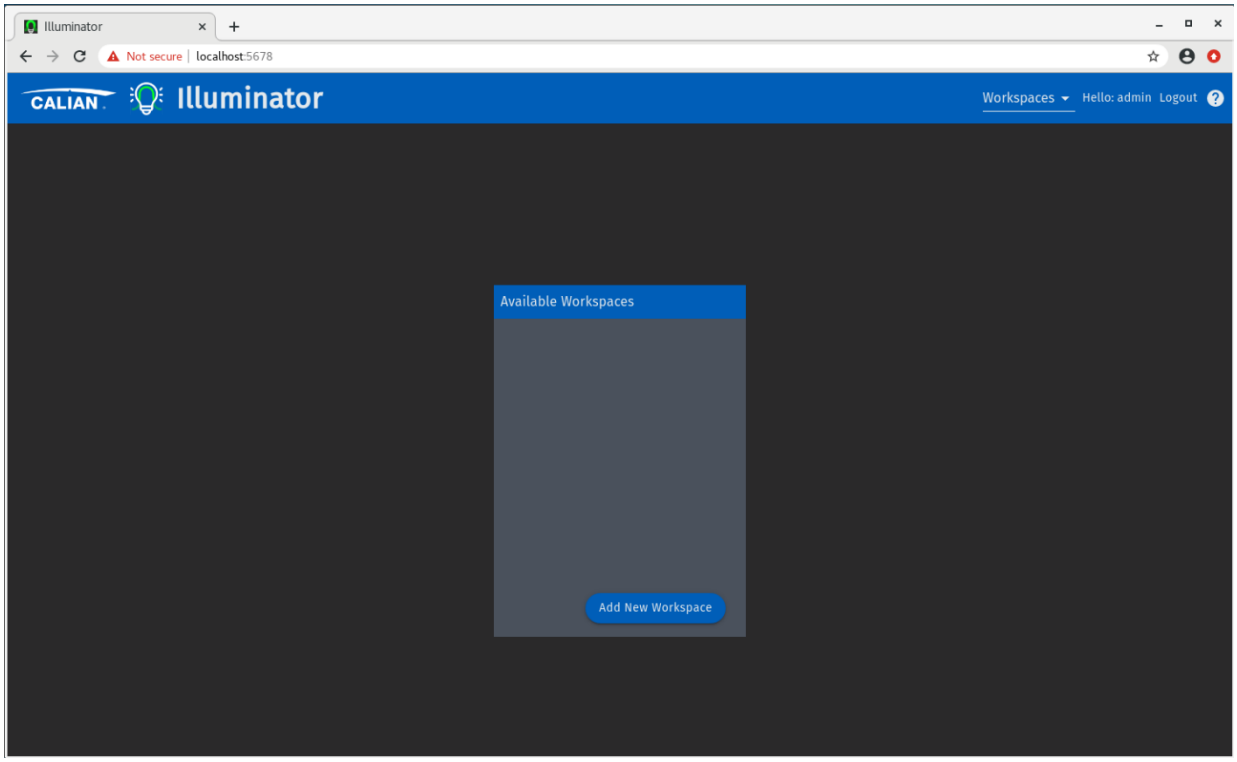


Figure 5-5 Available Workspaces Dialog

To create a new workspace, click the “Add New Workspace” button. This shows the Create Workspace Dialog as shown in Figure 5-6. Enter a new workspace name and click OK.

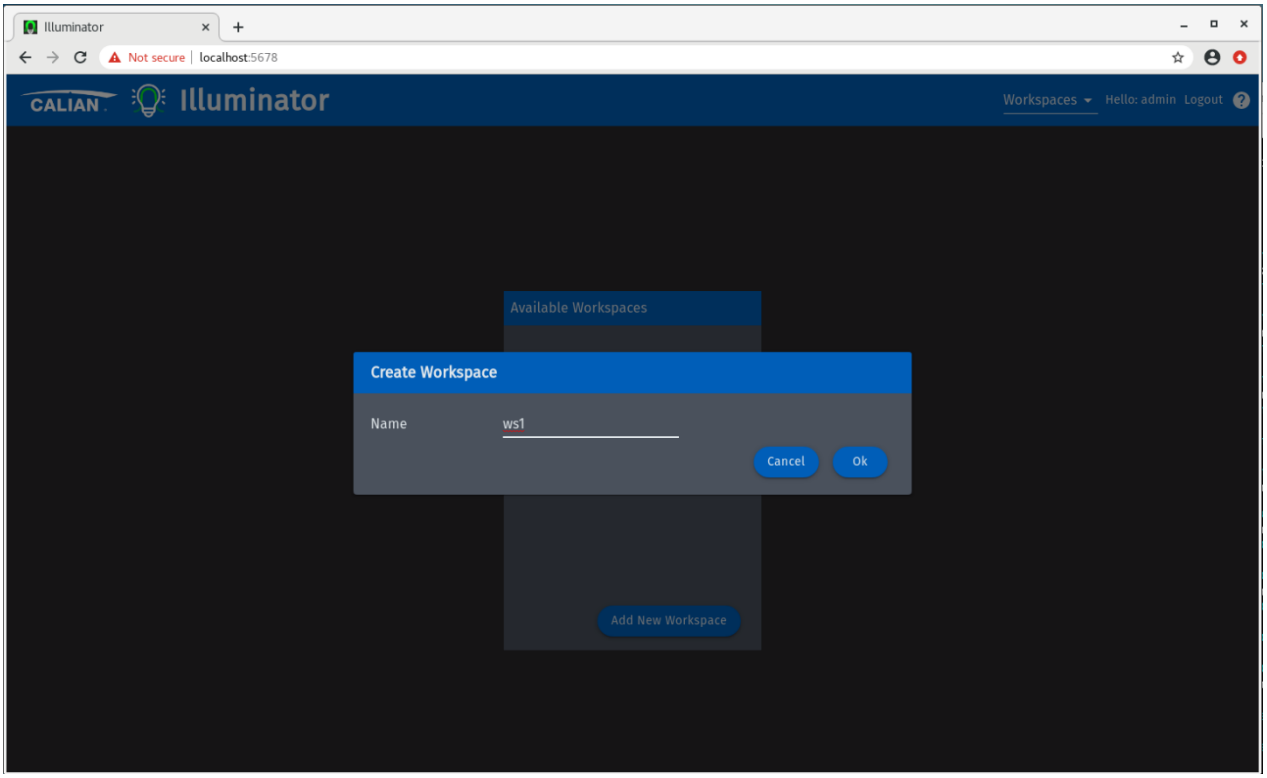


Figure 5-6 Create New Workspace Dialog

5.12.1 Open the Workspace

In the Available Workspaces dialog, long press on the workspace name. This opens the workspace up.

5.12.2 Add a Site to the Workspace

By default, when opening a new workspace, the user will be presented with the Add Site dialog.

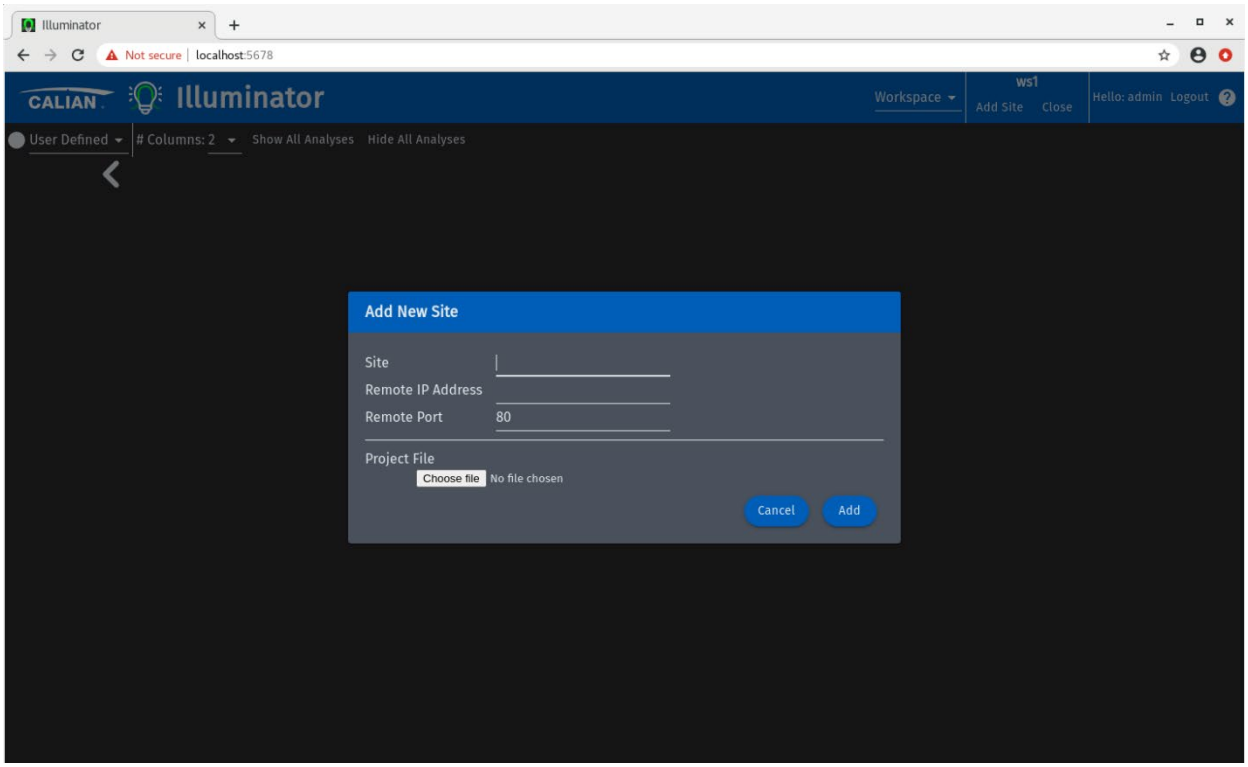


Figure 5-7 Add Site Dialog

Enter the following in the dialog:

- Site name
- Remote IP Address
- Remote Port, (typically 443 for D4s and 9784 for D3s)
- Browse to the Project File containing the carriers to measure
- Then click Add.

Once added, you will see a new Site Panel added to the Site Tree on the left.

Alternatively, you can click the “Add Site” button in the Main Application Toolbar to display the Add Site dialog too as shown in Figure 5-8.

Figure 5-8 Add Site Button in Main Application Toolbar

After adding the site, in this case “TestSite”, you will see the following:

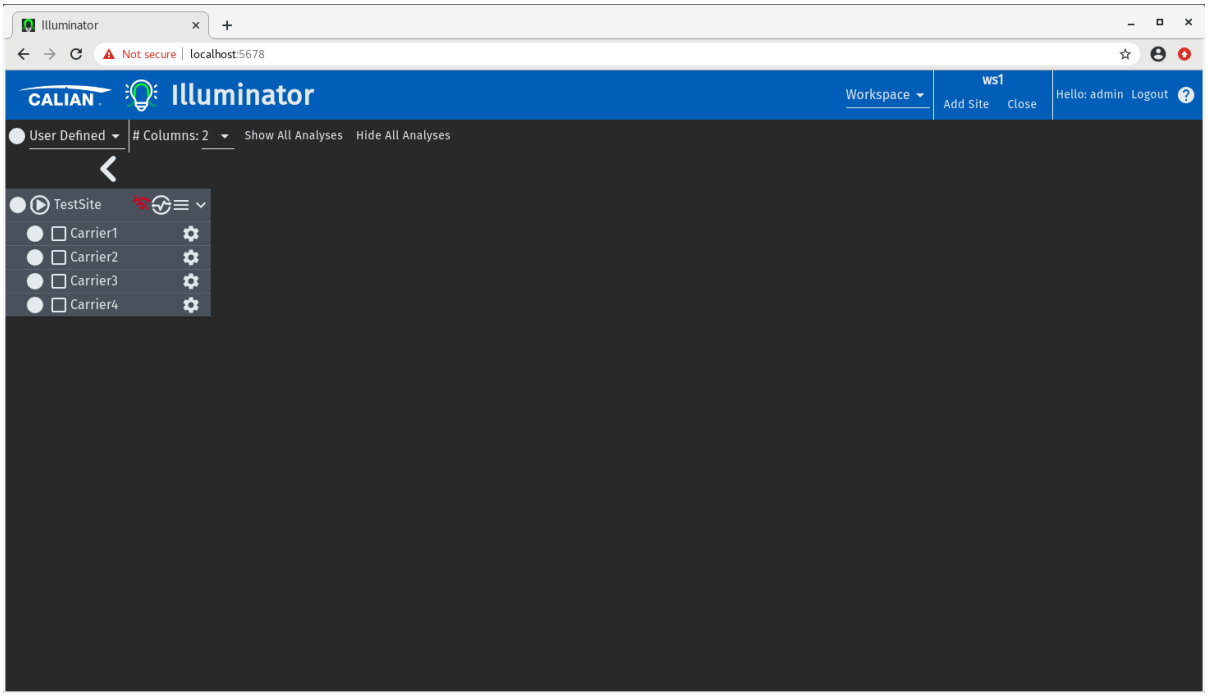


Figure 5-9 Workspace with One Site Added

5.12.3 Test the Round-Trip Connection to the Remote D4

To test not only if you have ping status to the remote Decimator, but to check if you can:

- Contact the Illuminator central site from the UI
- Contact the remote Decimator from the Illuminator central site
- Contact the Illuminator central site from the remote Decimator

This is important because this provides a check to make sure measurements can be forwarded to the Illuminator central site. This also checks if you can get past any firewalls and if you have any certificate issues.

You will see a snack bar with the status of the test.

5.12.4 Add Carriers to the Dashboard

Clicking on the checkbox  next to the carrier to check it, will add the carrier to the Dashboard on the right.

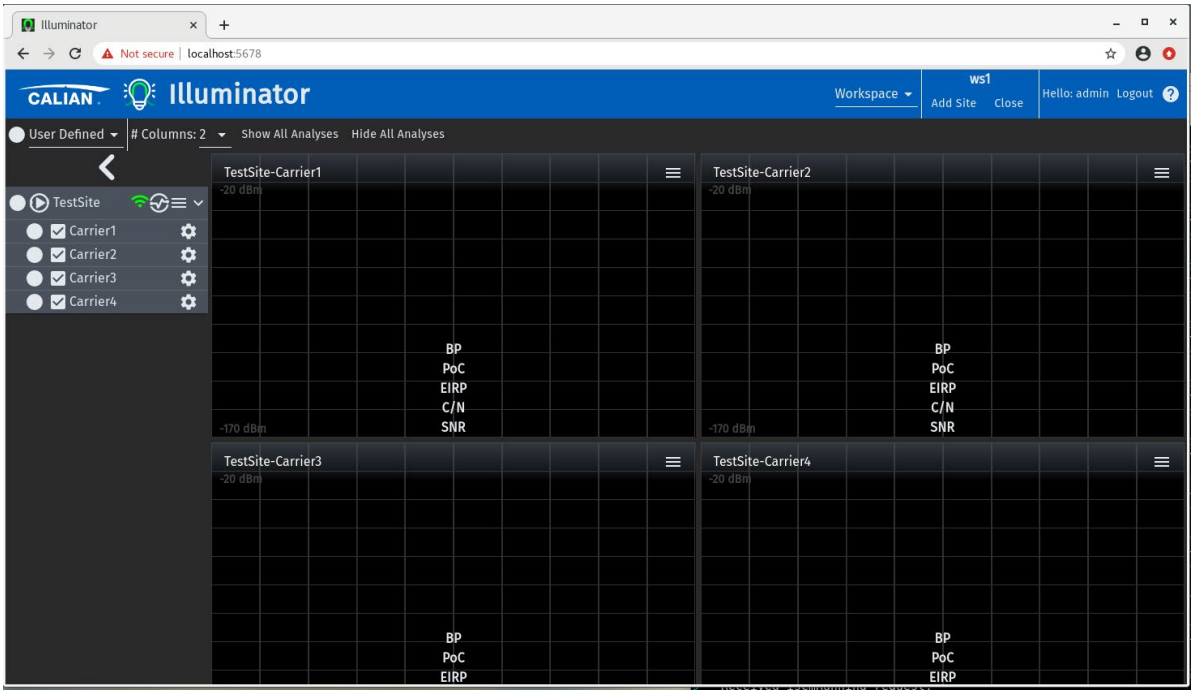


Figure 5-10 4 Carriers Added to the Dashboard

Note: If you do not have remote D4 license installed for Spectator or Detector, that information will be shown on the Carrier Tile.

5.12.5 Start Carrier Monitoring

To start and stop the Carrier Monitoring at a remote site, click the play/stop button on the Site Panel.

-  Indicates that Carrier Monitoring is stopped
  - Clicking this icon will display a confirmation to Start Site Carrier Monitoring dialog as shown in Figure 5-11.

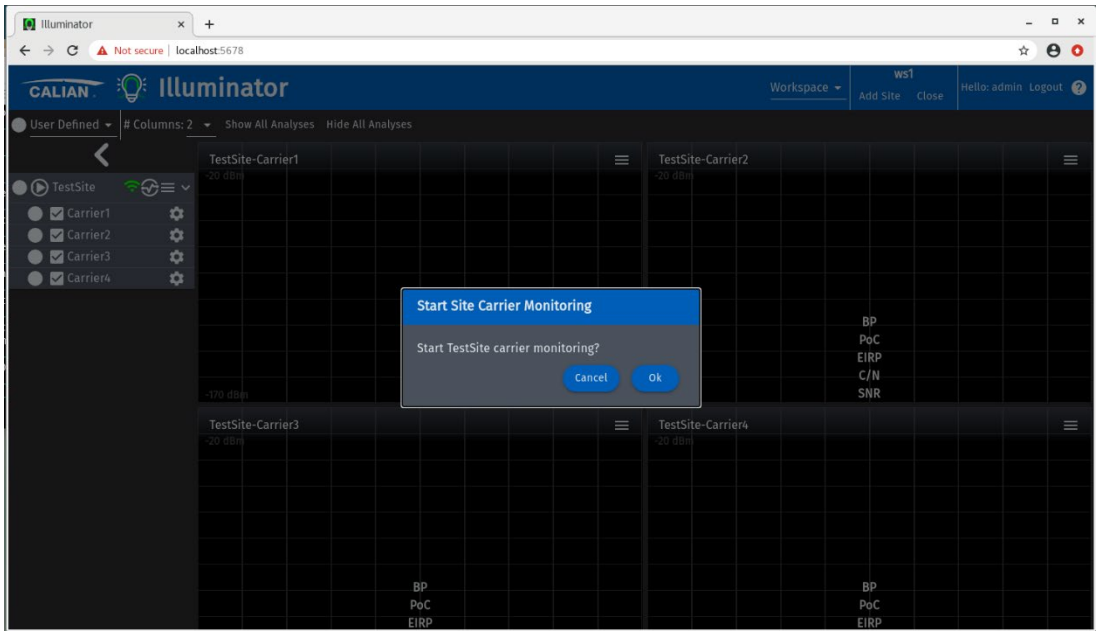


Figure 5-11 4 Start Carrier Monitoring Confirmation

  - It will then start Carrier Monitoring after clicking OK

After a few seconds, results will return to the dashboard carriers and the Carrier Tiles are updated. Congratulations! You are up and running!

Figure 5-12 4 Carrier Monitoring Running

6. Reference Guide

This section describes each functionality in depth, often duplicating some of the Getting Started sections on purpose to be a comprehensive resource.

6.1 Main Application Toolbar

After logging in, users will see the main application toolbar at the top of the view Figure 6-1 with the following from left to right:

- Calian Logo
- Illuminator Logo
- Illuminator Application Name
- If you are an admin role user, the View Navigator, Figure 6-2 which is a pull down of other views to navigate to:
- Workspaces – this view
- Logs – See the Logs section
- Data – See the Data section
- User Management – See the User Management section
- Certificates – See the certificates section
- Username, in this case “admin”
- Logout button. Clicking Logout will log the current user out of the Illuminator and present them with the Login dialog.
- Help button, see the next section on “Getting More Information”

Figure 6-1 Main Application Toolbar

Figure 6-2 Main Application Toolbar – View Navigator

6.1.1 Getting More Information

At any time, from any screen, you can click on the help button on the top right of the user interface. This will display a popup menu that looks like the following (Figure 6-3):

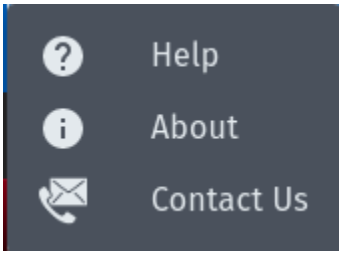


Figure 6-3 Help Menu

6.1.1.1 Displaying Help

Click the Help menu to display help. This will launch this user manual you are now reading, in a new tab in the browser.

6.1.1.2 About

Click the About menu to display the About information (Figure 6-4). This displays the Software Version, and the Build number.

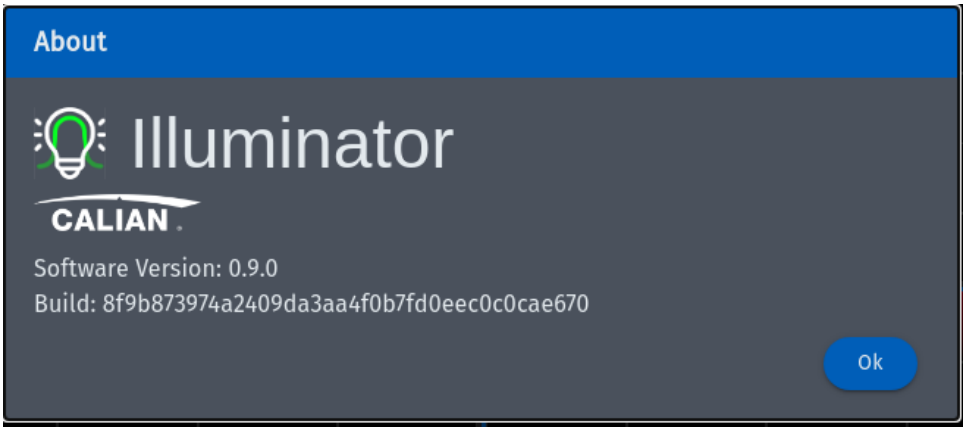


Figure 6-4 Help About Dialog

6.1.1.3 Contact Us

Click the Contact Us menu to display the Contact information (Figure 6-5).

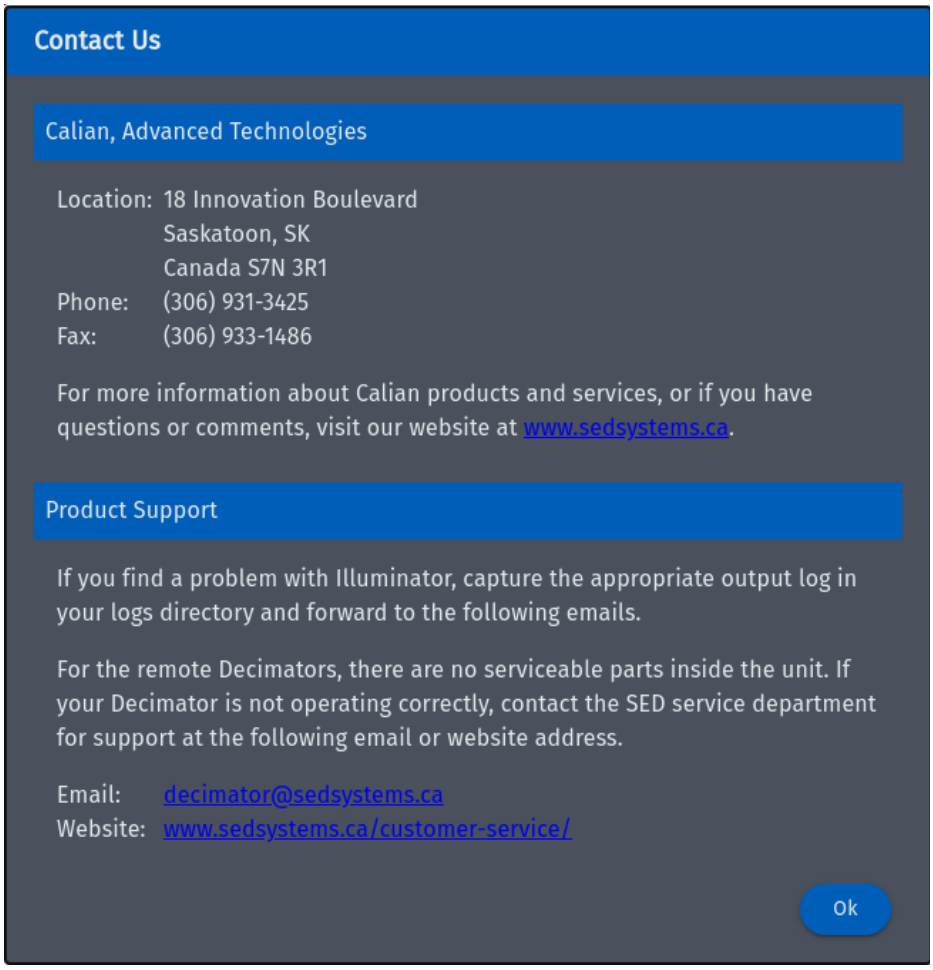


Figure 6-5 Contact Us Dialog

6.2 Workspaces

By default, after logging in, users enter the Workspaces view. From here they can see all the Available Workspaces in the Available Workspaces Dialog as shown in Figure 6-6. In this case, there are no workspaces defined.

Only the workspaces the logged in user can see are viewable here. You can read how to configure this in the User Management section.

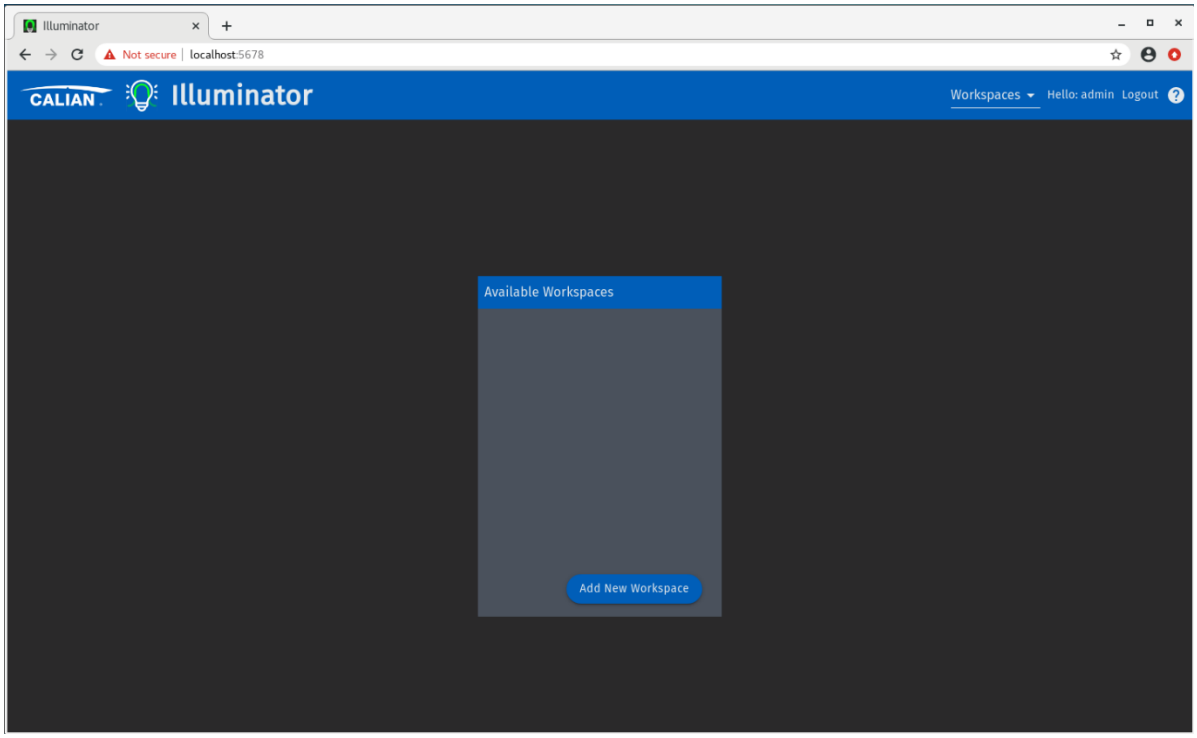


Figure 6-6 Available Workspaces Dialog

6.2.1 Creating a Workspace

To create a new workspace, click the “Add New Workspace” button. This shows the Create Workspace Dialog as shown in Figure 6-7. Enter a new workspace name and click OK.

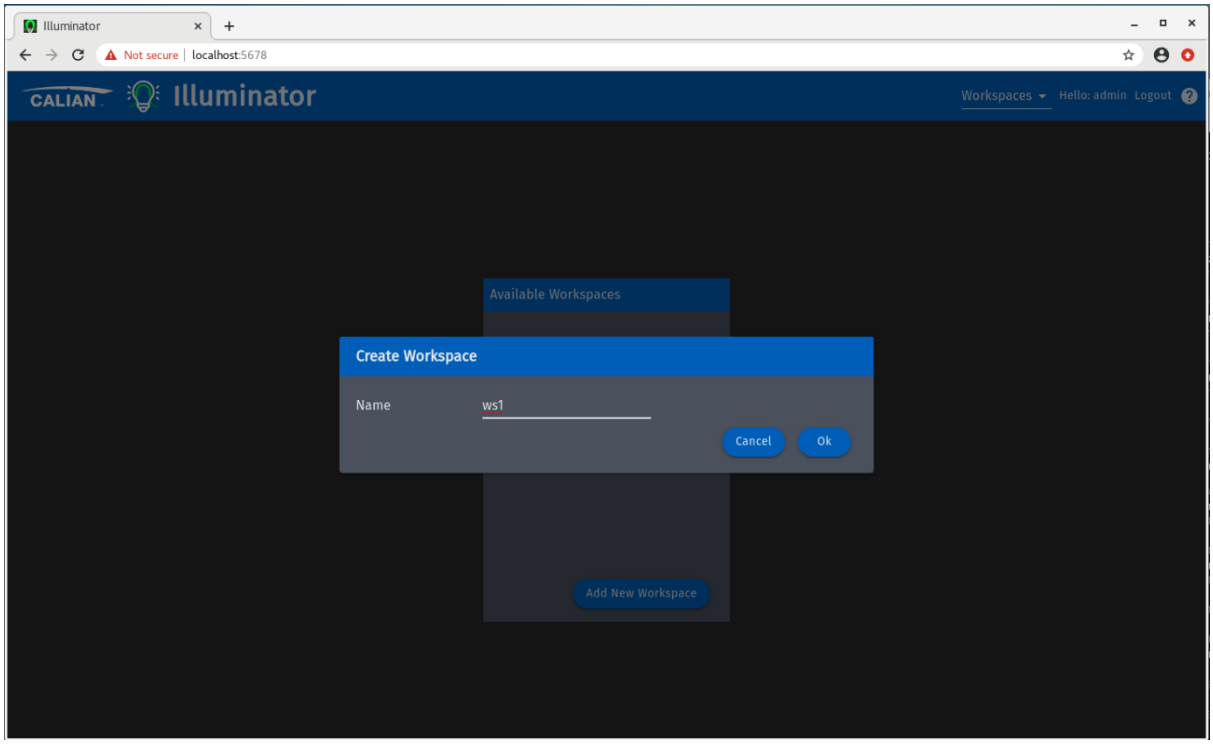


Figure 6-7 Create New Workspace Dialog

6.2.2 Deleting a Workspace

To delete an existing workspace, click the “X” button to the right of the workspace name in the Available Workspaces Dialog and confirm the deletion.

6.2.3 Opening a Workspace

To open a workspace, long-press the workspace name in the Available Workspaces Dialog. The Workspace Editor is now opened.

6.3 Workspace and the Workspace Editor

A workspace defines an area in the Illuminator used to capture a configuration of carriers to measure from remote Decimators. You can add/remote sites, start and stop carrier monitoring and view results, amongst many more things.

The Workspace Editor make a slight adjustment to the Main Application Toolbar, adding the workspace name and an Add Site button to it as shown in Figure 6-8.

Figure 6-8 Site Name and Add Site Button in Main Application Toolbar

The workspace editor has 4 view styles:

- User Defined
- Rotating Tiles
- Active Alarm
- Historical Alarm

To toggle them back and forth, you can use the pull-down menu at the top left of the Workspace Editor.

Let's examine each one in more detail, one at a time.

6.3.1 User Defined View

The User Defined view is the primary focal point for the user where you will be spending most of your time, as seen in Figure 6-9.

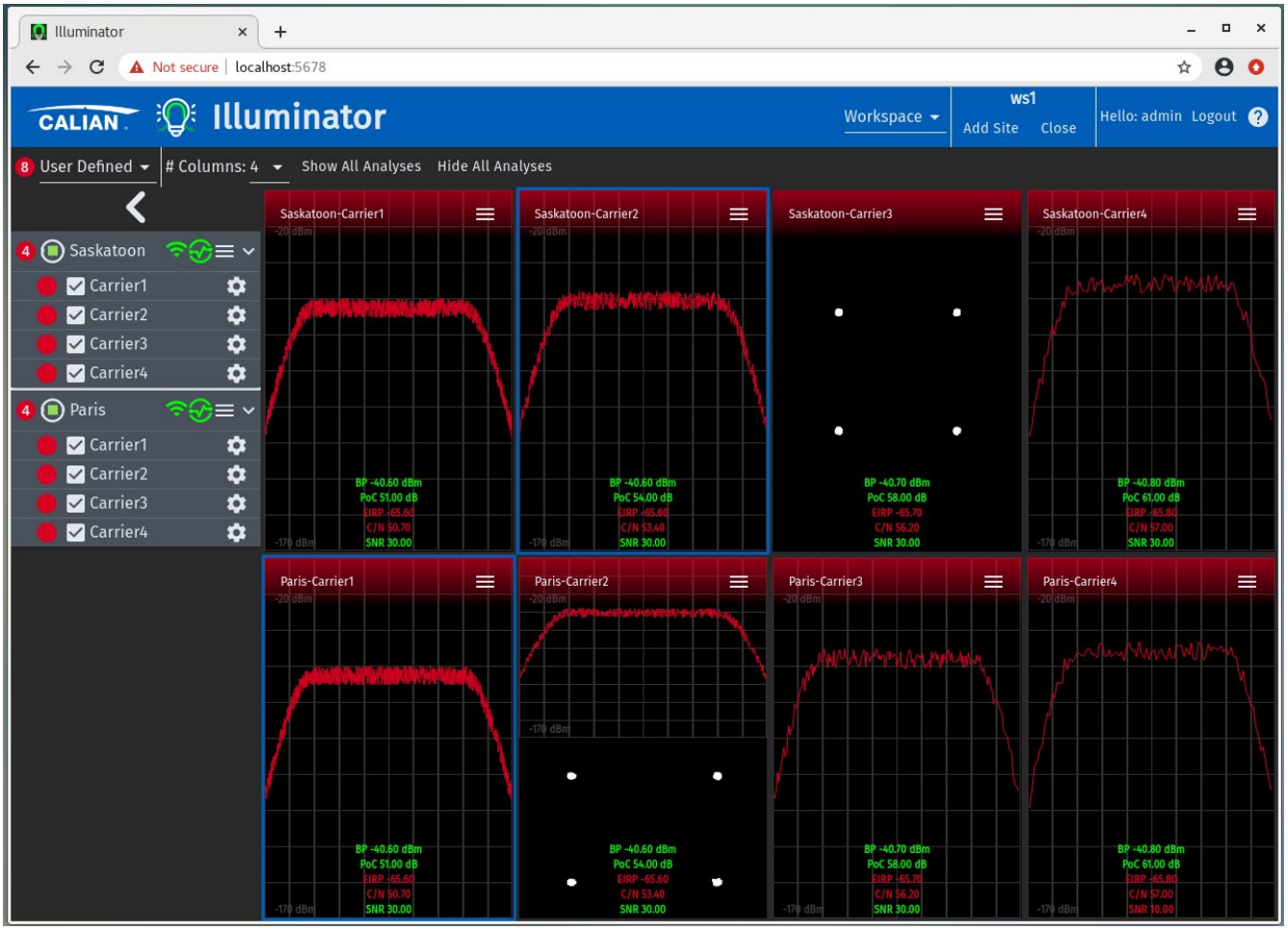


Figure 6-9 Workspace Editor – User Defined View

It consists of the following:

- a view toolbar at the top
- A Site Tree on the left containing Site Panels
- A Dashboard of Carrier Tiles in the middle

6.3.1.1 Adding a Site to a Workspace

By default, when opening a new workspace, the user will be presented with the Add Site dialog.

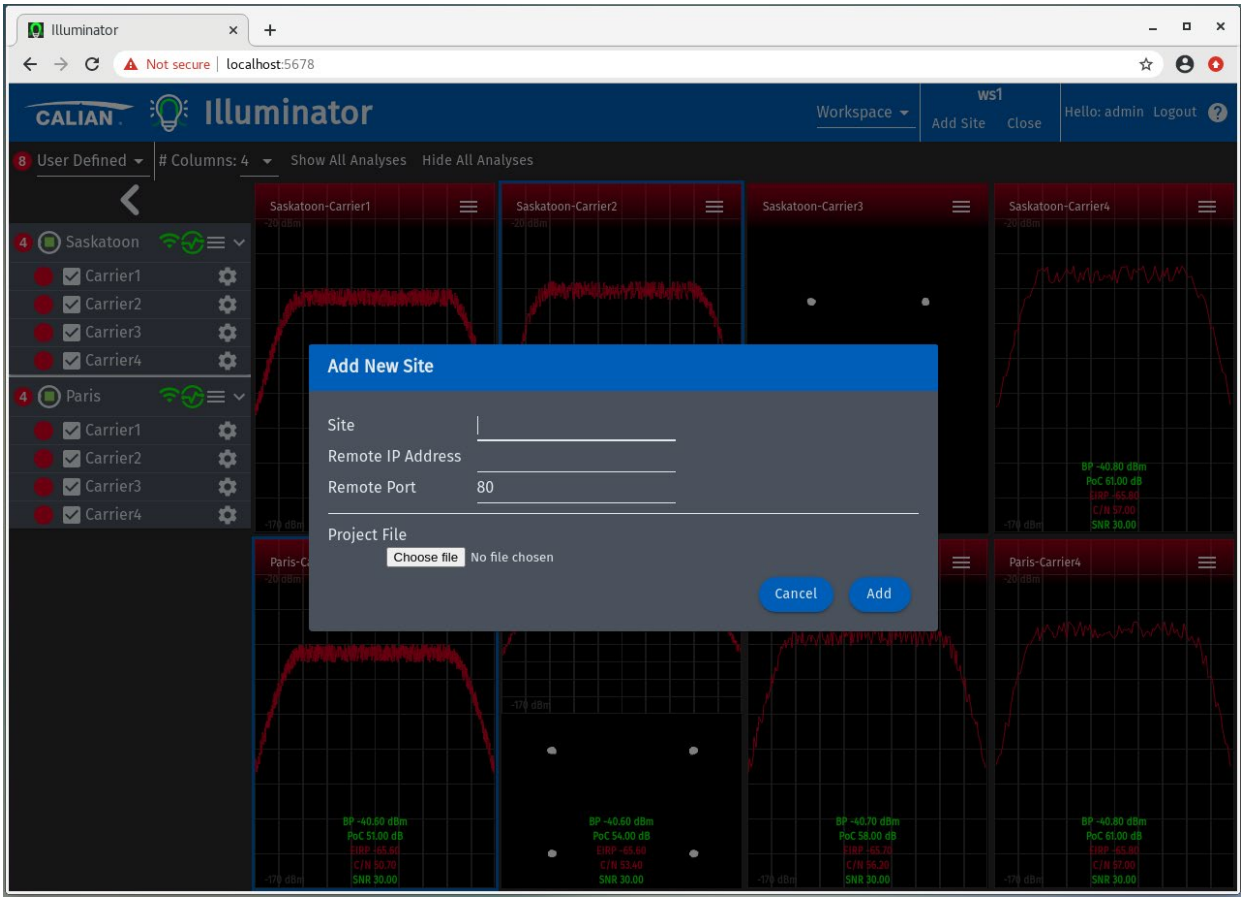


Figure 6-10 Add Site Dialog

Enter the following in the dialog:

- Site name
- Remote IP Address
- Remote Port, (typically 443 for D4s and 9784 for D3s)
- Browse to the Project File containing the carriers to measure
- Then click Add.

Once added, you will see a new Site Panel added to the Site Tree on the left.

Alternatively, you can click the “Add Site” button in the Main Application Toolbar to display the Add Site dialog too as shown in Figure 6-11.

Figure 6-11 Add Site Button in Main Application Toolbar

6.3.1.1.1 Site Tree

The Site Tree resides on the left edge of the User Defined view as shown in Figure 6-12. It can be expanded in the typical style by clicking on the arrow at the top to make it completely visible (Figure 6-12), or collapsed into its smaller form to preserve horizontal real-estate for the Dashboard as shown in Figure 6-13.

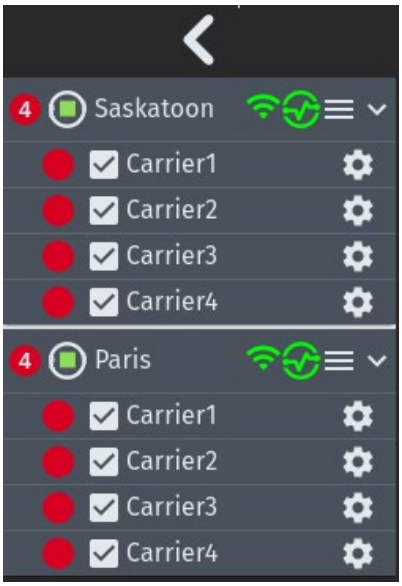


Figure 6-12 Site Tree - Expanded

Figure 6-13 Site Tree Collapsed

6.3.1.1.2 Site Panel

A Site Panel shows everything you need to know about the site as shown in Figure 6-14. It resides within the Site Tree.

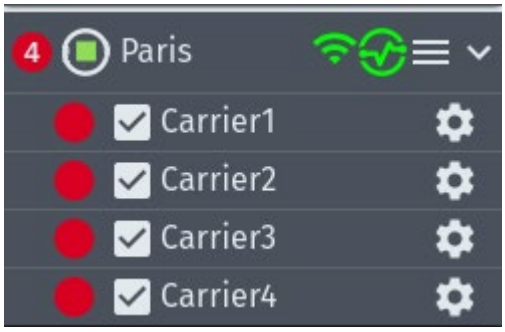


Figure 6-14 Site Panel – Expanded

6.3.1.1.2.1 Viewing Carriers at a Site

To view/hide the carriers at a site click the button on the top right of the Site Panel. This expands/collapses the Site Panel. The collapsed view of this panel looks like that in Figure 6-15.

Figure 6-15 Site Panel – Collapsed

6.3.1.1.2.1.1 Viewing the Network Ping Status to a Site

The ping status icon in the Site Panel shows if the remote site has ping connectivity. It will be green if it is, or red if it is not reachable. Within the Illuminator software, a 30 second ping timer will go off to constantly re-evaluate this ping status and update the icon.

6.3.1.1.2.1.2 Determining if Measurement Data Has Arrived Recently from a Site

If measurement data has arrived within that last 30 seconds from a remote site Decimator, the Measurement Arrived icon will go green. At the beginning, when adding a site and not playing, this icon will be white for "Unknown" state, and if Carrier Monitoring is playing at that site and no measurements have arrived, then the icon will turn red.

6.3.1.1.2.1.3 Adding a Carrier to the Dashboard

Clicking on the checkbox next to the carrier to check it, will add the carrier to the Dashboard.

6.3.1.1.2.1.4 Removing a Carrier from the Dashboard

Clicking on the checkbox ☐ next to the carrier to uncheck it, will remove the carrier from the Dashboard.

6.3.1.1.2.1.5 Viewing Carrier Configuration / State

Clicking on the carrier's gear button ⚙ will show the detailed configuration state of the measurement. This is shown in Figure 6-16:

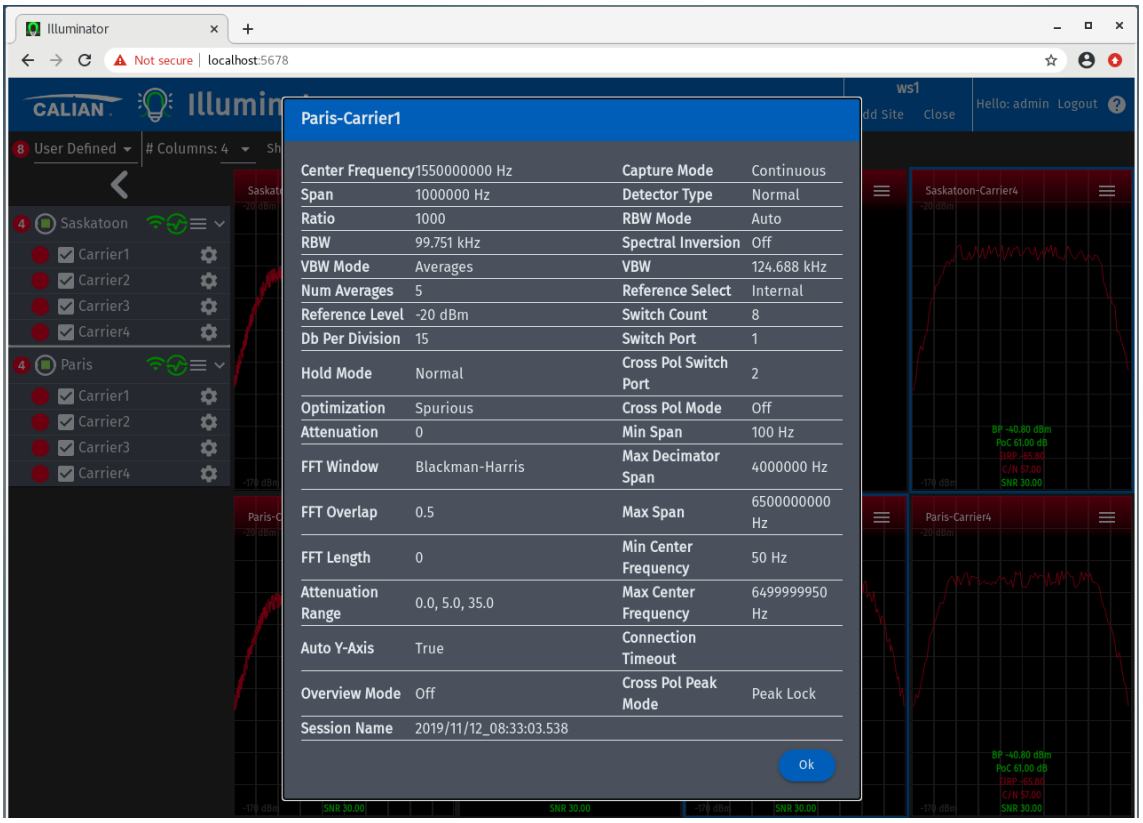


Figure 6-16 Carrier Configuration State

6.3.1.1.2.1.6 Starting / Stopping Carrier Monitoring at a Site

To start and stop the Carrier Monitoring at a remote site, click the play/stop button on the Site Panel.

- ▶ Indicates that Carrier Monitoring is stopped
  - Clicking this icon will display a confirmation to Start Site Carrier Monitoring dialog as shown in Figure 6-17

- It will then start Carrier Monitoring after clicking OK

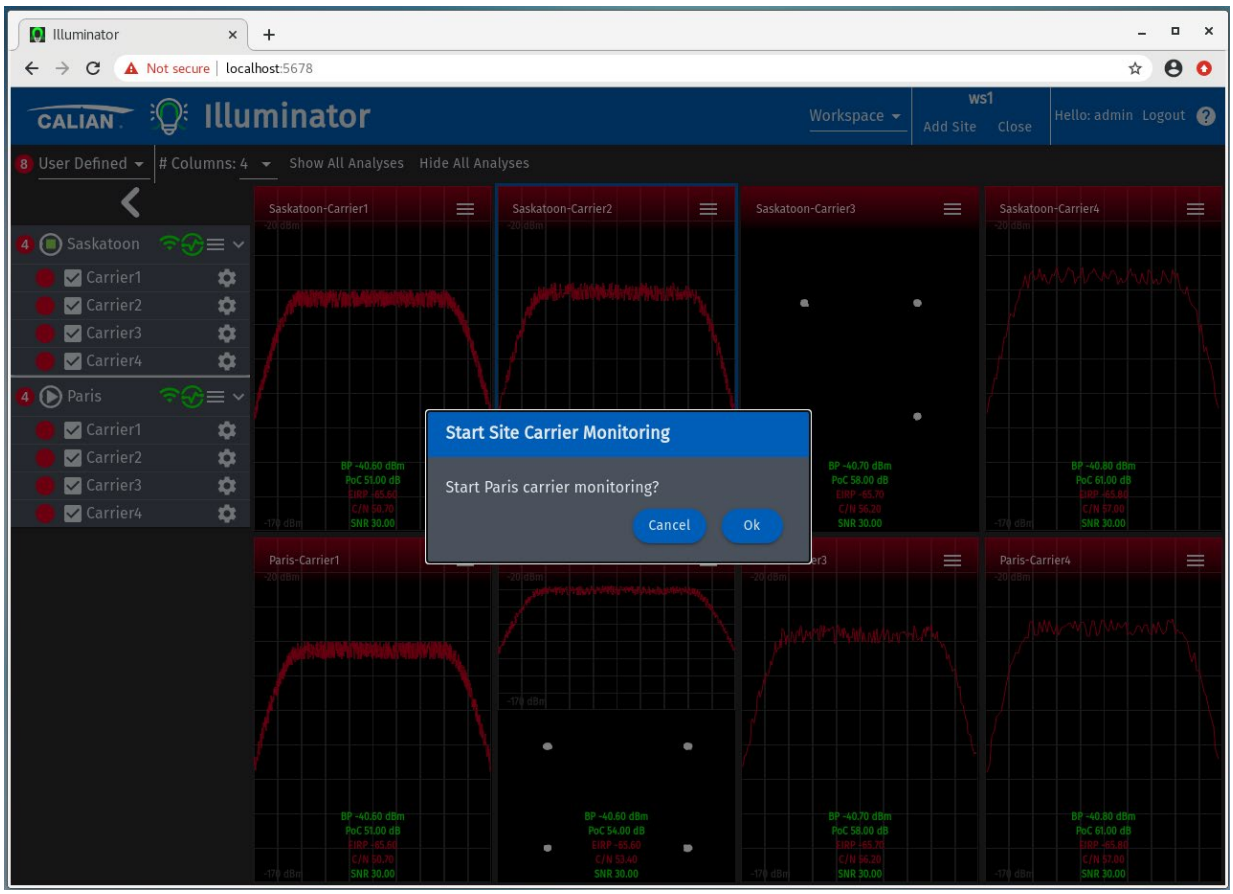


Figure 6-17 Confirmation to Start Site Carrier Monitoring

-  Indicates that Carrier Monitoring is playing/running
  - Clicking this icon will display a confirmation to Stop Site Carrier Monitoring dialog as shown in Figure 6-18
  - It will then stop Carrier Monitoring after clicking OK

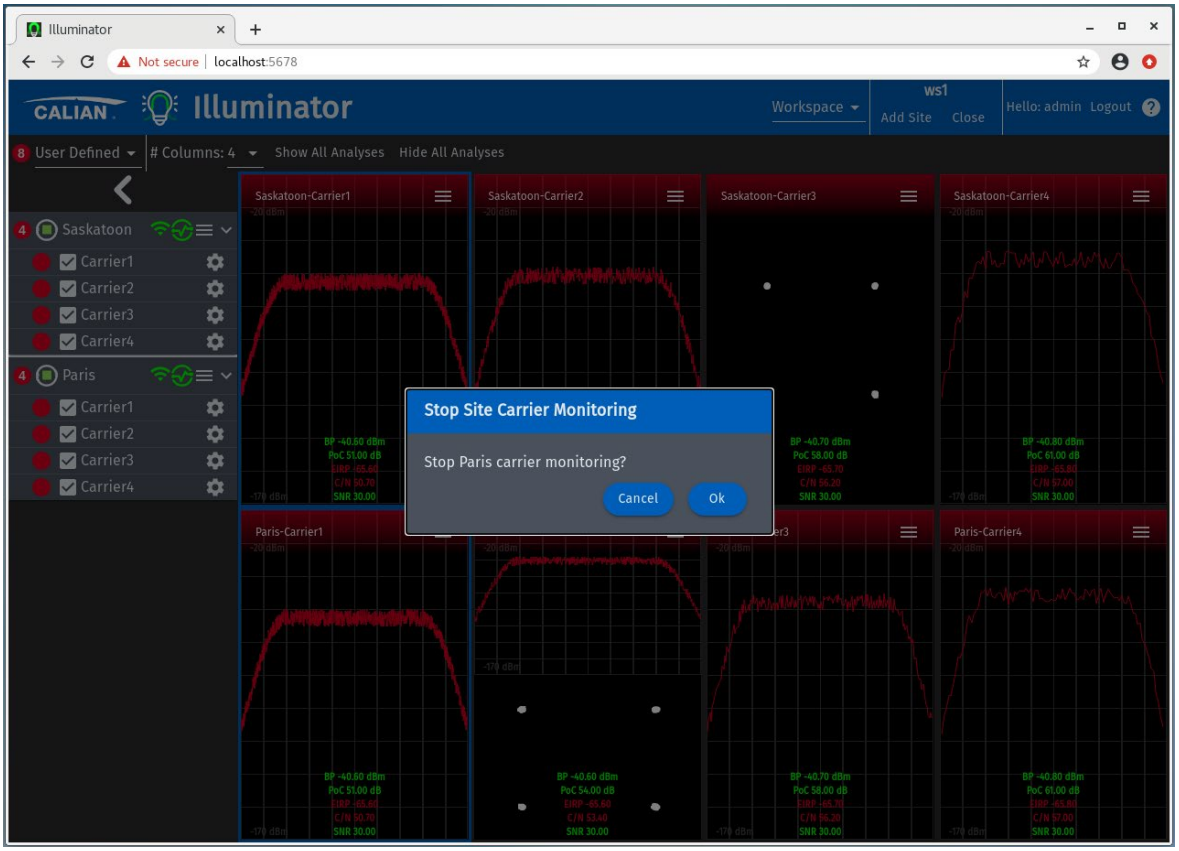


Figure 6-18 Confirmation to Stop Carrier Monitoring

6.3.1.1.2.1.7 Site Panel Hamburger Menu

Each site panel has a hamburger menu button  to show more functionality that can be performed on that site. These are shown in Figure 6-19.

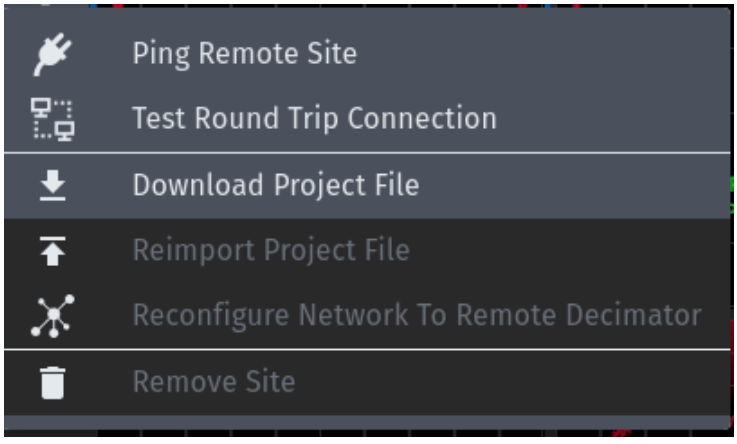


Figure 6-19 Site Functions

- Pinging the Remote Site
- Test Round Trip Connection
- Download Project File
- Reimport Project File
- Reconfigure Network to Remote Decimator
- Remove Site

Let's examine these in more detail.

6.3.1.1.2.1.7.1 Pinging Remote Site

Users can ping a remote site at any time if they are curious about network connectivity. The next UI update will reflect the result of the ping status on the ping icon.

6.3.1.1.2.1.7.2 Testing the Round-Trip Connectivity to a Site

To test not only if you have ping status to the remote Decimator, but to check if you can:

- Contact the Illuminator central site from the UI
- Contact the remote Decimator from the Illuminator central site
- Contact the Illuminator central site from the remote Decimator

This is important because this provides a check to make sure measurements can be forwarded to the Illuminator central site. This also checks if you can get past any firewalls and if you have any certificate issues.

You will see a snack bar with the status of the test.

6.3.1.1.2.1.7.3 Downloading a Project File

To download a project file to the Downloads folder on your computer, select the Download Project File menu option. The system will download the project file to disk.

You can use this file and upload it to the remote Decimator, make changes to your measurements and reimport the project file into the site.

6.3.1.1.2.1.7.4 Reimporting a Project File

To reimport a project file, to change the measurements at the site, select the Reimport Project File menu option. The system will display the Reimport Project File dialog as shown in Figure 6-20.

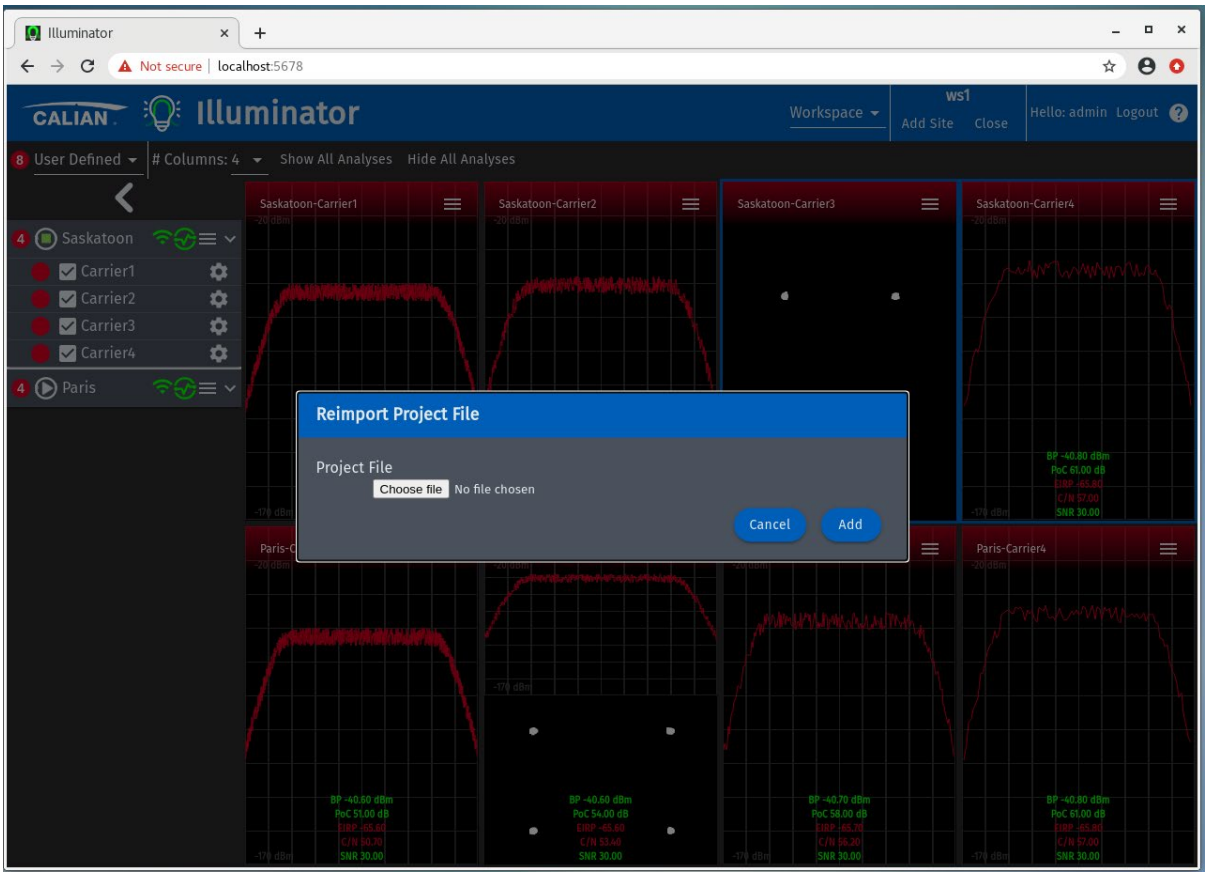


Figure 6-20 Reimport Project File Dialog

Browse to a new file and select Add.

Note: This function is disabled if Carrier Monitoring is playing.

6.3.1.1.2.1.7.5 Reconfiguring the Network to a Remote Site Decimator

To reconfigure the network to a remote site Decimator, select the Reconfigure Network to Remote Site Decimator. The system will display the Reconfigure Network to Remote Decimator dialog as shown in Figure 6-21.

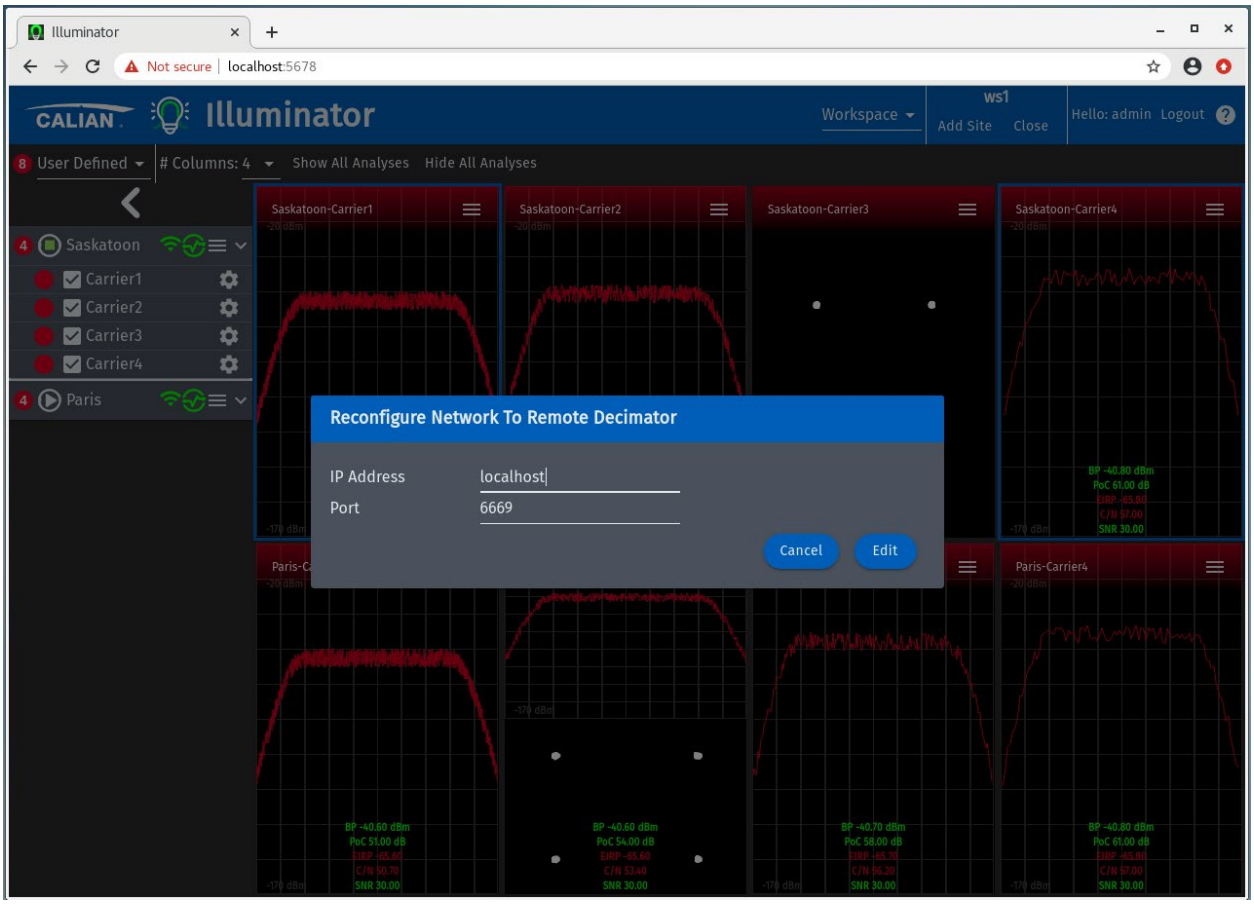


Figure 6-21 Reconfigure Network to Remote Site Dialog

Enter the new IP Address and/or Port and click Edit.

Note: This function is disabled if Carrier Monitoring is playing.

6.3.1.1.2.1.7.6 Removing a Site

To remove a site, select the Remove Site menu option from the Site Panel Hamburger button and confirm the removal as shown in Figure 6-22.

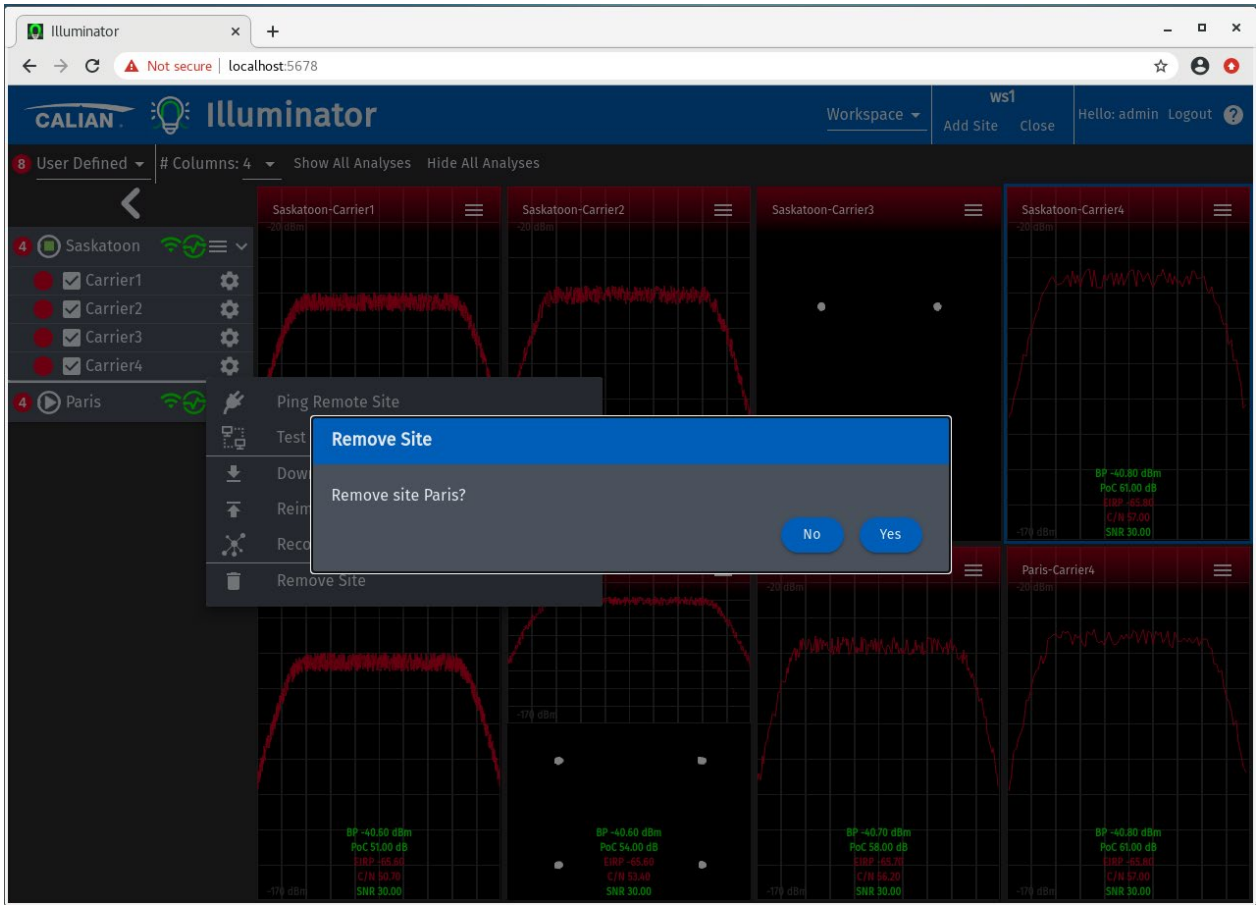


Figure 6-22 Remove Site Dialog

Note: This function is disabled if Carrier Monitoring is playing.

6.3.1.1.3 Viewing Status

To view status, the Illuminator uses colored status balls as shown in Figure 6-23.

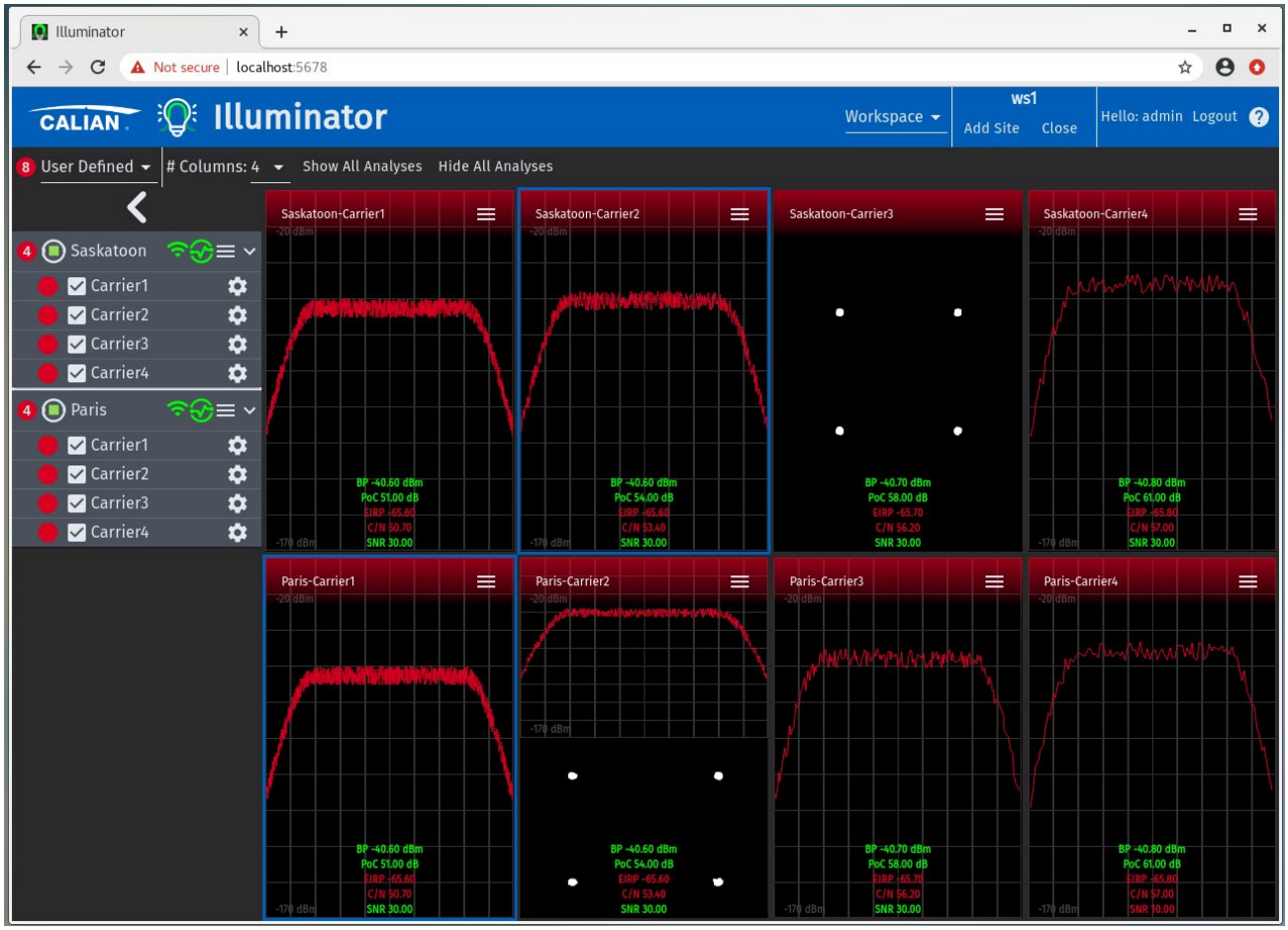


Figure 6-23 Status

Each status ball can be one of the following colors:

- Grey – Unknown state
- Green – Healthy state
- Red – Failed state

6.3.1.1.3.1 Carrier / Measurement Status

Each carrier has a colored status ball next to it. It depicts the overall status of all the analyses for that measurement the last time it was measured. If any analysis has failed, then the overall status for that carrier is red.

6.3.1.1.3.2 Site Status

Each site has a colored status ball in the Site Panel reflecting the overall status of the site. In the above case, both Saskatoon and Paris have 4 failed carriers and depict this with the number in the colored status ball.

6.3.1.1.3.3 Workspace Status

The workspace has a colored status ball to summarize the state of all the carriers in the workspace. It also shows a number of failed carriers in the workspace on the colored status ball, in this case, there are 8 failed carriers.

6.3.1.1.4 Dashboard

Carriers are added and removed to/from the Dashboard from the Carrier checkboxes on the Site Panel on the Site Tree as shown in Figure 6-24. Any Carrier Tile that has a blue border indicates that the Carrier Tile has just had its data updated.

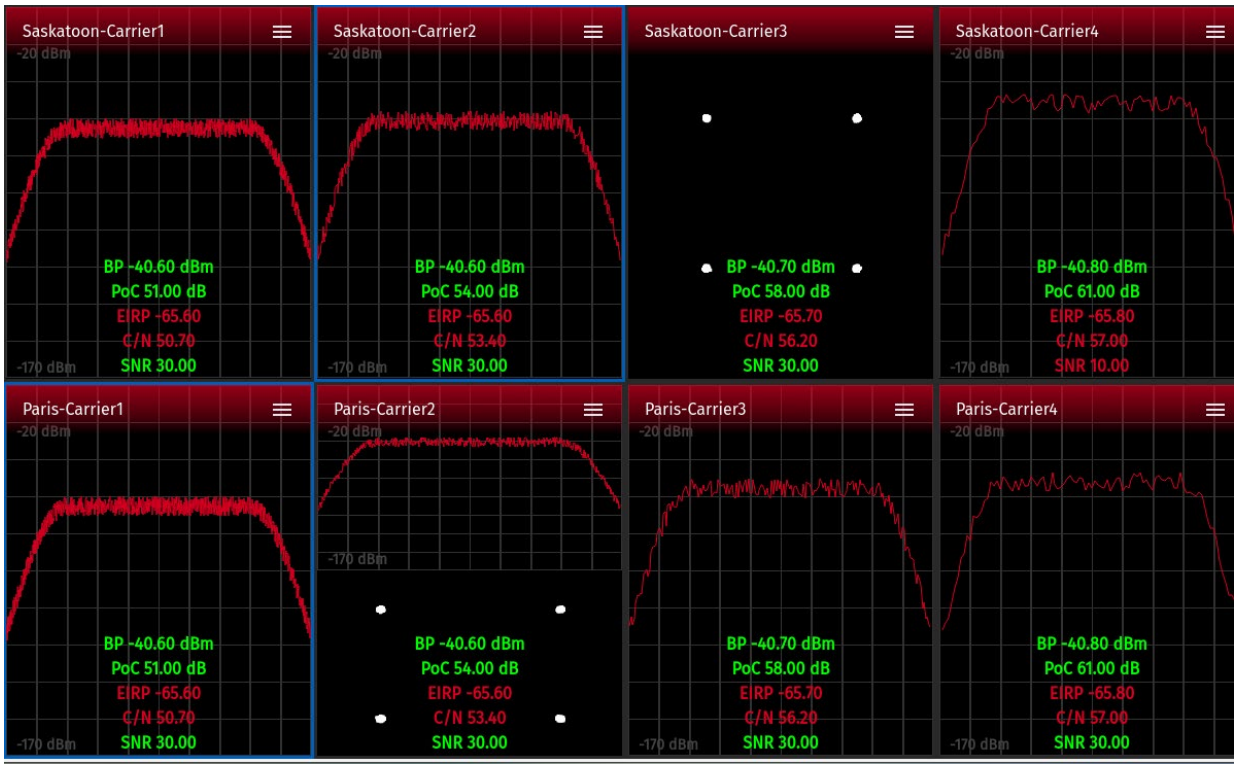


Figure 6-24 Dashboard

6.3.1.1.4.1 Changing the Number of Columns on the Dashboard

You can change the number of columns of Carrier Tiles on the Dashboard by selecting a new value in the number of columns dropdown on the Workspace view toolbar as shown in Figure 6-25.

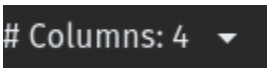


Figure 6-25 Number of Columns of Carrier Tiles Dropdown

6.3.1.1.4.2 Showing/Hiding All Analyses Summary Overlays on Carrier Tile

You can show and hide the Analyses Overlay text on the Carrier Tiles on the Dashboard by clicking “Show All Analyses” or “Hide All Analyses” on the Workspace view toolbar as shown in Figure 6-26.

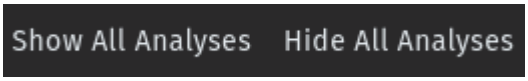


Figure 6-26 Show / Hide Analyses Summary Overlays Buttons

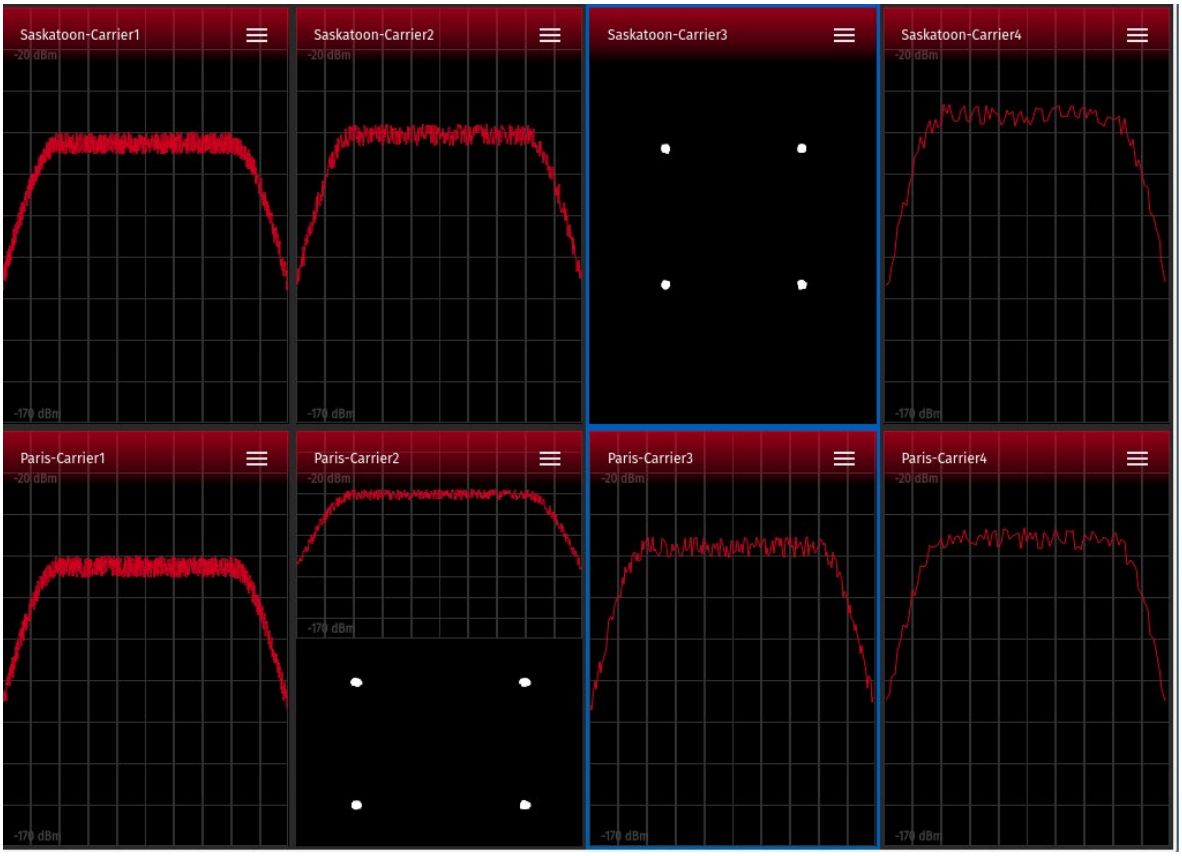


Figure 6-27 Dashboard with All Carrier Tile Analyses Overlay Text Hidden

6.3.1.1.4.3 Carrier Tile

A Carrier Tile resides in one row and column in the Dashboard. It looks like the following Figure 6-28.

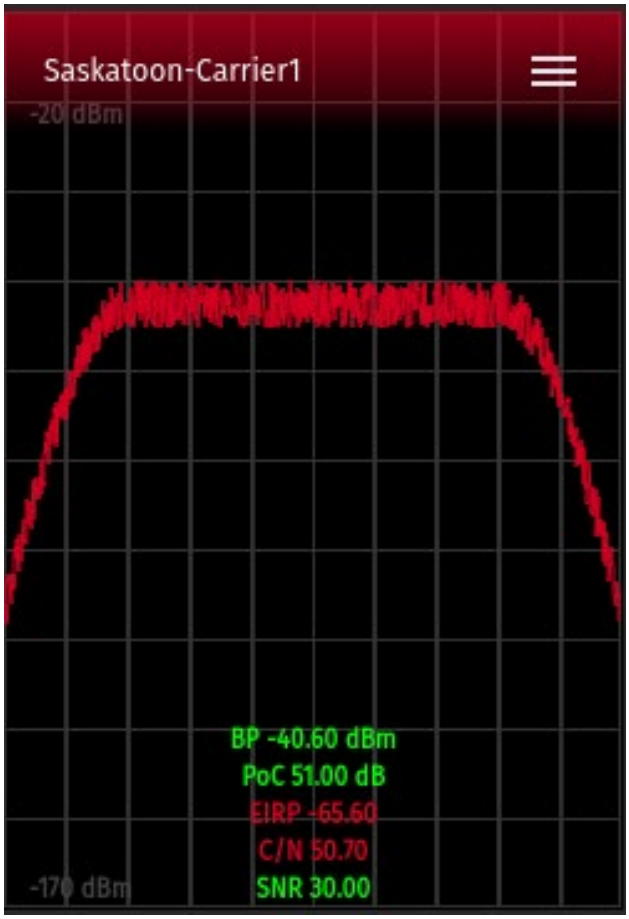


Figure 6-28 Carrier Tile - Spectrum View

The Carrier Tile is made up of the following items:

- Title Bar
  - Shows the site and carrier name
  - Colors the title banner in a status color depending on the overall state of the measurement
  - Hamburger button – Clicking on this provides the following menu options Figure 6-29
    - Change Displayed Plot (Available on D4 if both Spectator and Detector licenses are installed)
    - Show Historical

- ----------
- Show/Hide Analyses
- Hold – Clicking this will open a submenu that provides the following menu options
- Reset
- ----------
- Normal
- Min
- Max
- Min/Max
- Show State

- Plot Area

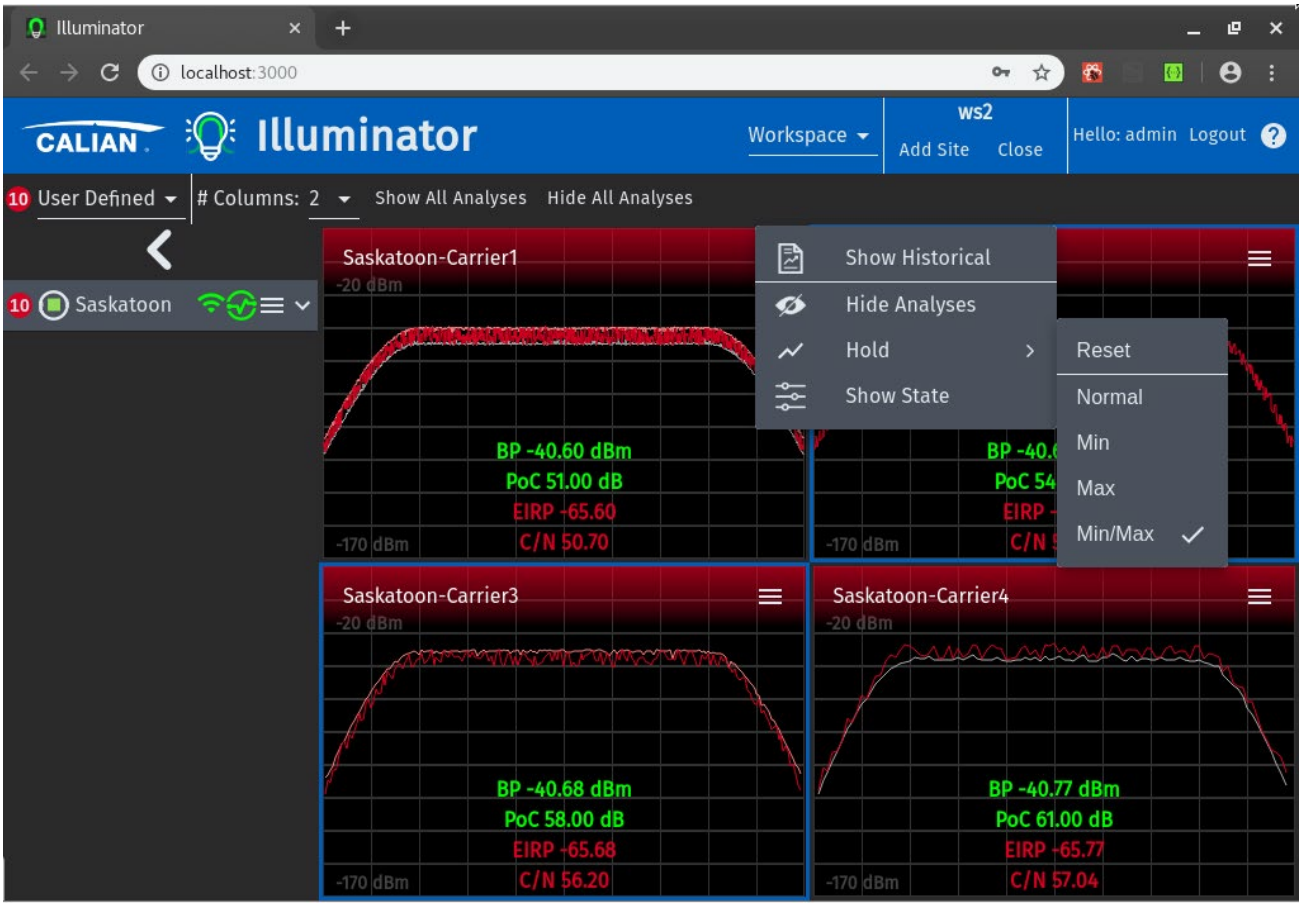


Figure 6-29 Carrier Tile - Hamburger Menu

6.3.1.1.4.3.1 Toggling the Carrier Tile's View to Show Spectrum/Constellation/Both

The previous view for the Carrier Tile was Spectrum.

To toggle to a different view on the Carrier Tile, select the Hamburger button and select Change Displayed Plot.

This next view shows the constellation and is referred to as the Constellation as shown in Figure 6-30.

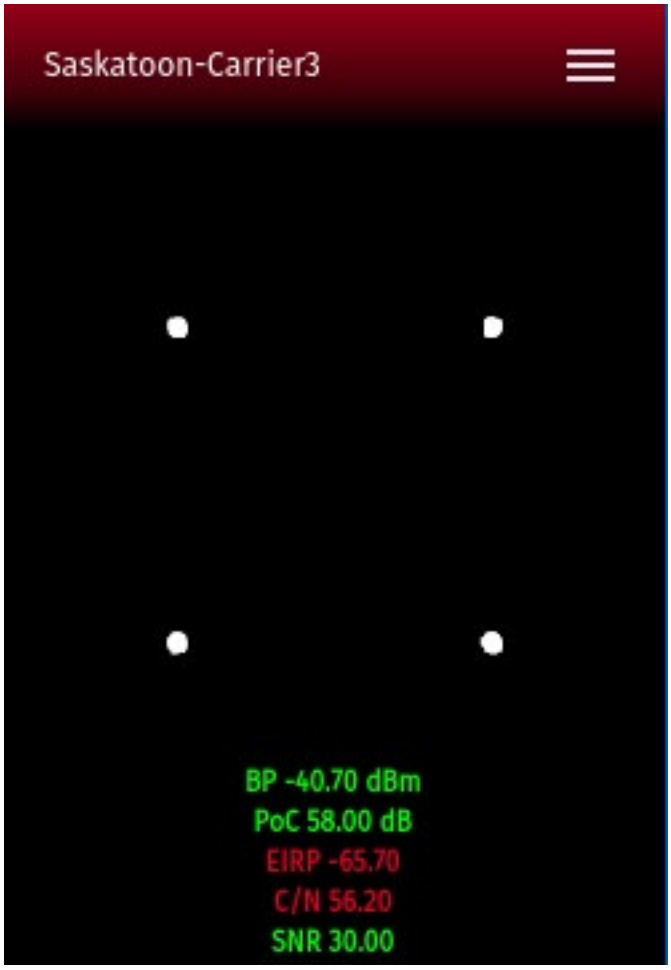


Figure 6-30 Carrier Tile - Constellation View

This next view shows the constellation and is referred to as Both as shown in Figure 6-31.

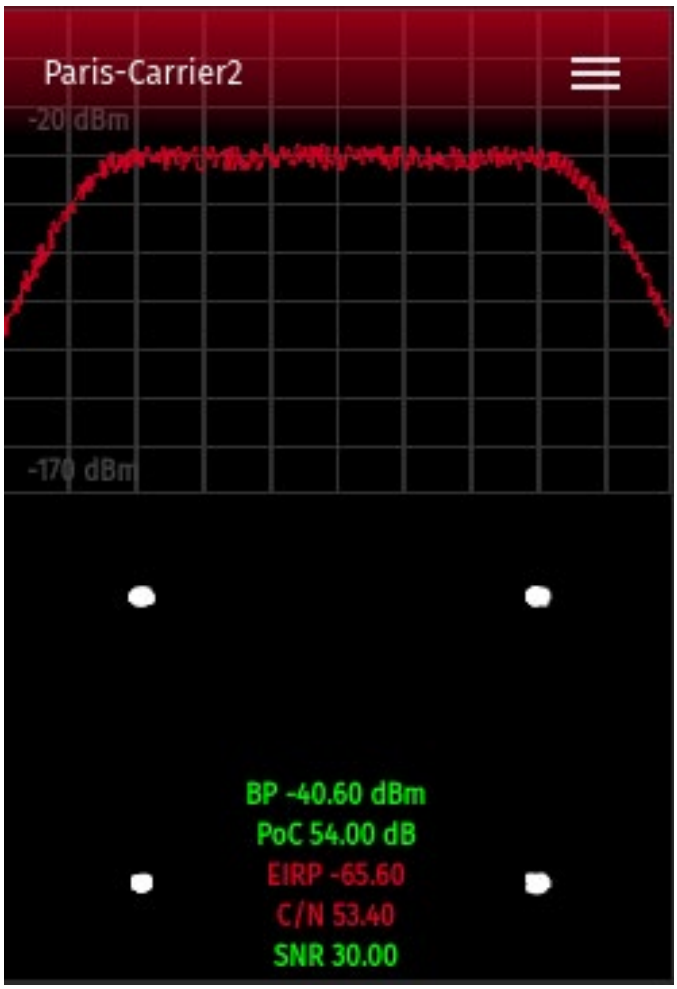


Figure 6-31 Carrier Tile - Both View

Note: If the Carrier Tile is wider than tall, then the 2 plots will be rendered side by side.

6.3.1.1.4.3.2 Hiding the Analysis Summary Overlays

To toggle the Analyses Overlay text on and off for an individual Carrier Tile without impacting other Carrier Tiles, select the Hamburger button and select Show Analyses or Hide Analyses.

6.3.1.1.4.3.3 Adding, Removing, and Resetting Max and Min Traces

To add, remove, or reset max and min traces for an individual Carrier Tile, select the Hamburger button, select Hold and select the desired option.

6.3.1.1.4.3.4 Showing Carrier Configuration State

To show the Carrier Configuration State, select the Hamburger button and select Show State. The system will display the following dialog as in Figure 6-32.

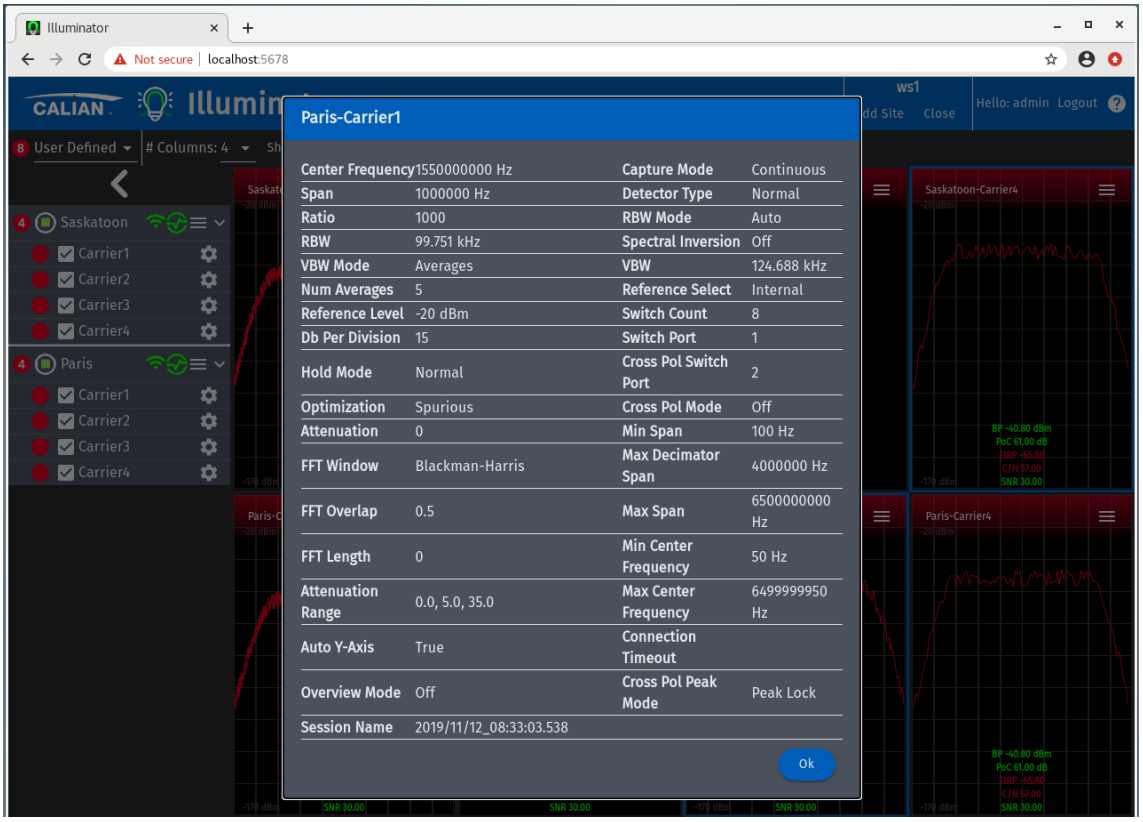


Figure 6-32 Carrier Configuration State

6.3.1.1.4.3.5 Showing Historical Data for a Carrier

The historical view allows the current analyzer settings of the Carrier Tile to be viewed along with historical trend of the measurement, in addition to the measurement trace and constellation plot.

To show historical data for a carrier, select the hamburger button from a Carrier Tile and select "Show Historical" from the menu. The Illuminator will display the historical data as shown in Figure 6-33.

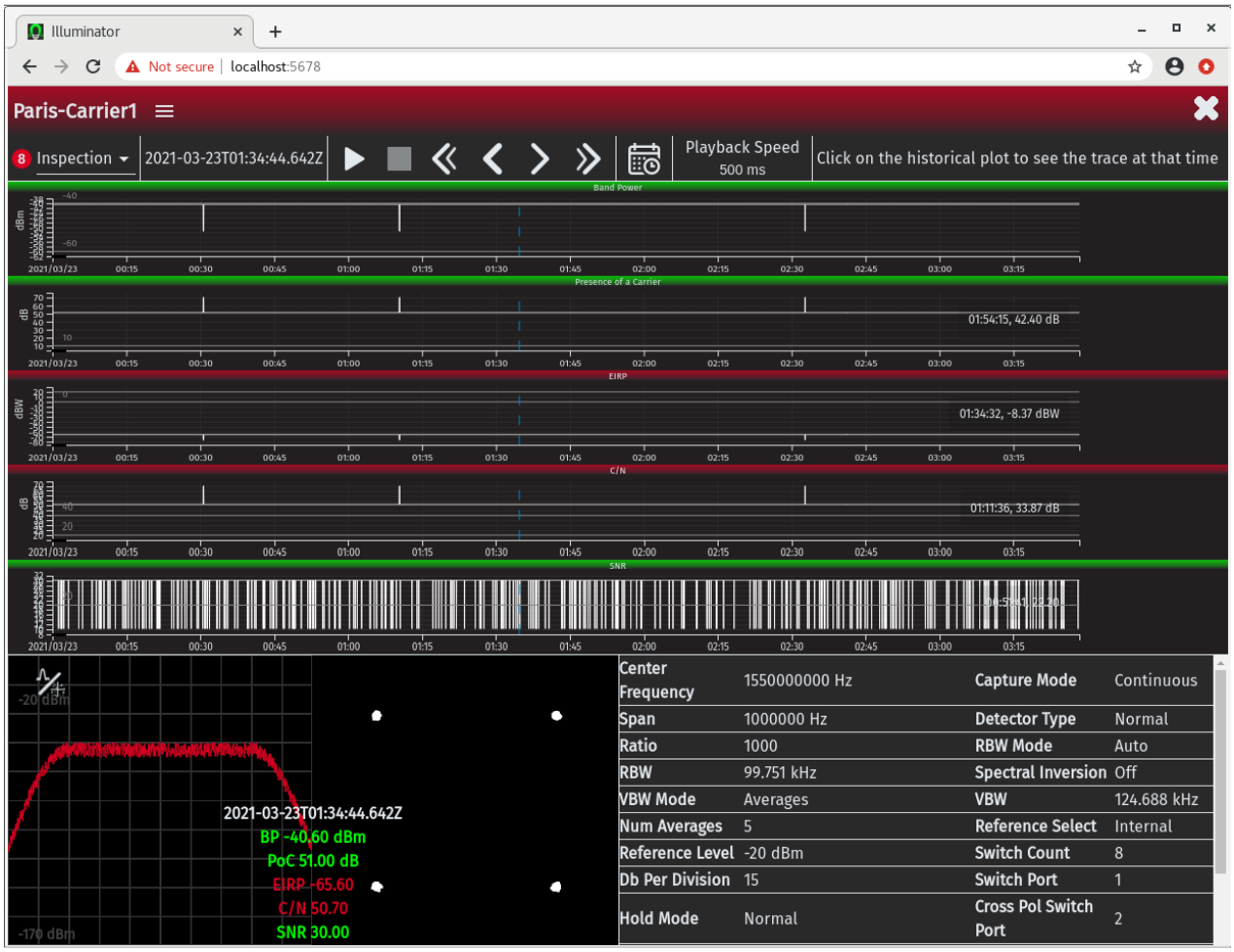


Figure 6-33 Historical Data – Inspection Mode

The screen consists of these areas:

- Carrier name title bar with hamburger button to toggle on and off historical analyses plots
- Toolbar at the top

- Historical analyses plots in the middle
- Setting panel at the bottom right (inspection and live updates modes only)
- Trace plot and/or Constellation plot at the bottom left (inspection and live updates modes only)

The view window works in a live update mode along with an inspection mode.

In the live update mode, the trace updates in real-time as new traces are measured. The state of the measurement is re-evaluated and displayed along with an update to the trend portion of the window.

6.3.1.1.4.3.5.1 Selecting Which Analyses You Want to View on the Timeline

Since there can be many analyses on the timeline, you can toggle them by clicking the hamburger button to display a drop-down menu of analyses to show and hide as shown in Figure 6-34.

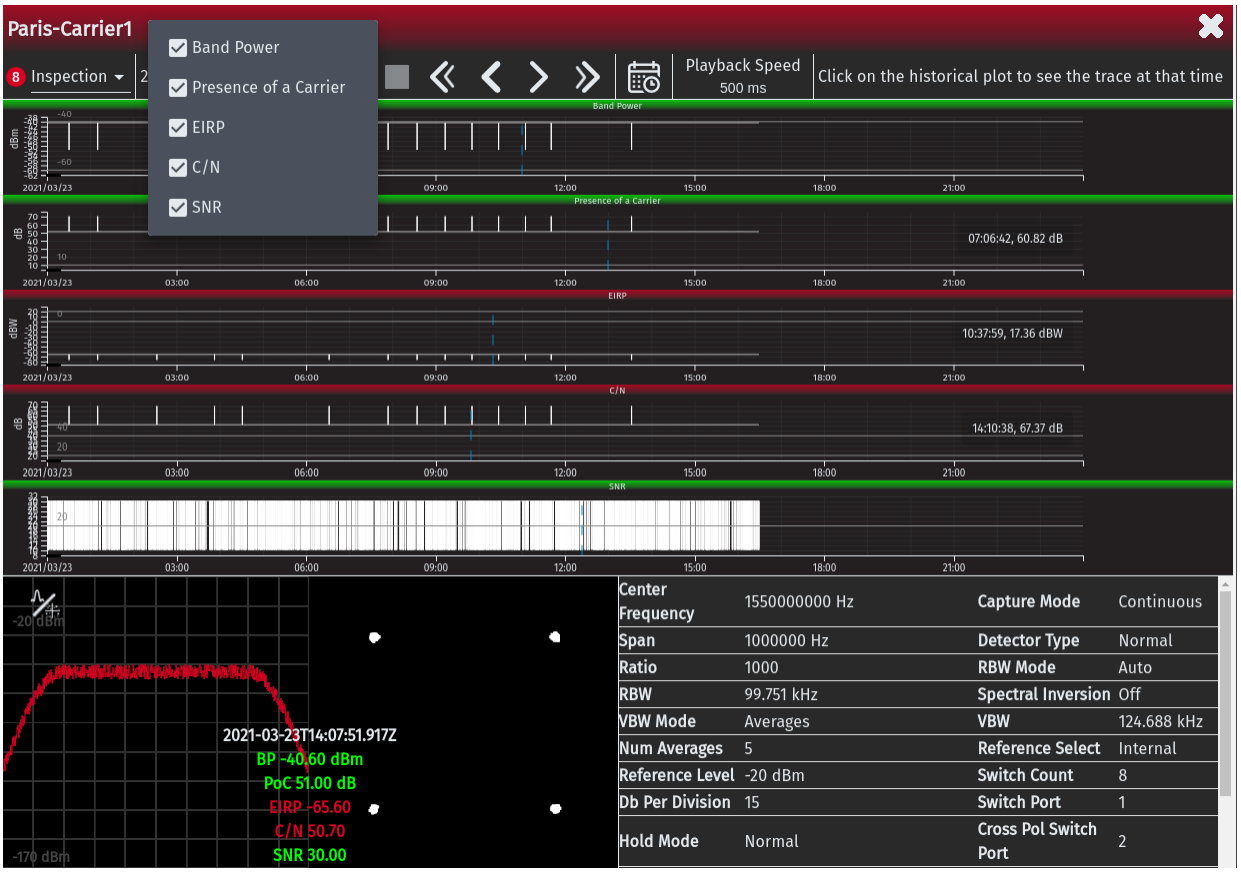


Figure 6-34 Historical Toggle Analysis Plots

6.3.1.1.4.3.5.2 Toggling the Display View to Show Spectrum/Constellation/Both

In the same way that you can toggle the view in the Carrier Tile, you can toggle the trace and constellation plots in the historical view, assuming you have both the Spectator and Detector licenses installed on the remote D4 unit. Use the button on the top left of the panel to do this as shown in Figure 6-35.

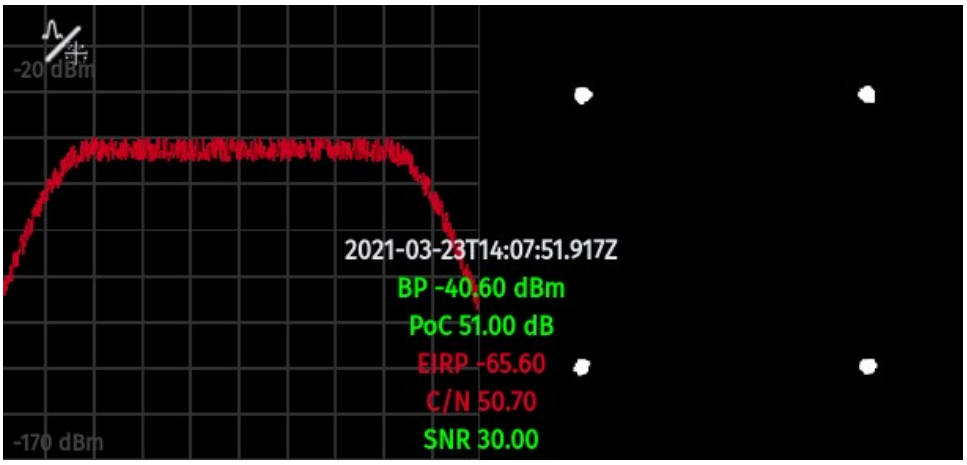


Figure 6-35 Historical Plot Toggle Button

6.3.1.1.4.3.5.3 Toolbar

The historical view toolbar consists of a mode combo box followed by the selected date label and mouse-over date label. The mode can be one of the following:

- Live Update
- Inspection
- Long Term

6.3.1.1.4.3.5.4 Live Update Mode

When you select Live Update mode, the Decimator shows the latest trace plot and continues to append analysis results to the historical analysis plots as shown in Figure 6-36. The toolbar is empty other than the mode combo box.

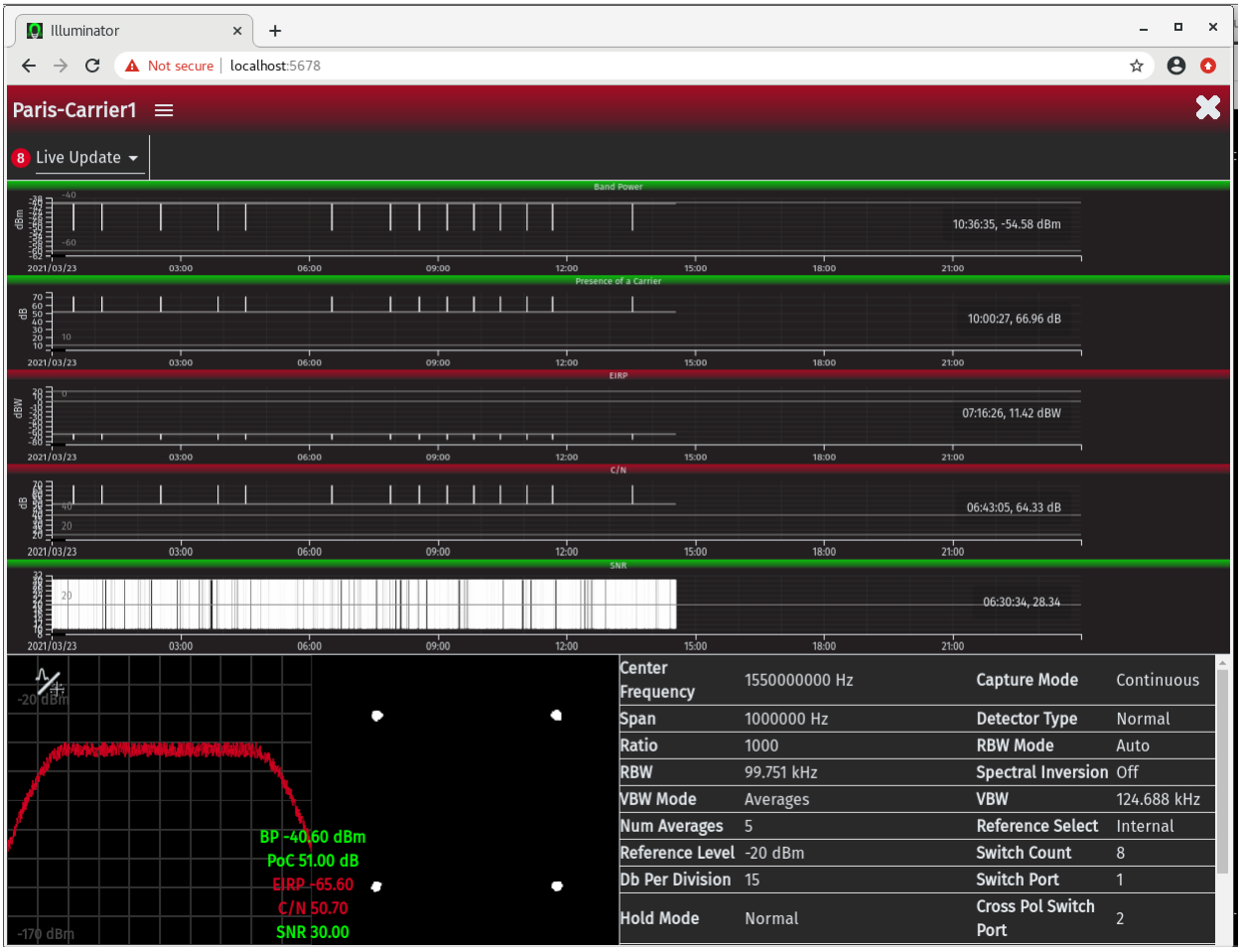


Figure 6-36 Historical Data – Live Update Mode

6.3.1.1.4.3.5.5 Inspection Mode

When you select Inspection mode, the system displays one day of analysis results in the historical analysis plots as shown in Figure 6-37.

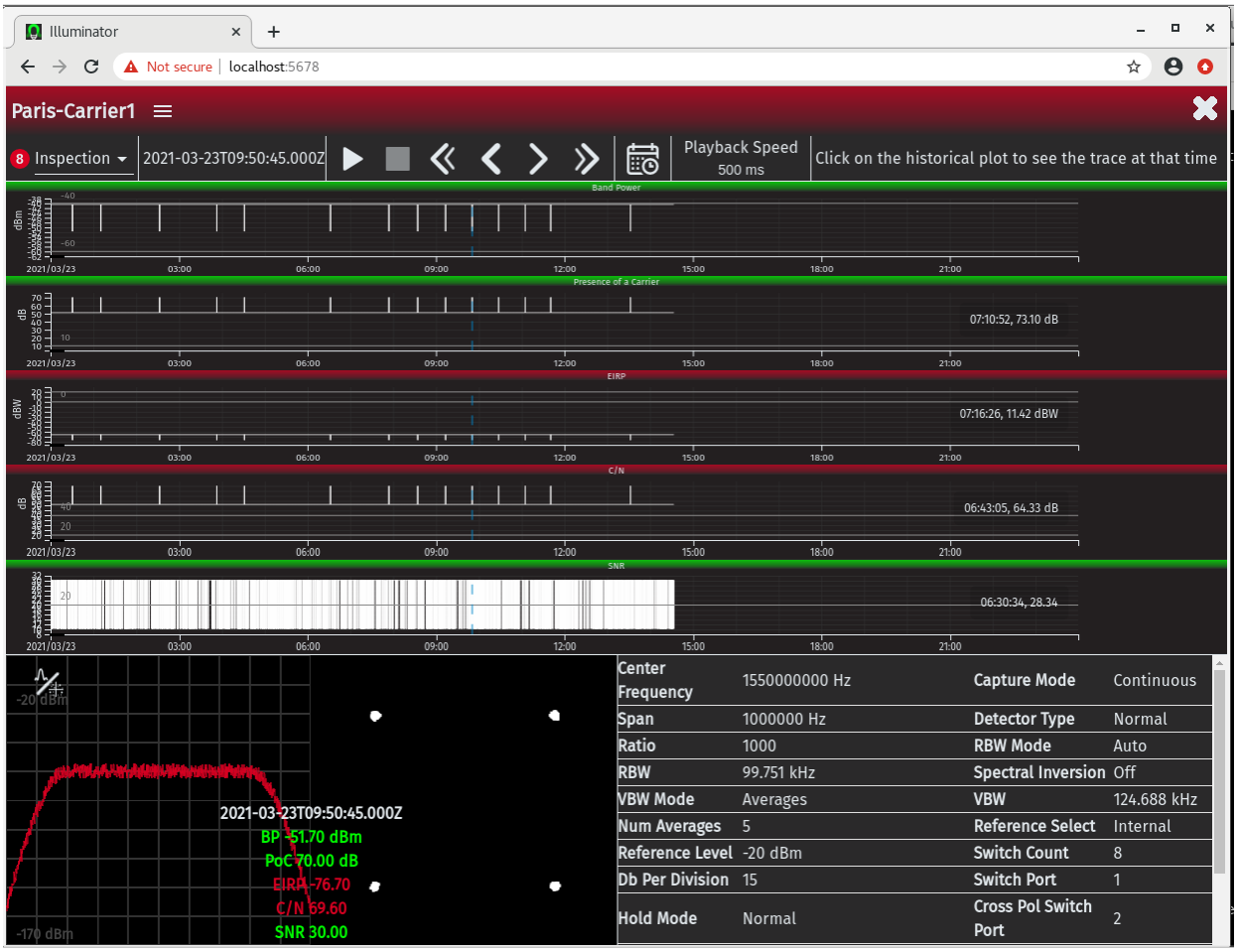


Figure 6-37 Historical Data – Inspection Mode

6.3.1.1.4.3.5.5.1 Inspection Mode Toolbar

The Inspection mode toolbar is shown in Figure 6-38.

Figure 6-38 Inspection Mode Toolbar

The toolbar provides the following items:

- Selected time: This shows the day and time of the selected time along with the day of the week.

- Play: Click this button to play the simulation at the specified playback speed starting from the currently selected time.
- Stop: Click this button to stop the simulation.
- Go to First: Click this button to select the first time in the historical analysis plots.
- Go to Previous: Click this button to select the previous time from the selected time in the historical analysis plots.
- Go to Next: Click this button to select the next time from the selected time in the historical analysis plots.
- Go to Last: Click this button to select the last time in the historical analysis plots.
- Calendar: Click this button to display a calendar. Select a day to display. Days with data are indicated with a white dot on the top right of the date.
- Playback Speed: The playback speed in milliseconds. Defaults to 500 ms. A smaller value will play faster. 500 ms is the smallest value possible. Note that small values may not perform well on older computers.
- Help icon tooltip. Mouse over to see the following below:
    - Select a time: Left click within the historical analysis plot. The charts will display a blue vertical line on the historical analysis plots and update the trace plot and/or constellation plot with the data at that time.
    - Zoom in: Mouse wheel up within the historical analysis plot centered on the point
    - Zoom out: Mouse wheel down within the historical analysis plot centered on the point
    - Pan: When zoomed in you can pan left or right by left mouse click down and moving the mouse left or right.

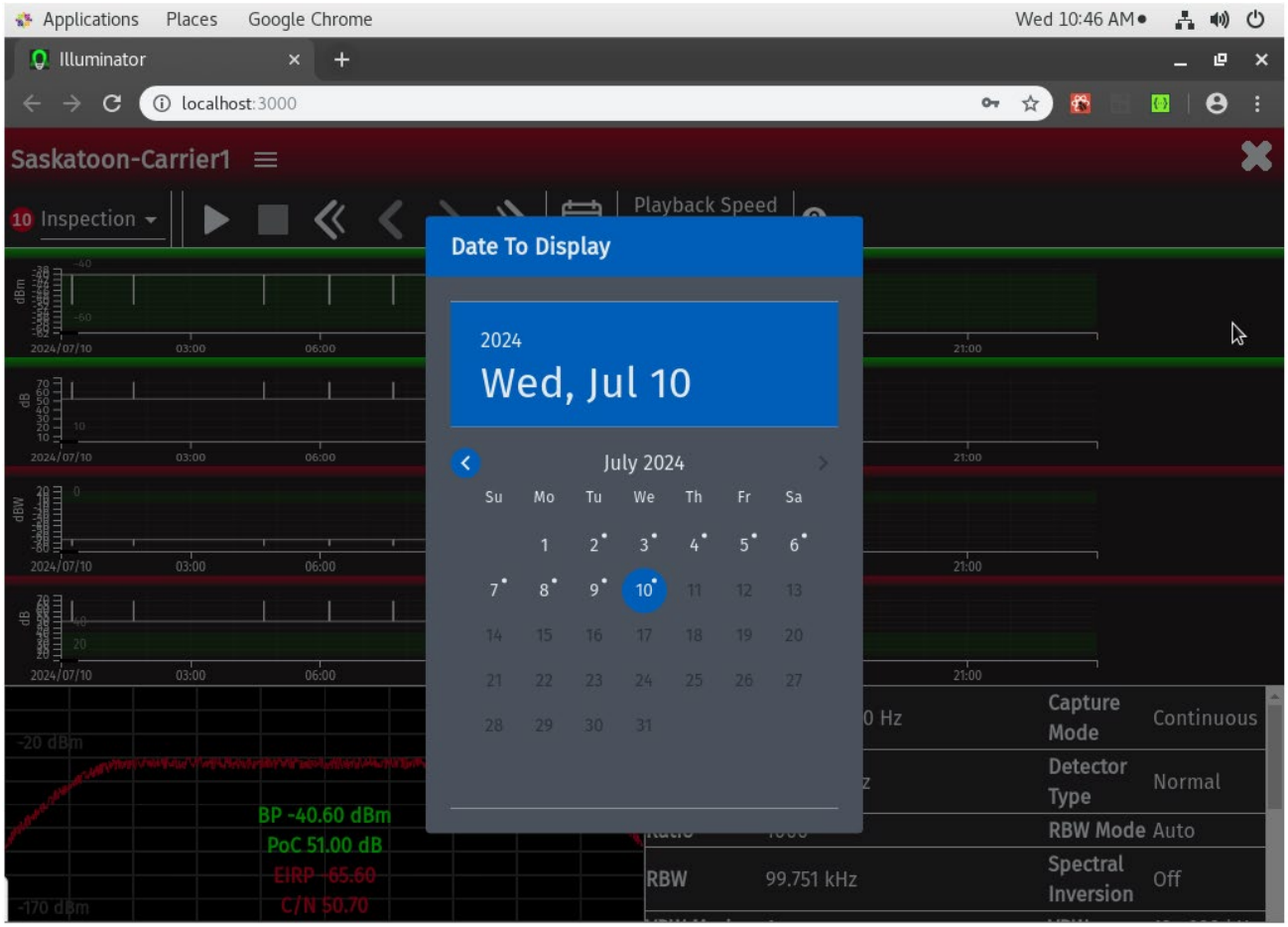


Figure 6-39 Historical Data – Inspection Mode Calendar

6.3.1.1.4.3.5.6 Long Term Mode

Long term mode is used to display historical data over more than one day, typically 30 days. It is recommended that only a few months of analysis results are plotted at a time, as retrieving larger data sets takes much longer and could cause your browser to timeout.

When you select Long Term mode, the system displays the mean (bold white trace), maximum (pink trace), and minimum (grey trace) of analysis results in time increments across a span of specified days, as shown in Figure 6-43. By default, the system displays the last 30 days from the current day, with hourly time increments.

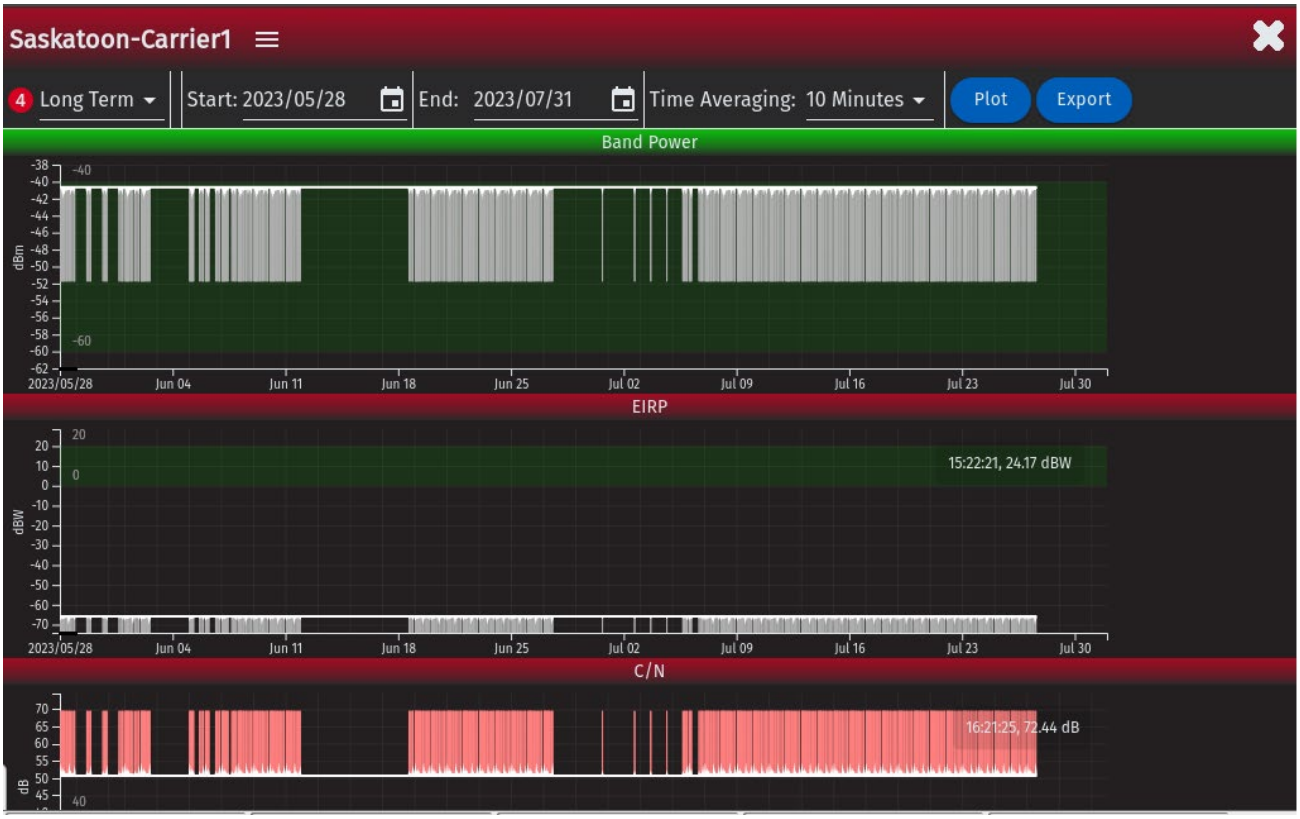


Figure 6-40 Historical Data – Long Term Mode

6.3.1.1.4.3.5.6.1 Long Term Mode Toolbar

The Long Term mode toolbar is shown in Figure 6-44.

Figure 6-41 Long Term Mode Toolbar

The toolbar provides the following items:

- Start: This shows the start date of the time range displayed on the analysis plots. Clicking the input field will display a calendar that can be used to select a new start date. By default, this is set to 30 days before the current day.
- End: This shows the start date of the time range displayed on the analysis plots. Clicking the input field will display a calendar that can be used to select a new end date. By default, this is set to the current day.

- Time Averaging: This is a combo box for selecting the time increments between each point on the analysis plots. The time increment options are as follows:
  - 10 Minutes
  - 30 Minutes
  - Hourly (default)
  - 4 Hours
  - 12 Hours
  - Daily
- Plot: Click this button to plot the current values set in the toolbar onto the analysis plots.
- Export: Click this button to download the Long Term analysis plots to an HTML file. The HTML file is shown in Figure 6-45.
- Reset: This button is only displayed if the values set in the toolbar do not match what is being displayed on the analysis plots. Click this button to reset the toolbar values back to what is being displayed on the analysis plots.

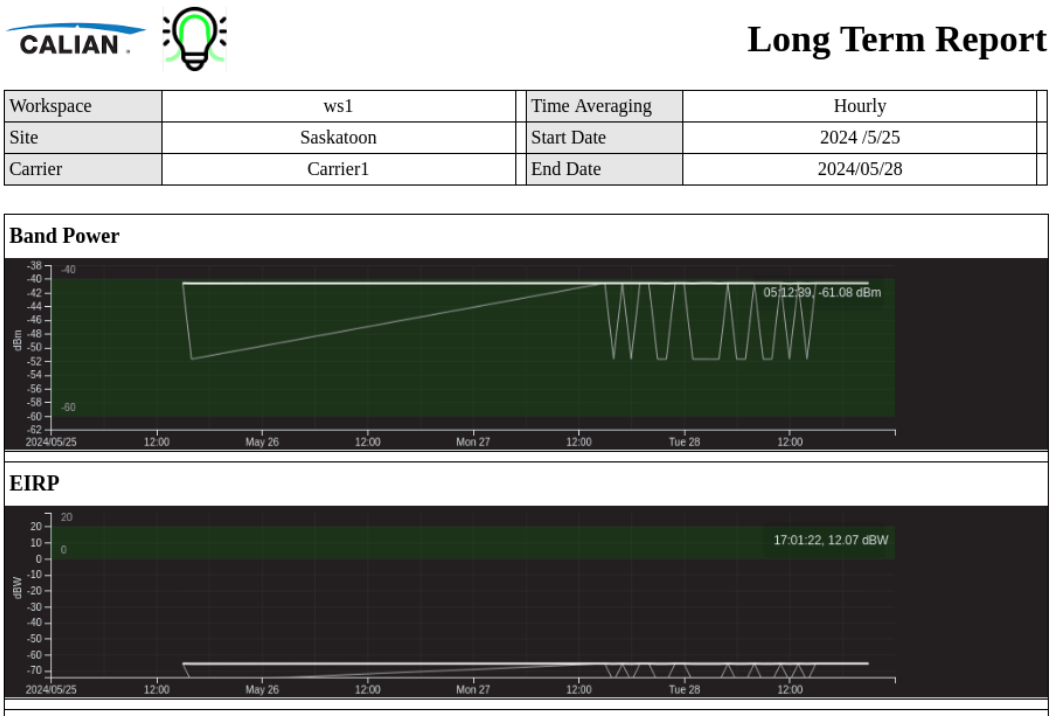


Figure 6-42 Long Term Report HTML File

6.3.2 Rotating Tiles View

The second view available in the Workspace Editor is the Rotating Tiles View. This view is analogous to the User Defined View except that multiple groups of Carrier tiles on a dashboard can be displayed. Each dashboard group has its own number of columns, and the dashboard groups rotate from one to another group based on a configurable timer. Groups can be named any anything you chose, such as using site names or something more domain specific like “Narrow Carriers” and “Wide Carriers” and any measurement tile from any site can be added to any group.

The Rotating Tiles View is shown in Figure 6-43.

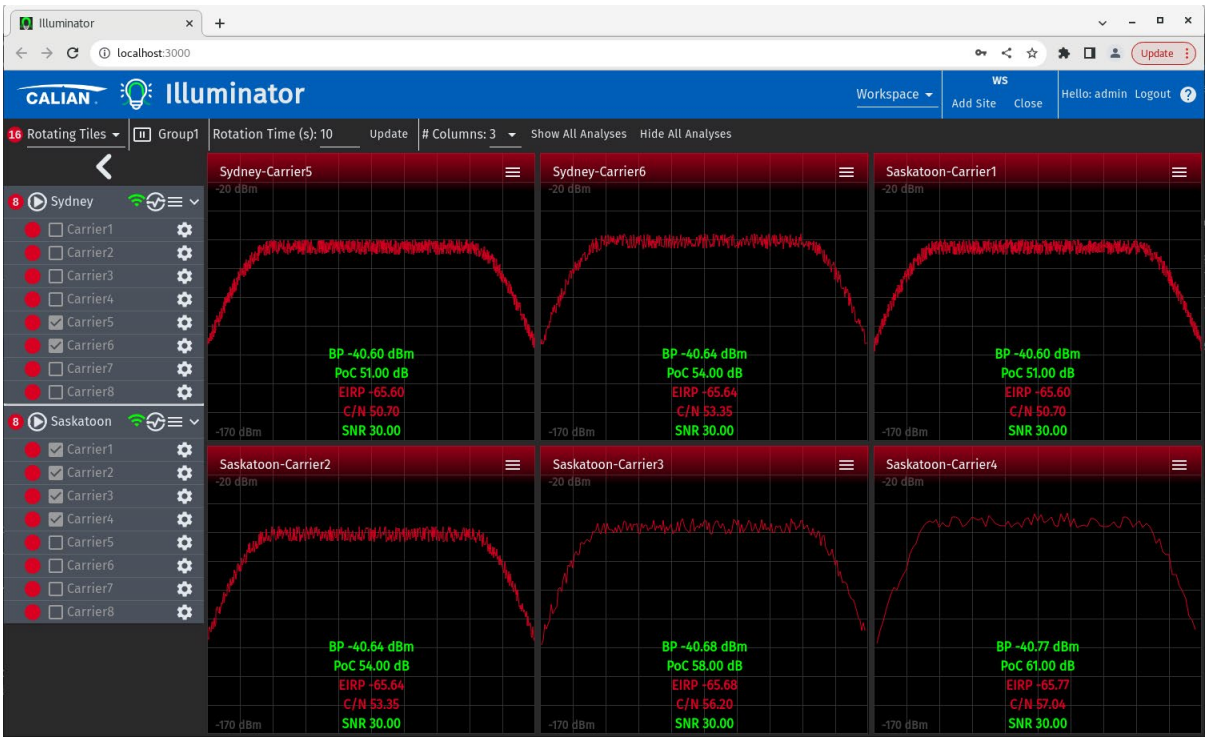


Figure 6-43 Rotating Tiles View

The view consists of a toolbar at the top, a collapsible site tree on the left and a dashboard in the middle, all analogous to the User Defined view. The rest of this section will focus on the differences between this view and the User Defined view.

The Toolbar is shown in Figure 6-44 and Figure 6-45. It has 2 layouts depending on the mode it is in.

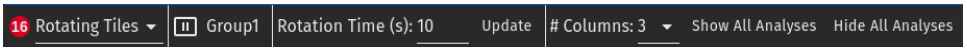
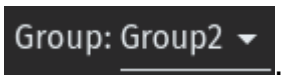
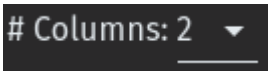


Figure 6-44 Rotating Tiles View Toolbar (When Playing / No Edits)

Figure 6-45 Rotating Tiles View Toolbar (Editing)

On the toolbar, to the right of the measurement status icon and the Rotating Tiles selection in the view dropdown, the toolbar provides the following items:

- Edit Groups / Play Through Groups toggle button: This button toggles the toolbar into Edit mode to allow users to add measurements to the dashboard for the selected Group. Since the UI is in Edit mode, the Groups will not be rotating, making it obvious for the user to know which Group the checked measurement from the tree will be added to. When in Play Through Groups mode, no editing of the groups is allowed
    - In Edit mode the button looks like  with the tooltip indicating "Start Playing Groups". Clicking this button will take you back to playing mode. In Edit mode, the checkboxes for each measurement in the collapsible site tree are enabled and three additional buttons are added to the toolbar:
        -  Add a group
        -  Rename the selected group
        -  Delete the selected group
    - In Play Through Groups mode the button looks like  with the tooltip indicating "Edit Groups". Clicking this button will take you back to Edit mode. In Play Through Groups mode, the measurements in the shown group are displayed and updated. Each group will be rotated to show the next group and its associated carrier tiles based on a timed interval specified by the Rotating Time entry field.
- Group Name: This shows the selected group name  . When editing groups, this label becomes a dropdown, allowing users to select which group they want to display. All the carrier tiles in the group are displayed in the dashboard on the bottom right.
- Rotation Time and Update button: This controls the time in seconds to rotate the groups from one to another  . Users can adjust the time and click the Update button to commit the new time. This is only visible when in Play Through Groups mode.

- # Columns: This specifies the number of columns 

in the tiled dashboard for the selected group. Each group has its own number of columns.
- Show All Analyses: This button 

shows all the analysis results overlaid on the carrier tiles.
- Hide All Analyses: This button 

hides all the analysis results from being displayed on the carrier tiles.

The following activities are described in the subsequent sections:

- Toggling Between Edit Groups Mode and Play Through Groups Mode
- Adding a Rotating Group
- Renaming a Rotating Group
- Deleting a Rotating Group
- Adding a Carrier Tile to the Dashboard Within a Rotating Group
- Removing a Carrier Tile from the Dashboard Within a Rotating Group
- Modifying the Rotation Time Between Rotating Groups
- Modifying the Number of Columns on the Dashboard in a Rotating Group
- Show All Analyses
- Hide All Analyses

6.3.2.1 Toggling Between Edit Mode and Play Through Groups Mode in the Rotating Tiles View

Toggling to Edit mode  allows the user to make modifications to the Groups. Toggling back to Play Through Groups mode  allows the groups to be rotated based on the configured rotating timer. Without this feature, users would be trying to add a Carrier Tile to the selected group and the selected group could be in the process of rotating to the next group, making it difficult to control. In Edit mode, the measurement items in the tree have their checkboxes enabled, while in Play Through Groups mode, they are disabled.

6.3.2.2 Adding a Rotating Group in the Rotating Tiles View

To add a group in the rotating tiles view:

- Enter edit mode
- Click the Add group button  on the toolbar
- In the Add Group dialog, enter the new group name and click OK
- The New group appears in the Group dropdown

6.3.2.3 Renaming a Rotating Group in the Rotating Tiles View

To rename a group in the rotating tiles view:

- Enter edit mode
- Click the Rename group button  on the toolbar
- In the Rename Group dialog, enter the new group name and click OK
- The group name is modified in the Group dropdown

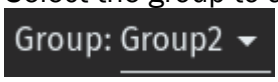
6.3.2.4 Deleting a Rotating Group from the Rotating Tiles View

To delete a group in the rotating tiles view:

- Enter edit mode
- Click the Delete group button  on the toolbar
- In the Delete Group confirmation, click yes
- The group is removed from the Group dropdown

6.3.2.5 Adding a Carrier Tile to the Dashboard Within a Rotating Group

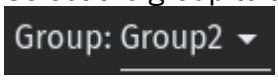
To add a carrier tile to a group in the rotating tiles view:

- Enter edit mode
- Select the group to add the carrier tile to on the toolbar using the Group Dropdown 

- In the collapsible site tree on the left, find the carrier you want to add to the group and click its checkbox
- The carrier tile is added to the group dashboard

6.3.2.6 Removing a Carrier Tile from the Dashboard Within a Rotating Group

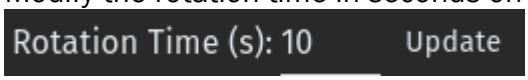
To remove a carrier tile from a group in the rotating tiles view:

- Enter edit mode
- Select the group to add the carrier tile to on the toolbar using the Group Dropdown 

- In the collapsible site tree on the left, find the checked carrier you want to remove to the group and click the checkbox to uncheck it
- The carrier tile is removed from the group dashboard

6.3.2.7 Modifying the Rotation Time Between Rotating Groups

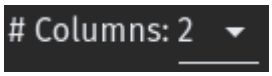
To modify the rotating time in the rotating tiles view:

- Enter play through rotating mode
- Modify the rotation time in seconds on the rotating time entry field
  

- Click Update
- The Illuminator display rotates between groups every so many of these configured seconds

6.3.2.8 Modifying the Number of Columns on the Dashboard in a Rotating Group

To modify the number of columns on the dashboard in a rotating group in the rotating tiles view:

- Select a new number of columns from the # Columns dropdown
  

- The number of columns is automatically adjusted on the dashboard
- Note that each group has its own number of columns

6.3.2.9 Show All Analyses

To show all the analyses overlay information on all the tiles in the rotating tiles view:

- Click on Show All Analyses button 

  on the toolbar
- The Illuminator shows all the analyses results overlaid on the carrier tiles

6.3.2.10 Hide All Analyses

To hide all the analyses overlay information from all the tiles in the rotating tiles view:

- Click on Hide All Analyses button 

  on the toolbar
- The Illuminator hides all the analyses results from being rendered on the carrier tiles

6.3.3 Active Alarm View

The third view available in the Workspace Editor is the Active Alarm View. It shows all carriers in all sites that are in alarm state in a graphical view. This is shown in Figure 6-46.

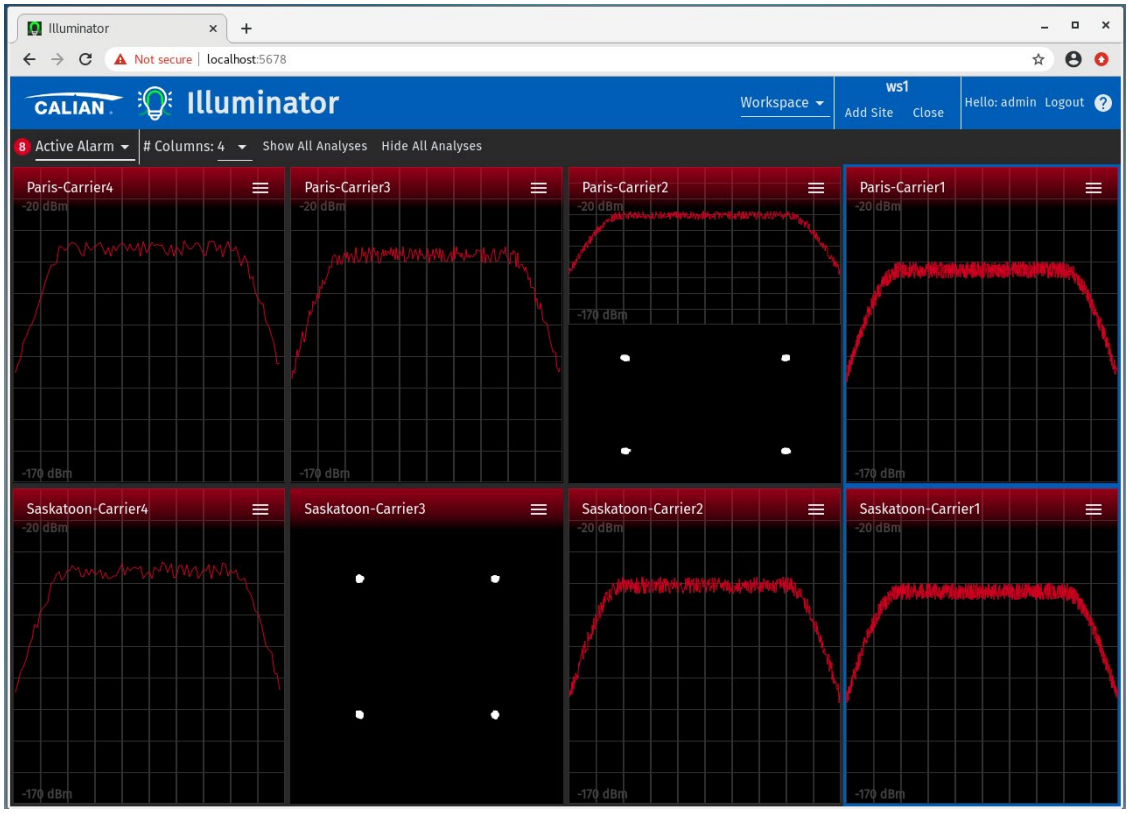


Figure 6-46 Active Alarm Graphical View

Note: You can also view the Active Alarms in tabular format using the Logs | Active Alarm view.

6.3.4 Historical Alarm View

The fourth and last view available in the Workspace Editor is the Historical Alarm View. It shows all carriers in all sites that are in alarm state in a graphical view along with any carrier that was in alarm over an interval (in the case in the figure since the last 12 hours). In the case below there are no carriers that have been in alarm in the last 12 hours and are not in alarm anymore. This is shown in Figure 6-47.

Figure 6-47 Historical Alarm Graphical View

The Carrier Tiles are ordered as follows:

- Carriers still in alarm state (red) with the most recent alarm state change to failed first, then the rest of the failed alarms
- Carriers that were in alarm state over the interval specified, with the first one being the latest one to be triggered into healthy state and the last one being the longest in healthy state

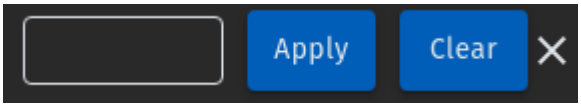
Note: You can also view the Historical Alarms in tabular format using the Logs | Historical Alarm view.

6.4 General Table Functions

The next 2 sections, Logs and Data use tabular data to view system information. Users can view and control the following standard table features as shown in Figure 6-48:

Figure 6-48 Typical General Table Functions Window

- Select individual rows or all rows with the checkbox
- Query on items in a particular column using the magnifying glass
  - 
- Filter time range on this data
  - 

- Search for data
  - 
  - 

    - Entering a value in the text box filters only the rows which contain that text
- Copy selected rows to the clipboard
  - 
- Download selected rows to a file in the Downloads folder
  - 

6.5 Logs

Log views show tabular view of logs in the system.

6.5.1 Active Alarm

Active alarms can be viewed in tabular format for the workspace as shown in Figure 6-49.

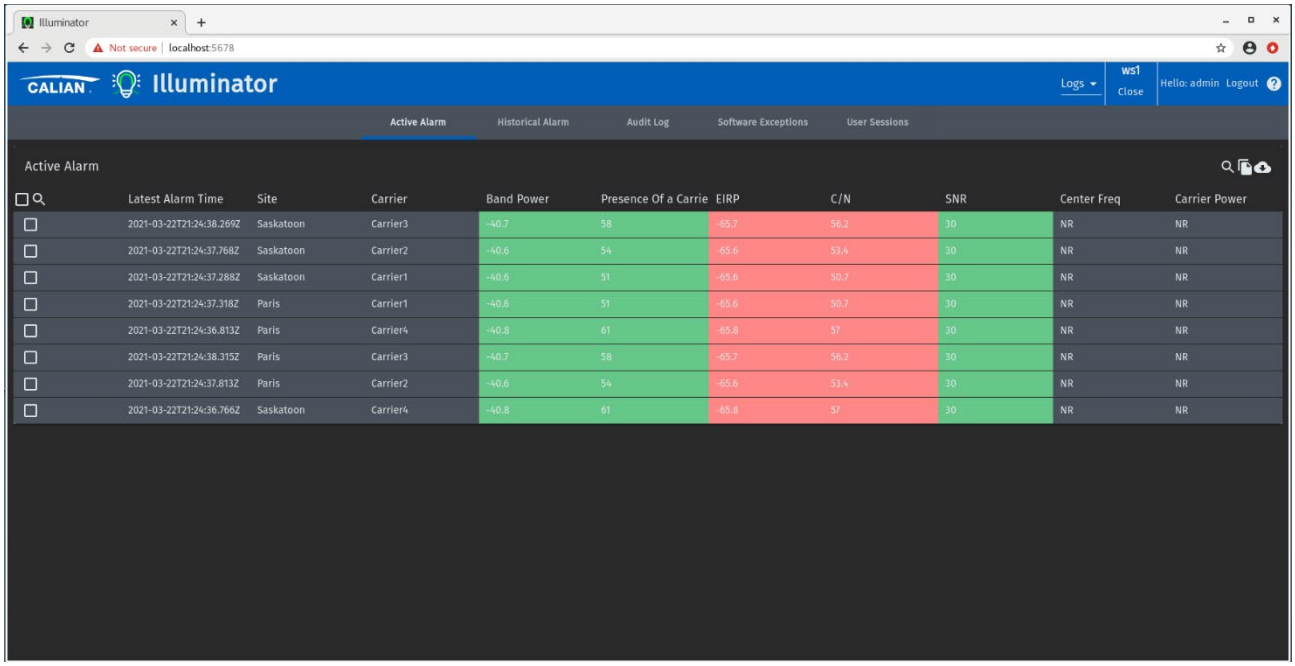


Figure 6-49 Active Alarms Tabular View

The table contains the following columns:

- Selection checkbox
- Latest Alarm Time
- Site
- Carrier
- Band Power – the value and colored by analysis result status
- Presence of a Carrier – the value and colored by analysis result status
- EIRP – the value and colored by analysis result status
- C/N – the value and colored by analysis result status
- SNR – the value and colored by analysis result status
- Center Frequency – the value and colored by analysis result status
- Carrier Power – the value and colored by analysis result status

Users can specify the following standard table features:

- Select individual rows or all rows
- Search for data
- Copy selected rows to the clipboard
- Download selected rows to the Downloads folder

6.5.2 Historical Alarm

Historical alarms can be viewed in tabular format for the workspace as shown in Figure 6-50.

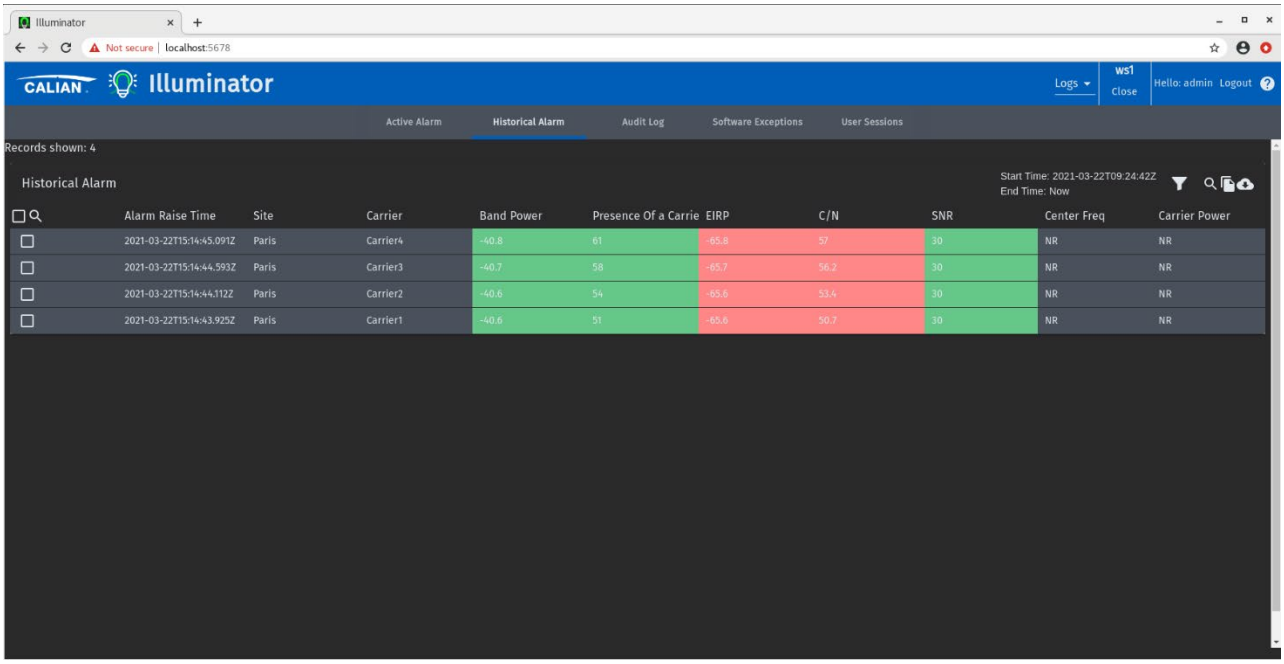


Figure 6-50 Historical Alarms Tabular View

The table contains the following columns:

- Selection checkbox
- Latest Alarm Time
- Site
- Carrier
- Band Power – the value and colored by analysis result status
- Presence of a Carrier – the value and colored by analysis result status
- EIRP – the value and colored by analysis result status
- C/N – the value and colored by analysis result status

- SNR – the value and colored by analysis result status
- Center Frequency – the value and colored by analysis result status
- Carrier Power – the value and colored by analysis result status

Users can specify the following standard table features:

- Select individual rows or all rows
- Filter time range on this data
- Search for data
- Copy selected rows to the clipboard
- Download selected rows to the Downloads folder

6.5.3 Audit Log

User activity that changes system configuration is stored and is viewable in the Audit Log as shown in Figure 6-51.

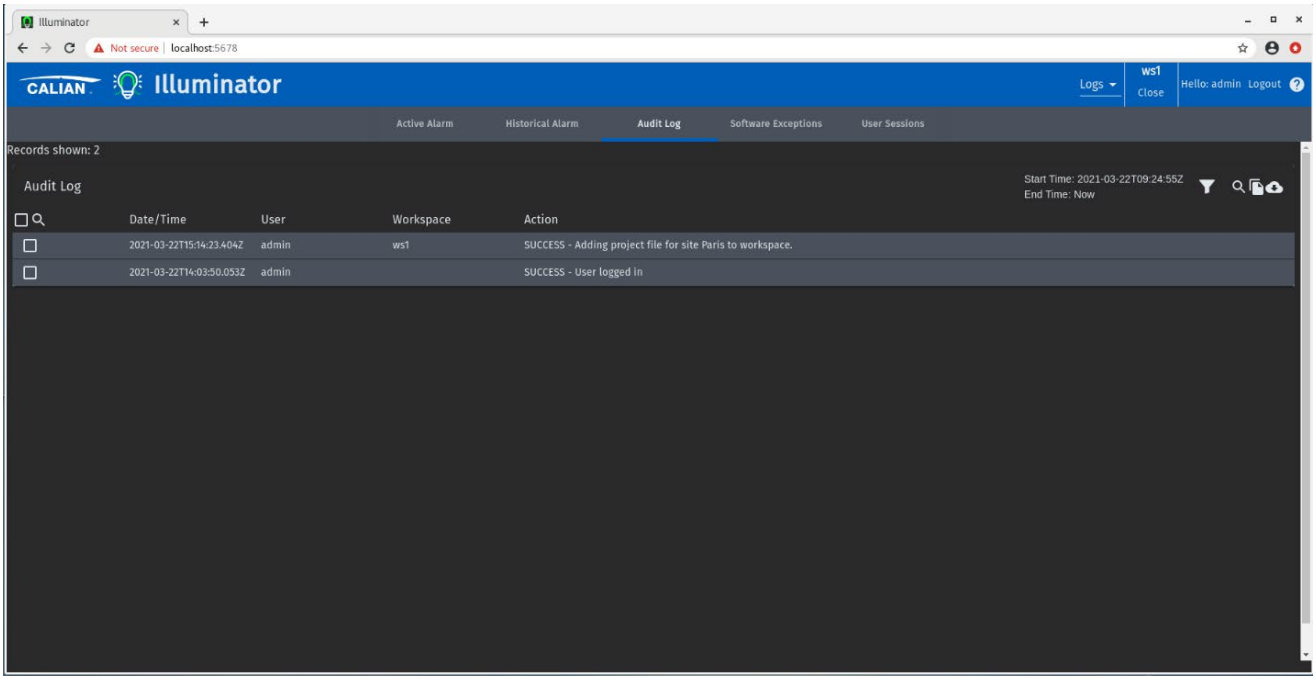


Figure 6-51 Audit Log

The table contains the following columns:

- Selection checkbox
- Date/Time

- User
- Workspace
- Action

Users can specify the following standard table features:

- Select individual rows or all rows
- Filter time range on this data
- Search for data
- Copy selected rows to the clipboard
- Download selected rows to the Downloads folder

Only Administrator and Read/Write role users have access to this view.

6.5.4 Software Exceptions

Any abnormal software problems are stored and are viewable in the Software Exceptions Log as shown in Figure 6-52.

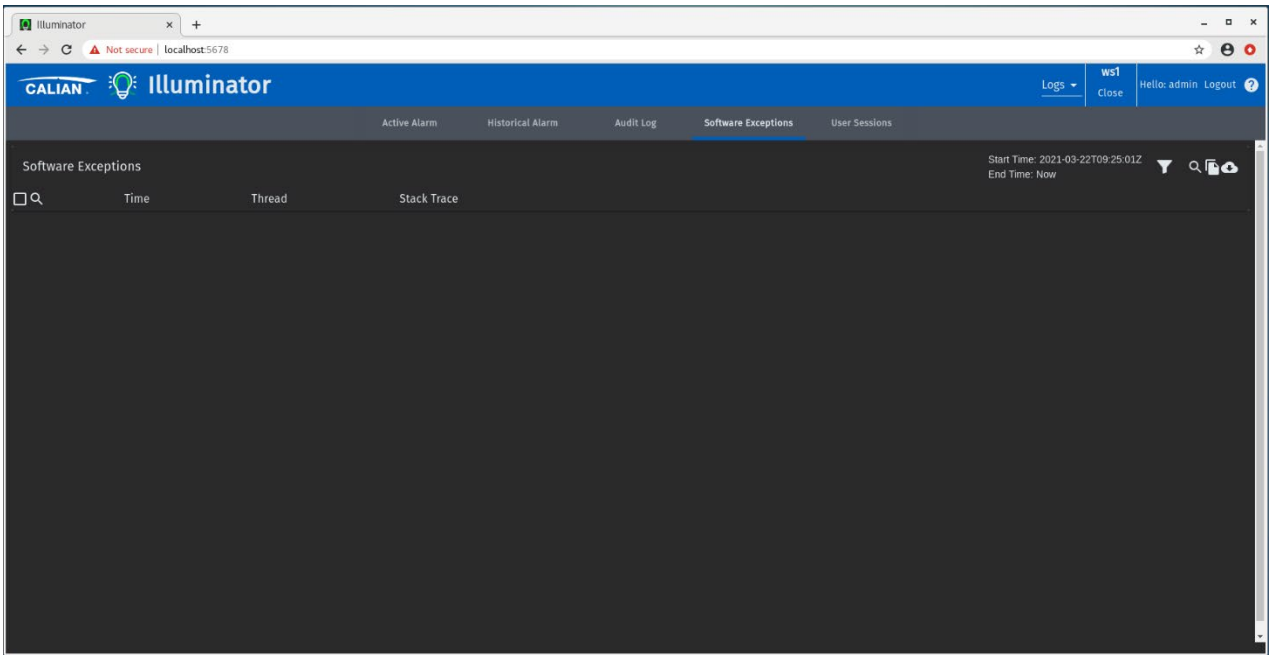


Figure 6-52 Software Exceptions Log

The table contains the following columns:

- Selection checkbox
- Time

- Thread
- Stack Trace

Users can specify the following standard table features:

- Select individual rows or all rows
- Filter time range on this data
- Search for data
- Copy selected rows to the clipboard
- Download selected rows to the Downloads folder

Only Administrator and Read/Write role users have access to this view.

6.5.5 User Sessions

Users who are logged into the Illuminator are shown in the User Sessions Log as shown in Figure 6-53.

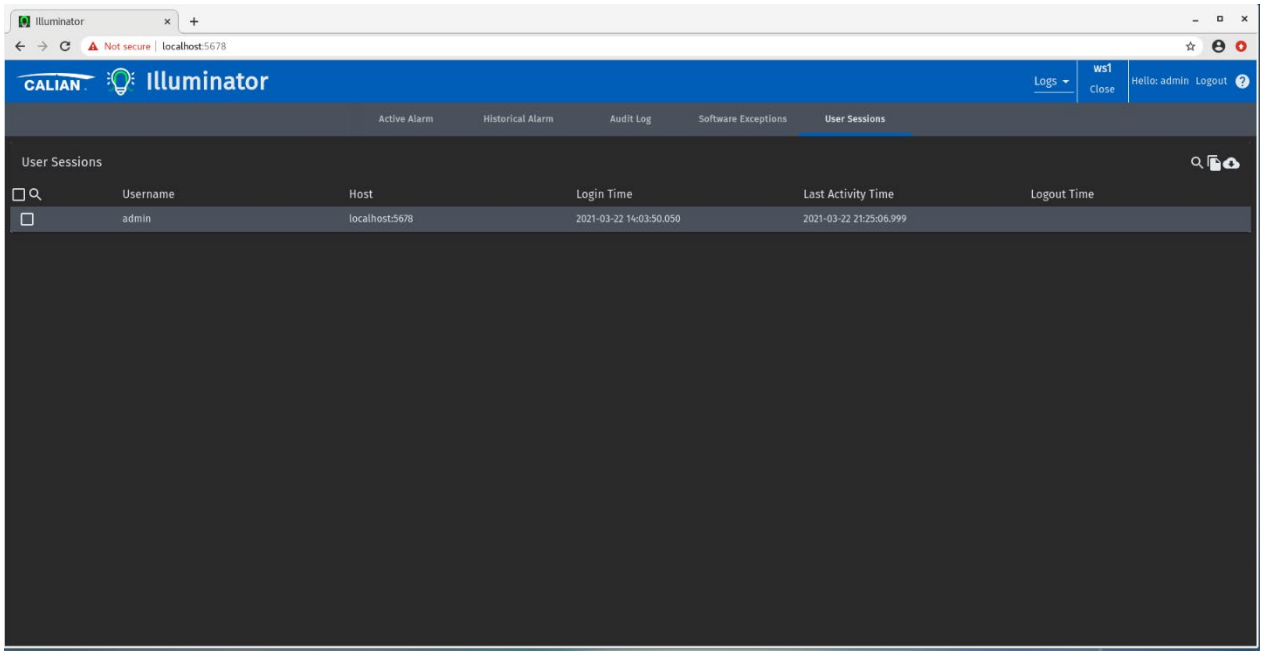


Figure 6-53 User Sessions Log

The table contains the following columns:

- Selection checkbox
- Username
- Host

- Login Time
- Last Activity Time
- Logout Time – blank if the user is still logged in

Users can specify the following standard table features:

- Select individual rows or all rows
- Search for data
- Copy selected rows to the clipboard
- Download selected rows to the Downloads folder

Only Administrator and Read/Write role users have access to this view.

6.6 Data

Data menu provides mechanisms to view and configure the time series dependent measurement results.

6.6.1 QoS Report

Users can compute the QoS for a carrier or a series of carriers over an interval of time as shown in Figure 6-54.

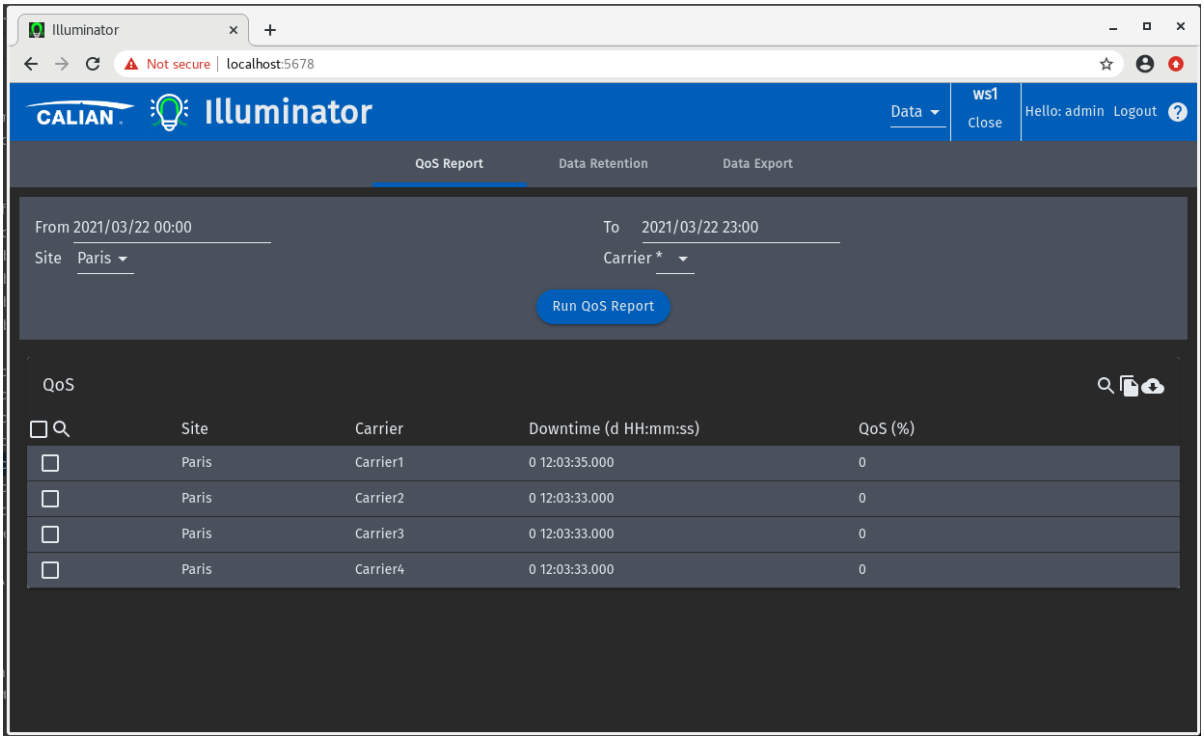


Figure 6-54 QoS Report

Set the following:

- Start time
- End time
- Site
- Carrier

Click “Run QoS Report”. This may take several minutes and may time out. If so, enter one carrier and narrow your time range.

The results table shows the following columns:

- Selection Checkbox
- Site
- Carrier
- Downtime in (days hours minutes seconds milliseconds)
- QoS as a %

Only Administrator role users have access to this view.

6.6.2 Data Retention

Measurement data resides on disk and stored in the InfluxDB database. Users can configure how many days this measurement data will persist on disk before it is purged as shown in Figure 6-55. The range is 7 days to 1825 days (5 years).

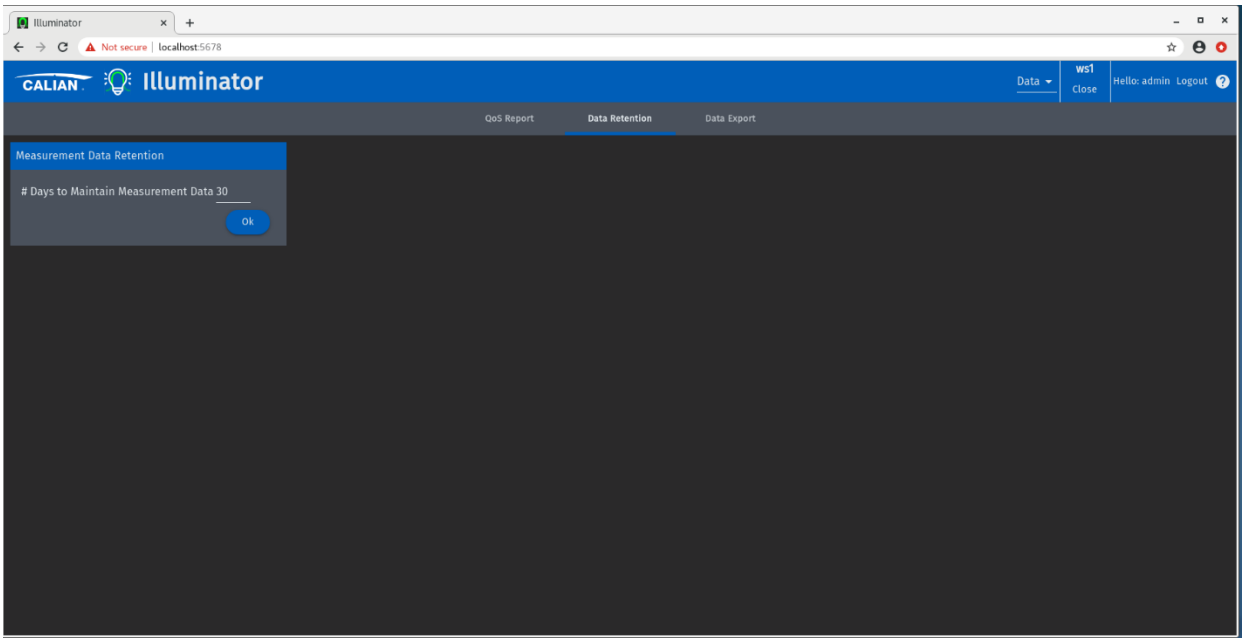


Figure 6-55 Data Retention

Set the number of days to maintain measurement data and click OK. If changes are made to shorten the data retention, it may take several hours for the system to start purging old data.

Only Administrator role users have access to this view.

6.6.3 Data Export

The Illuminator provides 2 forms of data export as shown in Figure 6-56.

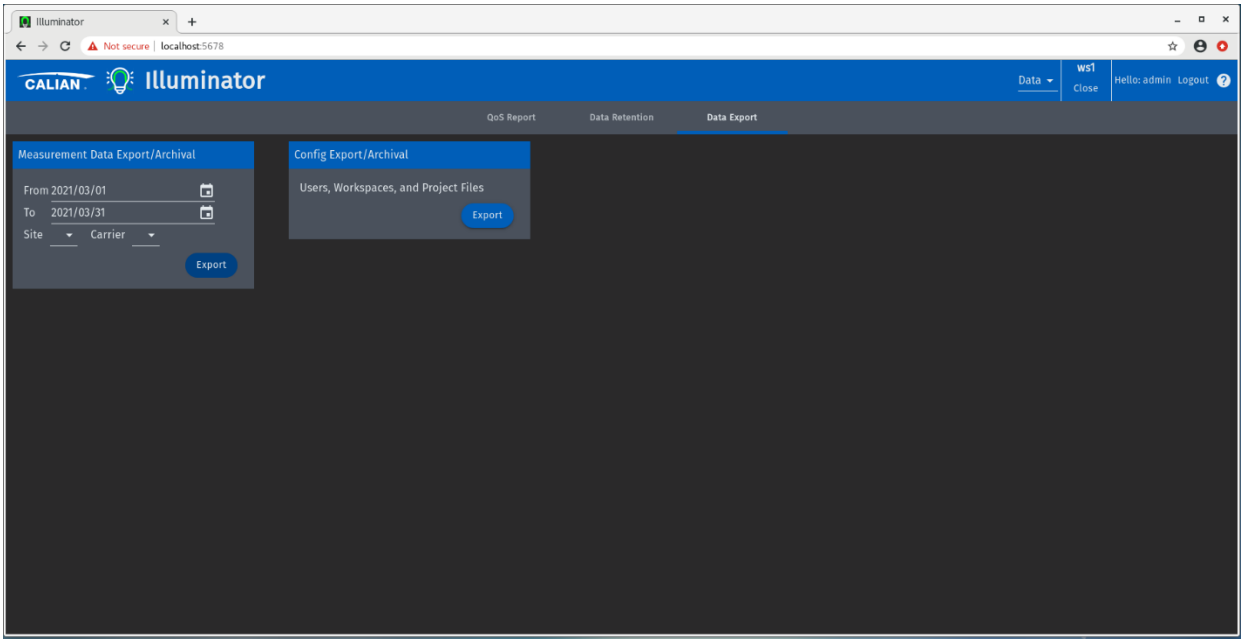


Figure 6-56 Data Export

- Users can export measurement data by specifying the Site and Carrier and along with a time range and clicking the Export button
  - This is exported to CSV files in a zip file format to the Downloads directory
  - Be careful not to export too much data, as this is throttled by the system to not put too much stress on the database
- Users can export the Config Database
  - This exports a series of CSV files combined into a zip file format to the Downloads directory

Only Administrator role users have access to this view.

6.7 User Management

User Management allows administrators the ability to add, edit and delete users as shown in Figure 6-57. Only admin users can enter this area.

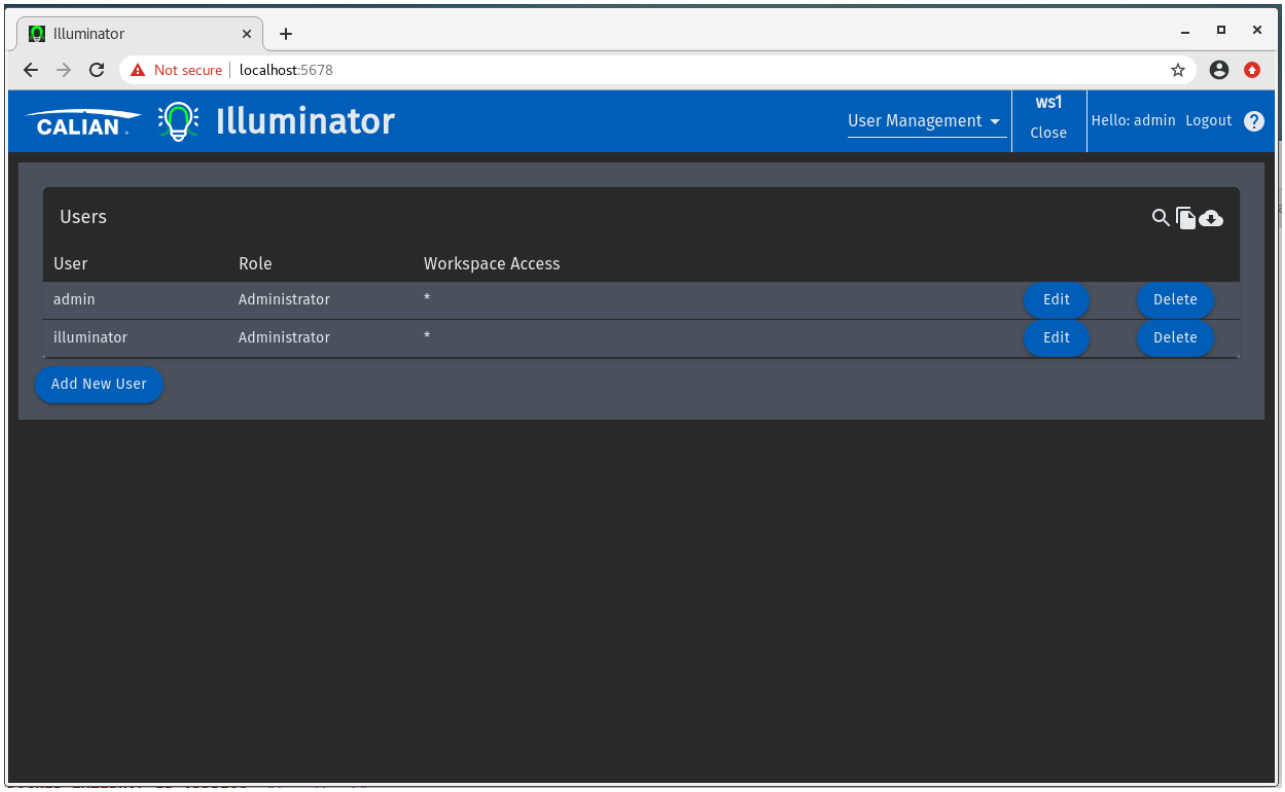


Figure 6-57 User Management

Out of the box, 2 users are provided to you: admin and illuminator

- User 1
  - User: admin
  - Password: admin
- User 2
  - User: illuminator
  - Password: illuminator

6.7.1 The illuminator User

The illuminator user is a special user that is used in the interaction between the Illuminator central site and the remote Decimators. Do not delete this user.

Important: You also need to ensure that the illuminator user and same password that is specified here are on each remote Decimator.

6.7.2 Add User

Admins can add users by clicking on the “Add New User” button on the User Management view as shown in Figure 6-58.

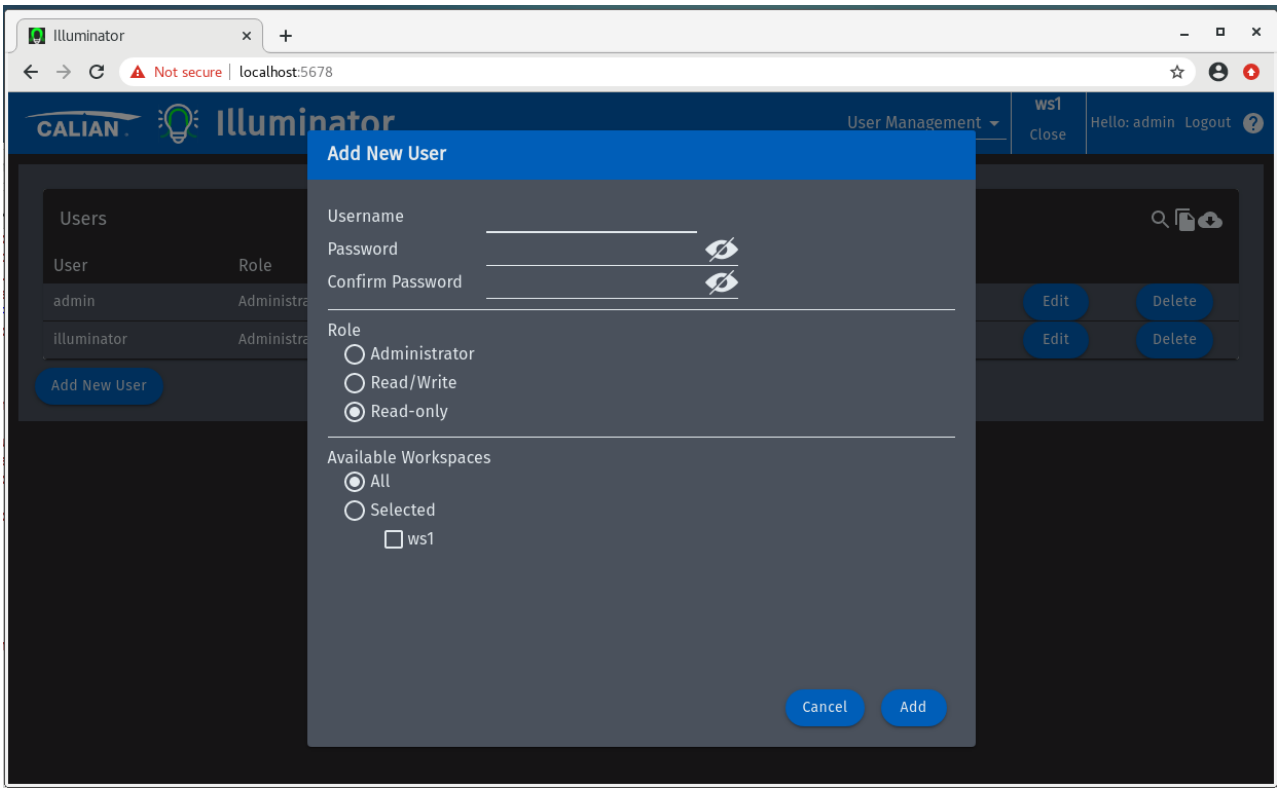


Figure 6-58 Add User

The Add New User dialog appears. Enter:

- Username
- Password
- Confirm Password
- Role
- Available Workspaces that the user can have access to

6.7.3 Edit User

Admins can edit existing users by clicking on the “Edit” button on the user row to edit in the User Management view as shown in Figure 6-59.

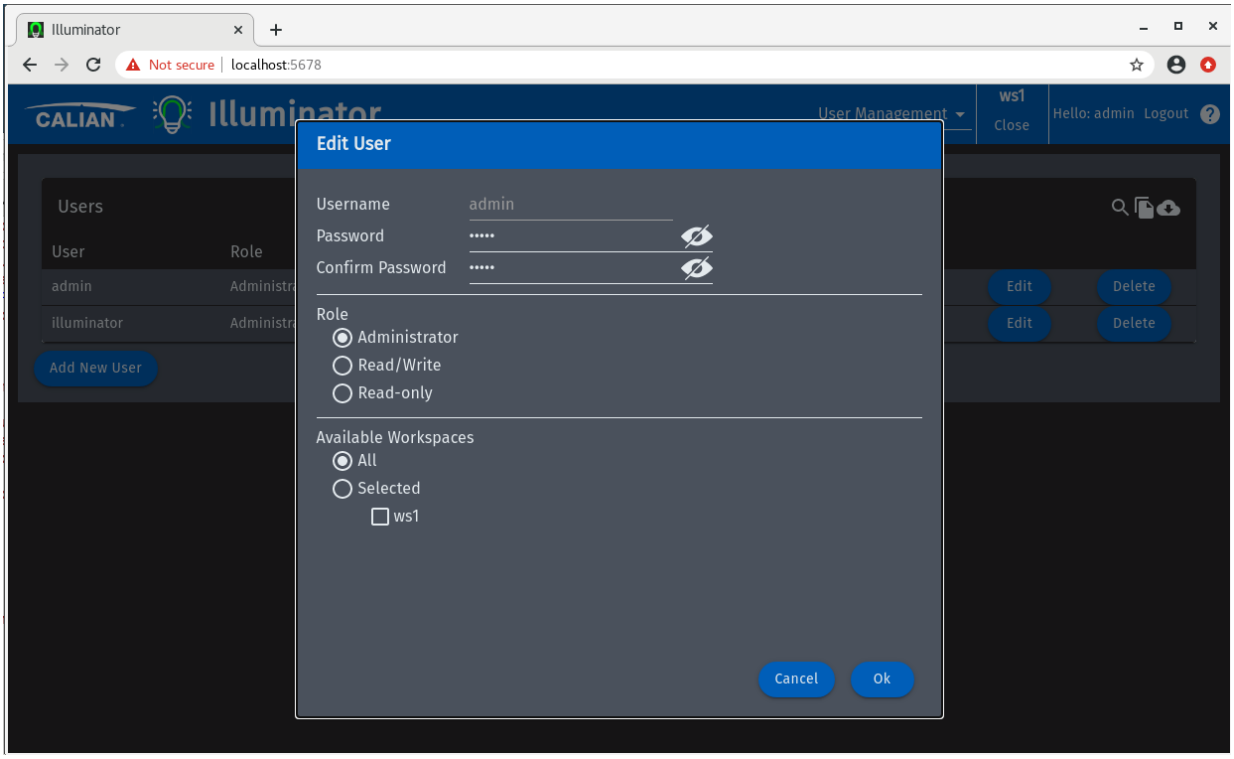


Figure 6-59 Edit User

The Edit User dialog appears. Enter:

- Password
- Confirm Password
- Role
- Available Workspaces that the user can have access to

6.7.4 Delete User

Admins can delete existing users by clicking on the “Delete” button on the user row to edit in the User Management view as shown in Figure 6-60.

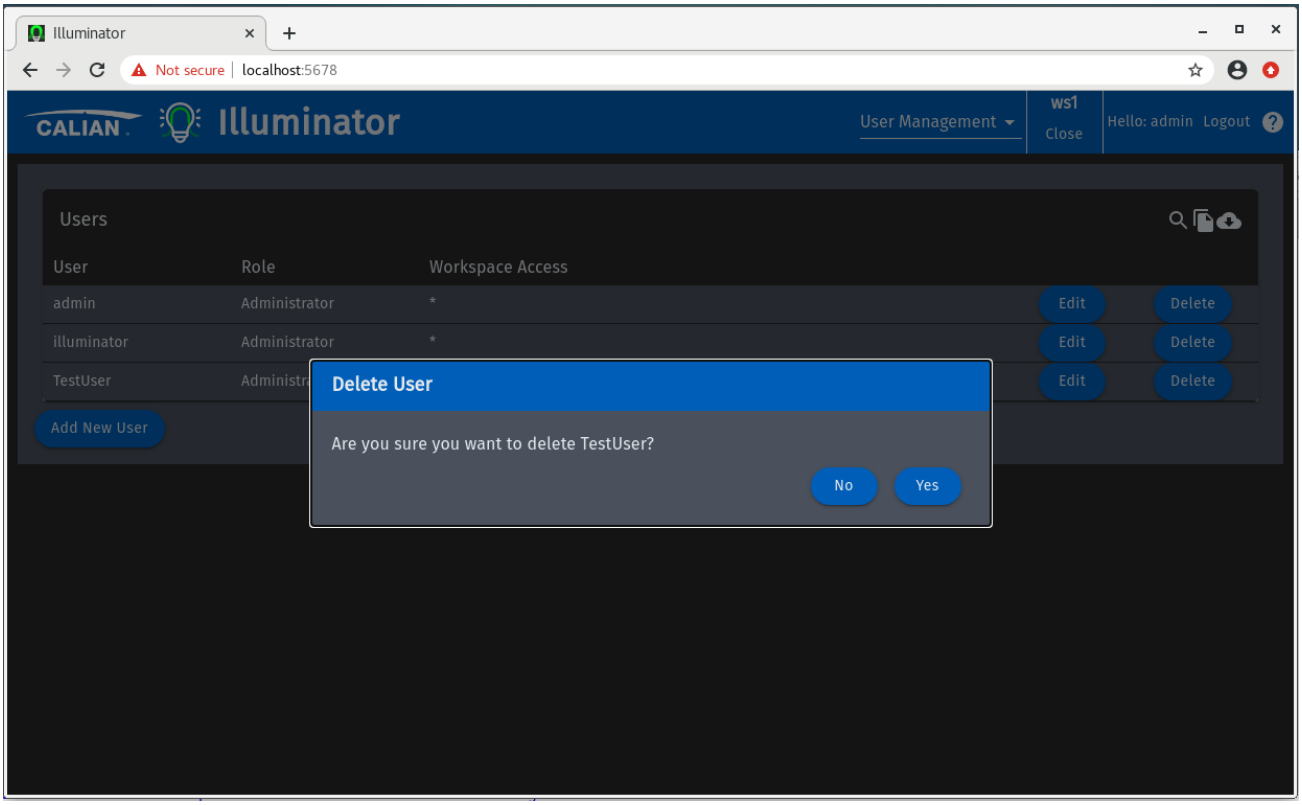


Figure 6-60 Delete User

The confirmation dialog appears. Click Yes to delete the user.

Notes:

- You cannot delete the last admin role user
- You cannot delete the illuminator user since it is a reserved user
- You cannot delete yourself

6.8 Certificates

The Illuminator provides a mechanism for viewing the currently loaded self-signed certificate (the expiry date) and generate a new self-signed certificate as shown in Figure 6-61.

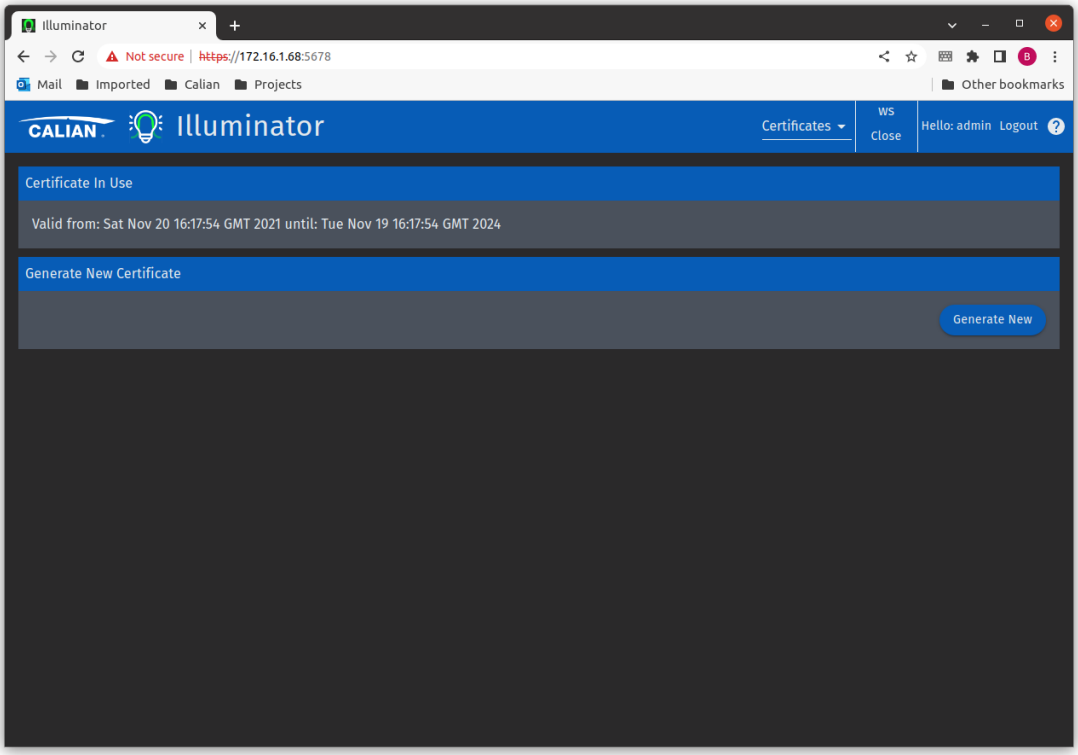


Figure 6-61 Certificates

To generate a new self-signed certificate, click the Generate Certificate button. After a few seconds, the proposed new certificate's expiration date is presented on the Certificates page.

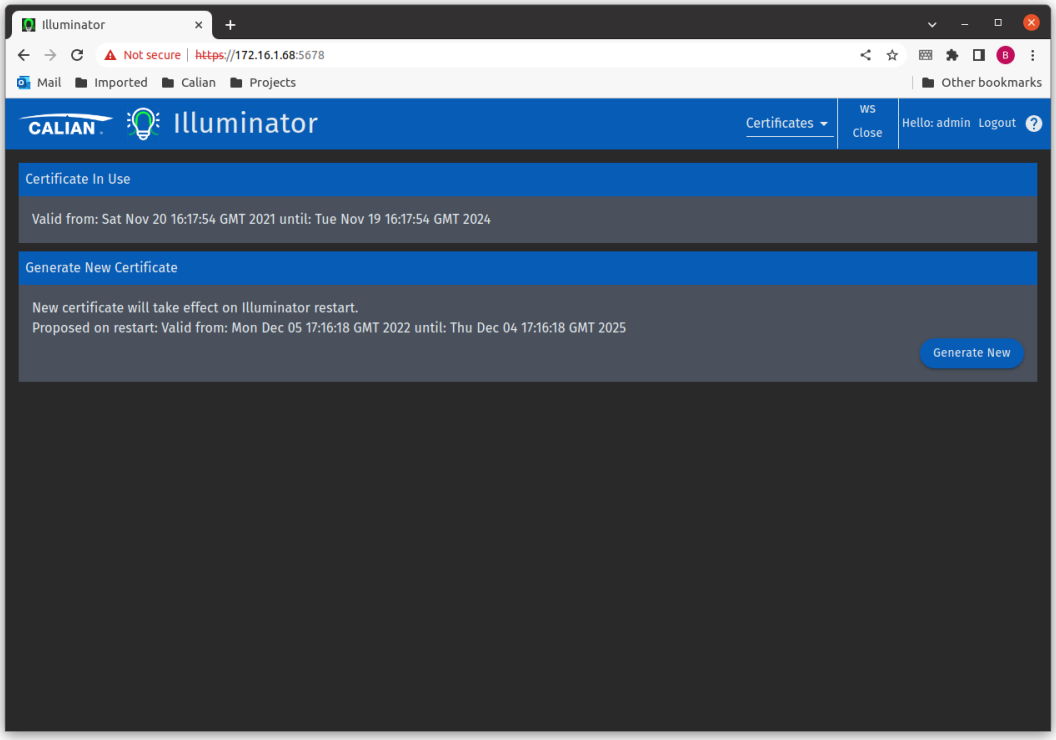


Figure 6-62 Generating a New Certificate

Note: This certificate will be used after the next reboot of the Illuminator. See the start and stop Illuminator sections.

Only Administrator role users have access to this view.

6.9 Web API

Some users may not want to use the Illuminator user interface but drive the Illuminator and remote Decimators via a REST API and receive updates via a WebSocket.

This information can be provided by Calian for users wishing to integrate the Illuminator into their own Carrier Monitoring systems on their network already.

6.10 Authorization Mappings (Roles / Functions)

The following roles are available on the Illuminator:

- Administrator
- Read/Write
- Read-Only

Any function that can be performed by Read-Only users, can be performed by all users.

Any function that can be performed by Read/Write users, can be performed by Read/Write users and Administrator users.

Only Administrator users can perform Administrator functions.

Table 6-1 shows the Role to Function Mapping required.

Table 6-1 Role to Function Mapping

Role	UI Functions	Web API Functions Allowed
Administrator	Audit Log Certificates Data Export DB Cfg Licence Retention Policy User Management User Sessions	addUser deleteUser editUser getAllSessions getAllUsers getCertificate generateCertificate getRetentionPolicy saveCertificate setLicence setRetentionPolicy switchCertificate testCertificate
Read/Write	Add Site Add Workspace Configure Dashboard Carrier Tiles Data Export Measurements Delete Site Delete Workspace Edit Site Network Get Device Licence Reimport Project File Set Number of Columns in Workspace Dashboard Start Carrier Monitoring Stop Carrier Monitoring SW Exception Log	addProjectFileToWorkspace addMeasurement addWorkspace deleteProjectFileFromWorkspace deleteWorkspace editProjectFileNetwork getDeviceLicence reimportProjectFileToWorkspace setUserDefinedTiles setWorkspaceNumCols startCm stopCm

Table 6-1 Role to Function Mapping

Role	UI Functions	Web API Functions Allowed
Read-Only	Compute QoS Download Project File Get Active Alarms Get Historical Alarms Ping Remote Site Test Round Trip Connection View Historical Data View Workspace	computeQos configExport dataExport dataExportNumRecords downloadProjectFile getActiveAlarms getActiveAlarmsWithTrace getAllWorkspaces getAuditLog getDeviceLicence getHistoricalAlarmLog getHistoricalAlarmsWithTrace getHistoricalMeasurements getMeasurement getMeasurementsForPlayback getSwExceptionsLog getWorkspaceSiteCarriers getWorkspaceStatus isLicenceInstalled openWorkspace pingRemoteSite testRoundTripConnectionStart testRoundTripConnectionEnd userDefinedReload
No Role required	Login Logout	login logout getVersion resetAdminUserAndLicence isLicenceInstalled