



Clarius USB Transmitter Compliance Testing

Application Help

Version 3.0.0

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077-1853-01 June 2025

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Welcome

The Clarius USB Tx Compliance Testing solution provides a simple, automated, and efficient way to test the USB4v2 technology for Compliance Test Specification(CTS).

The Clarius compliance USB Tx solution uses optimized computing and parallel execution methods which reduces the execution time of measurements. It also provides test data management and test data analytics.

The Tektronix DPS75004SX/DPS75904SX/DPS77004SX Series Oscilloscope supports the Tektronix USB4 Compliance.

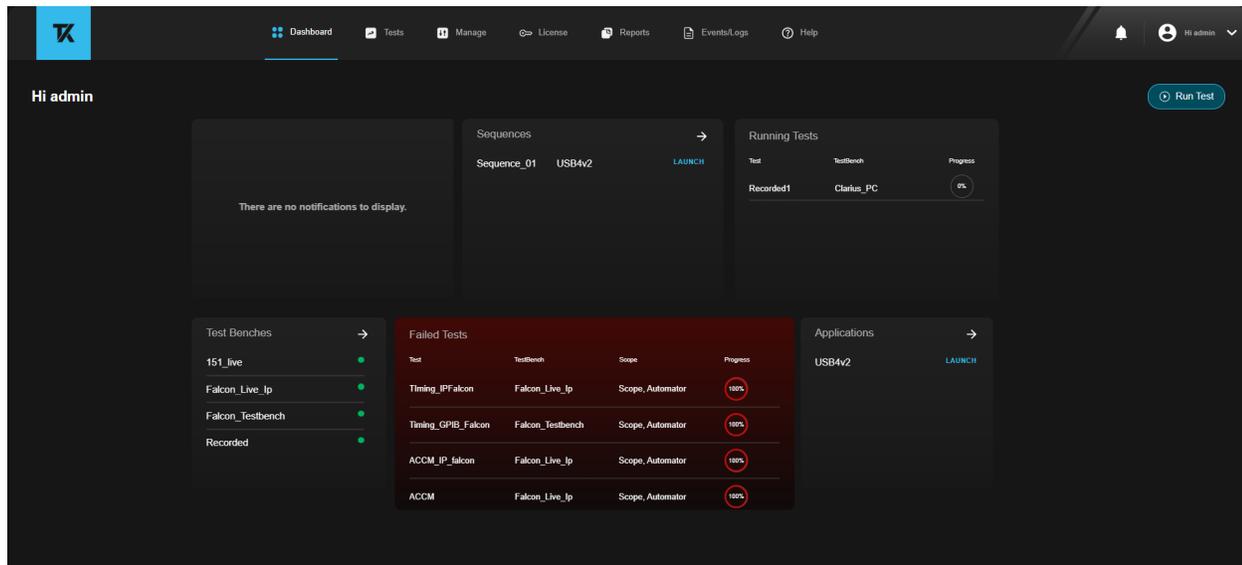


Figure 1: Clarius compliance USB Tx

Key features

- The Clarius USB Tx Compliance Testing solution provides a comprehensive toolset for the USB4 Gen4 verification, characterization, and compliance testing.
- The solution is compliant with the USB4 specification v2.0.
- The application uses the SigTest tool to run the measurement, which is available on the usb.org
- Supports embedding, de-embedding, and custom channel characterization.
- Pre-recorded mode supports the offline analysis and baseline for future specification changes.
- Quickly validate test results with comprehensive reporting that details test margin.

Getting help and support

Product documents

Use the product documents for more information about getting started with the Clarius, the application functions, and how to remotely use the application.

Table 1: Clarius automation framework and application documents

| To learn about | Use this document |
|--|--|
| How to install the Clarius | Clarius Automation Framework Getting Started Guide |
| How to use the application | Clarius Compliance USB Tx Application Help |
| How to automate using the API and SDK commands | Clarius Automation Framework (API and SDK) Programming Guide |

Conventions

This application help uses the following conventions:

- The terms "Application" and "Software" refer to the Clarius compliance USB Tx application.
- The term "target system" refers to the Computer/Laptop where the Clarius automation framework and application is installed.
- The acronym "DUT" is an abbreviation for Device Under Test.
- The term "select" refers choosing a screen item (button control or list item) using a mouse.
- A **Note** identifies important information.
- The acronym "Tx" is an abbreviation for Transmitter.

Technical support

Tektronix values your feedback on our products. To help us serve you better, please send us your suggestions, ideas, or comments on your application or oscilloscope. Contact Tektronix through mail, telephone, or website. See [Contacting Tektronix](#) for more information.

When you contact Tektronix Technical Support, please include the following information (be as specific as possible):

General information

- All instrument model numbers
- Hardware options, if any
- Modules used
- Your name, company, mailing address, phone number, FAX number
- Please indicate if you would like to be contacted by Tektronix about your suggestions or comments.

Application specific information

- Software version number
- Description of the problem
- If possible, save the log file(s) and share it with the Tektronix support person to understand the problem and get it resolved.

System requirements

This section explains the recommended system requirements to install the Clarius automation framework and the application(s).

| Requirement | Recommended requirements |
|------------------------|--|
| Operating system | Windows 10 Enterprise and Pro (version 21H2 and above) or Windows 11 Enterprise and Pro (version 21H2 and above) Language: English (United States) only. |
| CPU cores | 16 |
| RAM | 64 GB |
| Disk space | 800 GB HDD/SSD of free disk space |
| Network speed | 50 Mbps |
| Browser | Microsoft Edge (default) or Google Chrome |
| Additional software | <ul style="list-style-type: none"> • Python 3.12.x¹ • Download the USB4 SigTest Tool. • Install the 64 bit MATLAB runtime compiler. <ul style="list-style-type: none"> • Version R2024a (24.1) for SigTest version 0.95 • Version R2023a (9.14) for SigTest version 0.9 |
| Supported Oscilloscope | DPS75004SX/DPS75904SX/DPS77004SX |
| Cables | SMA cable pair that supports bandwidth \geq 25 GHz |
| Attenuator | 6 dB that supports bandwidth \geq 25 GHz |
| Adaptor | 1.85 mm to 2.92 mm that supports bandwidth \geq 25 GHz |
| Microcontroller | To configure the DUT, enter the specific test mode using a microcontroller or other methods during testing. |
| Test fixture | To connect TP2 test point. |
| DUT | USB4v2 Gen4 DUT |

¹ Python installation is required for Clarius SDK and DUT control automator.

Recommended deployment models

This section lists the supported deployment models for setting up Clarius automation framework and run the tests.

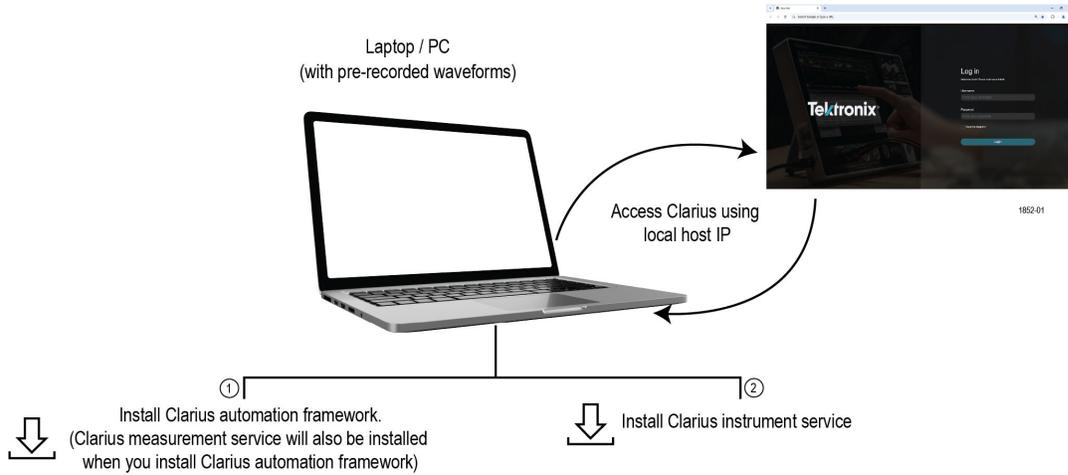


Figure 2: Deployment model 1: Single system deployment

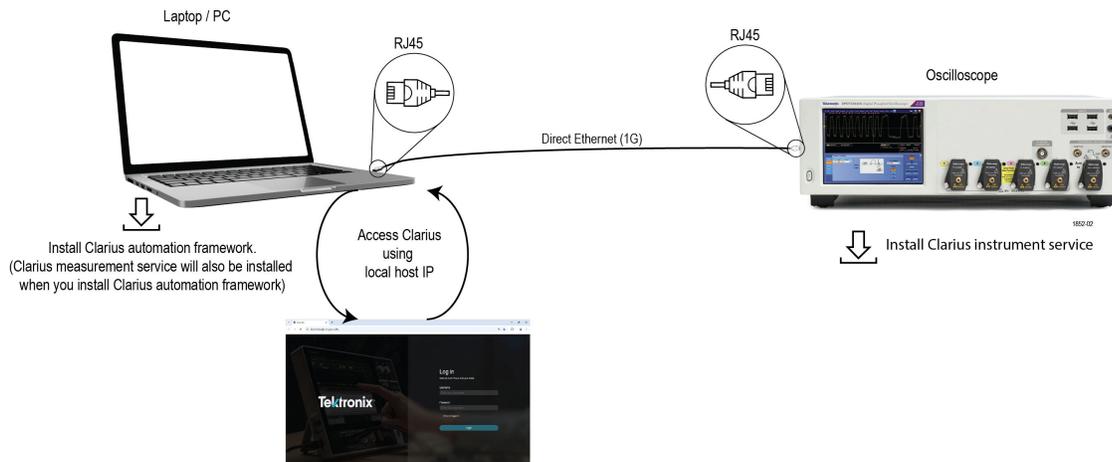


Figure 3: Deployment model 2: Peer to peer connection

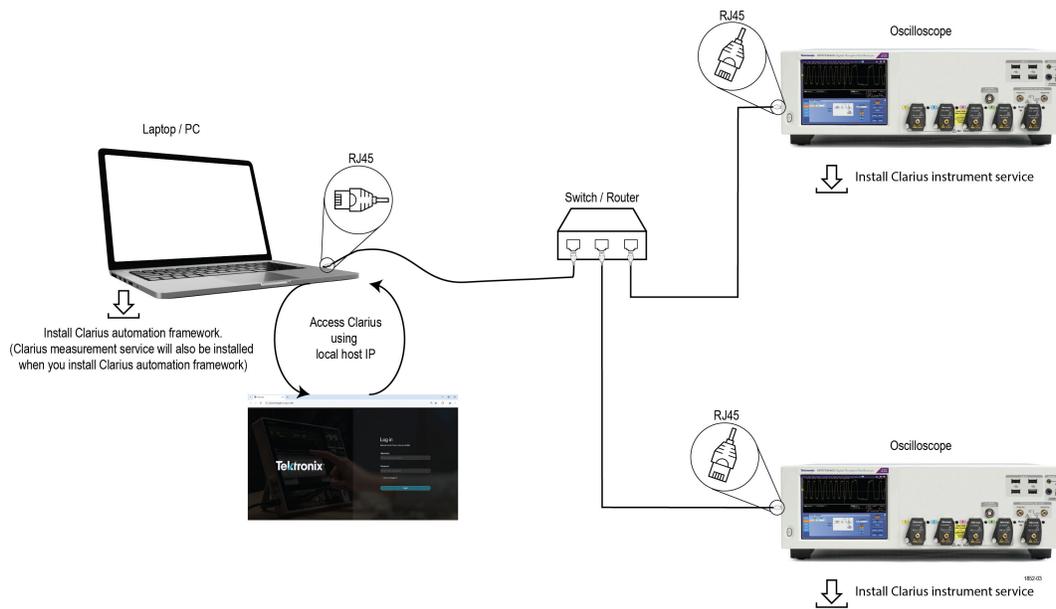


Figure 4: Deployment model 3: Private network setup via standard switch / router / hub

Enable ports to install Clarius automation framework

The installer checks for the first available port within the range incrementally and allocates the port of the services. If no ports are available within the range, installation will prompt user to enter their custom ports.

The following table lists the services and the port ranges.

| Port name | Port range |
|--------------------------------------|------------|
| Clarius user interface | 4200:4209 |
| Event communication with instruments | 5672:5679 |
| Programming interface | 8443:8449 |
| SSL certificates download interface | 8080:8089 |
| Large objects transfer interface | 9001:9009 |

Dynamic memory and disk space allocation for the Clarius automation framework virtual machine

Dynamic memory allocation

The minimum RAM required to install the Clarius automation framework is 8 GB.

By default, the installer allocates 12 GB, if the 50% of available RAM is greater than 12 GB. You can also manually allocate RAM from 8 GB up to 50% of total available RAM.

Example

| | |
|---|---|
| Total RAM available in the target system | 64 GB |
| Minimum RAM required | 8 GB |
| RAM allocated | 12 GB (50% of 64 GB = 32 GB, you can choose from 8 GB to 32 GB) |



Note: If the 50% of the total available RAM is less than 8 GB, then the installation will fail.

Disk space allocation

The maximum allocated disk space for Clarius automation framework installation is 90% of the available disk space.

Example

| | |
|--|--------------------------|
| Total disk space available in the target system | 300 GB |
| Minimum disk space required | 20 GB |
| Maximum disk space required | 90% of available storage |

Installing Clarius automation framework

This section describes the instructions for installing the Clarius automation framework on a computer/laptop. The term **target system** used in this document will refer to the computer/laptop where the Clarius automation framework and application are installed.

Follow the steps to complete the installation:

1. [Enable Virtualization technology in BIOS²](#)
2. [Configure power and sleep settings](#)
3. [Enable ports to install Clarius automation framework](#)
4. [Dynamic memory and diskspace allocation for the Clarius automation framework virtual machine](#)
5. [Enable Hyper-V in the target system](#)
6. [Install Clarius automation framework in the target system](#)
7. [Install Clarius instrument service](#)

Enable Hyper-V on the target system

Hyper-V is a hardware virtualization tool that allows you to create and run a virtual machine on your system without affecting the host operating system. To enable Hyper-V on your computer, follow these steps:

1. Log in to the system with an administrator account.
2. Type **Control Panel** in the search box and press **Enter**.

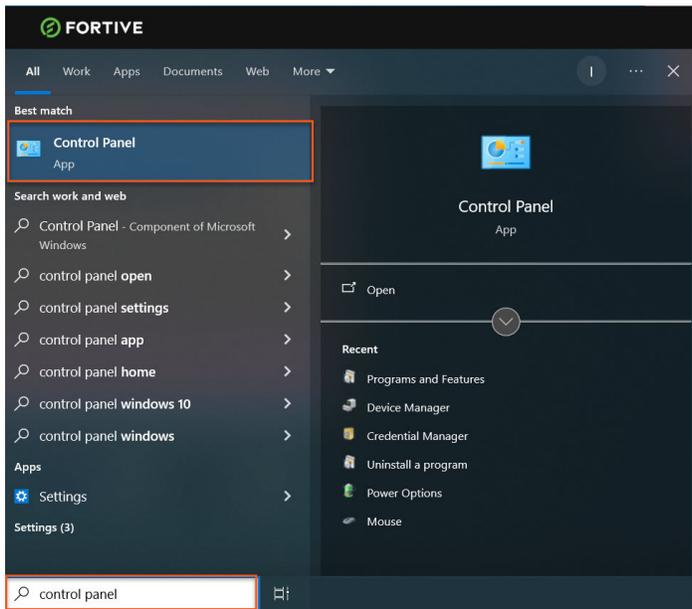


Figure 5: Control Panel

3. Select **Control Panel > Programs and Features**.

² Contact the IT team of your organization to enable the virtualization technology in your system.

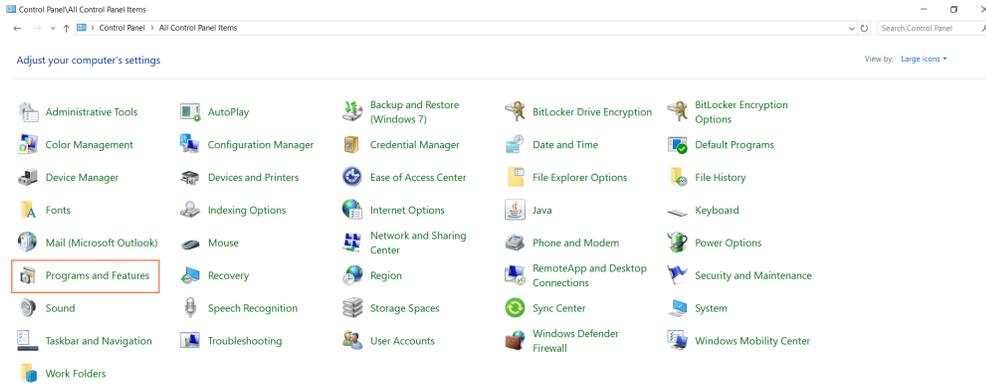


Figure 6: Programs and Features dialog

4. Select Turn Windows features on or off.

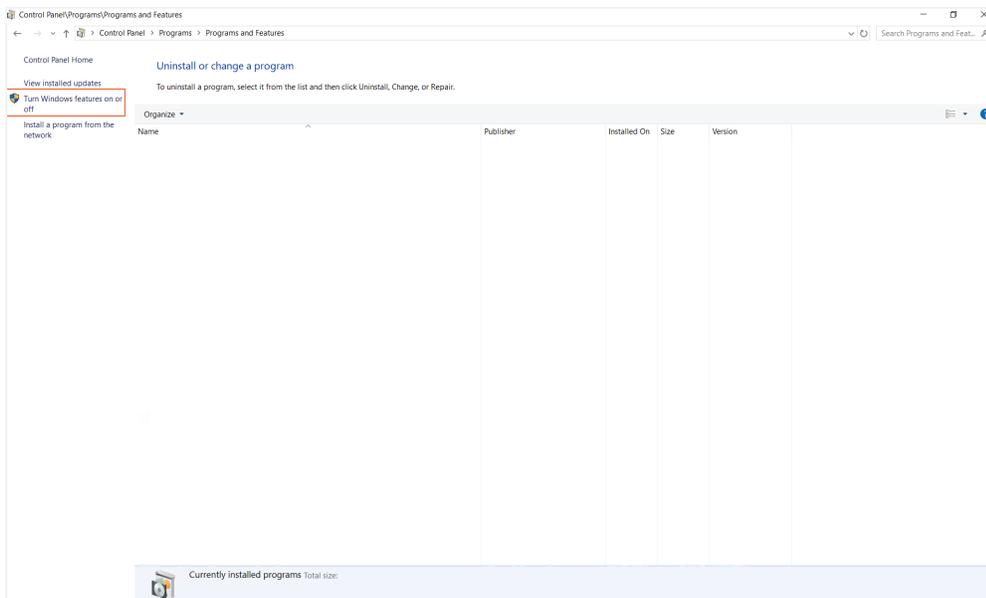


Figure 7: Turn Windows features on or off dialog

5. Select Hyper-V and its sub features.

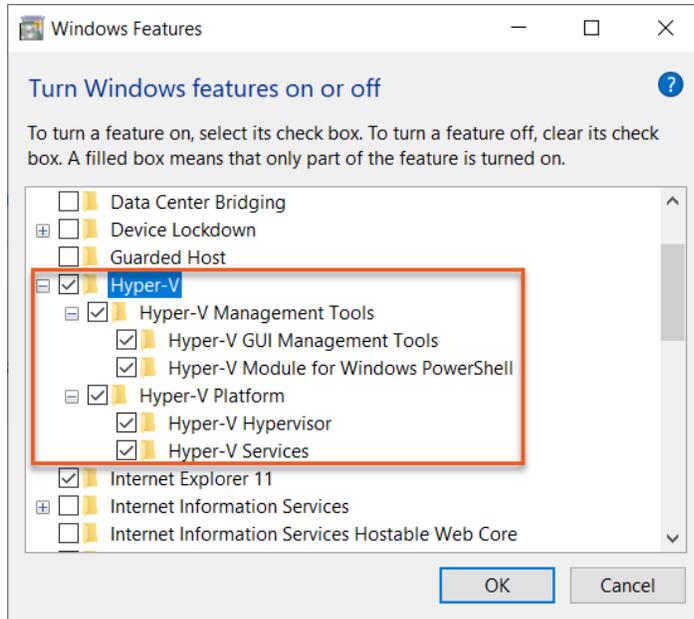


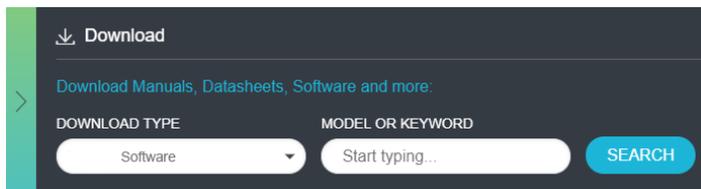
Figure 8: Enabling Hyper-V in the Windows Features dialog box

6. Select **OK** to install. You must restart the system when prompted.

Install Clarius automation framework

To install Clarius automation framework in the target system, follow the steps:

1. Go to www.tek.com.
2. Click **Download**. In the Downloads menu, select DOWNLOAD TYPE as Software and enter the application name in the MODEL OR KEYWORD field and click **SEARCH**.



3. Select the compatible version of Clarius automation framework and follow the instructions to download the software. Copy the installer package (.zip) to the target system³ and extract the file.

Note:



- Check the Release Notes for the version compatibility details of Clarius automation framework and application.
- To unzip the package, right-click, select **Extract All** and select **Extract**.

4. Double-click the Clarius installer (**clarius-automation-framework-<<version>>.exe**) from the extracted folder and select **Yes** on the User Account Control.

³ A PC/Laptop/Computer where the Clarius automation framework and application will be installed.

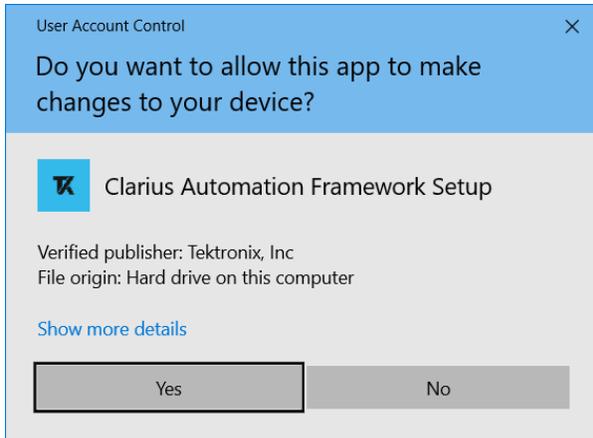


Figure 9: Clarius user account control dialog

5. Read the welcome instructions and select Next.

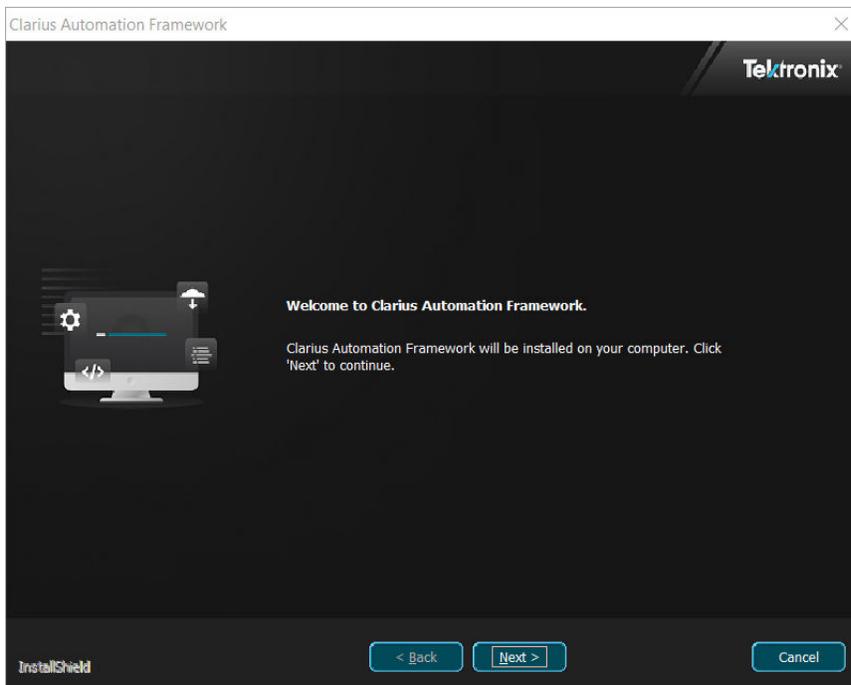


Figure 10: Clarius installer setup

6. Read the license agreement; accept the terms of the license agreement and select **Next**. Please wait until the prerequisites progress check is complete.

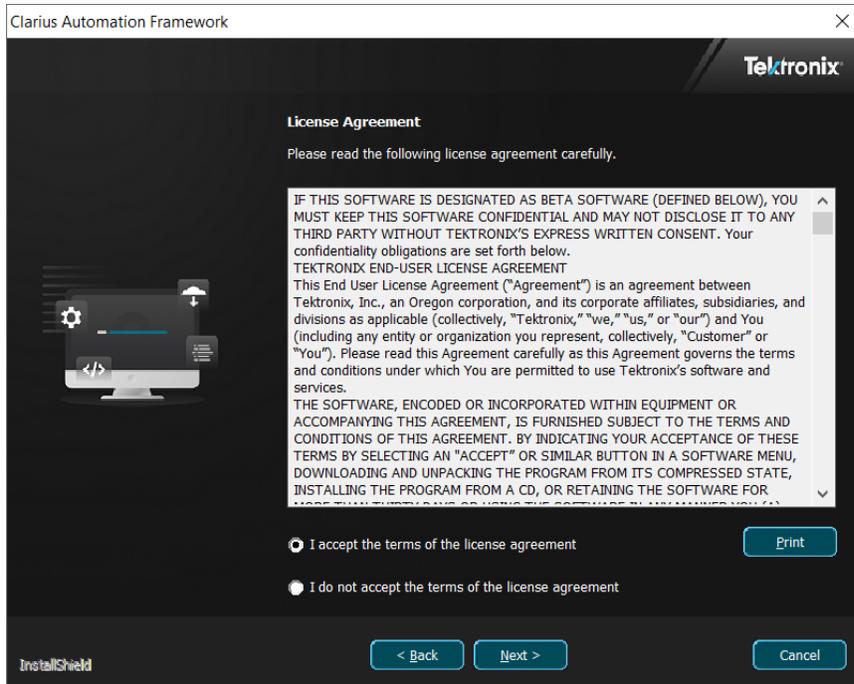


Figure 11: Clarius installer setup

7. Click **Browse**, select the path to install, and click **Next**. The default path is `C:\Program Files\Tektronix\Clarius\`.

You can select any local disk drive other than a network drive path for installation.

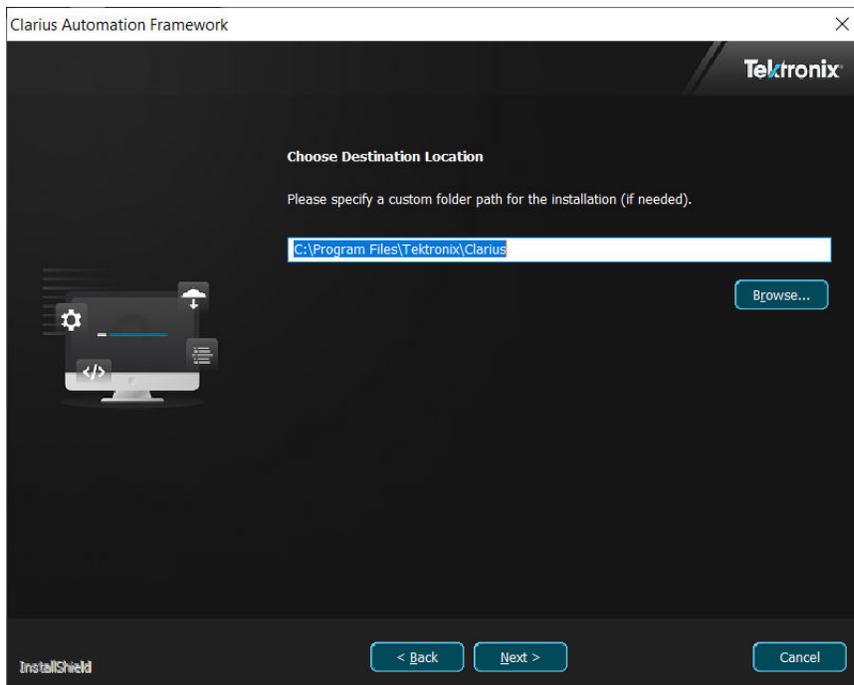


Figure 12: Clarius install path

8. Set the password for the Clarius automation framework matching the criteria and click **Next**. This password will be used to log in to the Clarius automation framework.

Figure 13: Clarius user information

Note:

- For details on Disk Storage allocation, [click here](#).
- It is recommended to configure the Disk storage in System Settings as 700 GB.
- For details on RAM allocation, [click here](#).
- **CPU cores allocation example:** The minimum logical CPU cores required is 2 and the maximum core is calculated as 75% of total logical CPU cores. By default, a midpoint value between the minimum and maximum cores will be added in the installation wizard field. If the allocated logical CPU cores is in decimal value, then the number after the decimal point will be discarded. For example, value 3.5 will be added as 3.



For details on recommended CPU cores to install, refer [System requirements](#) section.

9. By default, ports are configured. Click **Next** to proceed with the installation. Refer [Enable ports to install Clarius automation framework](#) for more information.

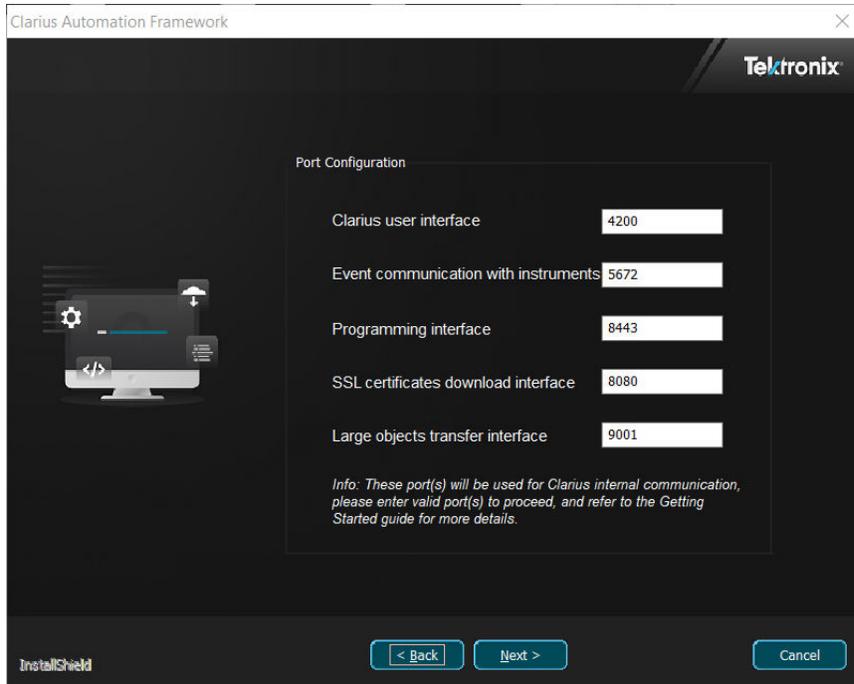


Figure 14: Port configuration

10. Select **Yes** to install the Instrument Service. This will create a local test bench(Clarius_PC) in the target system for pre-recorded waveform analysis.

Installing instrument service will also install Clarius SDK in an isolated Python environment.



Tip: If you skip the instrument service installation, you can refer [Install Clarius instrument service](#) section for the installation steps.

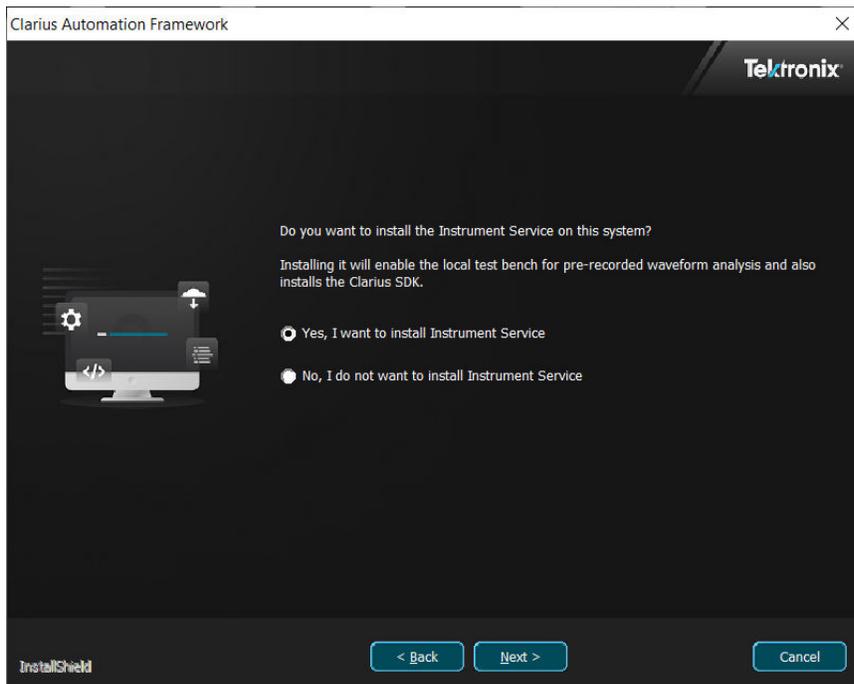


Figure 15: Install instrument service

11. Displayed only if [step 10](#) is selected No.

Select the **Automation SDK** checkbox to install the Clarius SDK and click **Next**.

You can install Clarius SDK in the following ways:

- Install Python in a global environment and then install SDK in that environment. If a supported Python version is detected, then select to install the SDK in that environment.
- Install Python in an isolated Python environment and install SDK in that environment.⁴

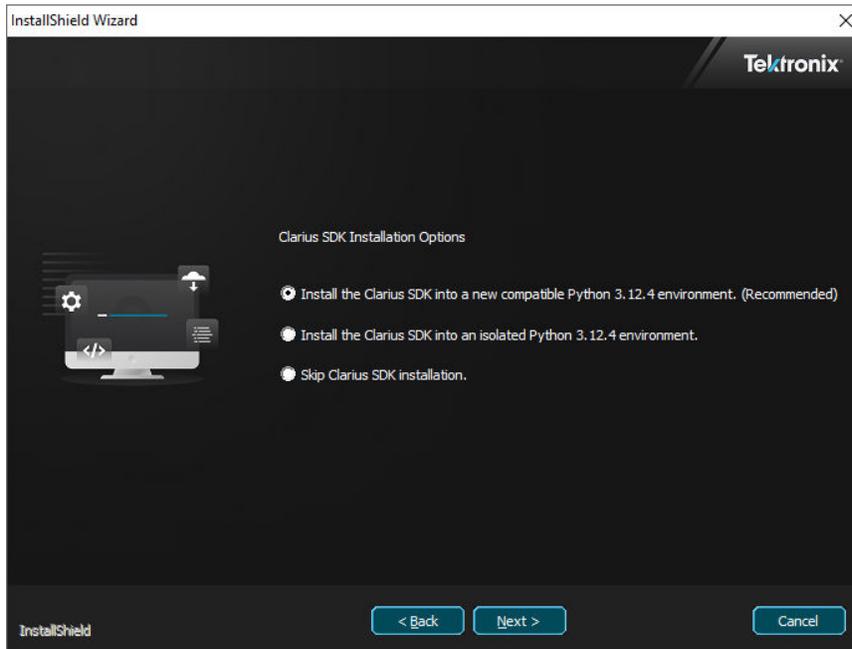


Figure 16: Install automation SDK

Note:



- Clarius SDK requires Python version 3.12.x.
- If you skipped the SDK installation, refer to the [Install Clarius SDK](#) section to install.

⁴ An isolated Python environment will have its own independent set of Python packages installed in its site directories.

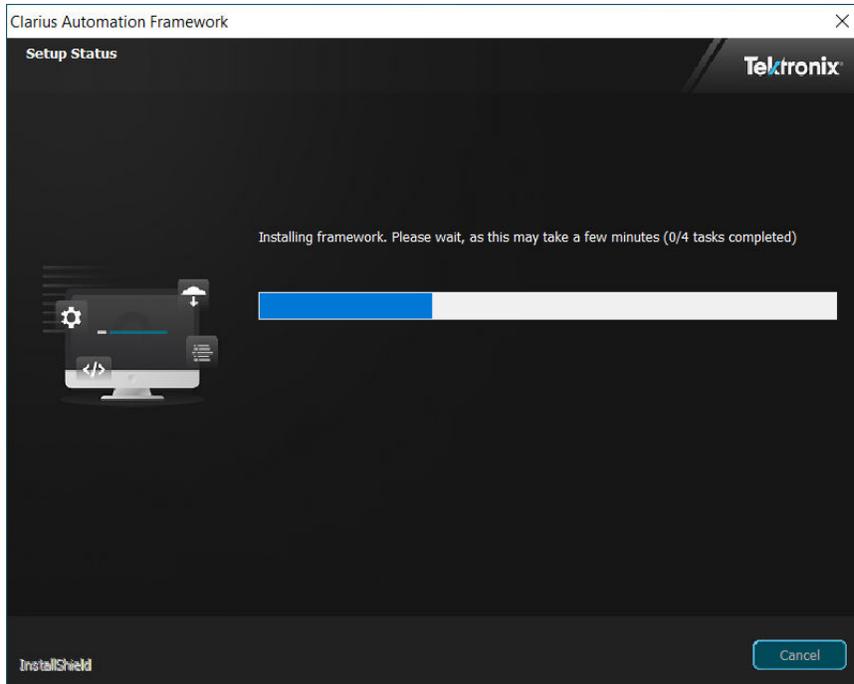


Figure 17: Installing Clarius automation framework

12. Select **Launch Clarius** checkbox to launch the Clarius automation framework. Select **Finish** to exit setup.

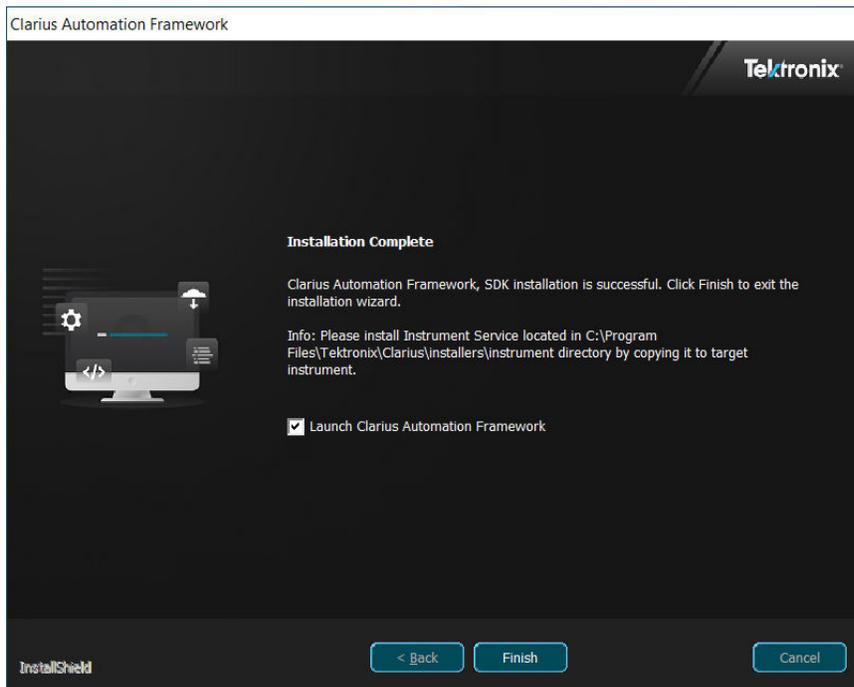


Figure 18: Launch Clarius

Note:



- By default, the Clarius automation framework will be launched in the Microsoft Edge browser.
- If the installation fails, check the installation logs at (C:\ProgramData\Tektronix\Clarius\logs)

for more details about the failure or contact a Tektronix field engineer for support.

The ProgramData folder is hidden by default. Enable **Show hidden files, folders, and drives** to view the folder path.

13. (Optional) Launch the Clarius automation framework from the desktop.



Note: You can access the Clarius automation framework from the target system using the local host URL `https://127.0.0.1:42005`. To remotely access the Clarius automation framework, use the host name or IP address of the Clarius automation framework installed system.

Log in to the Clarius automation framework with the following credentials

- **Username:** admin
- **Password:** Enter the user configured password set during installation.

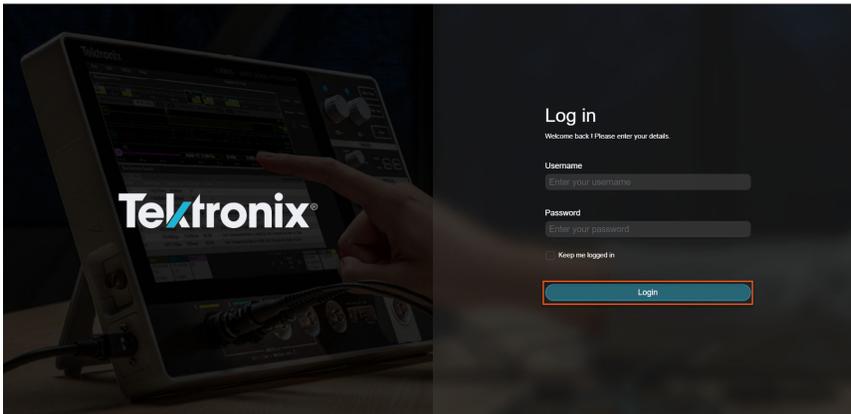


Figure 19: Clarius login page



Note: During installation, if port 4200 was already used, then the first available port within the range of 4200 to 4209 will be checked incrementally and allocated.

By default, no application(s) will be installed and the home screen will not display any data. To install the application, refer to [Install USB Tx application](#) on page 36.

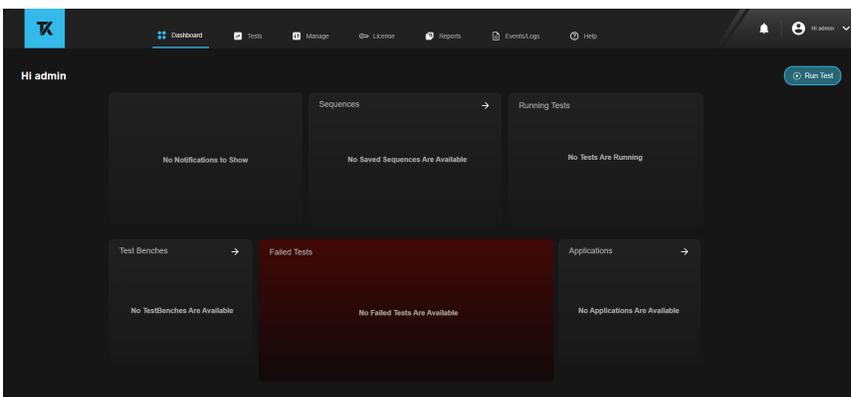


Figure 20: Clarius homepage

⁵ The default port allocated is 4200. If this port was not available during the installation, then the first available port within the range of 4200 to 4209 will be checked incrementally and allocated.

Install Clarius instrument service

Clarius instrument service sends the waveforms to the Clarius measurement service⁶ for analysis. Refer to [Network topology](#) diagram for more information on instrument service.

The instrument service can be installed by the following ways:

- [Install instrument service in the target system where pre-recorded waveforms are located.](#)
- [Install instrument service in the oscilloscope to use pre-recorded waveforms or live acquisitions.](#)

If you have skipped Clarius instrument service installation during the installation of the Clarius automation framework, follow the steps to install in the target system.

1. Navigate to the **installers** folder located in the Clarius automation framework installed path in the target system. The default path is `C:\Program Files\Tektronix\Clarius\installers`.

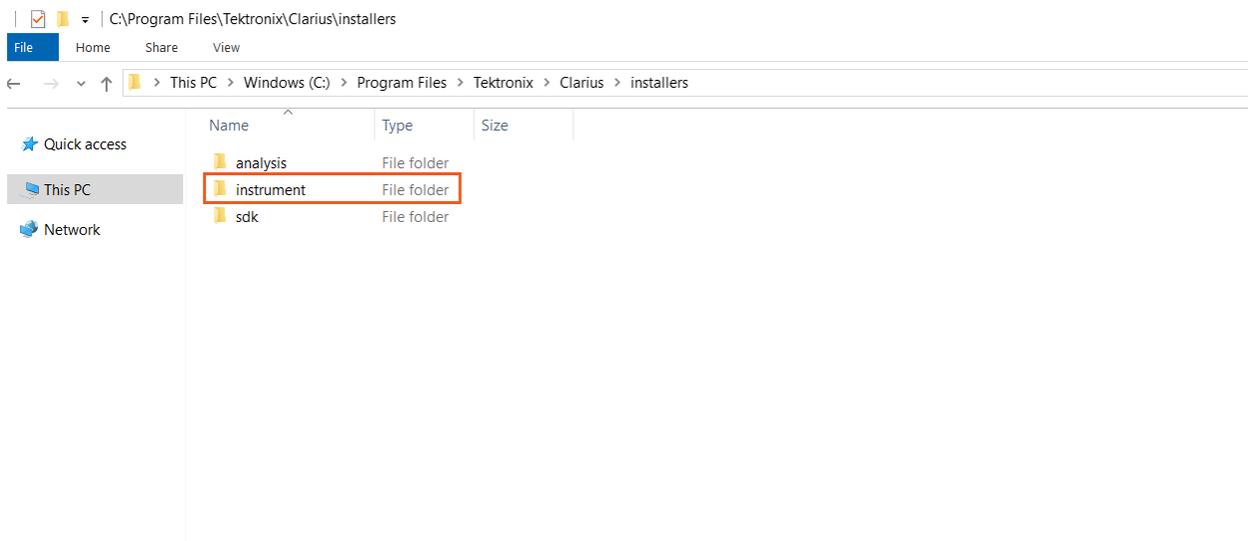


Figure 21: Instrument folder

2. Open the **Instrument folder**, double-click **clarius-instrument-service-<<version>>.exe**, and follow the steps to complete the installation.

⁶ Measurement service will be installed in the target system where Clarius automation framework is installed.

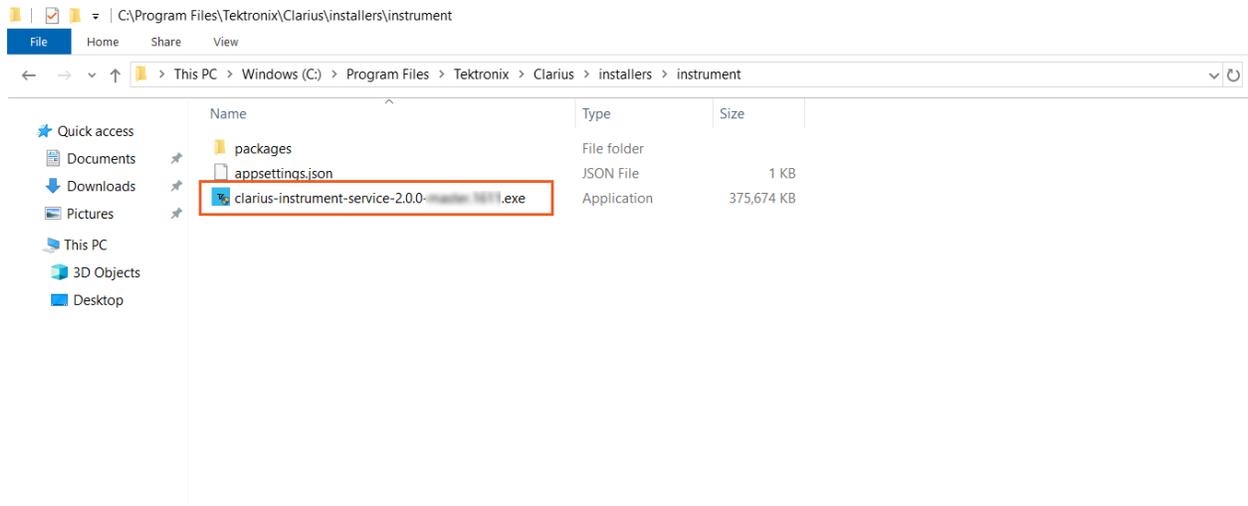


Figure 22: Clarius instrument service executable file in the target system

- On successful installation of the Clarius instrument service, the **InstrumentServiceStart.bat** and **InstrumentServiceStop.bat** icons will be created on the desktop.

Follow the steps to install the Clarius instrument service in the oscilloscope:

- In the target system where the Clarius automation framework is installed, navigate to the installed path. The default path is `C:\Program Files\Tektronix\Clarius\installers`.
- Select and copy the **Instrument folder** and paste it in the downloads folder or folder of your choice in the oscilloscope.

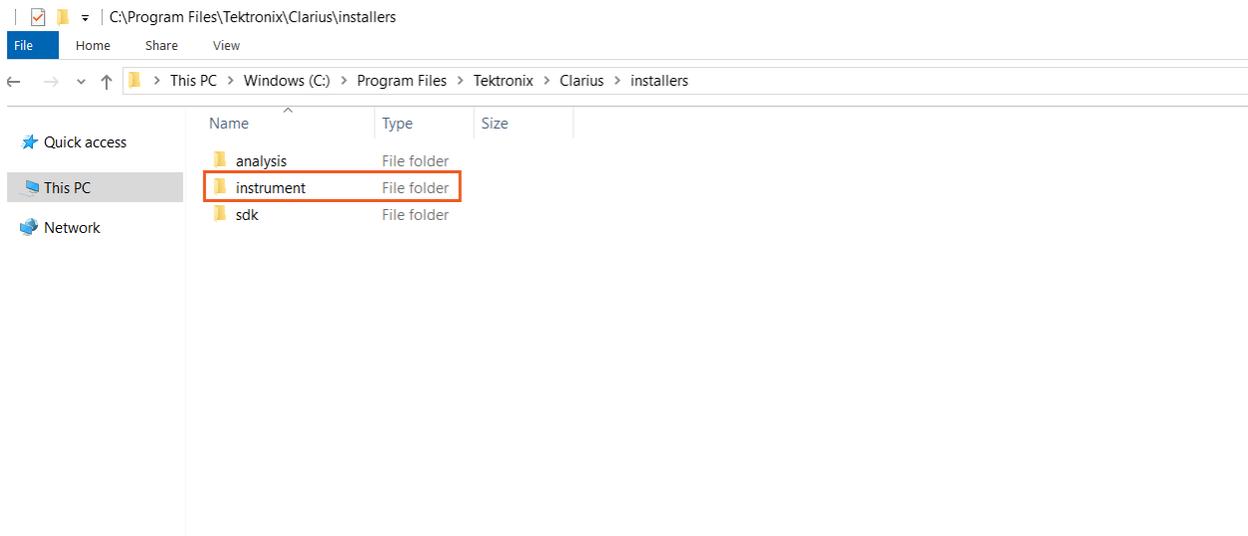


Figure 23: Instrument folder

- Open the **Instrument folder**, double-click **clarius-instrument-service-`<<version>>.exe`**, and follow the steps to complete the installation.

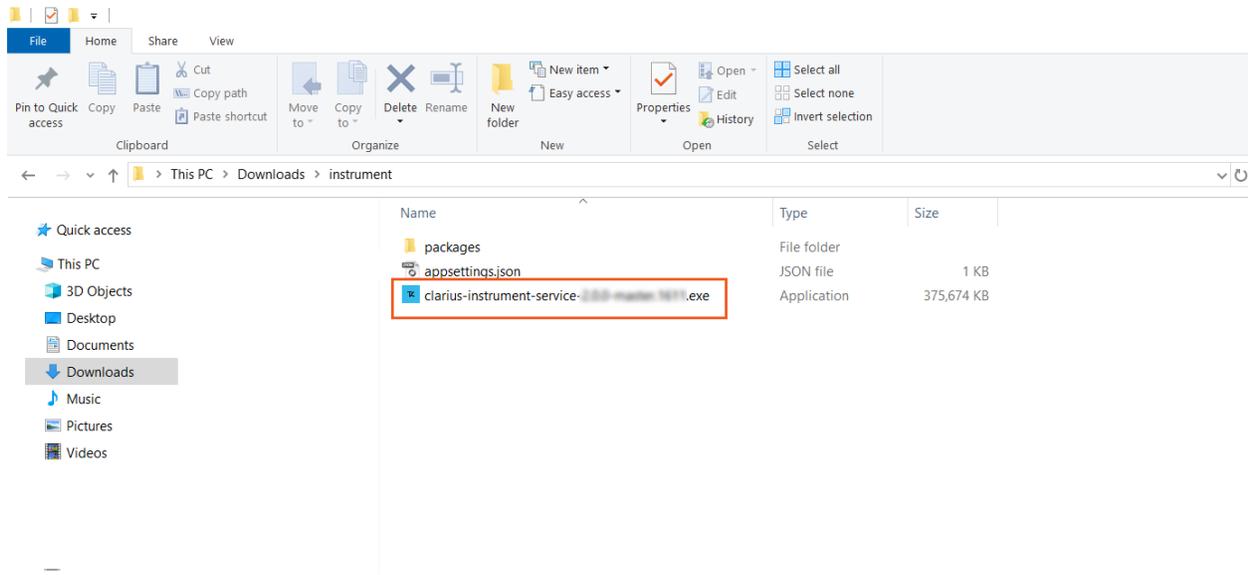


Figure 24: Clarius instrument service executable file in the oscilloscope

4. On successful installation of the Clarius instrument service, the **InstrumentServiceStart.bat** and **InstrumentServiceStop.bat** icons will be created on the desktop.



Note: Installing instrument service will also install Clarius SDK. If a supported Python version is detected, Clarius SDK will be installed in that environment. Otherwise, Python 3.12.x will be installed in an isolated environment and Clarius SDK will be installed in that environment.

Upgrading Clarius automation framework

This section describes the instructions for upgrading the Clarius automation framework in a target system. Follow the steps to complete the installation.

1. [Upgrade Clarius automation framework](#)
2. [Upgrade Clarius instrument service](#)

Upgrade Clarius automation framework

This section describes the instructions for upgrading Clarius automation framework.

Table 2: Clarius automation framework version upgrade table

| Version | Upgrade Support | Upgradable version(s) |
|---------|-----------------|--|
| 3.0.0 | Yes | <ul style="list-style-type: none"> • 2.1.0 • 2.0.0 |

Prerequisite:

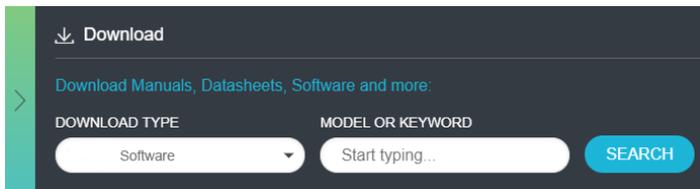
- You must have at least 30 GB of free disk storage available in Clarius virtual machine to upgrade the Clarius automation framework. You can check the available free disk storage from the admin console. Refer to [Admin Console and Monitoring](#) on page 114 section.



Note: Ensure that the PC does not shut down or restart during the upgrade process. If the PC is restarted or shut down, the upgrade will fail, and the Clarius automation framework will not roll back to the previous version.

To upgrade the Clarius automation framework in the target system, follow these detailed steps.

1. Go to www.tek.com.
2. Click **Download**. In the Downloads menu, select DOWNLOAD TYPE as Software and enter the application name in the MODEL OR KEYWORD field and click **SEARCH**.



3. Select the compatible version of Clarius automation framework and follow the instructions to download the software. Copy the install package (.zip) to the target install system and extract the zip file.
4. Double-click the installer and select **Yes** on the User Account Control.

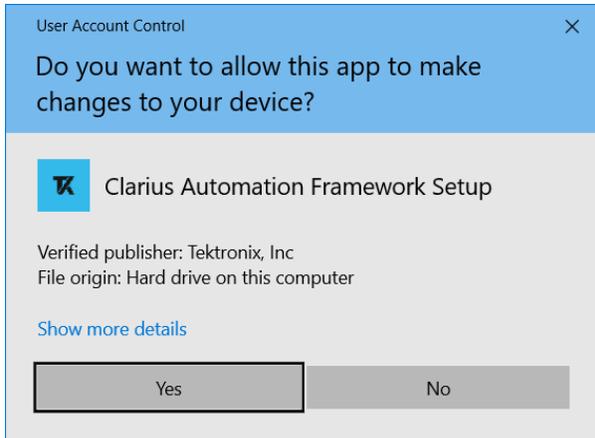


Figure 25: Clarius user account control

5. Read the welcome instructions and click **Update**.

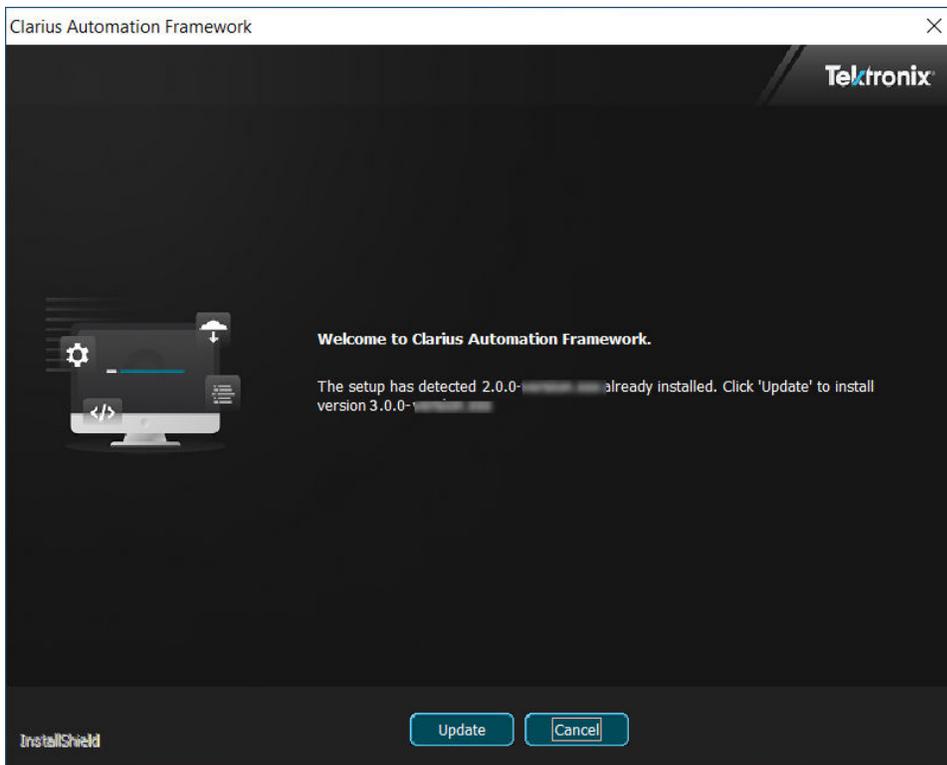


Figure 26: Upgrade Clarius installer setup

6. Accept the terms of the license agreement and click **Next**. Please wait until the upgrade process is complete.

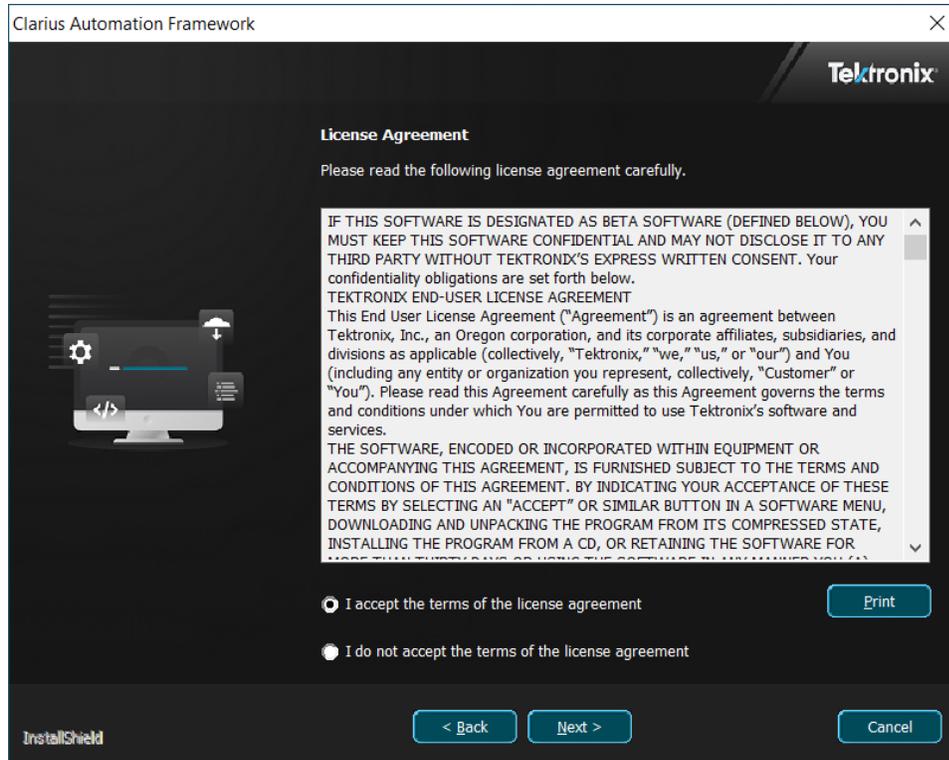


Figure 27: Clarius license agreement

7. Displayed only if Instrument Service is not installed in the previous version.

Select **Yes** to install the Instrument Service. This will create a local test bench in the target system for pre-recorded waveform analysis.

Installing instrument service will also install Clarius SDK in an isolated Python environment.



Tip: If you skip the instrument service installation, you can refer [Upgrade Clarius instrument service](#) section for the installation steps.

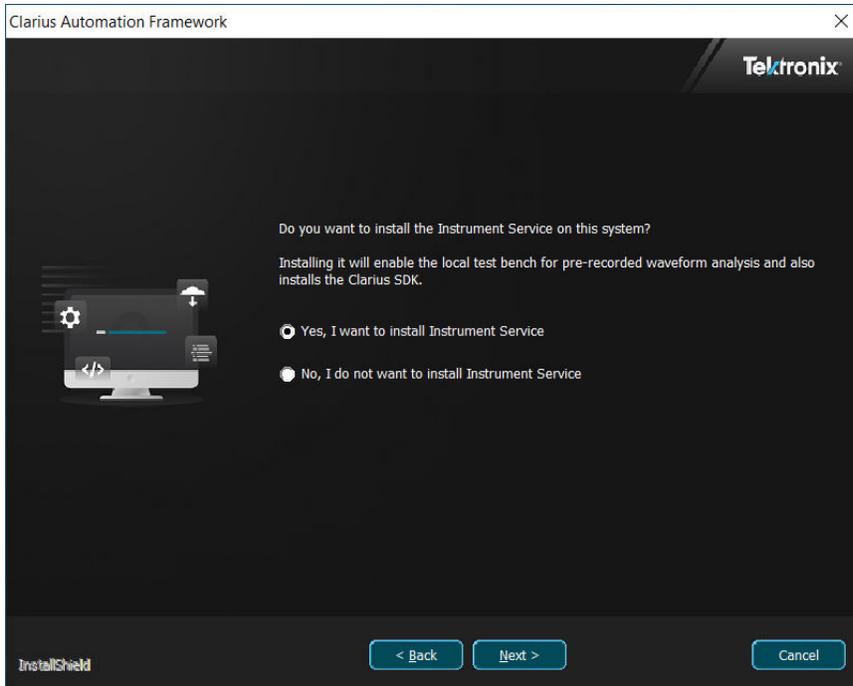


Figure 28: Install instrument service

8. The Clarius upgrade starts, please wait until the tasks and configuration process are complete.

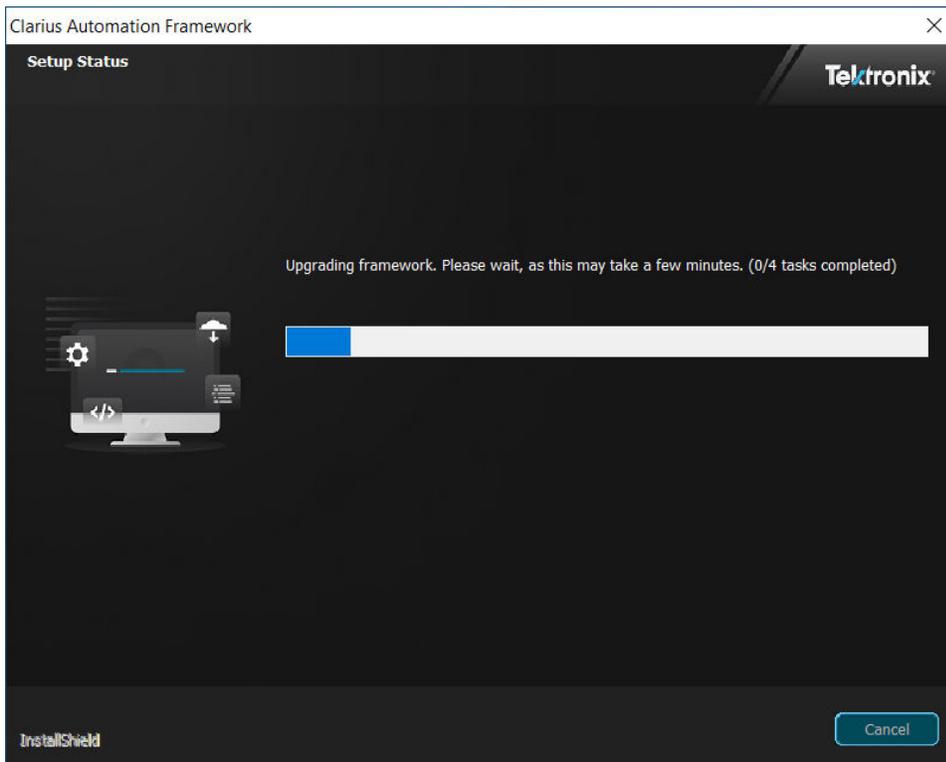


Figure 29: Upgrade Clarius

9. The Clarius upgrade is successful. Select the **Launch Clarius** checkbox to launch the Clarius compliance and click **Finish**. By default, the application will be launched in the Microsoft Edge browser.

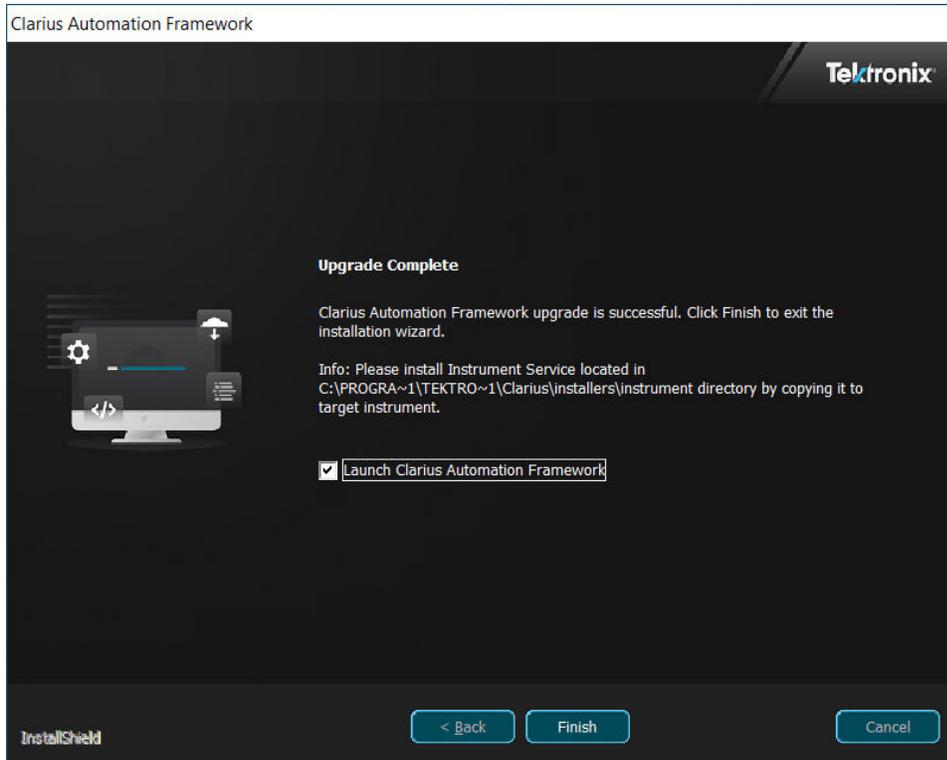


Figure 30: Launch Clarius



Note: Clear browser cache before launching the [Upgrade Clarius automation framework UI](#).

10. Log in to the Clarius automation framework with the following credentials.
 - **Username:** admin
 - **Password:** Enter the user configured password set during installation.

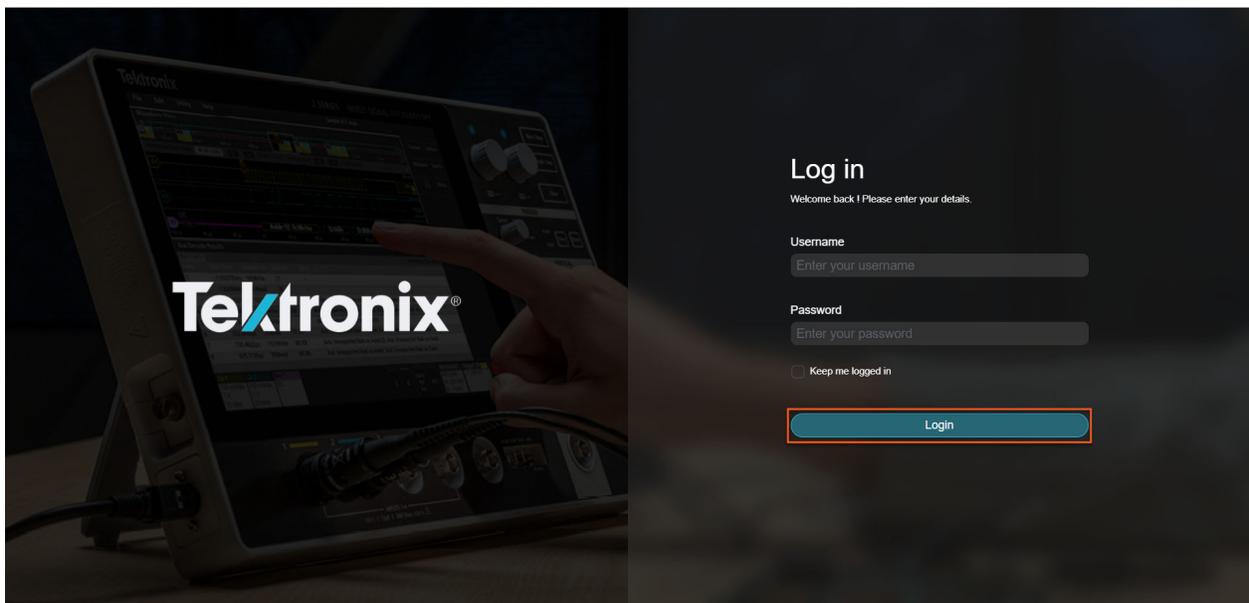


Figure 31: Clarius login page



Note: If the installation fails, please check the installation logs at (C:\ProgramData\Tektronix\Clarius\logs) for more details about the failure or contact Tektronix field engineer for support.

Clarius Automation Framework Upgrade Failure – Insufficient Disk Storage

If the upgrade aborts due to insufficient disk storage in the Clarius virtual machine, run the following commands in the command prompt.

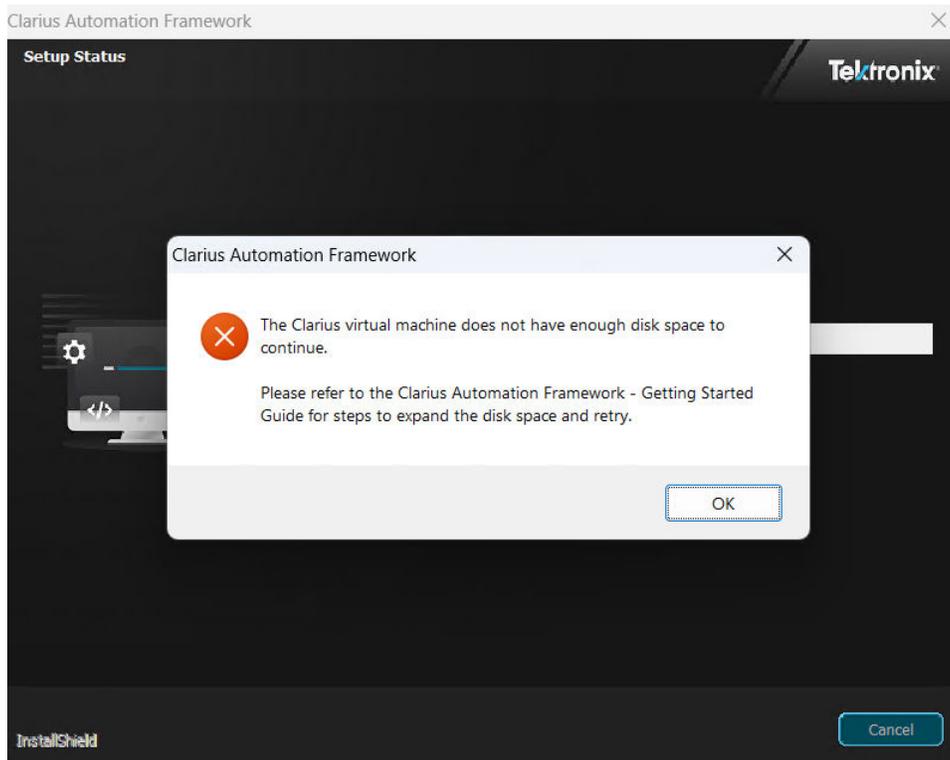


Figure 32: Clarius upgrade failed

1. Launch command prompt as **Administrator**⁷.
2. To view system information run the command `clarius --systeminfo view`.
3. To expand [Upgrade Clarius automation framework](#) storage, run the command `clarius --systeminfo manage --storage <value>`.

Example: `clarius --systeminfo manage --storage 125`

Note:



- By default, the [Upgrade Clarius automation framework](#) virtual machine will stop during storage configuration and will start automatically once the storage space is successfully expanded.
- Once [Upgrade Clarius automation framework](#) virtual machine storage is expanded, it cannot be shrunk.
- The storage value should be in GB and must be less than the available storage shown in `clarius --systeminfo view`.

After successfully expanding [Upgrade Clarius automation framework](#) virtual machine storage, proceed the [Upgrade Clarius automation framework](#) steps.

⁷ Click **Start** and type Command Prompt or CMD. Right-click on **Command Prompt** in the search results, and then select **Run as administrator**. This will open the Command Prompt with administrator privileges.

Upgrade Clarius instrument service

This section describes the instructions for upgrading the Clarius instrument service.

Table 3: Clarius instrument service version upgrade table

| Version | Upgrade Support | Upgradable version(s) |
|---------|-----------------|--|
| 3.0.0 | Yes | <ul style="list-style-type: none"> 2.1.0 2.0.0 |

To upgrade the Clarius instrument service in the oscilloscope, follow these detailed steps.

1. In the target system where the Clarius automation framework is installed, navigate to the installed path. The default path is `C:\Program Files\Tektronix\Clarius\installers`.

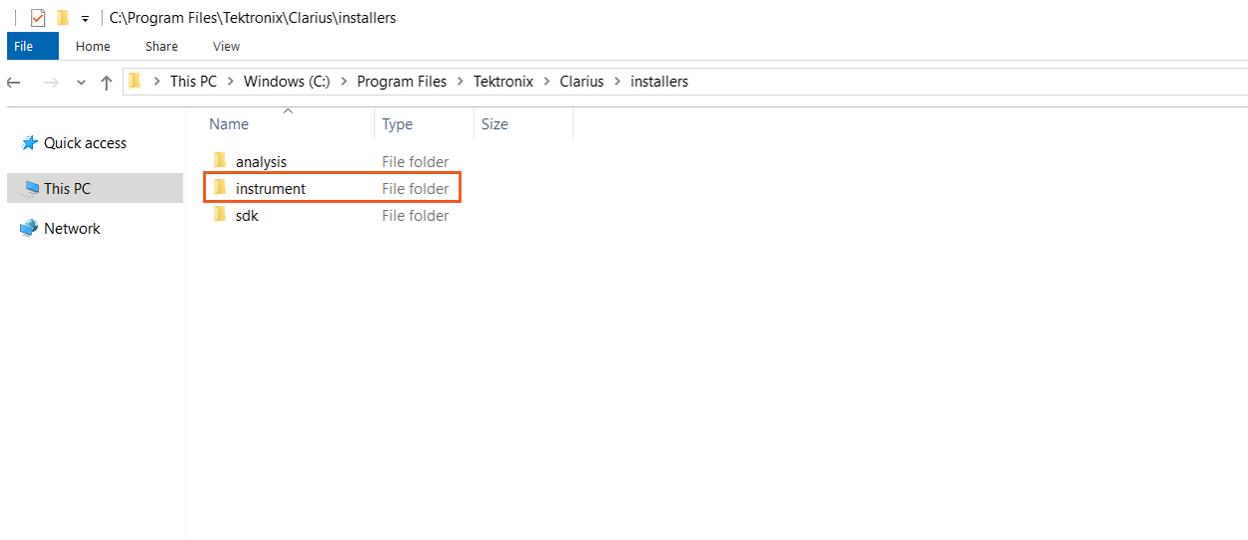


Figure 33: Instrument folder

2. Select and copy the **instrument folder** and paste it in the downloads folder or folder of your choice in the oscilloscope.

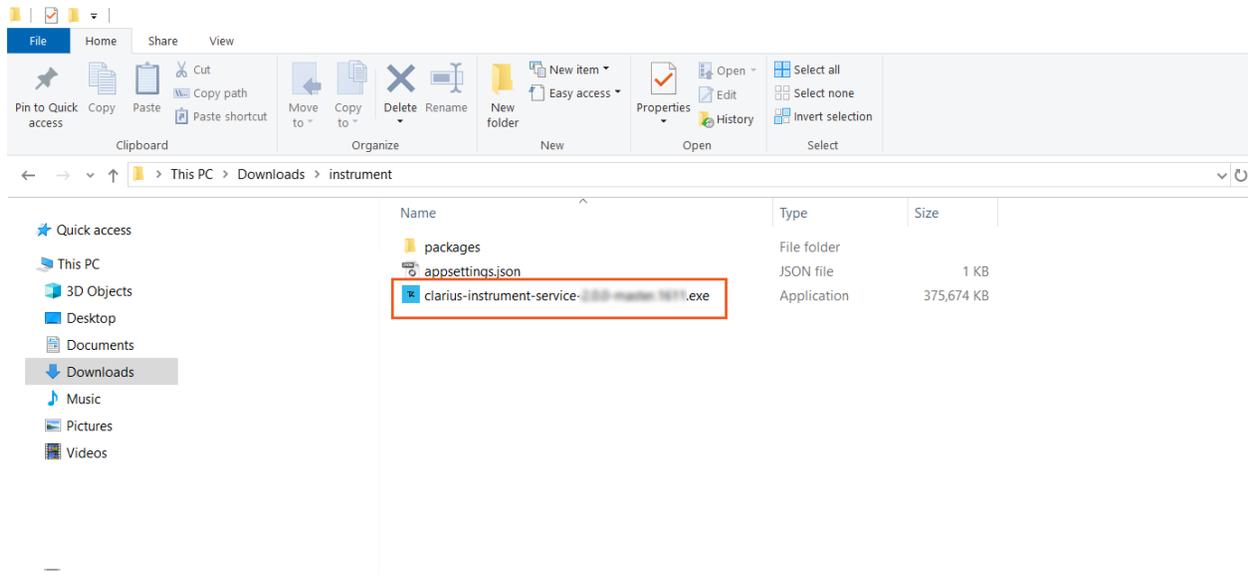


Figure 34: Clarius instrument service executable file in the oscilloscope

3. Double-click Clarius instrument service installer (**clarius-instrument-service-<<version>>.exe**) from the copied **Instrument folder** in the oscilloscope and select **Yes** on the User Account Control.

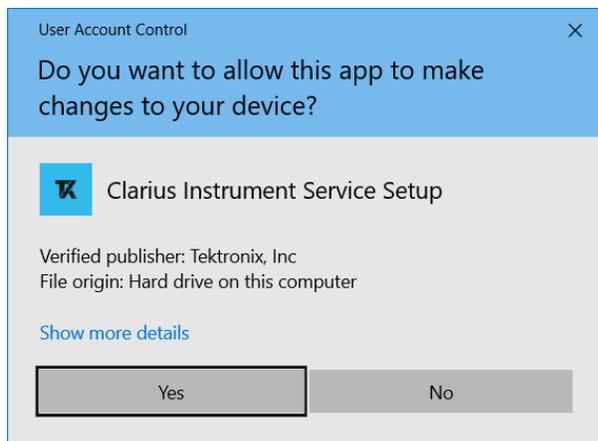


Figure 35: Clarius instrument service user account control dialog

4. Read the welcome instructions and select **Next**.

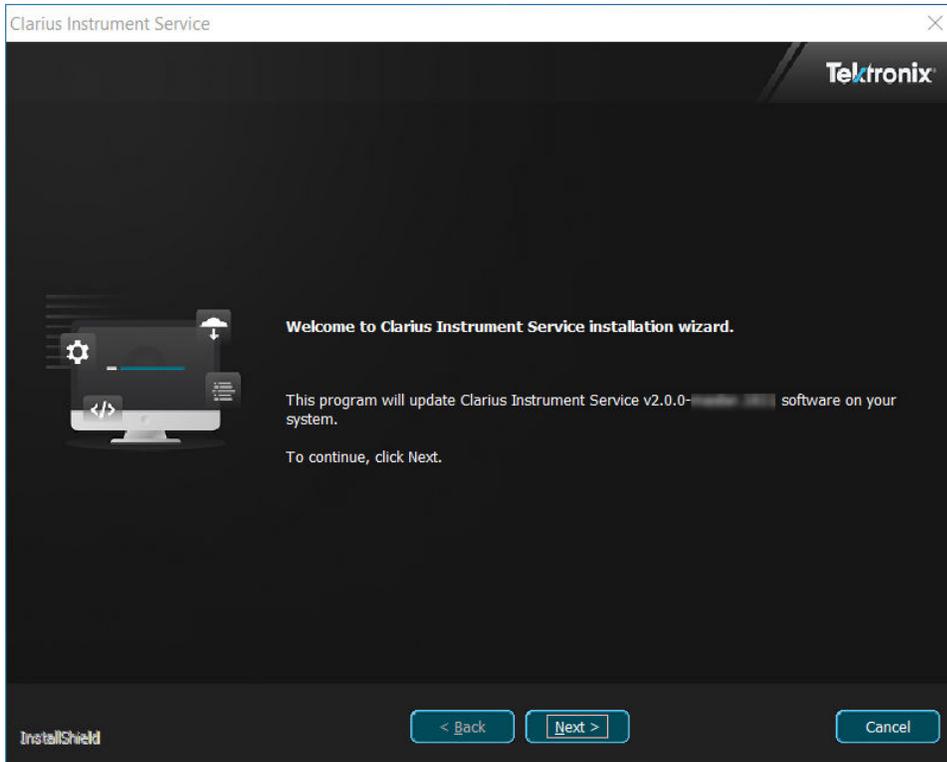


Figure 36: Clarius instrument service installer setup

5. Read the license agreement; accept the terms of the license agreement and select **Next**. Please wait until the prerequisites progress check is complete.

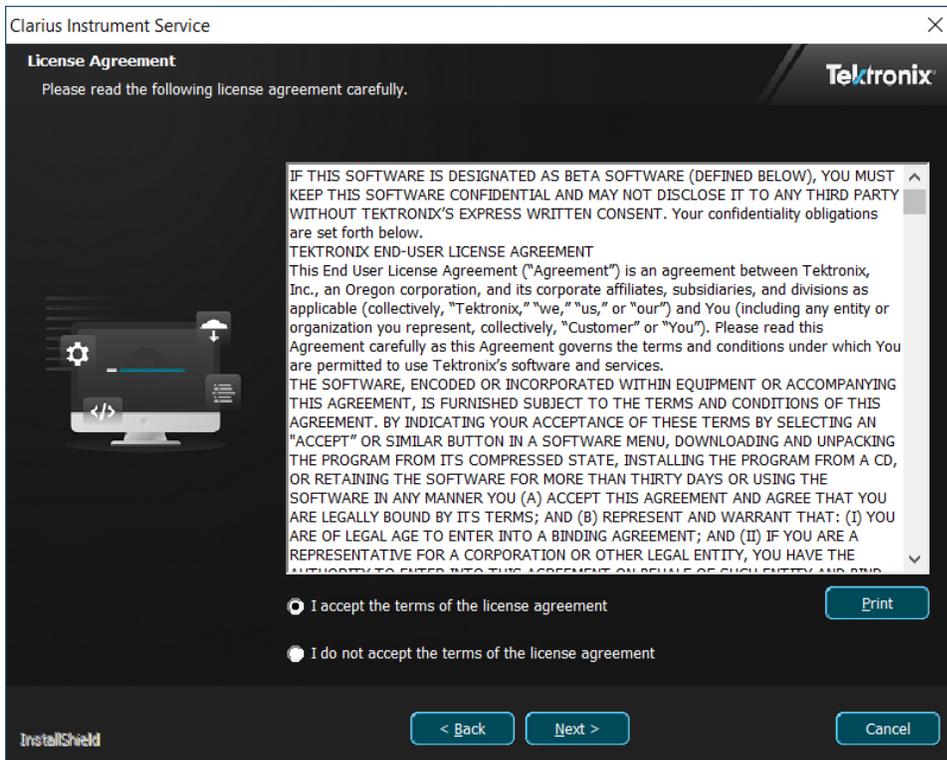


Figure 37: Clarius instrument service license agreement

6. The Clarius instrument service upgrade starts, please wait until the tasks and configuration process are complete.

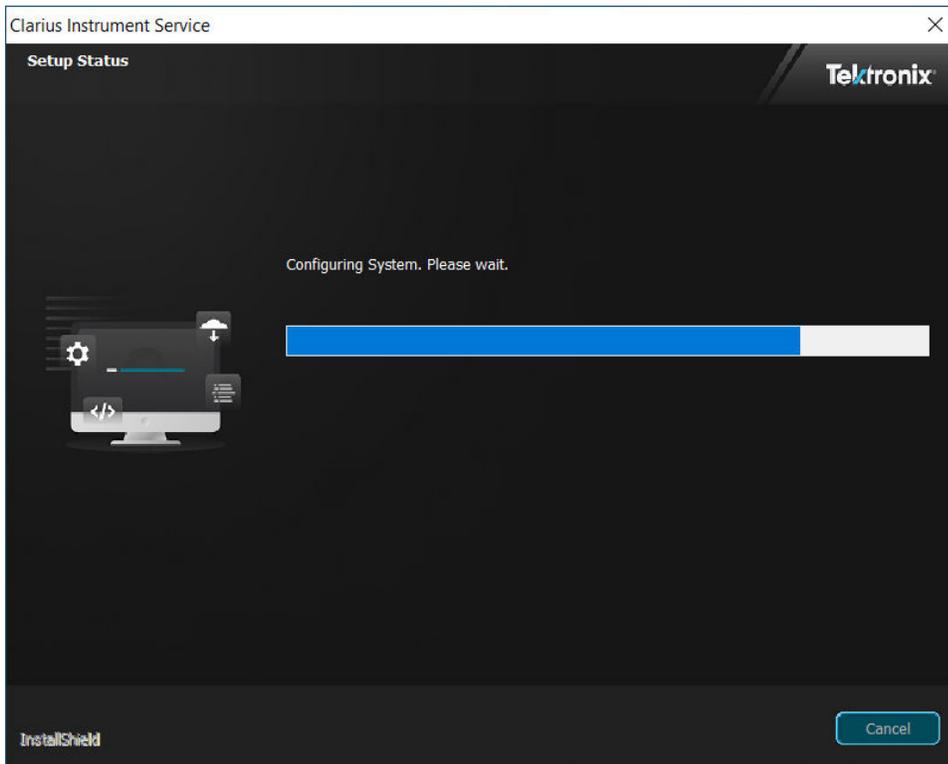


Figure 38: Installing Clarius instrument service

7. The Clarius instrument service upgrade is successful. Select the **Yes** checkbox to launch the Clarius instrument service and click **Finish**.

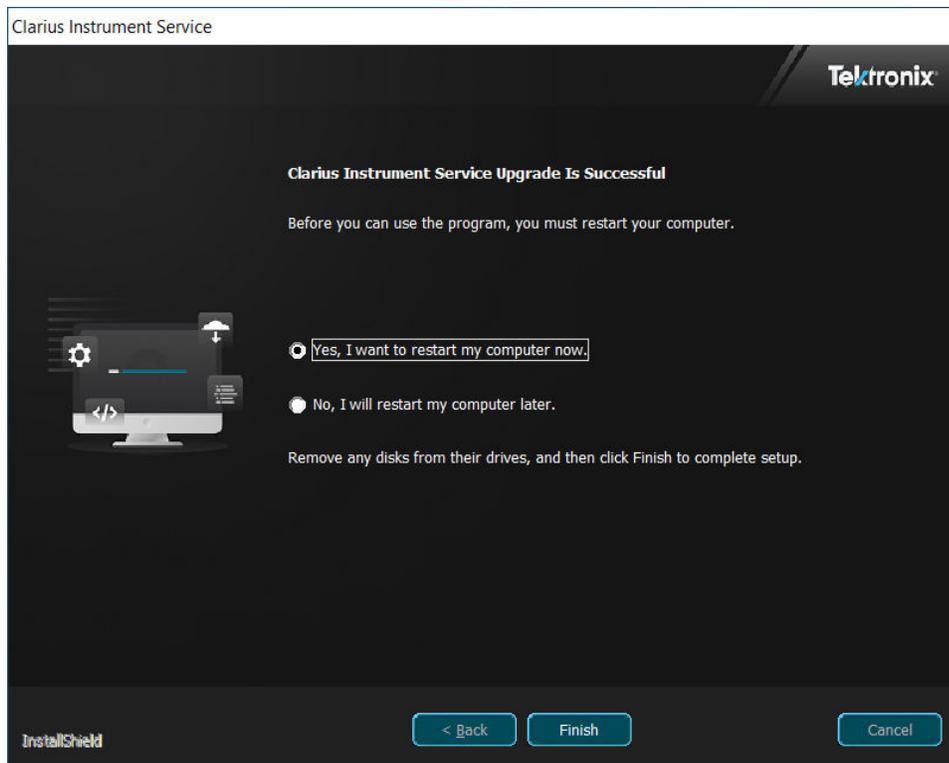


Figure 39: Launch Clarius instrument service

Installing application in Clarius automation framework

This section describes the instructions for installing a new USB Tx application in a target system. Follow the steps to complete the installation.

1. [Install Clarius USB Tx application](#)
2. [Install instrument service plug-in of USB Tx application](#)

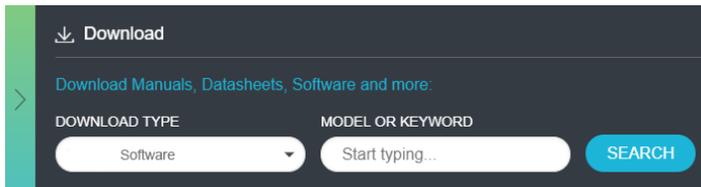
Install USB Tx application

Prerequisite:

Compatible version of Clarius automation framework must be installed. Check [Install Clarius automation framework](#) section for installation steps.

To install the USB Tx application in the target system, follow the steps:

1. Go to www.tek.com.
2. Click **Download**. In the Downloads menu, select DOWNLOAD TYPE as Software and enter the application name in the MODEL OR KEYWORD field and click **SEARCH**.



3. Select the latest version of software and follow the instructions to download. Copy the installer package to the target system⁸.
4. Double-click the USB Tx installer and follow the instructions in the installation wizard to complete the installation process.

By default, the application license will not be activated in Clarius compliance and the home screen displays no data. Refer [Activate application license](#) on page 40 to activate the license.



Note: If the installation fails, check the installation logs (C:\ProgramData\Tektronix\Clarius\logs) for details about the failure or contact a Tektronix field engineer for support.

Install instrument service plug-in of the USB Tx application

Install the instrument service plug-in of the application in the oscilloscope, where you have installed the Clarius instrument service. To install the Clarius instrument service, [click here](#).

Follow the steps to install the USB Tx instrument service plug-in:

1. In the target system where the Clarius automation framework is installed, navigate to the installed path. The default path is C:\Program Files\Tektronix\Clarius\installers.
2. Select and copy the Instrument folder and paste in the oscilloscope, where you have installed the Clarius instrument service.
3. Open the folder, double-click the **clarius-compliance-<<appname>>-instrument-service-<<version>>.exe** and install the plug-in.

⁸ A PC/Laptop/Computer where the Clarius automation framework is installed.

Upgrading application in Clarius automation framework

This section describes the instructions for upgrading the latest version of the USB Tx application in a target system. Follow the steps to complete the installation.

1. [Upgrade Clarius USB Tx application](#)
2. [Upgrade instrument service plug-in of USB Tx application](#)

Upgrade USB Tx application

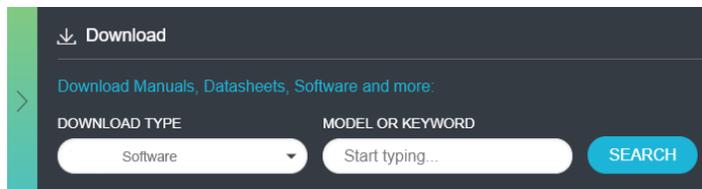
This section describes the instructions for upgrading the USB Tx application.

Prerequisite:

Compatible version of Clarius automation framework must be installed. Check [Install Clarius automation framework](#) section for installation steps.

To upgrade the USB Tx application in the target system, follow the steps:

1. Go to www.tek.com.
2. Click **Download**. In the Downloads menu, select DOWNLOAD TYPE as Software and enter the application name in the MODEL OR KEYWORD field and click **SEARCH**.



3. Select the latest version of software and follow the instructions to download. Copy the installer package to the target system⁹.
4. Double-click the USB Tx installer and follow the instructions in the installation wizard to complete the installation process.



Note: If the installation fails, check the installation logs (C:\ProgramData\Tektronix\Clarius\logs) for details about the failure or contact a Tektronix field engineer for support.

Upgrade instrument service plug-in of the USB Tx application

Upgrade the instrument service plug-in of the application in the oscilloscope, where you have installed the Clarius instrument service. To install the Clarius instrument service, [click here](#).

Follow the steps to upgrade the USB Tx instrument service plug-in:

1. In the target system where the Clarius automation framework is installed, navigate to the installed path. The default path is C:\Program Files\Tektronix\Clarius\installers.
2. Select and copy the **Instrument folder** and paste in the oscilloscope, where you have installed the Clarius instrument service.
3. Open the copied **Instrument folder** in the oscilloscope, double-click the **clarius-compliance-<<appname>>-instrument-service-<<version>>.exe** and upgrade the plug-in.

⁹ A PC/Laptop/Computer where the Clarius automation framework is installed.

Clarius SDK

Install Clarius SDK (Software Development Kit) in the target system (where Clarius automation framework is installed) or in the oscilloscope where the Clarius instrument service is installed.

Clarius SDK can be installed in the following ways:

- Install Python in the global environment and then install Clarius SDK in that environment. If a supported Python version is detected, you can select to install the Clarius SDK in that environment.
- Install Python in an isolated Python environment¹⁰ and install Clarius SDK in that environment.

Install Clarius SDK

If you have skipped Clarius SDK installation during the installation of Clarius automation framework, follow the steps to install.

1. In the target system, where the Clarius automation framework is installed, navigate to the installed path. The default path is `C:\Program Files\Tektronix\Clarius\installers\sdk`.
2. Select and copy the **sdk** folder and paste it to the oscilloscope.
3. Open sdk folder, double-click **clarius-sdk-`<<version>>.exe`** and follow the steps to complete the installation.

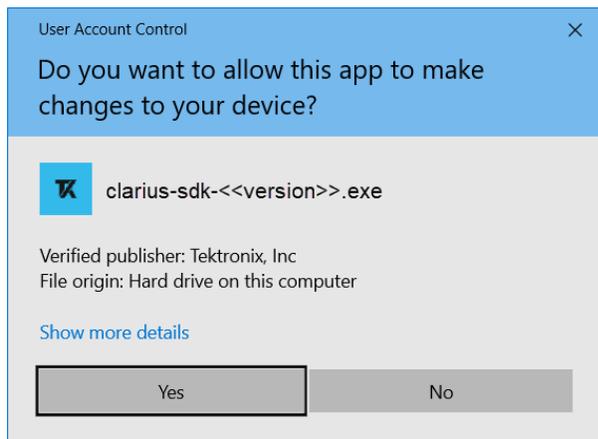


Figure 40: User account control dialog

¹⁰ An isolated Python environment will have its own independent set of Python packages installed in its site directories.

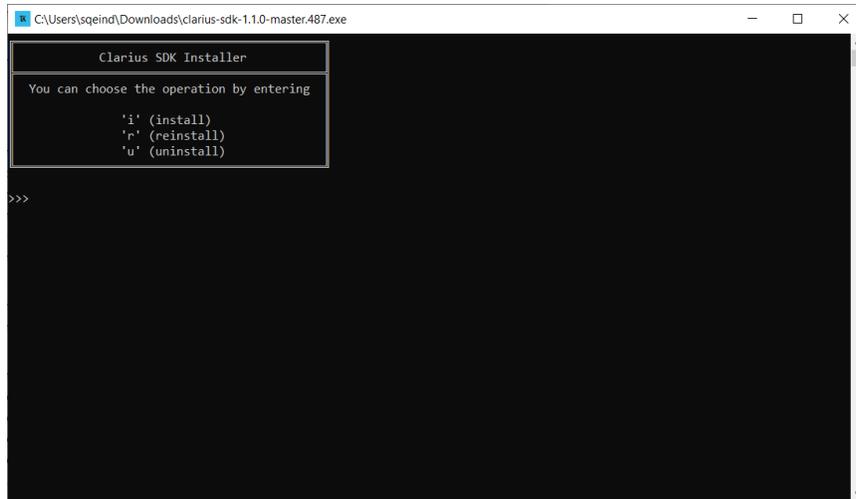


Figure 41: SDK installer setup

Activate application license

1. Double-click the **Clarius** icon from the desktop to launch the Clarius automation framework.
2. Log in using the **Username** as **admin** and the user configured password that was set during the installation.
3. Select the **License** tab and click  to copy the **Host ID**.

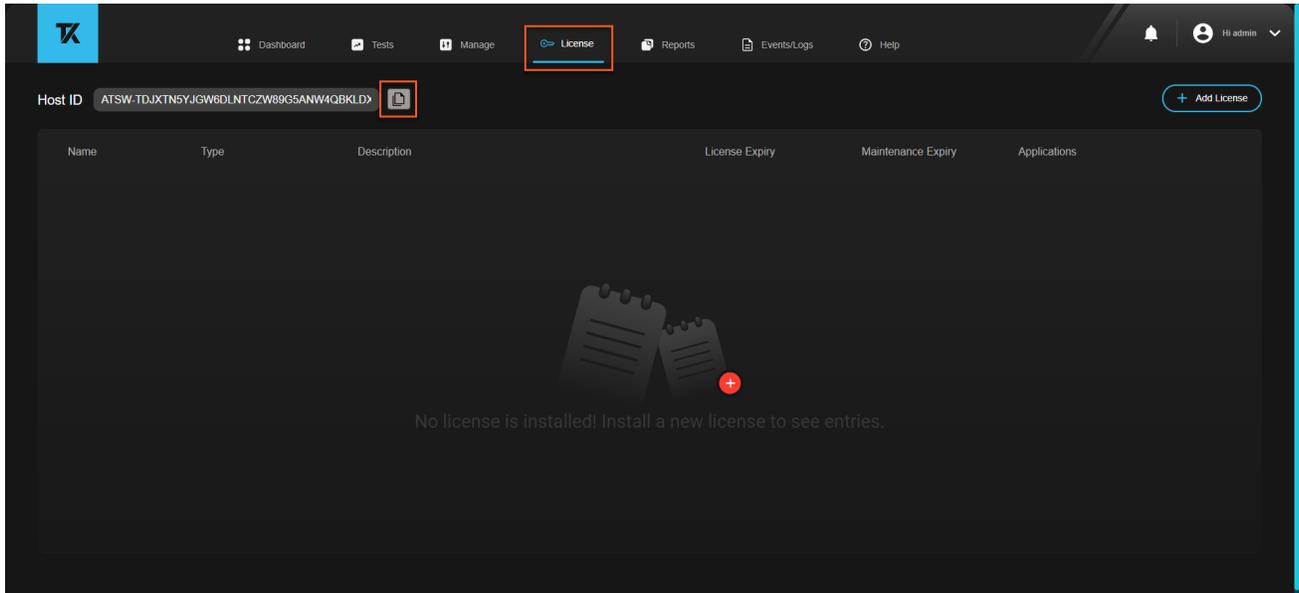


Figure 42: Copy Host ID for license request

4. Send the copied **Host ID** to the Tektronix application engineer and request for license file.
5. In the **License** tab, click **Add License**; browse and select the license file and click **Activate**.

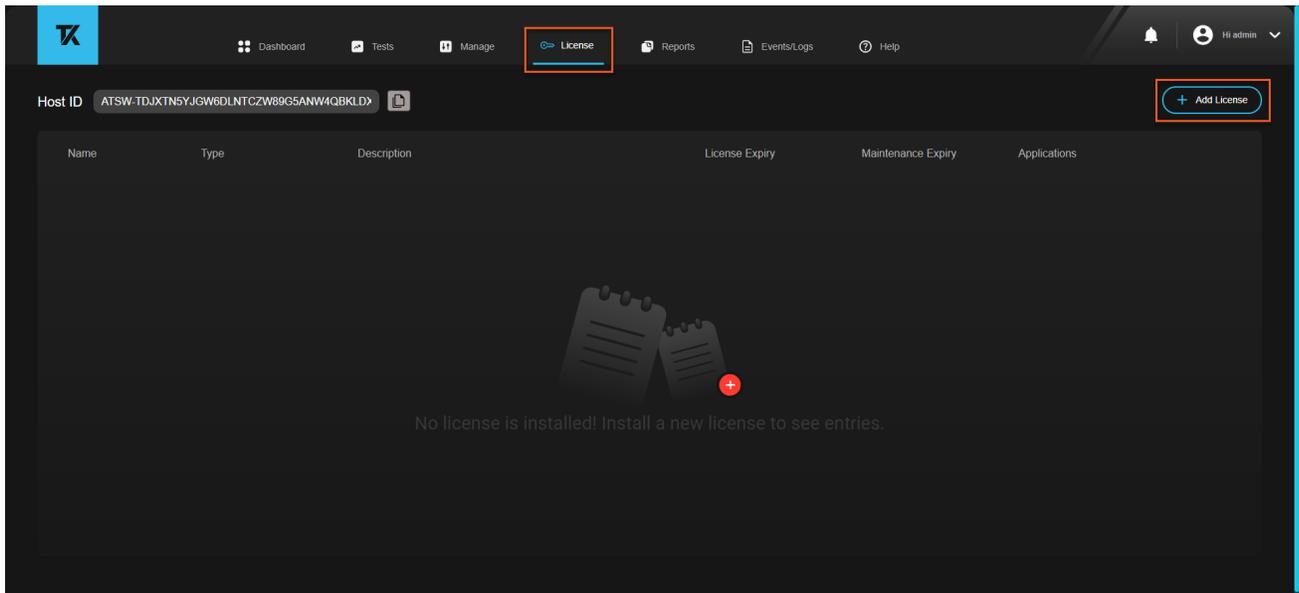


Figure 43: Add License

6. After successful activation, the application license details will be displayed in the license tab.

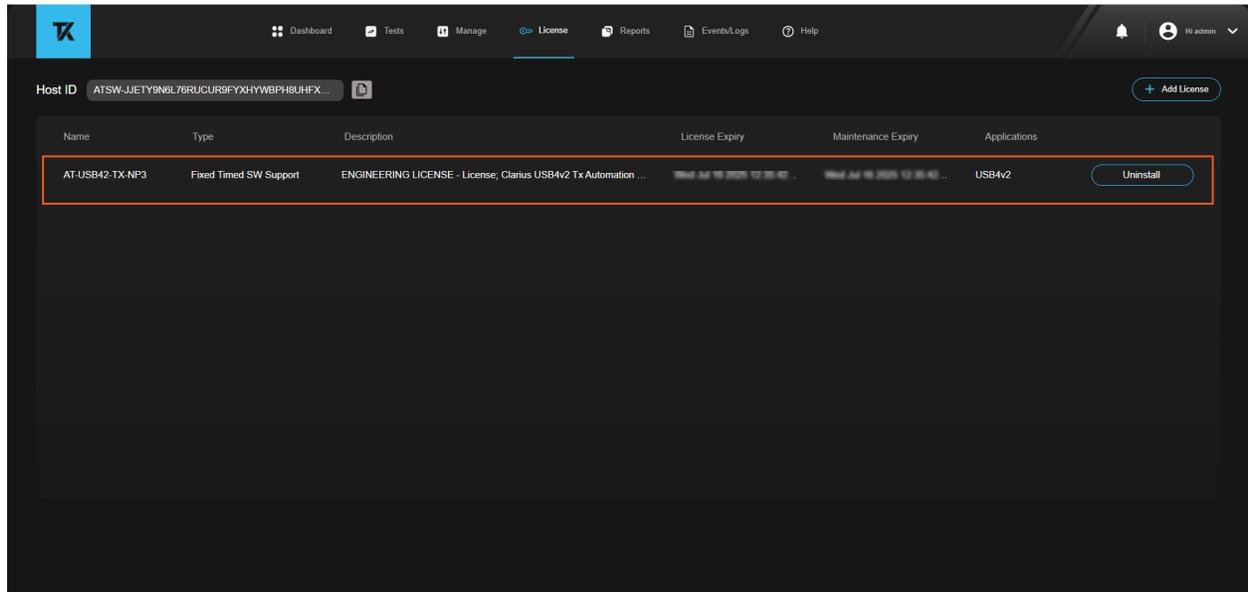


Figure 44: Installed application license in Clarius automation framework

Run the services

This section lists the services to run before performing tests in the Clarius automation framework. To perform testing within the Clarius automation framework, make sure all the installations are complete and all supporting services are running for the following scenarios.

- The *Clarius measurement service* must be up and running in the target system.
- The *Clarius instrument service* must be up and running in the system or oscilloscope from where the analysis of the waveform will be done.

Run Clarius measurement service

If the Clarius measurement service is running in the target system where Clarius automation framework is installed, you must see the Measurement service running status in *Admin Console*.

If it is not running, restart the **Measurement Service** from the **Admin Console**.

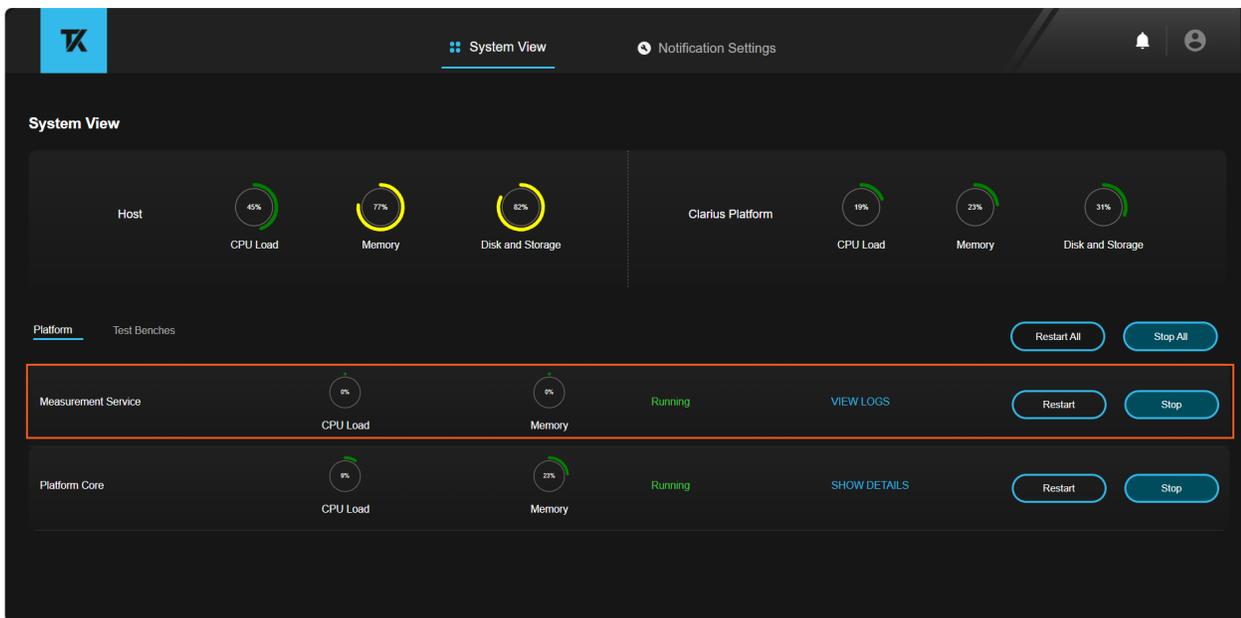


Figure 45: Clarius measurement service in Admin Console

You can also start, stop, check the status, and view the logs of the Measurement Service in the **Admin Console**.

Run Clarius instrument service

Clarius instrument service sends the waveform to the measurement service¹¹ for analysis. To check if the instrument service is running, click the **Show hidden icons** arrow  in the task bar of Windows and check for Instrument Service.

If the instrument service is not running, double-click the **InstrumentServiceStart.bat** icon from the desktop and run the instrument service. This will run the instrument service and the automator.

¹¹ Measurement service will be installed in the target system where Clarius automation framework is installed.

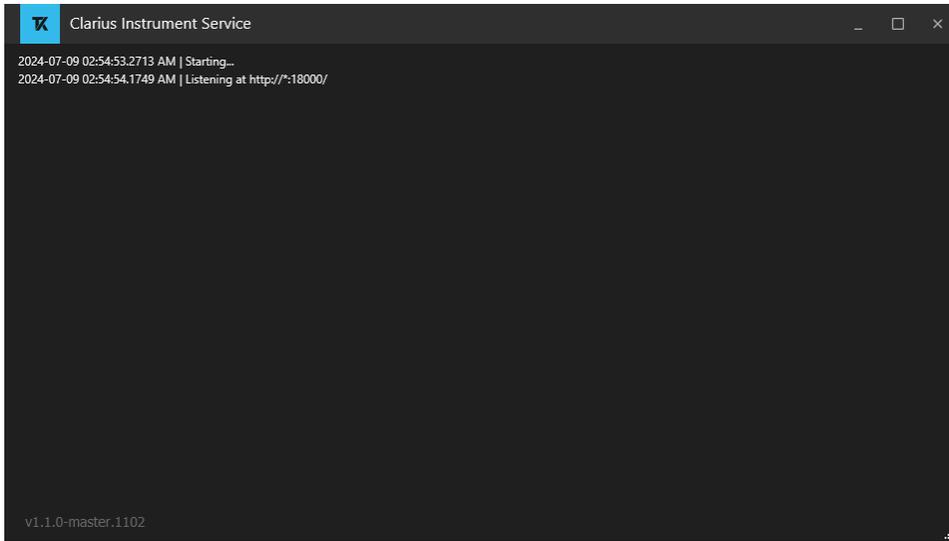


Figure 46: Clarius instrument service window

You can also run the instrument service by navigating to the installation path and double-click the **InstrumentServiceStart.bat**. The default installation path is `C:\Program Files\Tektronix\Clarius\lib\instrument\service`.

Application overview

This section describes the steps to log in to the Clarius automation framework, lists of the application controls, and the list of tabs that are in the navigation panel.

Start and log in to the application

1. Double-click the **Clarius** icon from desktop to launch Clarius automation framework.



Note: You can access the Clarius automation framework from the target system using the local host URL `https://127.0.0.1:4200`. To remotely access the Clarius automation framework, use the host name or IP address of Clarius automation framework installed system.

2. Log in to the application using the credentials.

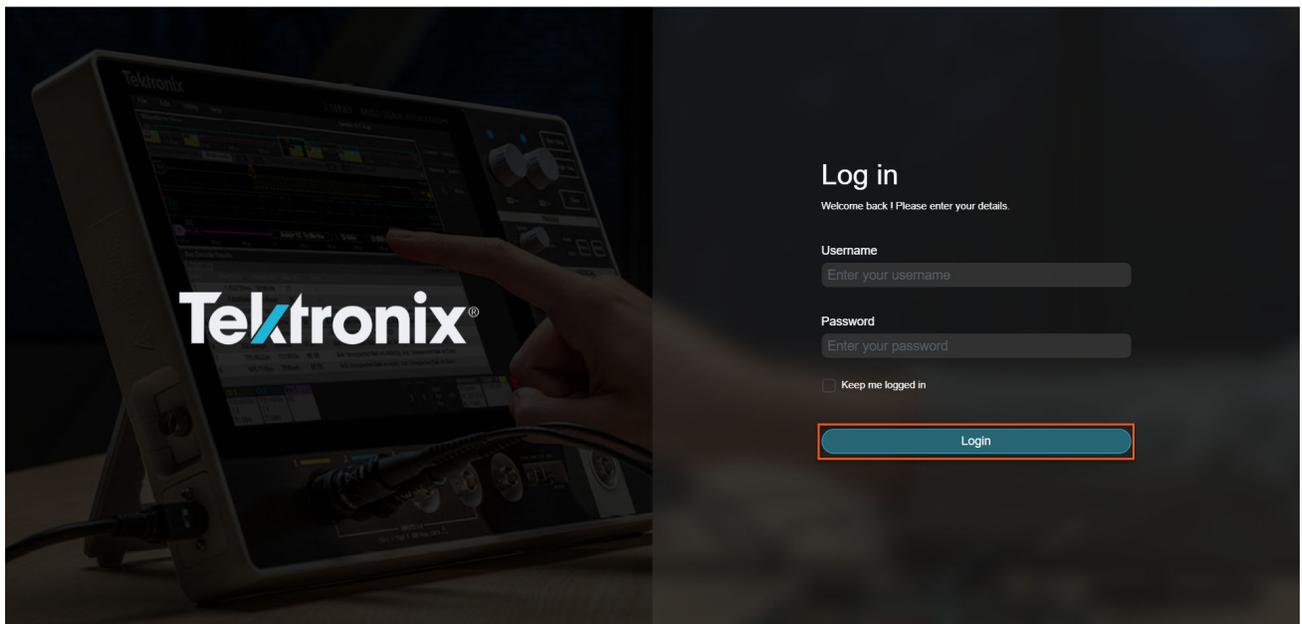


Figure 47: Clarius automation framework login page

After successful log in, you will be navigated to the home page. It displays the activated application(s), saved sequences of the application, test benches status, running tests, failed tests list, and notifications.

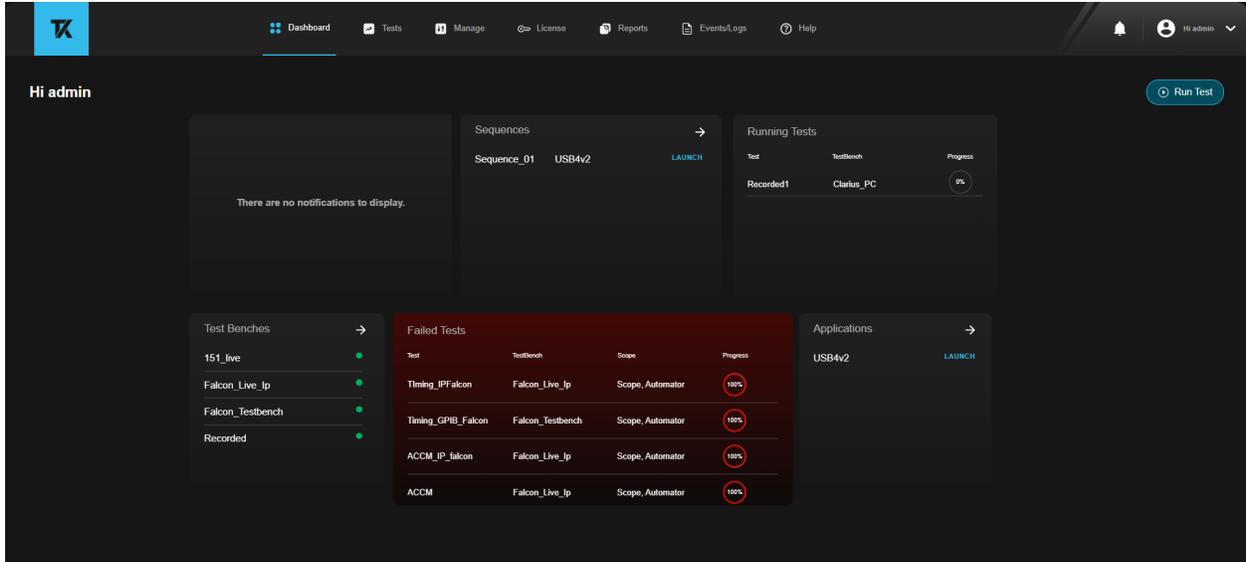


Figure 48: Clarius automation framework home page

Application controls

The Clarius automation framework uses the menus to group the related configurations, test, result, logs, and report settings. Click the respective menu to open the associated details.

A menu may have one or more tabs and frames that lists the selections available in that panel. Controls in a menu can change based on the settings made in that menu or another menu.

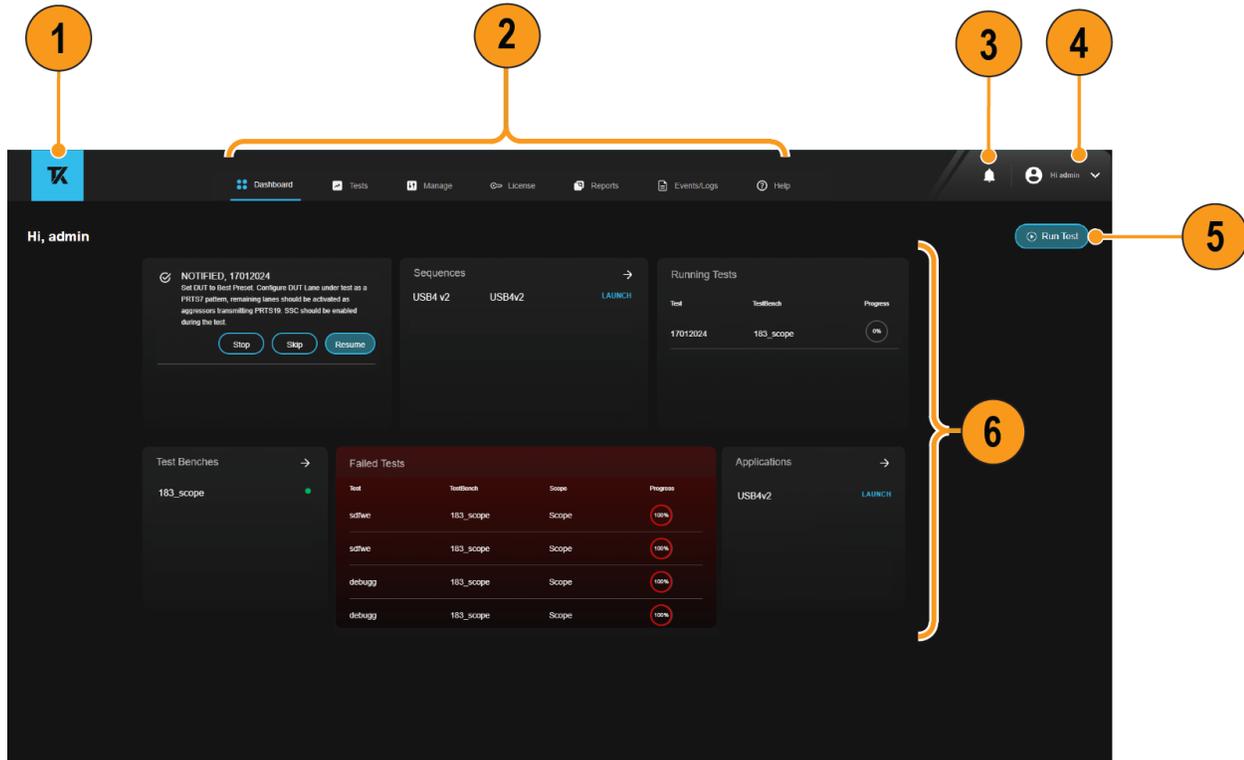


Figure 49: Application controls interface

Table 4: Application controls description

| Identifier | Element | Description |
|------------|------------------|---|
| 1 | Navigation panel | The navigation panel contains list of tabs that allows you to select the application, create and configure tests, create and configure test benches, and generate the test reports. |
| 2 | Notifications | Displays alerts when an event or action occurs in the application. |
| 3 | User profile | Displays the profile information and settings details of the account. You can view the version and user license agreement details in About menu. |
| 4 | Run Test | Click to perform a test by entering the required test information. |
| 5 | Widgets | An element of a graphical user interface that displays information or provides a specific details to the user to interact with the application. |

Navigation panel

The navigation panel contains a list of tabs that allows you to select the application, create and configure tests, test bench, generate the test report, view the logs of the executed test, and the license information. Click the respective tab to open the associated panel.

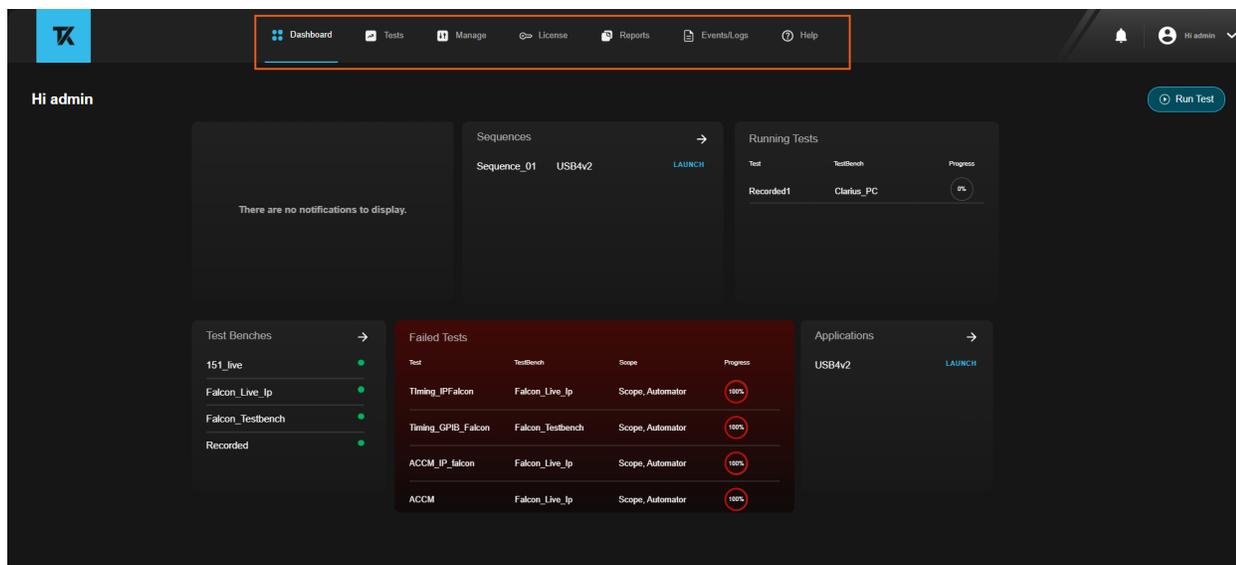


Figure 50: Clarius compliance navigation panel

Table 5: Navigation panel and tabs description

| Tabs | Description |
|-----------------|---|
| Dashboard | Displays the test data and test execution summary. It includes test progress, test notifications to view the status of each test, list of active applications, sequences, and test benches. |
| Tests | Allows you to create, configure, and run a new test. It also analyzes and displays the details of all executed tests. |
| Manage | Allows you to manage the application, test bench, and sequences that are created for the test execution. |
| License | Allows you to add license to the application and also view the licenses that are enabled. |
| Reports | Allows you to generate a test report and/or export a detailed test report for an executed test(s). |
| Events and logs | Displays the logs and events for a test. |
| Help | Allows you to open Help window to browse topics and read Help files. |

Dashboard: View the test execution details, progress, and results

The dashboard allows you to get quick insight about the test execution summary. The widgets in the dashboard displays the test related information such as applications used, available test benches, test notifications, sequences, and more.

The test execution results displayed here depends on the configurations in the other panels.

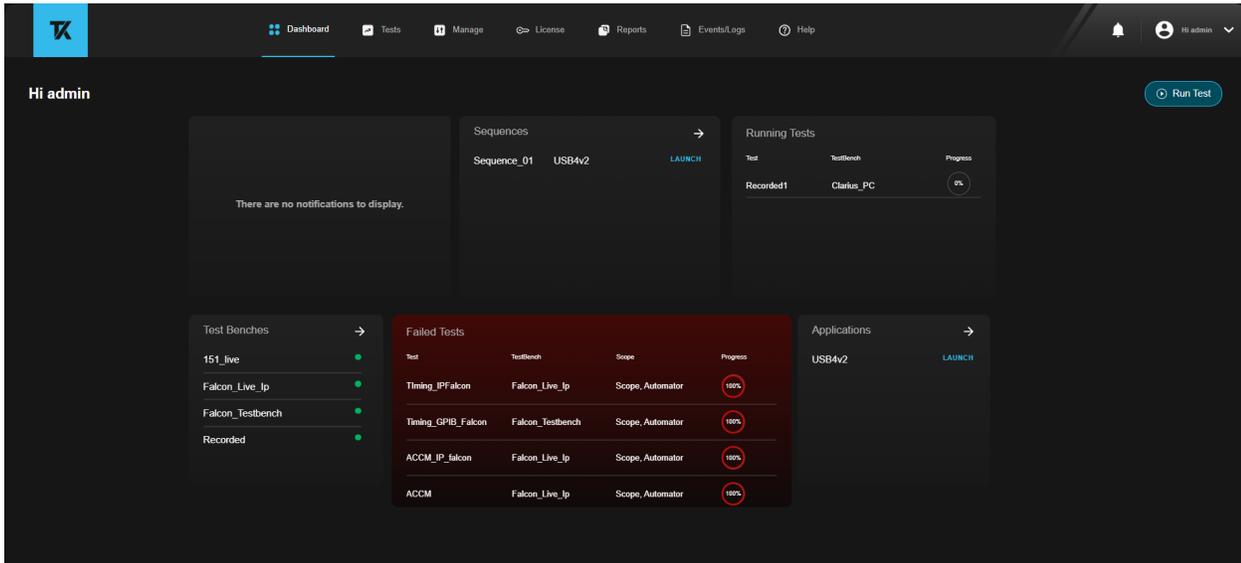


Figure 51: Clarius compliance dashboard view

Perform a test

The **Run Test** allows you to perform a test by entering the fields such as the test name, tags, test description, acquisition mode, test bench, and test sequence.

Widgets

A widget is a part of an interface that allows you to perform a task or access a service on the platform.

Running tests

This widget displays the current test execution status with details such as Test Name, Testbench, and Progress. The progress status displays the test status as Running, Failed, or Complete.

If tests are not performed, then the widget displays **No Tests Are Running** message.

Click the particular test from the **Running Test** widget to view the test details and progress of the currently running test from the **Test** tab.

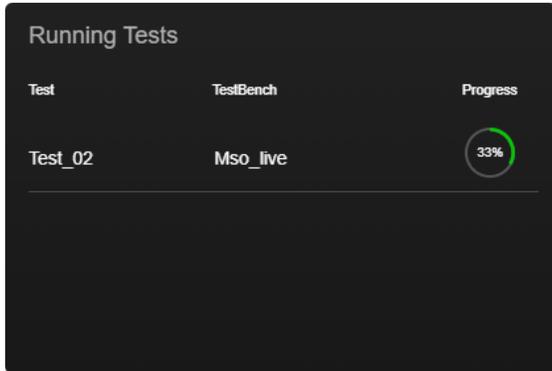


Figure 52: Clarius compliance running tests widget

Test benches

Displays the list of available test benches along with its status. Click  to navigate to the **Test benches** tab.

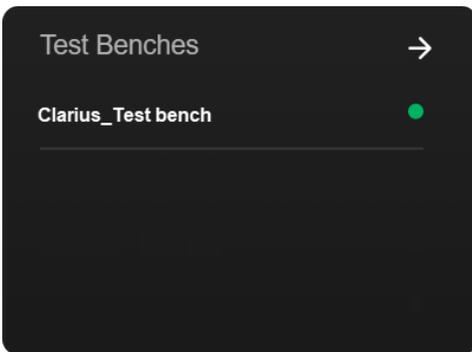


Figure 53: Clarius compliance test benches widget

Applications

Displays the list of activated application(s). Click **LAUNCH** to start the application.

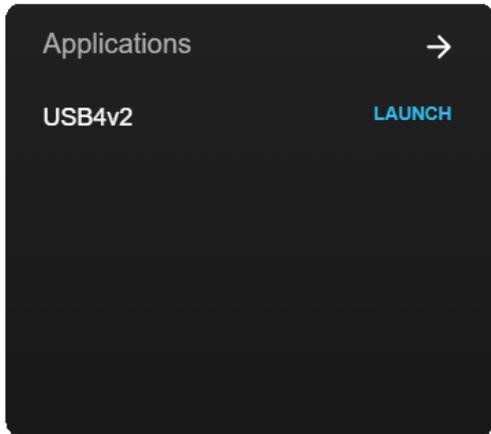


Figure 54: Clarius compliance applications widget

Failed tests

Displays the list of failed tests with details of Test Name, Test bench, Scope, and Progress. Click the particular failed test to navigate to the test details and view the test results from the **Tests** tab.

| Test | TestBench | Scope | Progress |
|-----------|-----------|-------|----------|
| min UI | 169_scope | Scope | 100% |
| UJ | 169_scope | Scope | 100% |
| UJ | 169_scope | Scope | 100% |
| tx_timing | 169_scope | Scope | 100% |

Figure 55: Clarius compliance failed tests widget

Sequences

Displays the list of available sequence(s). Click **LAUNCH** to run the sequence.

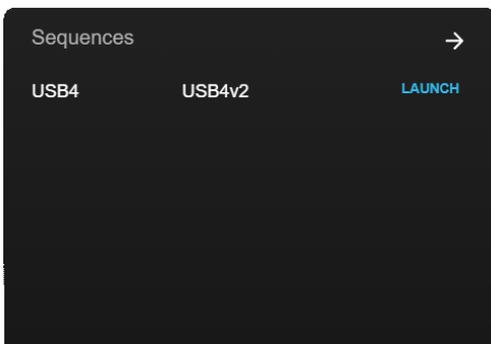


Figure 56: Clarius compliance sequences widget

Notifications

Displays the list of notifications for the active running test. If no tests are performed, the widget displays **No Notification to Show** message.

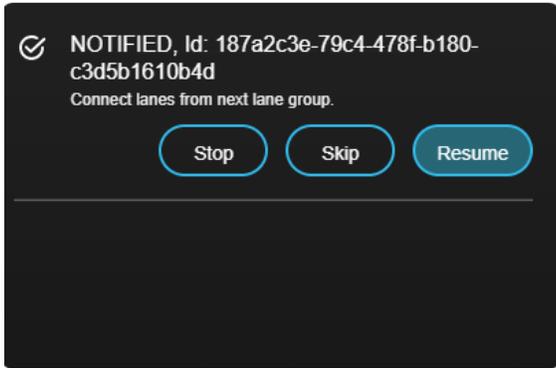


Figure 57: Clarius compliance notifications widget

Tests: Create and run a test, view run statistics and results

The **Tests** tab allows you to create, configure, and run a test. It also displays the name of the test, test mode, application name, execution time stamp, execution duration, and the test execution status. You can delete and view results of the executed test from **Tests** tab.

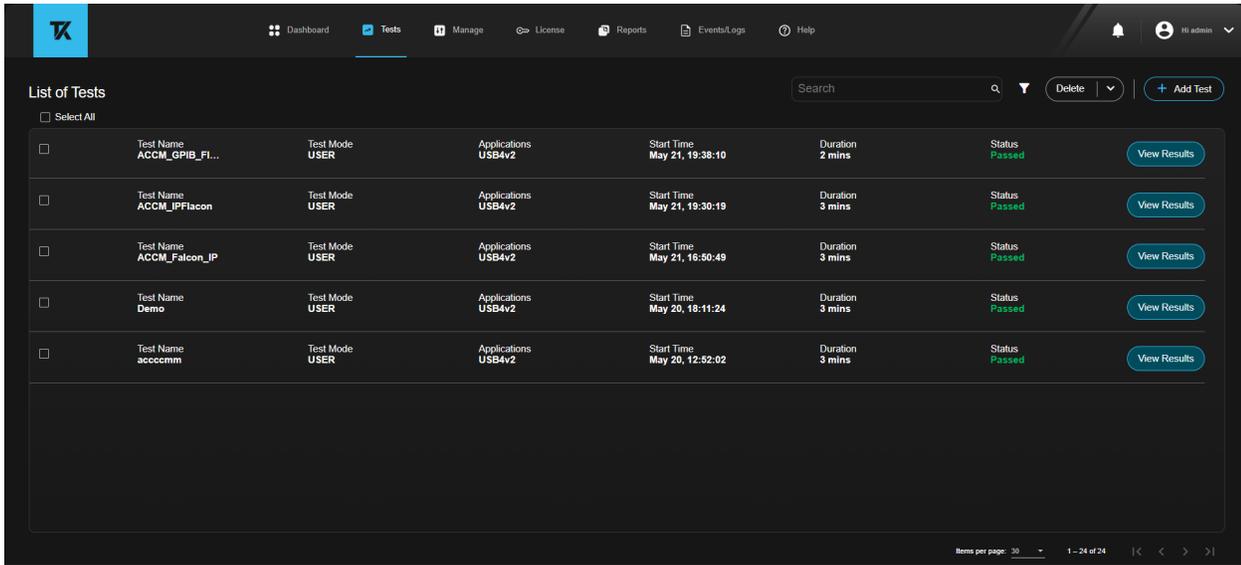


Figure 58: Tests tab in Clarius compliance

Select a test or tests and click **Delete** to delete the test or waveforms from the **Test** tab.

Create and run a test

The **Add Test** button allows you to create and configure a test.

Follow the steps to create a test:

1. In the **Tests** tab, click **Add Test**.

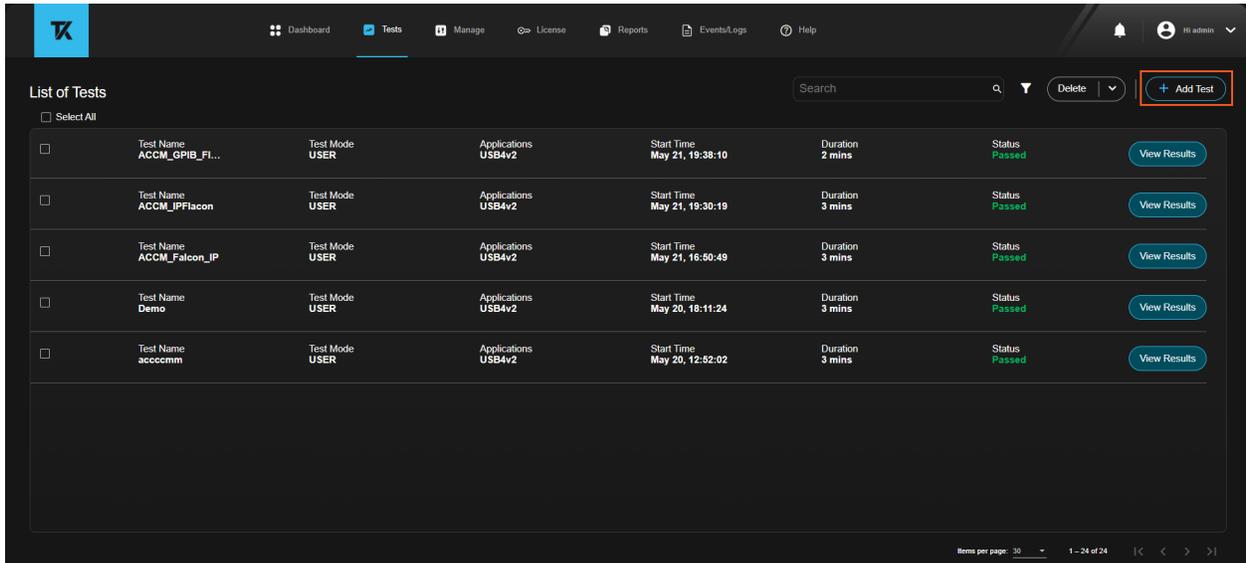


Figure 59: Add Test

2. Enter the test details in the respective fields.

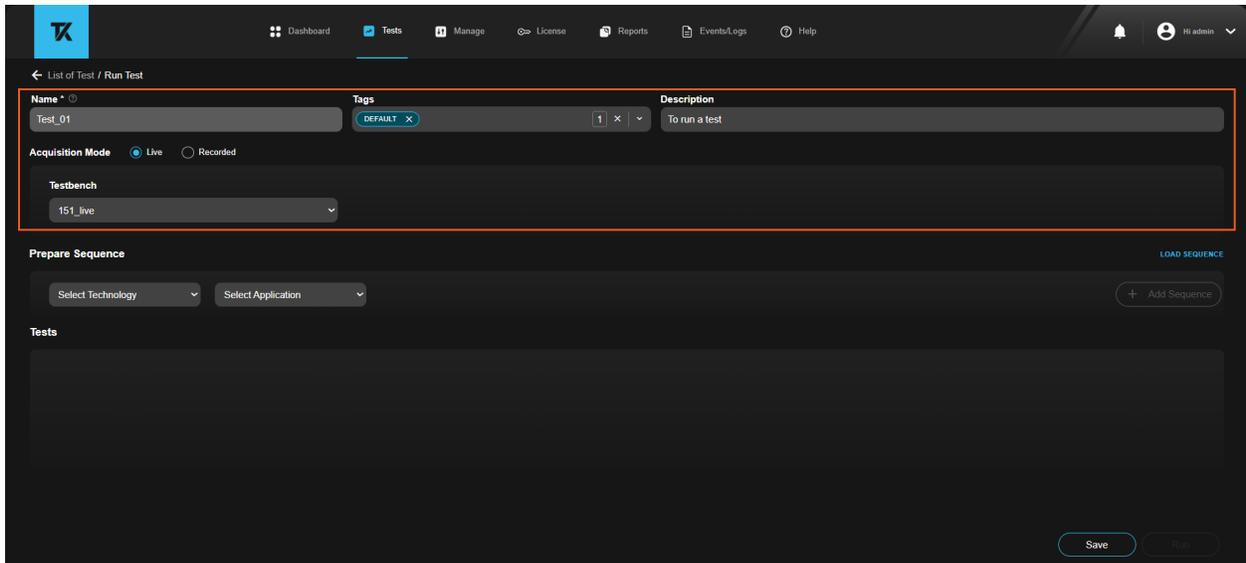


Figure 60: Test Parameters

| Menu | Description |
|------|---------------------------|
| Name | Enter a unique test name. |

Table continued...

| Menu | | Description |
|------------------|----------|---|
| Tags | | Tags are used to group the tests. There is a default tag added. You can add the required tag to the tests and can filter the tests based on the tag value. |
| Description | | Enter the test description. |
| Acquisition Mode | | Select the acquisition mode (Live or Recorded). |
| | Live | Select Live to run a test measurements on live signal. <ul style="list-style-type: none"> Select the <i>testbench</i> from the drop-down list. |
| | Recorded | Select Recorded to run a test measurements on prerecorded waveforms. <ul style="list-style-type: none"> Select the oscilloscope or Clarius installed PC from the drop-down to use recorded waveform files. Select the <i>testbench</i> from the drop-down on the Recorded mode. (Enables only when Remote PC/Oscilloscope is selected). Enter waveform folder path from Remote PC/Oscilloscope or Clarius PC. |

3. [Create and prepare a sequence.](#)
4. [Configure the sources and signals.](#)
5. [Configure the global settings.](#)
6. [Instrument connection diagram setup.](#)
7. [Configure the test scenario.](#)
8. Click **Run** to run the measurements with the configured settings.

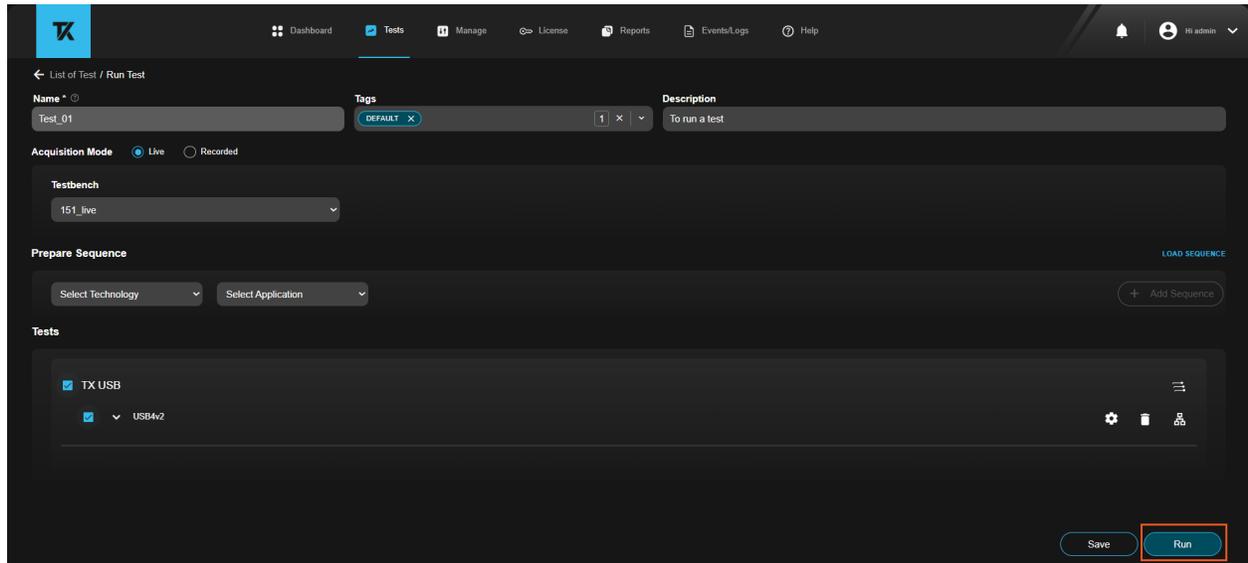


Figure 61: Run a test

Create and prepare a sequence

The create and prepare a sequence settings allows you to add a sequence by setting up the required details.

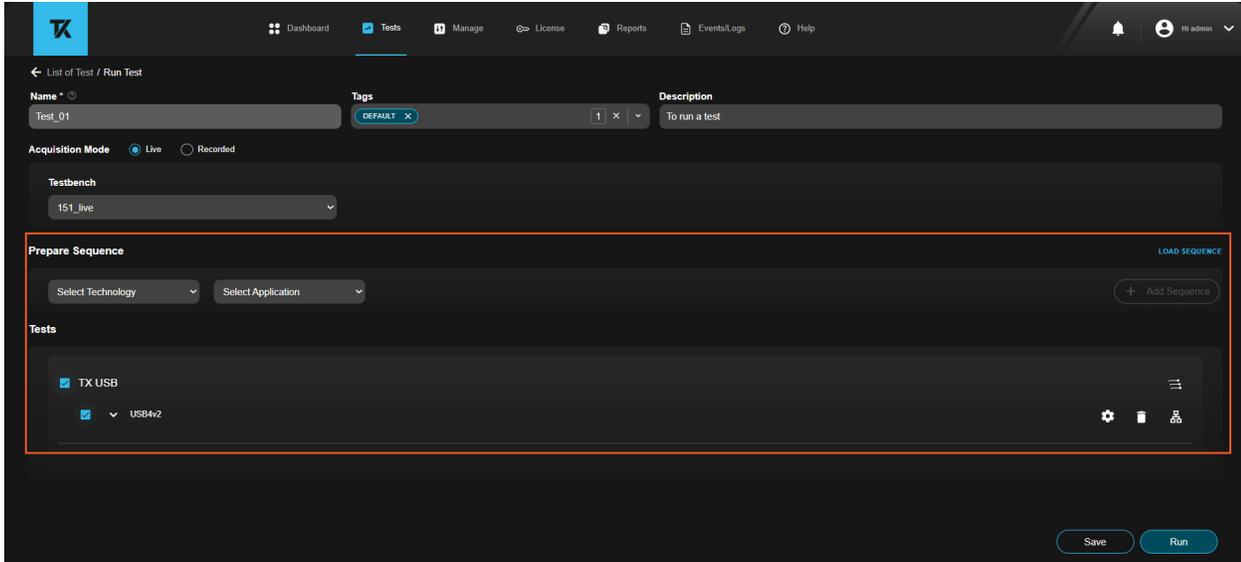


Figure 62: Tests tab: Create and prepare a sequence

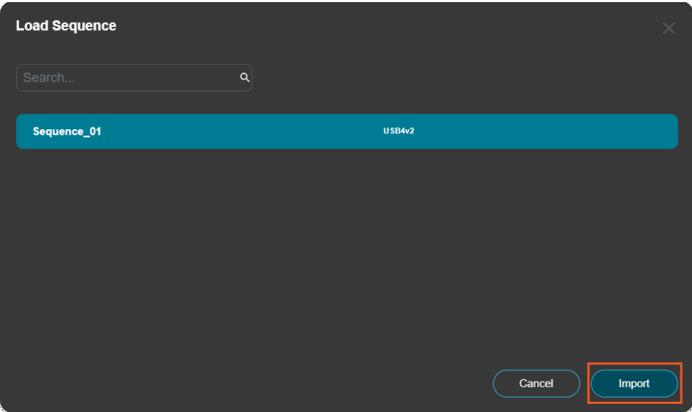
| Menu | Description |
|-------------------------------------|--|
| Import Sequence | <p>It allows to import the sequence that is created as a template.</p> <ul style="list-style-type: none"> Click the LOAD SEQUENCE button and select the desired sequence. Click Import.  |
| Select Technology | Select the technology from the drop-down to prepare a sequence. |
| Select Application | Select the active application from the drop-down to prepare a sequence. |
| Add Sequence | It allows to add a new sequence in the current test. |
| Sources and Signals | Select the required sources and signals to run the test. |
| Global Settings | Select the required global settings to run the test. |
| Delete sequence | Deletes the created sequence. |
| Connection Diagram | Shows the connection between the instruments to make the test setup. |
| Scenarios | It displays the list of scenarios with their Names and Local Settings related to the sequence. You can select and unselect a scenario. |
| Save | Saves all the sequence settings that are added. |

Table continued...

Tests: Create and run a test, view run statistics and results

| Menu | Description |
|------|---|
| Run | Run the test when all the settings are added. |

Configure the sources and signals

The Sources and Signals allows you to select source and assign signals to the channels.

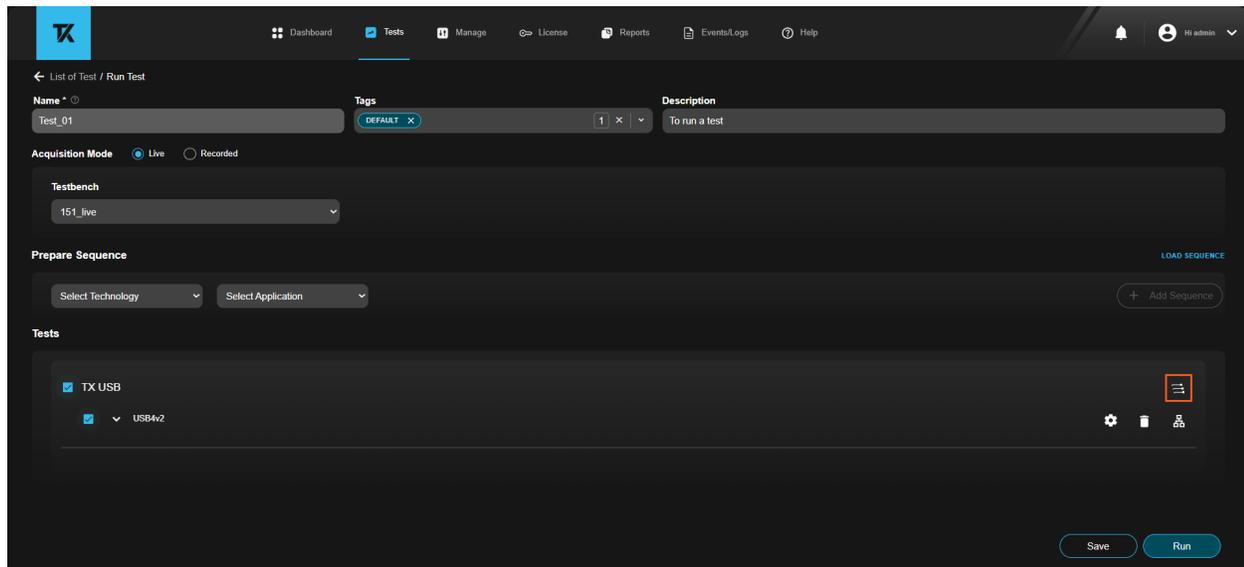


Figure 63: Tests tab: Configure the sources and signals for a test

To add the sources and signals, do the following:

1. Click  to configure the sources and signals for a test setup.
2. By default, signals will be added as per the selected technology and application.
3. Select or deselect the required source from the drop-down.

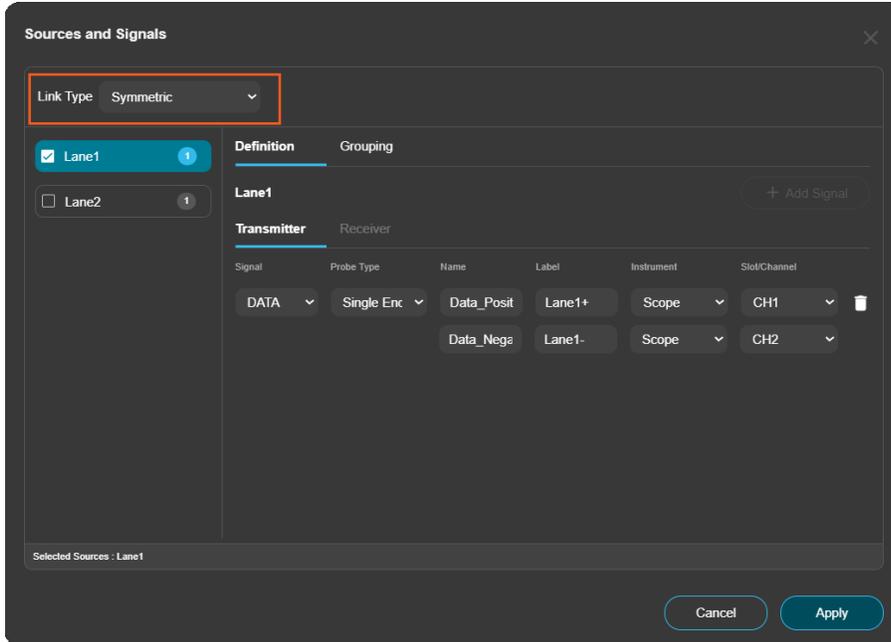
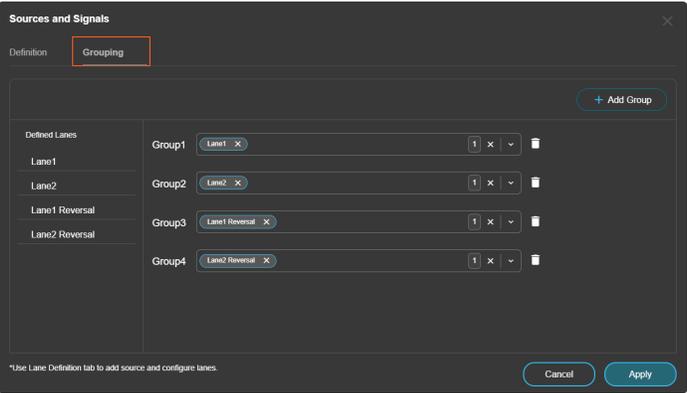


Figure 64: Test tab: Sources and signals

4. To add a new signal for the test setup and click **+ Add Signal**.
5. Navigate to the **Grouping** tab and click **+ Add Group** to add group of sources.
6. Click **Apply**.

| Sources | Description |
|---------------------------|---|
| <p>Definition</p> | |
| <p>Link Type</p> | <p>Select the link type from the drop-down.</p> <p>Options: Symmetric, Asymmetric</p> <p>Default: Symmetric</p> <p> Note: Changing the Link type will restore the lane settings to their default values.</p> |
| <p>Table continued...</p> | |

| Sources | Description | | | | | | | | | | |
|-----------------|---|-----------|--------|-----------|-------------------|------------|--|----------------|-------------------------------------|----------------|-------------------------------------|
| Source | <p>Select or deselect the required lane to configure the sources.</p> <p>Options:</p> <table border="1"> <thead> <tr> <th>Link Type</th> <th>Source</th> </tr> </thead> <tbody> <tr> <td>Symmetric</td> <td>Lane1, Lane2</td> </tr> <tr> <td>Asymmetric</td> <td>Lane1, Lane2, Lane1 Reversal, Lane2 Reversal</td> </tr> </tbody> </table> <p>Default: Lane1</p> | Link Type | Source | Symmetric | Lane1, Lane2 | Asymmetric | Lane1, Lane2, Lane1 Reversal, Lane2 Reversal | | | | |
| Link Type | Source | | | | | | | | | | |
| Symmetric | Lane1, Lane2 | | | | | | | | | | |
| Asymmetric | Lane1, Lane2, Lane1 Reversal, Lane2 Reversal | | | | | | | | | | |
| Signal | <p>Select the signal.</p> <p>Default: DATA</p> | | | | | | | | | | |
| Probe Type | <p>Select the probe type.</p> <p>Default: SINGLE_ENDED</p> | | | | | | | | | | |
| Name | <p>Displays the source name based on the probe type selected.</p> <p>Default: Data_Positive, Data_Negative</p> | | | | | | | | | | |
| Label | <p>Enter the label of the source in the field.</p> <p>Default:</p> <table border="1"> <thead> <tr> <th>Source</th> <th>Label</th> </tr> </thead> <tbody> <tr> <td>Lane1</td> <td>Lane1+ and Lane1-</td> </tr> <tr> <td>Lane2</td> <td>Lane2+ and Lane2-</td> </tr> <tr> <td>Lane1 Reversal</td> <td>Lane1 Reversal+ and Lane1 Reversal-</td> </tr> <tr> <td>Lane2 Reversal</td> <td>Lane2 Reversal+ and Lane2 Reversal-</td> </tr> </tbody> </table> | Source | Label | Lane1 | Lane1+ and Lane1- | Lane2 | Lane2+ and Lane2- | Lane1 Reversal | Lane1 Reversal+ and Lane1 Reversal- | Lane2 Reversal | Lane2 Reversal+ and Lane2 Reversal- |
| Source | Label | | | | | | | | | | |
| Lane1 | Lane1+ and Lane1- | | | | | | | | | | |
| Lane2 | Lane2+ and Lane2- | | | | | | | | | | |
| Lane1 Reversal | Lane1 Reversal+ and Lane1 Reversal- | | | | | | | | | | |
| Lane2 Reversal | Lane2 Reversal+ and Lane2 Reversal- | | | | | | | | | | |
| Instrument | <p>Select the required instrument from the drop-down.</p> <p>Default: Scope</p> | | | | | | | | | | |
| Slot/Channel | <p>Select the required slot/channel from the drop-down.</p> <p>Options: CH1, CH2</p> | | | | | | | | | | |
| Delete | Removes the added signal source. | | | | | | | | | | |
| Grouping | | | | | | | | | | | |

| Sources | Description |
|--|-------------|
|  | |
| <p>In USB4v2 applications, each group should have only one lane. Acquisitions in each lane occur sequentially. Refer to DUT link type and test fixture lane mapping.</p> | |

Configure the global settings

Global settings configured for the application will be applied for all the measurements within the application. These settings are applicable for all the scenarios present in the sequence.

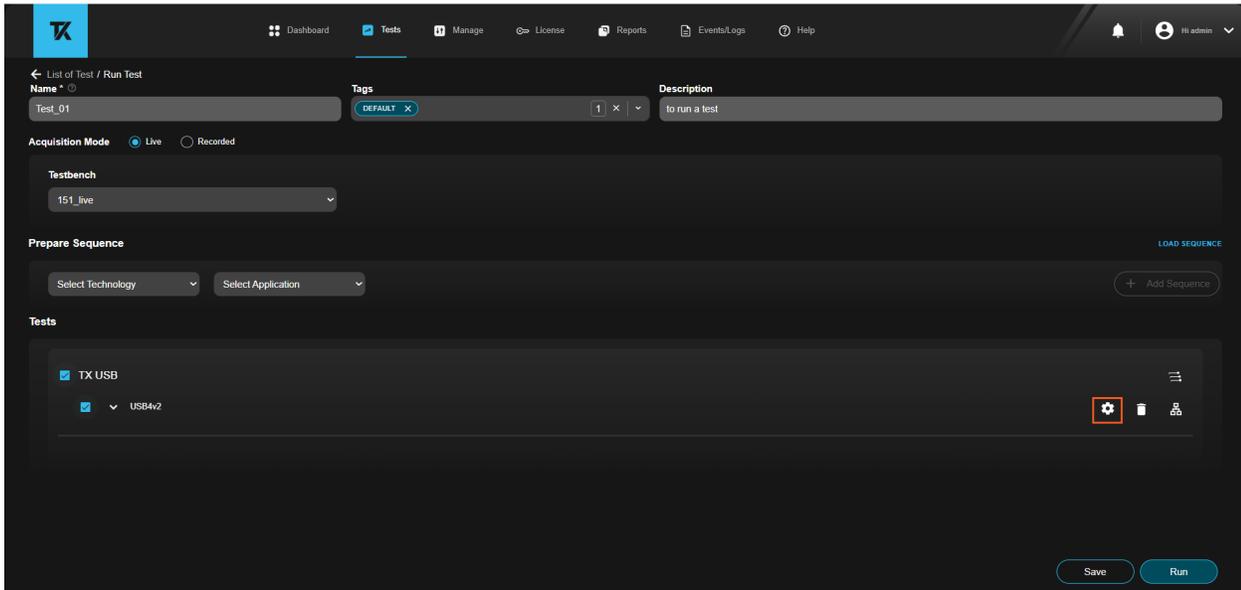


Figure 65: Tests tab: Configure global settings

Follow the steps to add or update the global settings:

1. Click  from the **Tests** pane.
2. Select or update the respective global settings and click **Apply**.

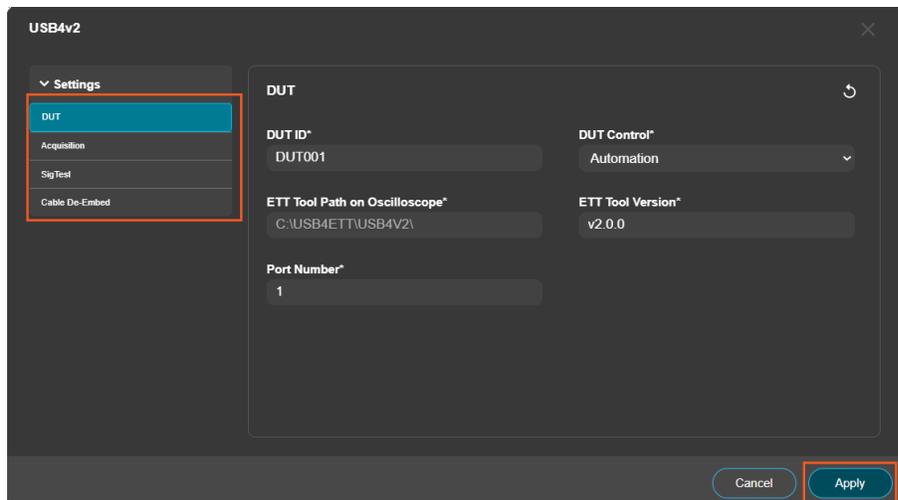


Figure 66: Test tab: Global settings

Table 6: Global settings

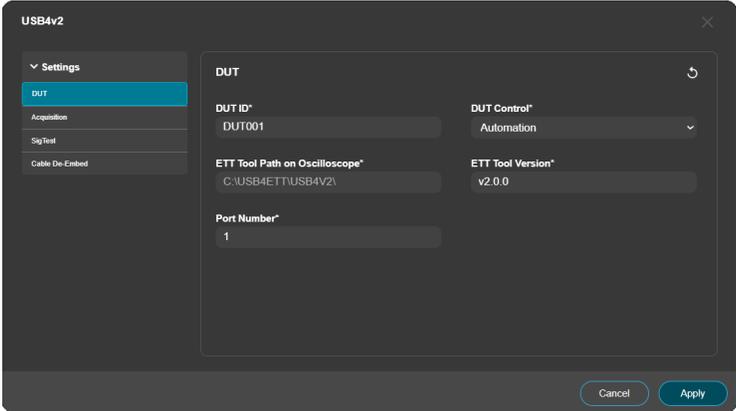
| Configuration Name | Details |
|--|--|
|  | Reset all settings to default. |
| DUT | |
|  | |
| DUT ID | Custom field to differentiate the DUT ID. Enter DUT identifier or name in the field. Default: DUT001 |
| DUT Control | Select the DUT control from the drop-down. Options: Automation, Manual Default: Automation  Note: This setting is displayed when the acquisition mode is set to LIVE . |
| ETT Tool Path on Oscilloscope | The USB ETT Tool should be installed in this location on the oscilloscope |

Table continued...

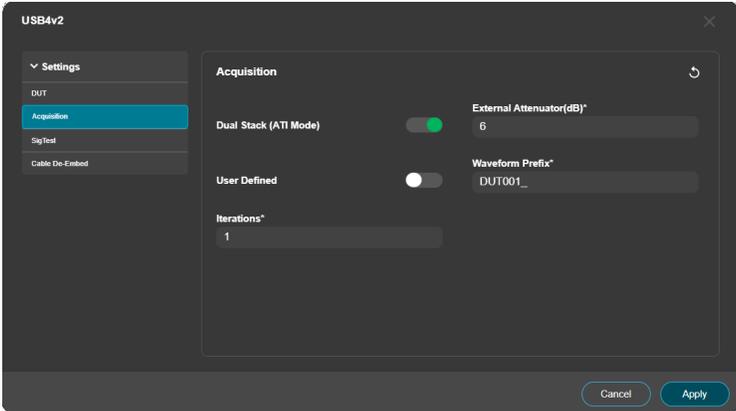
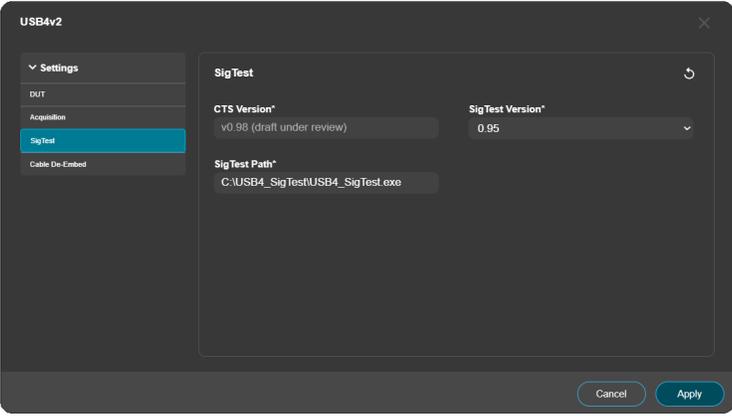
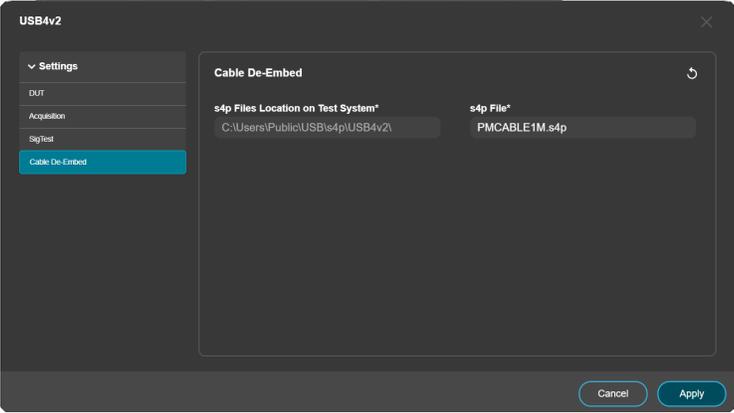
| Configuration Name | Details |
|--|---|
| | <p>Path: C : \USB4ETT\USB4V2\</p> <p> Note: This path is not user-editable and is shown for user reference.</p> <p> Note: This setting is displayed when the DUT control is set to Automation and the acquisition mode is set to LIVE.</p> |
| ETT Tool Version | <p>The USB ETT Tool version.</p> <p>Default: v2.0.0</p> <p> Note: This setting is displayed when the acquisition mode is set to LIVE.</p> |
| Port Number | <p>Enter the DUT port number.</p> <p>Default: 1</p> <p> Note: This setting is displayed when the DUT control is set to Automation and the acquisition mode is set to LIVE.</p> |
| <p>Acquisition</p>  | |
| Dual Stack (ATI Mode) | <p>Use the toggle button to enable or disable.</p> <p>Options: Enable, Disable</p> <p>Default: Enable</p> <p> Note: This setting is displayed when the acquisition mode is set to LIVE.</p> |
| External Attenuator(dB) | <p>Enter the connected attenuator value in this field.</p> <p>Default: 6</p> <p> Note: This setting is displayed only when the Dual Stack (ATI Mode) is enabled and acquisition mode is set to LIVE.</p> |
| User Defined | <p>Use the toggle button to enable or disable.</p> <p>Default: Disable</p> |

Table continued...

| Configuration Name | Details |
|--|--|
| |  Note: This setting is displayed when the acquisition mode is set to LIVE . |
| Bandwidth | Select the bandwidth of the instrument from the drop-down. Options: 33, 30, 25 Default: 25 GHz  Note: This setting is displayed only when User Defined is enabled and acquisition mode is set to LIVE . |
| Waveform Prefix | Enter the prefix for the waveform name. Default: DUT001_ |
| Iterations | Enter the number of iterations. Options: 1 to 20 Default: 1 |
| SigTest  | |
| CTS Version | Compliance Test Specification version. Default: v0.98 |
| SigTest Version | Mention the SigTest version which is specified in the "SigTest Path" to get printed in the test report. Option: 0.9, 0.95 Default: 0.95 |
| SigTest Path | To configure the system, install the SigTest tool and specify the path. Default: C:\USB4_SigTest\USB4_SigTest.exe  Note: It is recommended not to use any spaces in the path string. |
| Cable De-Embed Table continued... | |

| Configuration Name | Details |
|---|--|
|  | |
| s4p Files Location on Test System | Default: C : \Users\Public\USB\s4p\USB4v2\ |
| s4p File | Enter the cable s4p file name in the field. Default: PMCABLE1M.s4p |

Instrument connection setup

The instrument connection setup shows how to connect the DUT to the oscilloscope for the tests.

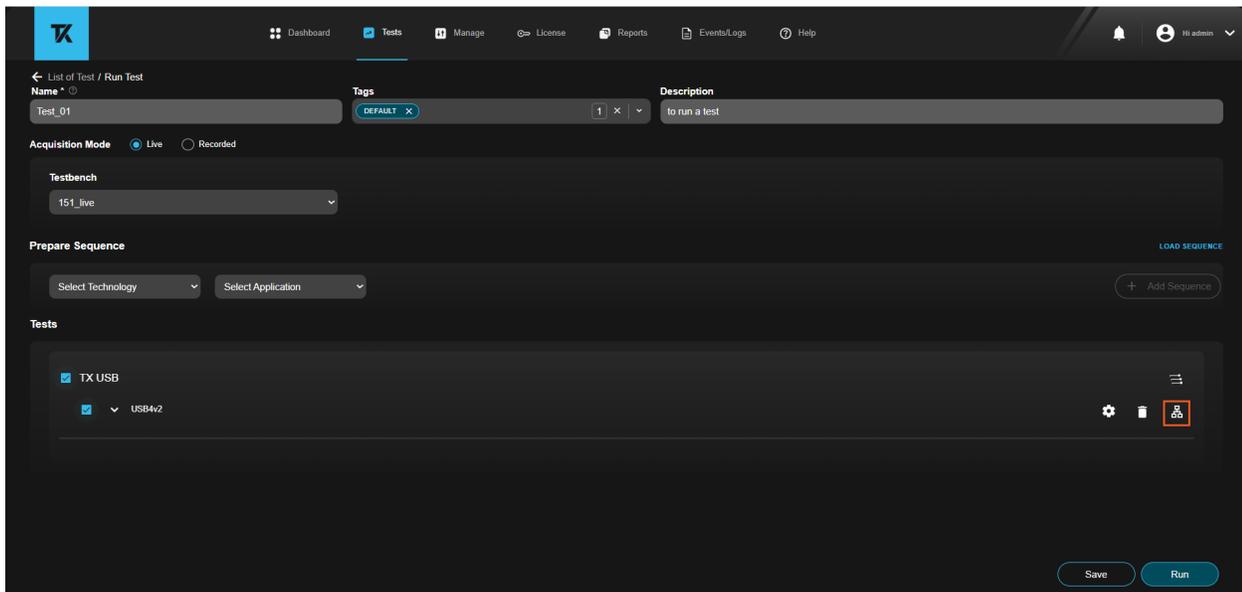
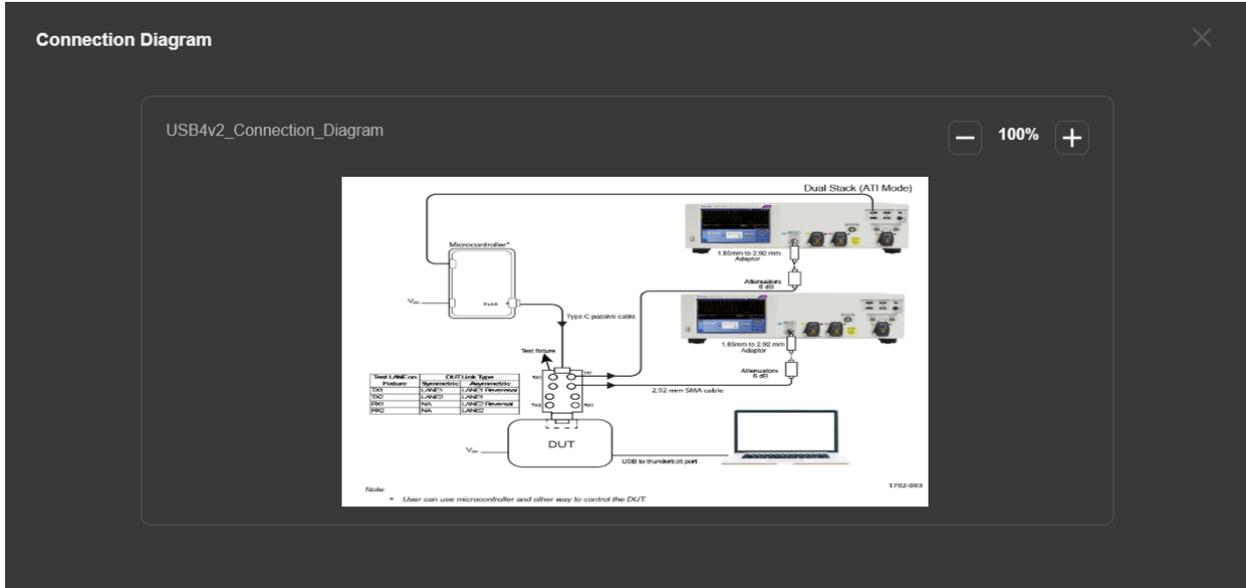


Figure 67: Tests tab: Connection diagram setup

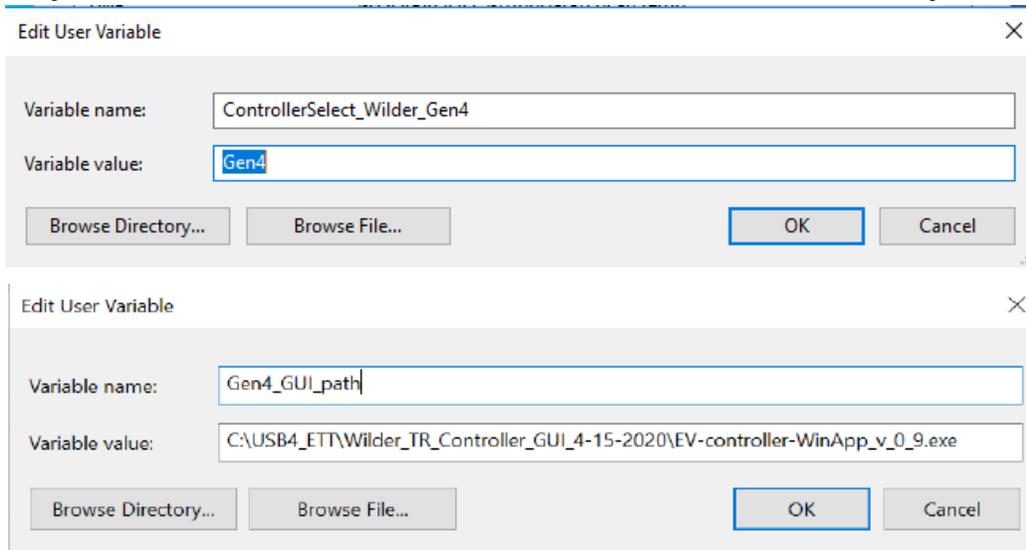
Follow the steps to view the test setup connections between the instruments.

1. Click  and then click **Connection Diagram**.
2. Click  to view the different connection diagrams that are associated to the test setup.



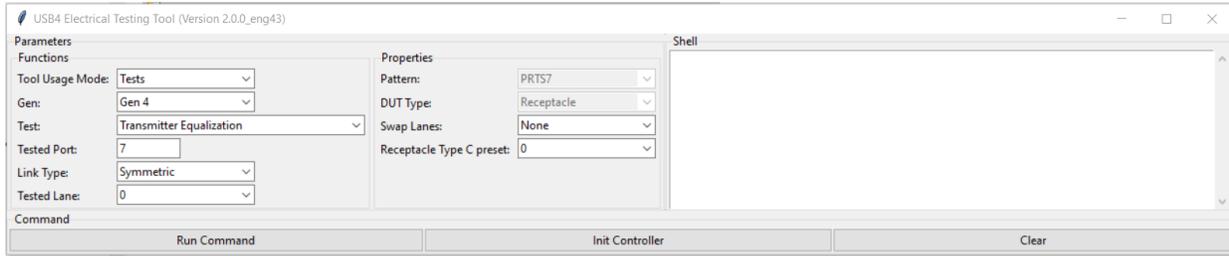
DUT and Micro controller Setup

1. Connect the DUT test fixture and connect the test fixture with Microcontroller.
2. Copy all ETT exe into C : \USB4ETT\USB4V2 \ on the oscilloscope.
3. In the search box, type **Edit the system environment variables** and click Enter.
4. Navigate to **Environment Variables > New > User Variables** window and then add the following:



Click **OK** on each of the windows to save the changes.

5. Double click the **USB4ElectricalTestTool.exe** which is copied in the C : \USB4ETT\USB4V2 \.
6. Configure the **Tested Port number** where you have connected your DUT. Configure the **Gen4, Transmitter Equalization** as **Test** and run the any of the preset.



Configure the test scenarios

The **Tests** tab displays the available scenarios and their measurements. Click the  icon to expand or collapse the list. By default, the scenarios and measurements are configured with their default values.

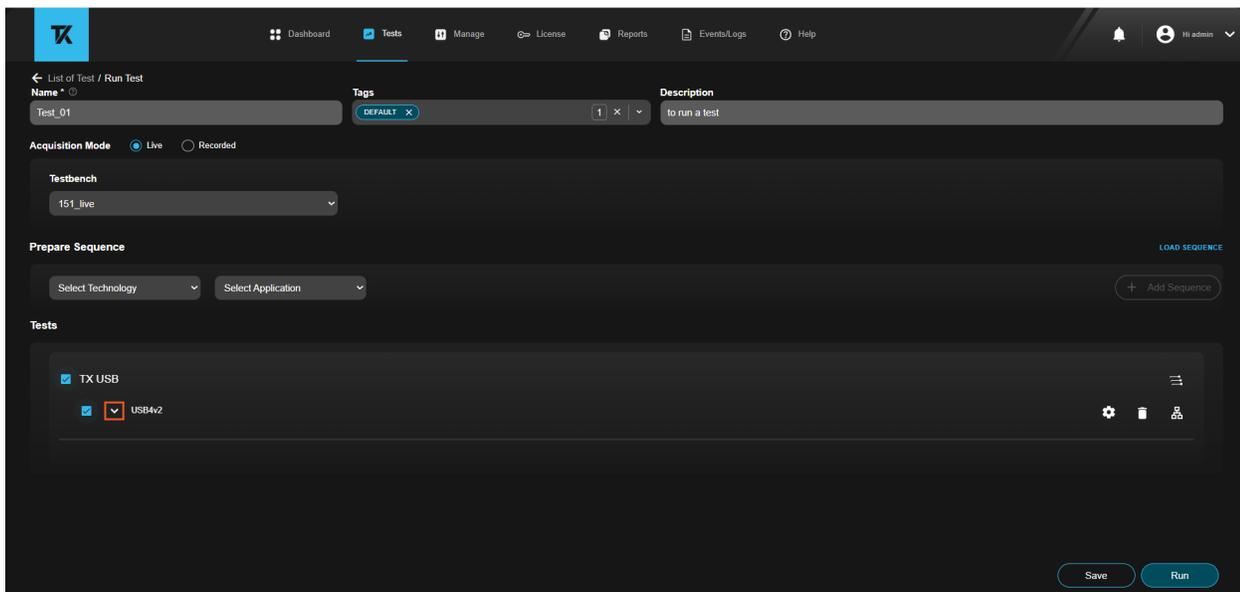


Figure 68: Tests tab: Configure test scenarios

Follow the steps to configure the scenarios:

1. Click  in the **Tests** frame to view and configure the scenarios settings.

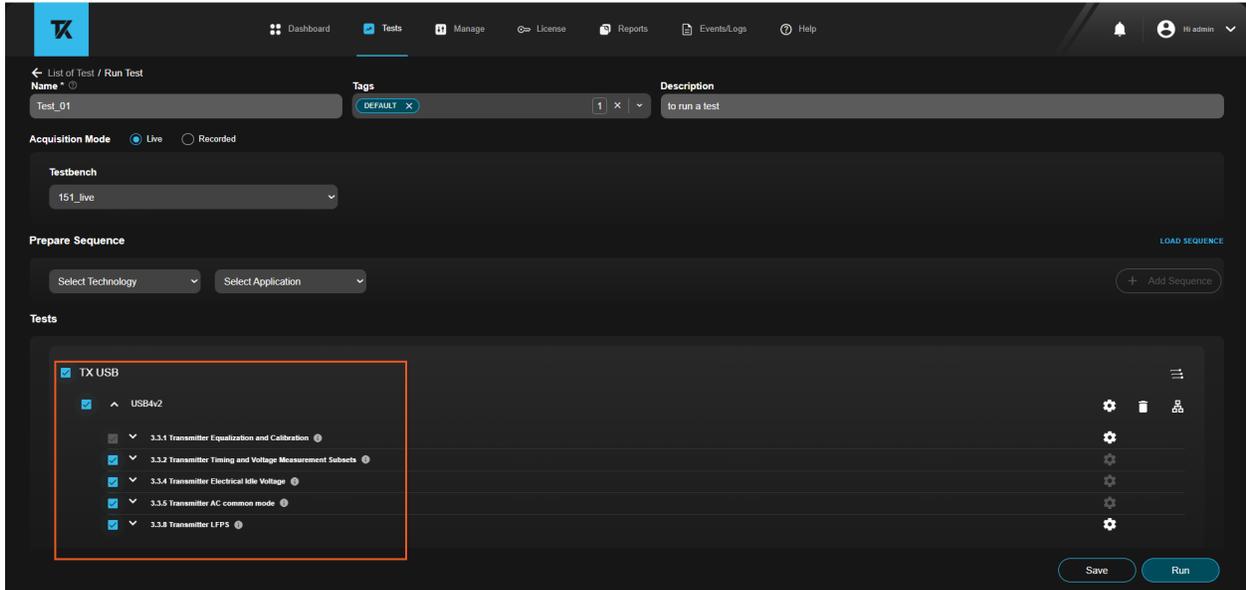
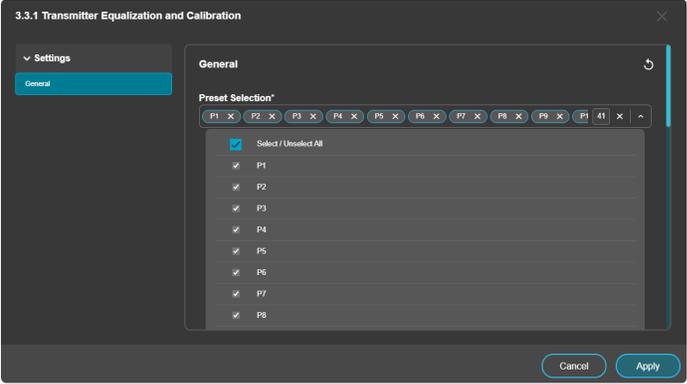
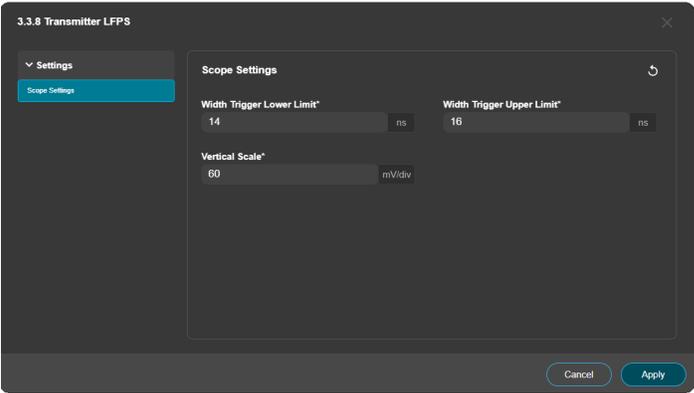


Figure 69: Configure the measurements

2. Select or deselect the relevant steps and scenarios to configure the corresponding scenario measurements.
3. Click  in associated settings to configure the respective scenario setting.

| Item | Description |
|--|---|
|  | Click to reset the mentioned values to default value. |
| General | |
| Preset Selection |  <p>Select the presets for which the transmitter equalization or preset calibration measurements to run.</p> <p>Default: P1, P2, P3, P4, P5, P6, P7, P8, P9, P10, P11, P12, P13, P14, P15, P16, P17, P18, P19, P20, P21, P22, P23, P24, P25, P26, P27, P28, P29, P30, P31, P32, P33, P34, P35, P36, P37, P38, P39, P40, P41</p> <p>By default, all options are selected.</p> |
| Scope Settings | |
| Table continued... | |

| Item | Description |
|---------------------------|---|
| Width Trigger Lower Limit |  <p>Sets the width trigger lower limit (in ns) for the setting of the oscilloscope. Enter the required width Trigger Lower Limit value in the text field. Default: 14 ns</p> |
| Width Trigger Upper Limit | <p>Sets the width trigger upper limit (in ns) for the setting of the oscilloscope. Enter the required width Trigger Upper Limit value in the text field. Default: 16 ns</p> |
| Vertical Scale | <p>Enter the Vertical Scale value in the text field. Default: 60 mV/div</p> |

4. Select the required measurements from the drop-down list.
5. Update the parameters with the required values.
6. Click **Apply**.

Run the measurements

Click **Run** to run the measurements with the configured settings.

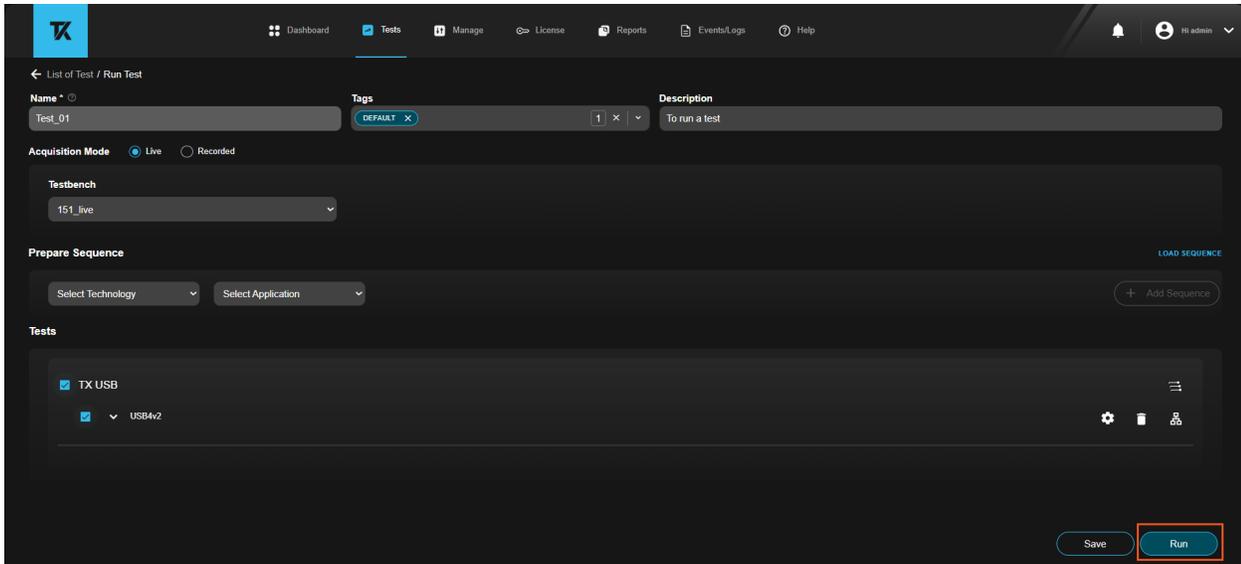


Figure 70: Run a test

View test execution status and results

The status and results of each executed test in the **Tests** tab display the test status and the result details.

1. Go to the **Tests** tab and click **View Results** of an executed test.

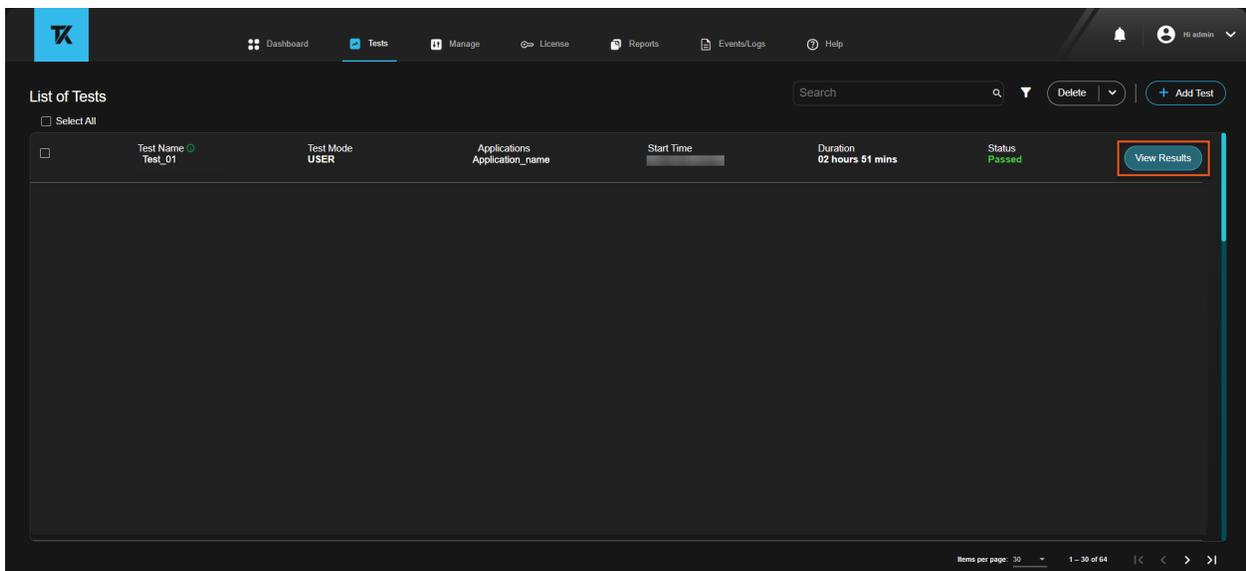


Figure 71: Tests: View results

2. The test execution details with results, plots, and waveforms are summarized as follows.

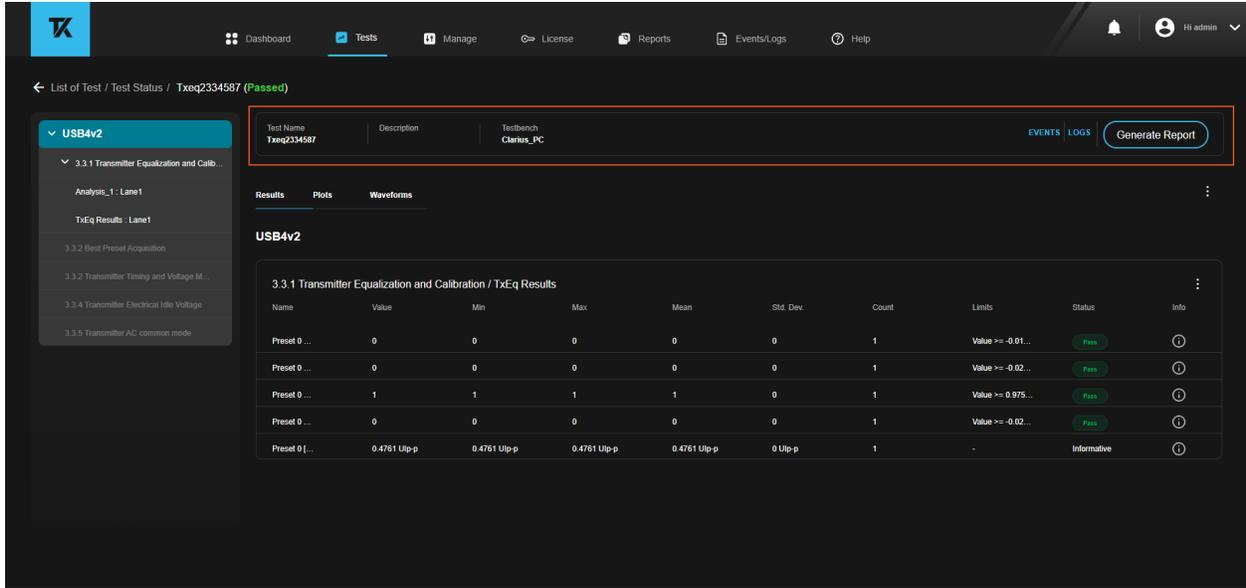


Figure 72: View test execution details

| Control | Description |
|-----------------|--|
| Test Name | Displays the test name that is set. |
| Description | Displays the test description. |
| Testbench | Displays the testbench that is used. |
| Events | View the events of an executed test. Refer Events for more information. |
| Logs | View the logs of an executed test. Refer Logs for more information. |
| Generate Report | Generates the report of an executed test. Refer Add and Generate New Report for more information. |

Test results

The **Results** tab displays the results of an executed test measurement.

Follow the steps to view the test results:

1. Select the required measurement from the left side bar to view the results. The top level selection displays all the application level results whereas, the lower level displays results for only that particular parameter in scenario or step level.
2. Click the **Results** tab to view the acquisition results.

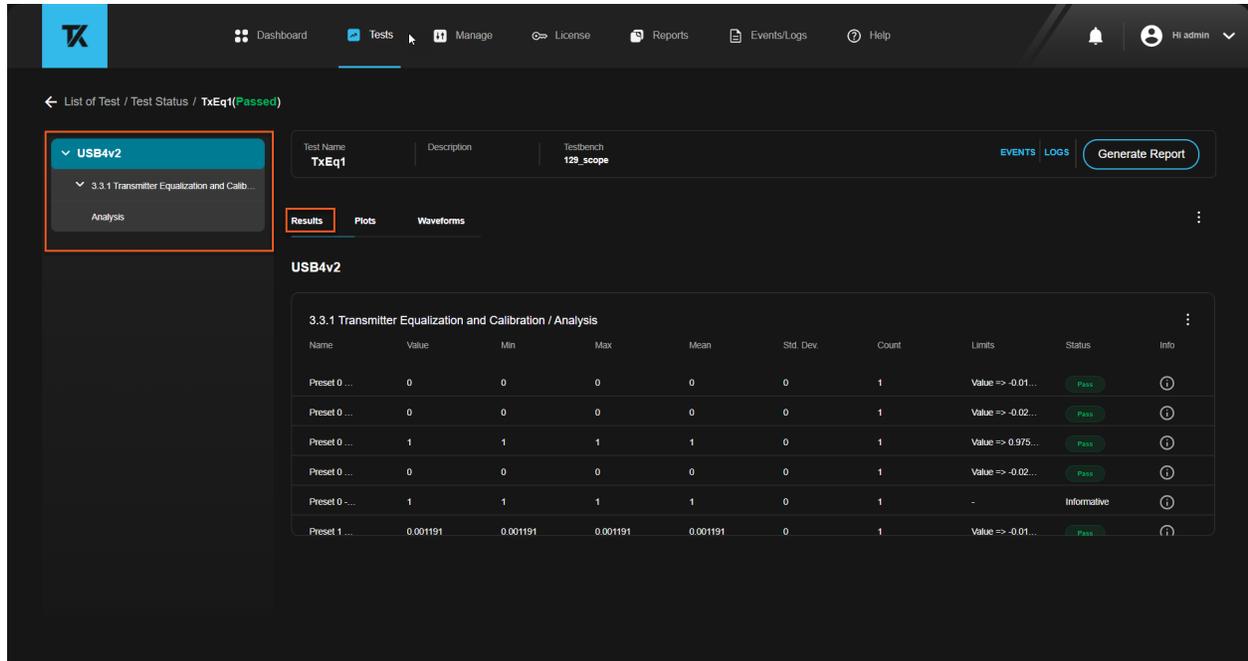


Figure 73: Test results

Table 7: Application level settings

| Menu | Description |
|---------|---|
| Name | Displays the name of the measurement that is executed. |
| Min | Displays the minimum measured value.  Note: This menu will be displayed only when the required measurement is selected from the left side bar. |
| Max | Displays the maximum measured value. |
| Mean | Displays the mean measured value. |
| Std.Dev | Displays the standard deviation of the measured value. |
| Count | Displays the count value for the measurement. |
| Limits | Displays the measurement limits. |
| Status | Displays the measurement status. |
| Info | Displays the additional information of the measurement. |

Table 8: Scenario level settings

| Menu | Description |
|--------|---|
| Name | Displays the name of the measurement that is executed. |
| Status | Displays the measurement status. |
| Info | Displays the additional information of the measurement. |

Table 9: Step level settings

| Menu | Description |
|--------------|---|
| Name | Displays the name of the measurement that is executed. |
| Value | Displays the measured value. |
| Limits | Displays the measurement limits. |
| Lower Margin | Displays the lower margin of the measured value. |
| Upper Margin | Displays the upper margin of the measured value. |
| Status | Displays the measurement status. |
| Info | Displays the additional information of the measurement. |

- Click  and select the sub-menu to customize the columns to display the respective test results data, and click **Apply**.

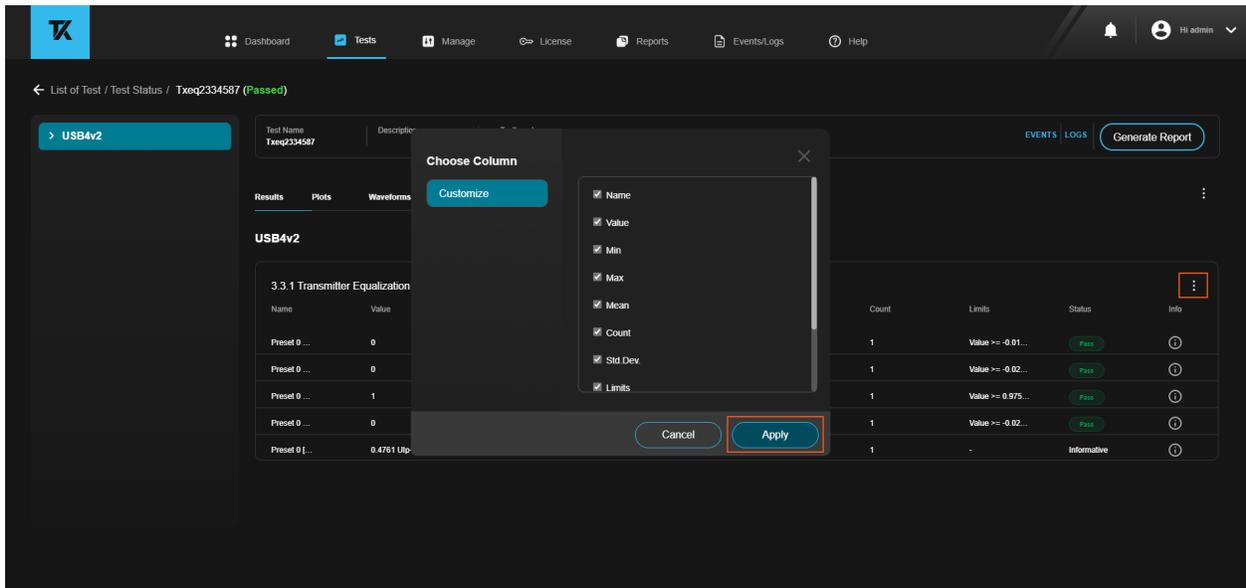


Figure 74: Customize test results columns

- Click  to customize the iteration settings to display the respective test results data, and click **Apply**(Displayed step level only).

Figure 75: Filter test results columns

- Click  and select **Download CSV Result** or **Download waveforms** to download the test results.

Test plots

The **Plots** tab displays the plots of an executed test measurement.

Follow the steps to view the test plots:

- Select the required measurement from the left side bar to view the plots. The top level selections displays all the plots whereas, the lower level displays results for only that particular parameter.
- Click the **Plots** tab to view the acquisition plots.

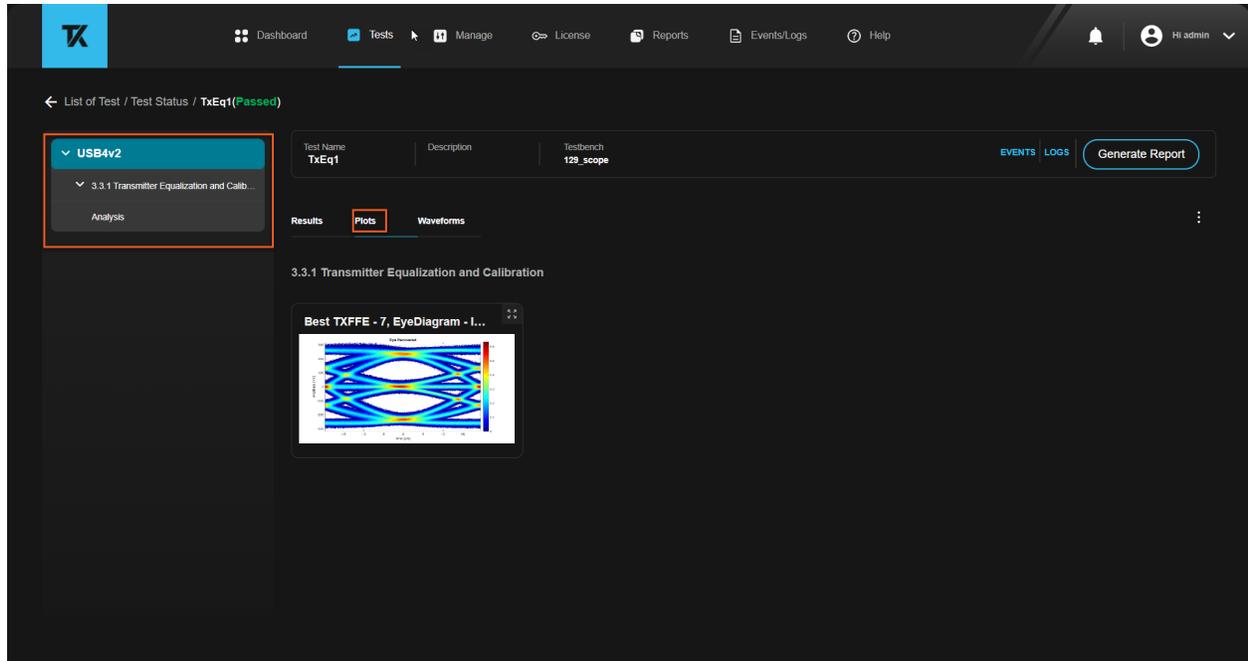


Figure 76: Test plots

3. Click  and select **Download CSV Result** or **Download waveforms** to download the test plots.

Test waveforms

The **Waveforms** tab displays the waveforms of an executed measurement.

Follow the steps to view the test waveforms:

1. Select the required measurement from the left side bar for which the waveforms to be viewed.
2. Click the **Waveforms** tab.
3. Select the number of iteration and the required waveform name from the drop-down to display the waveform.

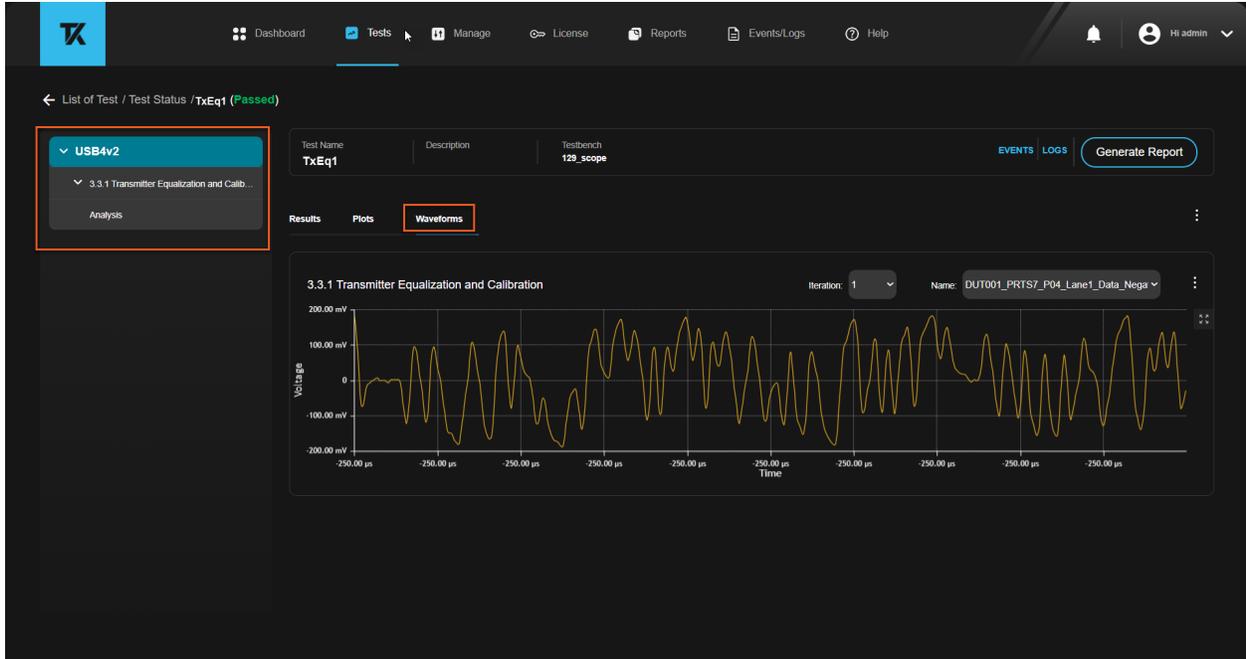
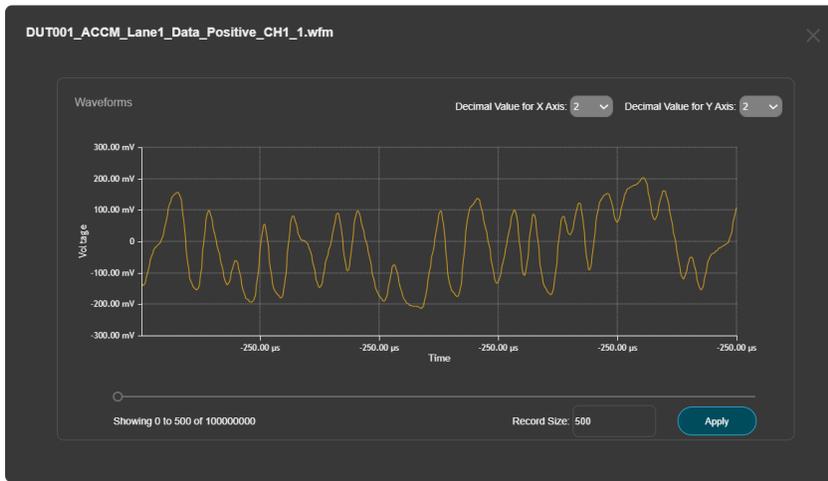


Figure 77: Test waveforms

4. (Optional) Click the icon  to set the view properties for the waveform and click **Apply**.
 - **Decimal value for Axis:** Set the decimal value for units of X Axis and Y Axis.
 - **Record Size:** Enter the total record length to view in a single screen.
 - **Waveform scroll bar:** Scroll to view the portion of the waveform.



5. To download individual test waveforms, click  of the respective measurement and select **Download waveforms**.
6. Click  and select **Download CSV Result** or **Download Waveforms** to download all test waveforms.

Filter tests

The filter by option under **Tests** tab allows the user to filter the test based on the criteria, such as: Status, Date Executed, and Applications.

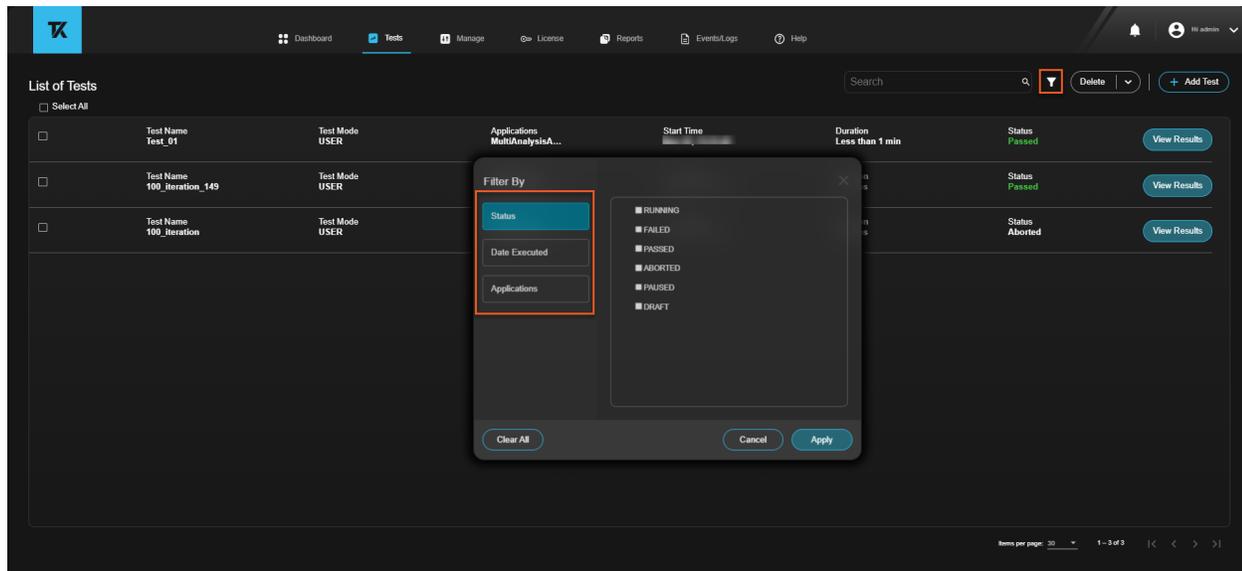


Figure 78: Filter test

| Filter By | Description |
|---------------|---|
| Status | Displays the test status. <ul style="list-style-type: none"> • RUNNING • FAILED • PASSED • ABORTED • PAUSED • DRAFT |
| Date Executed | Select the From and To date to filter required tests. |
| Applications | Select the required applications to filter the test. |
| Clear All | Clear all the filters. |
| Apply | Applies the filter to a particular test. |
| Cancel | Click to cancel all the changes. |

Manage: Test benches, sequence, and applications

The manage tab allows you to view the list of activated applications, create and configure test benches, and sequences. It also allows you to save the settings for further analysis.

Test Bench: Create and configure the test bench

A test bench is an environment that is used to verify the correctness of a test setup. The **Test Benches** tab allows you to create a test bench or edit an existing test bench for an application. You can also modify and delete the available test bench.

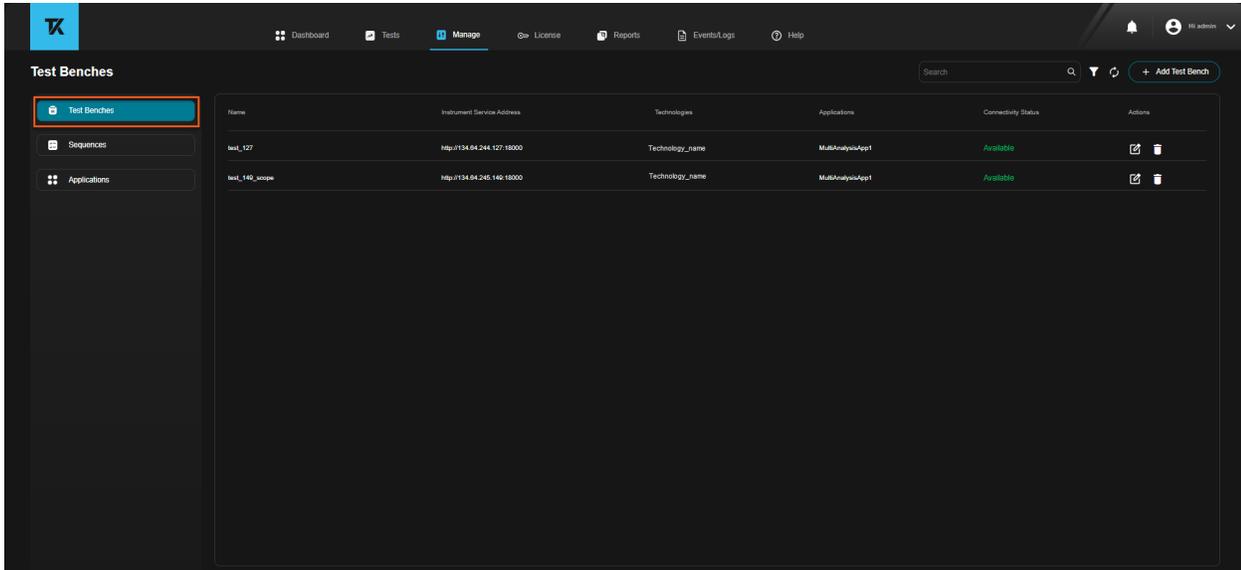


Figure 79: Manage test benches tab

| Element | Description |
|----------------------------|--|
| Name | The test bench name. |
| Instrument Service Address | The instrument service URL. <ul style="list-style-type: none"> http://<<IP address of instrument service>>:18000 |
| Technologies | Active technology. |
| Applications | Active application. |
| Connectivity Status | Shows the testbench availability status. <ul style="list-style-type: none"> Available Unavailable In Use |
| Actions | |
| Modify | Change or modify the existing test bench. |
| Delete | Delete the test bench. |

Table continued...

| Element | Description | |
|-------------|--|--|
| Filter By | Technologies | Filter by active technology. |
| | Applications | Filter by active application. |
| | Connectivity Status | Filter by active connectivity status. <ul style="list-style-type: none"> • Available • Unavailable • In use |
| | Acquisition Mode | Filter by active acquisition mode. <ul style="list-style-type: none"> • Live • Recorded |
| Refresh All | Click the Refresh All to refresh the testbench details. | |

Create a test bench

Follow the steps to create a test bench:

1. Go to **Manage > Test Benches** and click **+ Add Test Bench**.

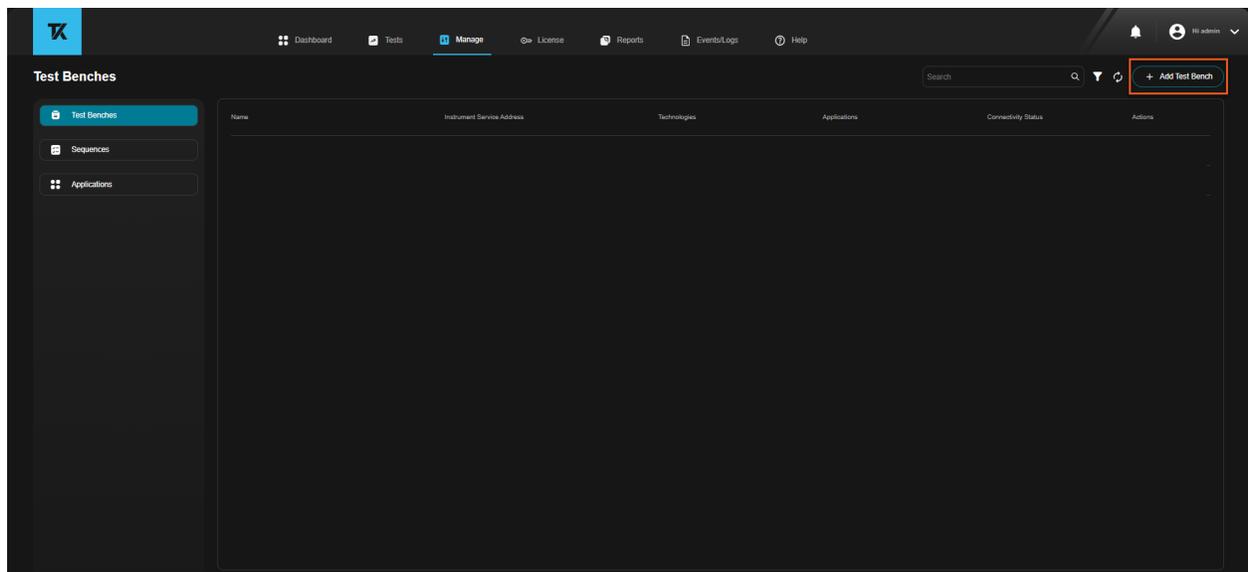


Figure 80: Create a test bench

2. Enter the test bench details in the respective fields.

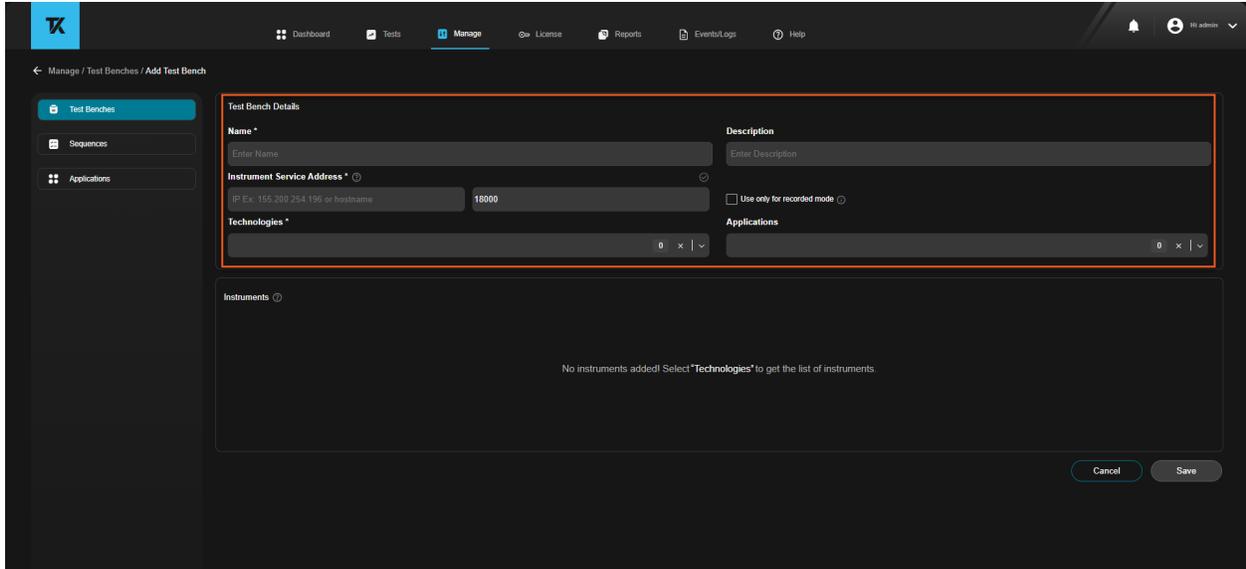


Figure 81: Test bench details

| Menu | Description | |
|----------------------------|---|------------------|
| Test Bench Details | | |
| Name | Enter the test bench name. | |
| Description | Enter the test bench description (Optional). | |
| Instrument Service Address | Enter the instrument service address (IP address/Host id) of the oscilloscope or target system. | |
| | <table border="1"> <tr> <td>Check Connection</td> <td>Enter the instrument address or host name. You can select the  to check the status of the instrument. This will be green if the instrument is available and connected.</td> </tr> </table> | Check Connection |
| Check Connection | Enter the instrument address or host name. You can select the  to check the status of the instrument. This will be green if the instrument is available and connected. | |
| Use only for recorded mode | Uploads recorded waveforms from the test bench to the data store. This cannot be used for live testing. | |
| Technologies | Select the technology. The test bench will be created for the selected technologies. | |
| Applications | Select the application. The test bench will be created for the selected applications. (Optional) | |

3. Select the instruments detail.

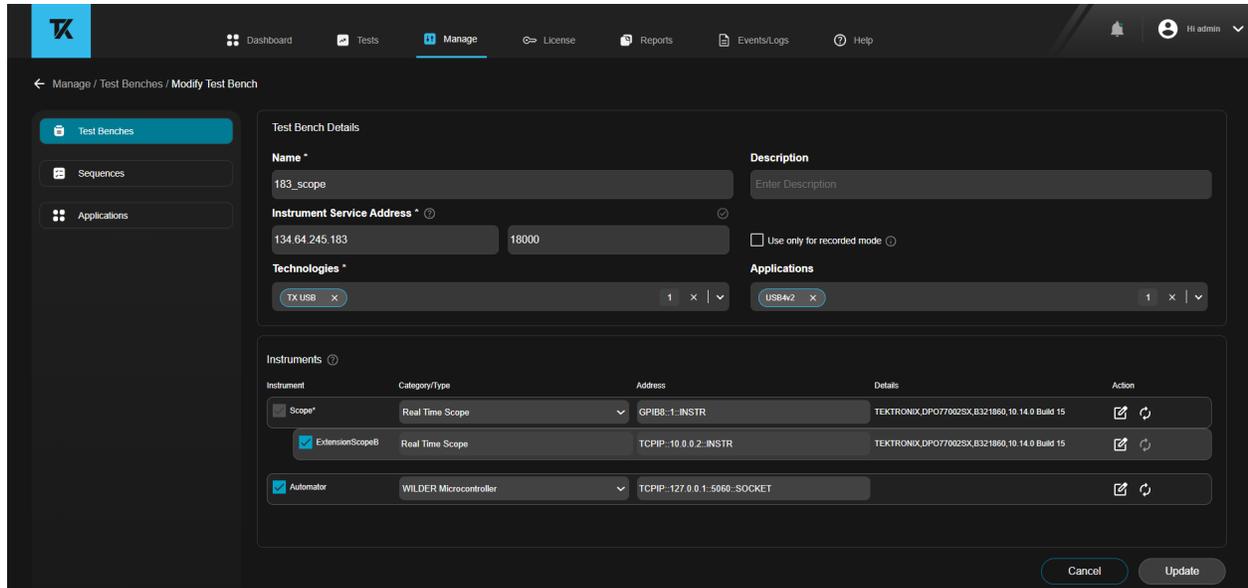


Figure 82: Instrument details

| Menu | Description |
|---------------|--|
| Instrument | <p>Select the required Instrument to create a new test bench.</p> <ul style="list-style-type: none"> Scope ExtensionScopeB Automator <p> Note: In ATI dual stack mode, the ExtensionScopeB details appear once you refresh the master Scope.</p> |
| Category/Type | <p>Select the required instrument category or type with respect to the instrument is selected.</p> <p>When the instrument is selected as Scope</p> <ul style="list-style-type: none"> Real Time Scope <p>When the instrument is selected as Automator</p> <ul style="list-style-type: none"> WILDER Microcontroller Custom |
| Address | <p>Enter the VISA resource address from the instrument service manager of the oscilloscope.</p> <p>Example:</p> <ul style="list-style-type: none"> For Scope: GPIB8::1::INSTR For Automator: TCPIP::127.0.0.1::5060::SOCKET <p>Note:</p> <p> </p> <ul style="list-style-type: none"> The scope addresses must be captured from TekVisa Instrument manager. IP address in Automator must be of the machine where instrument service is running. |

Table continued...

| Menu | Description |
|--------------------------------|--|
| Details | Click the  from the action panel after entering Address . It will displays the scope and properties details retrieving from the oscilloscope. |
| Action | Allows you to Edit and Refresh the instrument properties that are added.  Note: To edit the instrument properties, first you need to add address and select refresh icon. |
| Scope/Automator Details | |
| Category/Type | Select the required instrument type from the drop-down. Available options are: <ul style="list-style-type: none"> • Real Time Scope • WILDER Microcontroller • Custom |
| Address | Enter the IP address of the instrument in the field. <ul style="list-style-type: none"> • For Scope: GPIB8::1::INSTR • For Automator: TCPIP::127.0.0.1::5060::SOCKET |
| Properties | |
| Refresh | Click the  icon to refresh the instrument properties. |
| Manufacturer | Displays the instrument manufacturer details in the field. By default, the manufacturer will be added as TEKTRONIX . |
| Model | Displays the model in the field. |
| Bandwidth | Displays the bandwidth of the instrument in the field.  Note: Available only when the instrument is selected as Scope and ExtensionScopeB . |
| Serial Number | Displays the serial number of the instrument in the field.  Note: Available only when the instrument is selected as Scope and ExtensionScopeB . |
| Firmware Version | Displays the firmware version of the instrument in the field.  Note: Available only when the instrument is selected as Scope and ExtensionScopeB . |
| Artifact Type | Shows the artifact type of the instrument in the field.  Note: Available only when the instrument is selected as Automator . |
| Script Name | Enter the python script name of the DUT control that you want to use for automation in the field.  Note: Available only when the instrument is selected as Automator . |

4. Click **Save** to save the test bench.

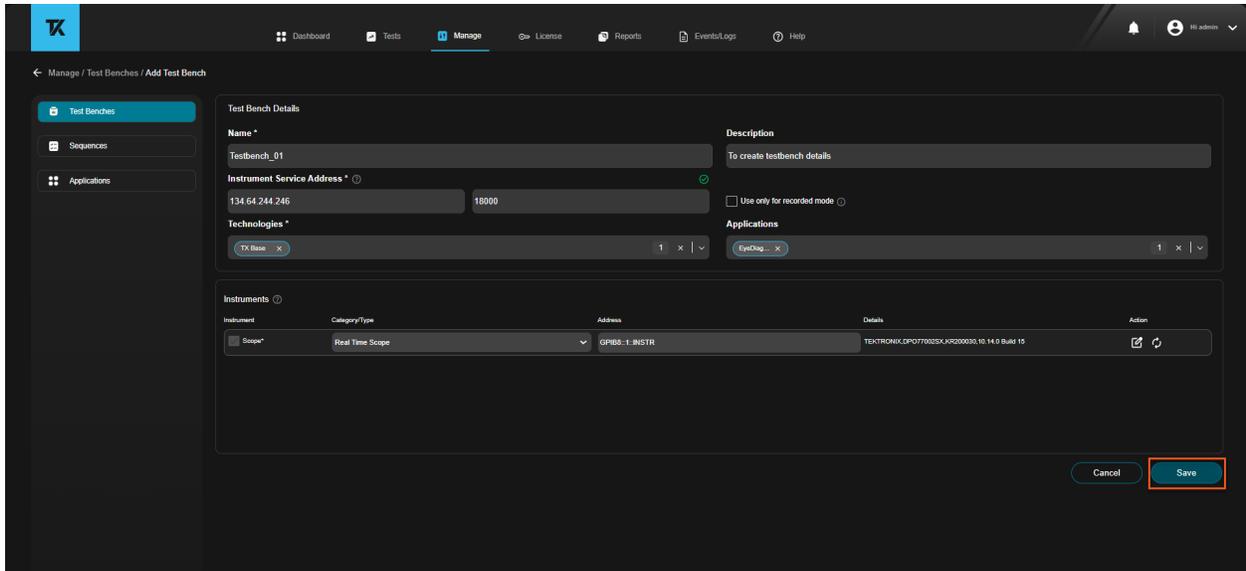


Figure 83: Save test bench details

5. You can view the saved test bench in the **Test Benches** tab. You can also edit or delete the existing test bench.

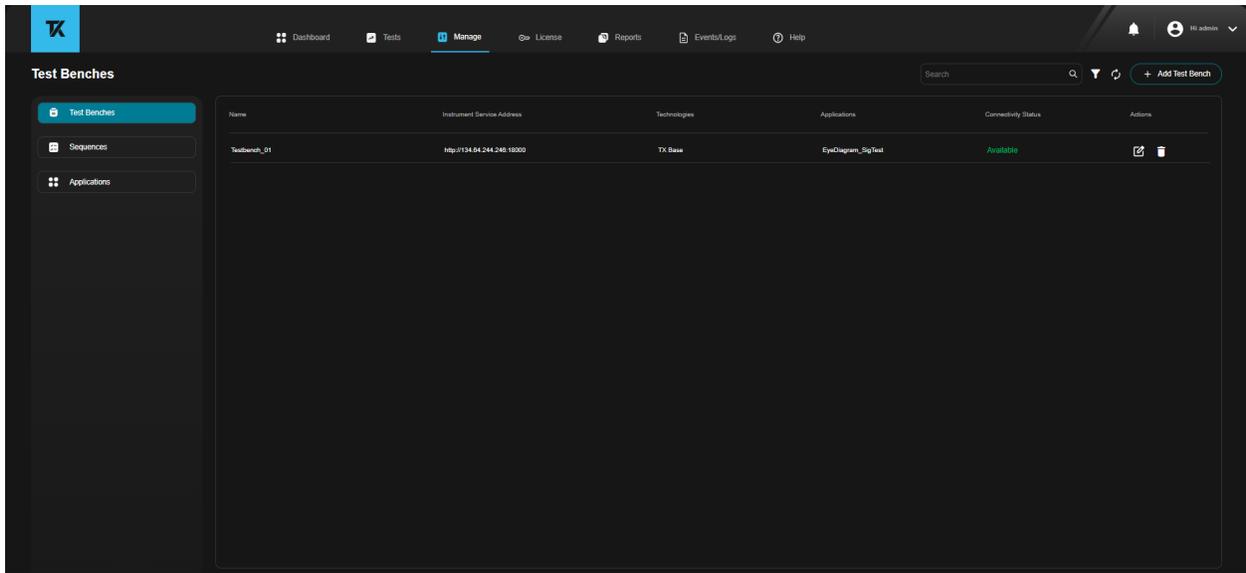


Figure 84: View test bench details

Sequences

The **Sequences** tab displays the list of created sequences along with the application names. This acts as a test template and can be imported while creating a test. You can also modify or delete the existing sequences.

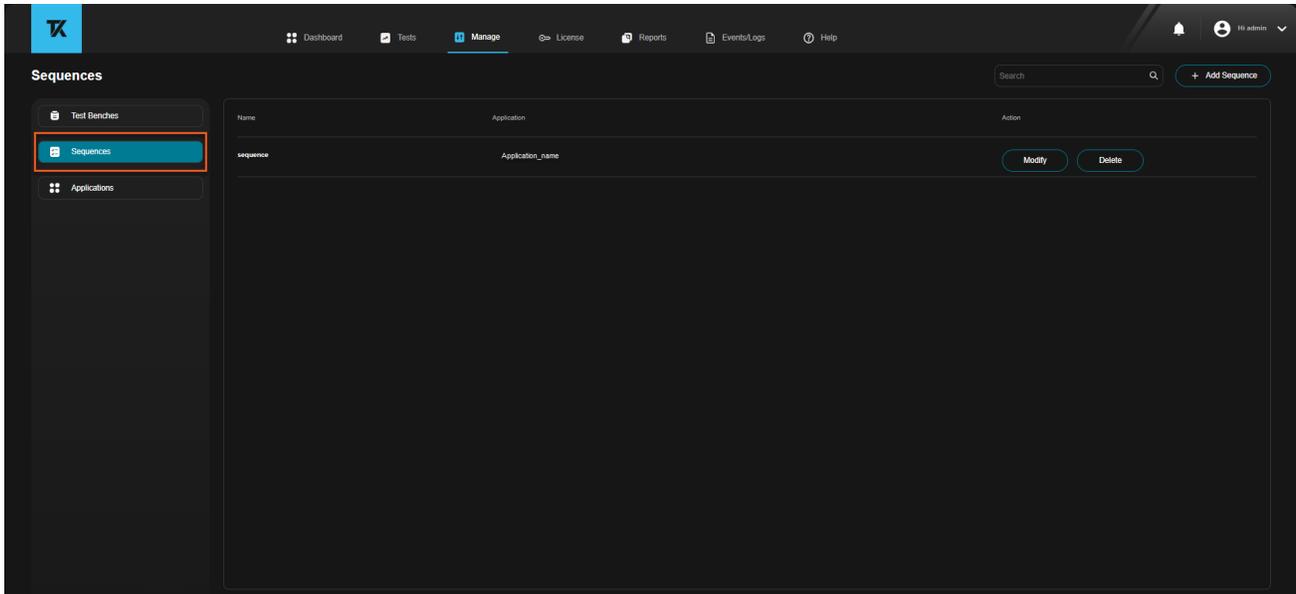


Figure 85: Sequences tab

Add new sequence

Follow the steps to create a sequence:

1. Go to **Manage > Sequences** and click **New Sequence**.

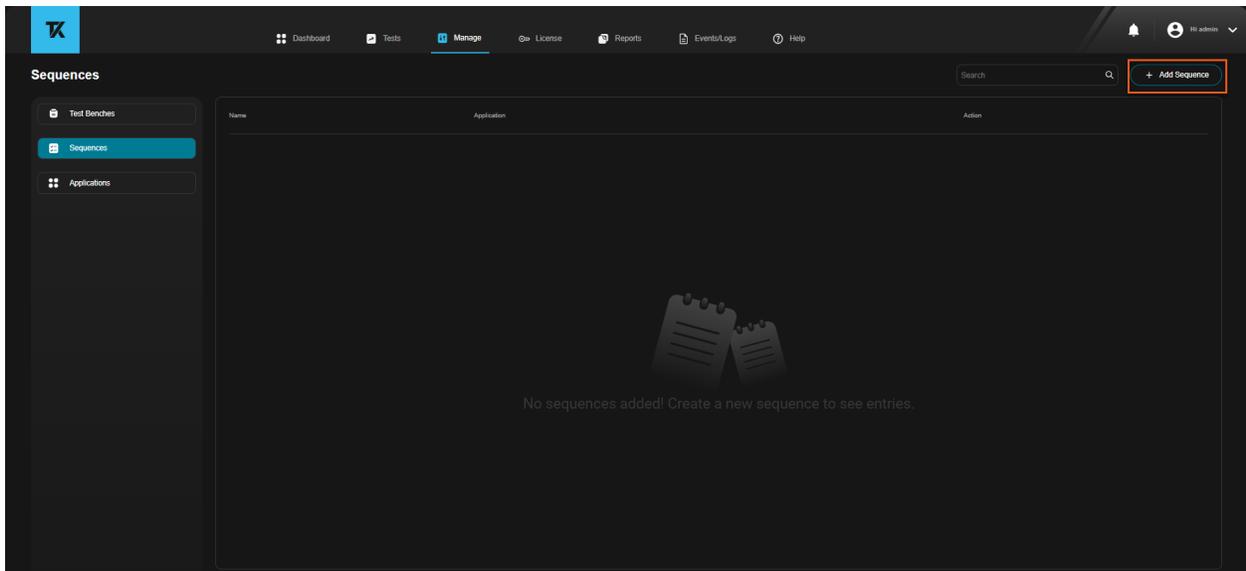


Figure 86: Add new sequence details

2. Enter **Sequence Details** in the respective fields; select the **Technology** and **Application** from prepare sequence pane and click **Add Sequence**.

| Sequence Details | Description |
|------------------|--|
| Name | Enter the name of the sequence. |
| Description | Enter the description of the sequence. |

Table continued...

| Sequence Details | Description |
|------------------|---|
| Prepare Sequence | Click + Add Sequence to add a test sequence. Refer Create and Prepare a Sequence for more information. |

3. Check and update the global settings for the respective fields and click **Apply**.
4. Configure the scenarios and measurements, and click **Apply**.
5. You can view the saved sequence in the **Sequences** tab. You can also modify or delete the existing sequence.
6. Click **Save**.

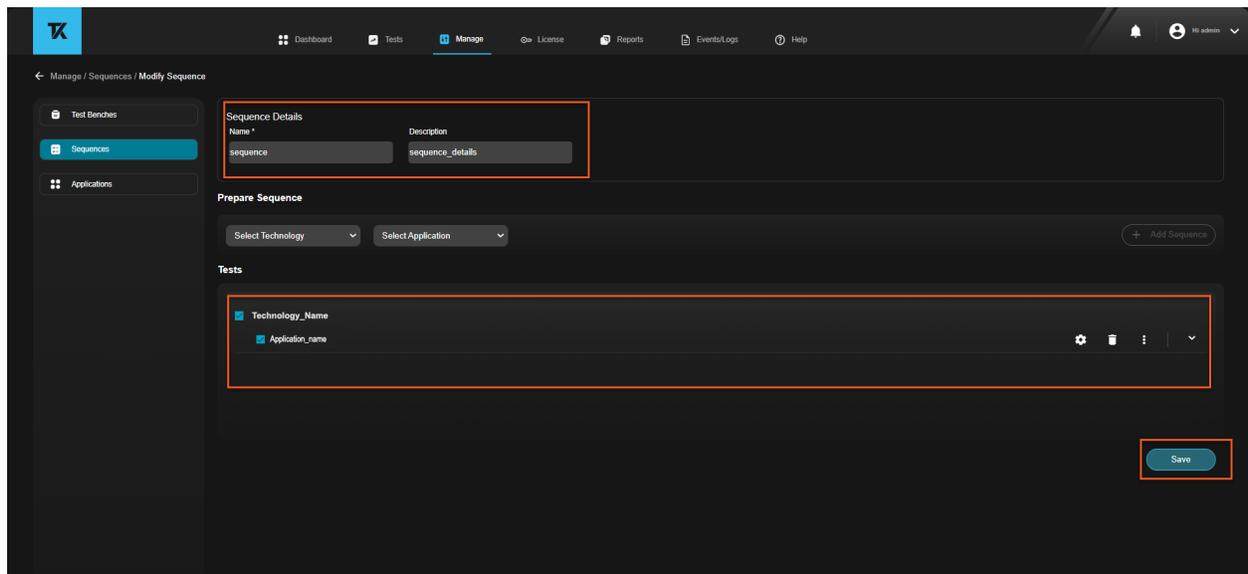


Figure 87: Save sequence details

7. You can view the saved sequence details. You can modify or delete the existing sequence.

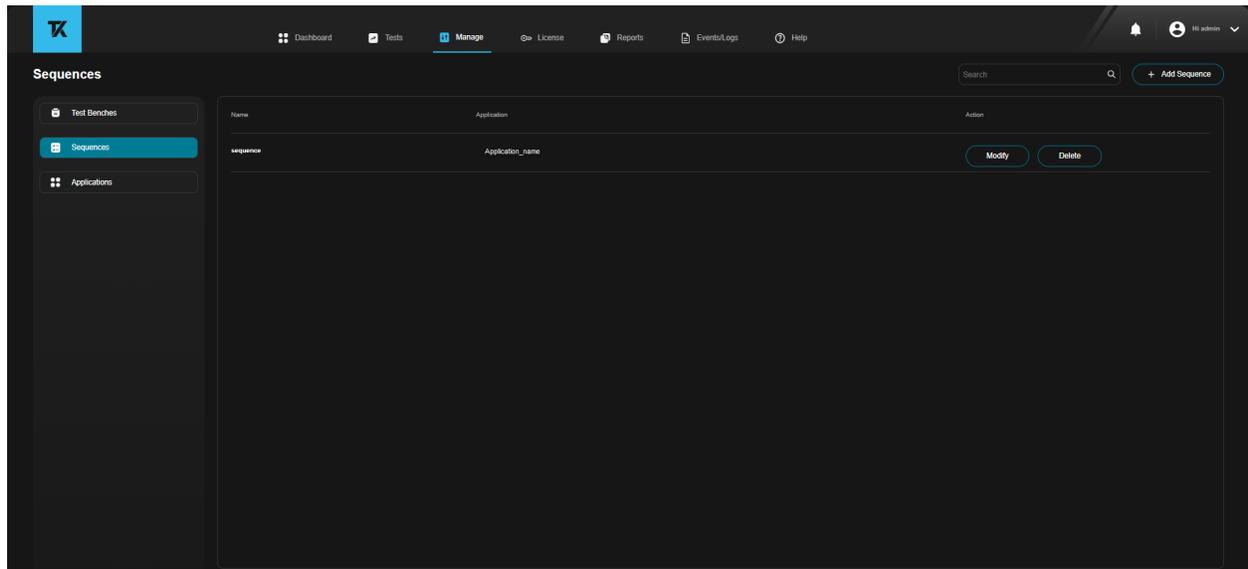


Figure 88: Sequence details

Applications

The **Applications** tab displays the list of activated applications with its name, type, sub-type, and version. You can also filter the applications by selecting the filter options.

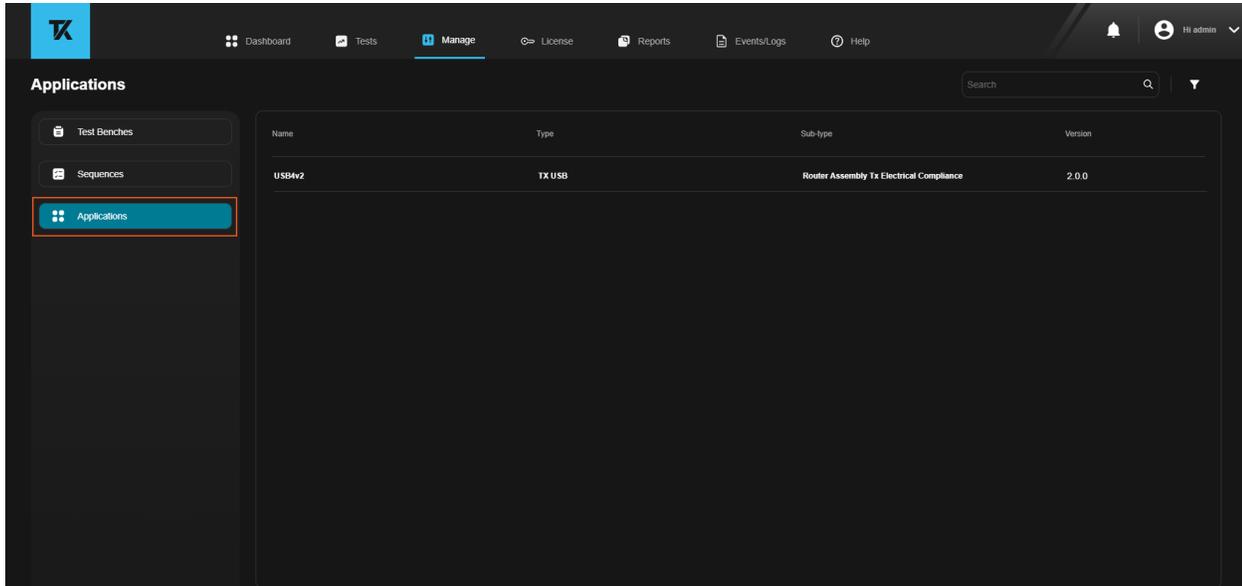


Figure 89: Manage application tab

Reports: View, generate, and export report of a test

The **Reports** tab allows you to generate a report, view the report, and export a detailed test report for all the executed tests. It also allows you to search for a specific report using the search bar.

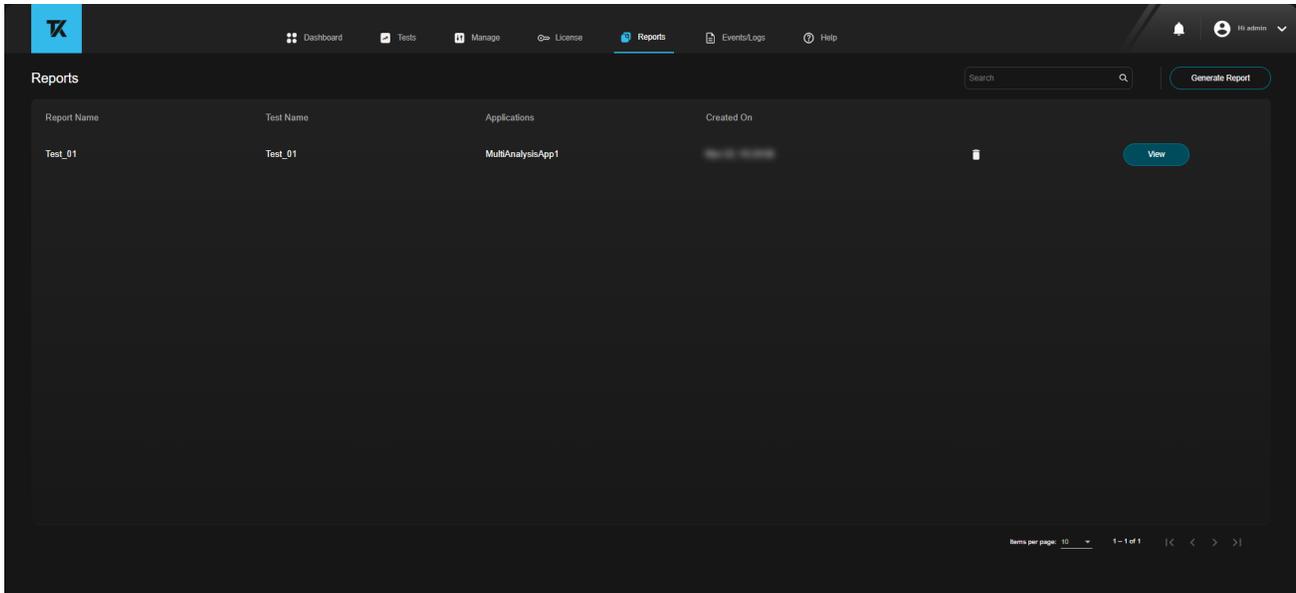


Figure 90: Reports tab

| Element | Description |
|-----------------|--|
| Report Name | Displays the report name. |
| Test Name | Displays the test name. |
| Applications | Displays the application name. |
| Created On | Displays the date and time by when the report is created. |
| Delete | Click the icon  to delete the report. |
| View | Click to view the report. |
| Generate Report | You can generate the report of an executed test. Refer Generate Report for more information. |

Generate report

The **Generate Report** allows you to generate a report of an executed test.

Generate report of a particular test

Follow the steps to generate a report of a particular test:

1. Go to **Tests** tab and click **View Results** of a particular test.

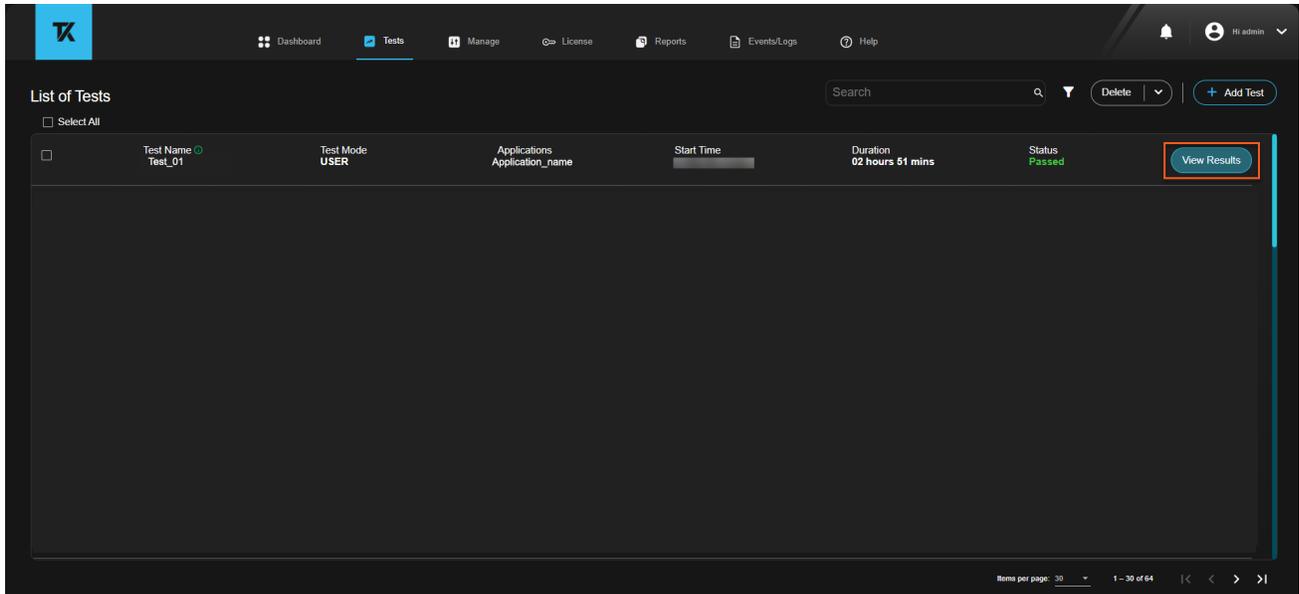


Figure 91: Tests tab: View results

2. Click **Generate Report**.

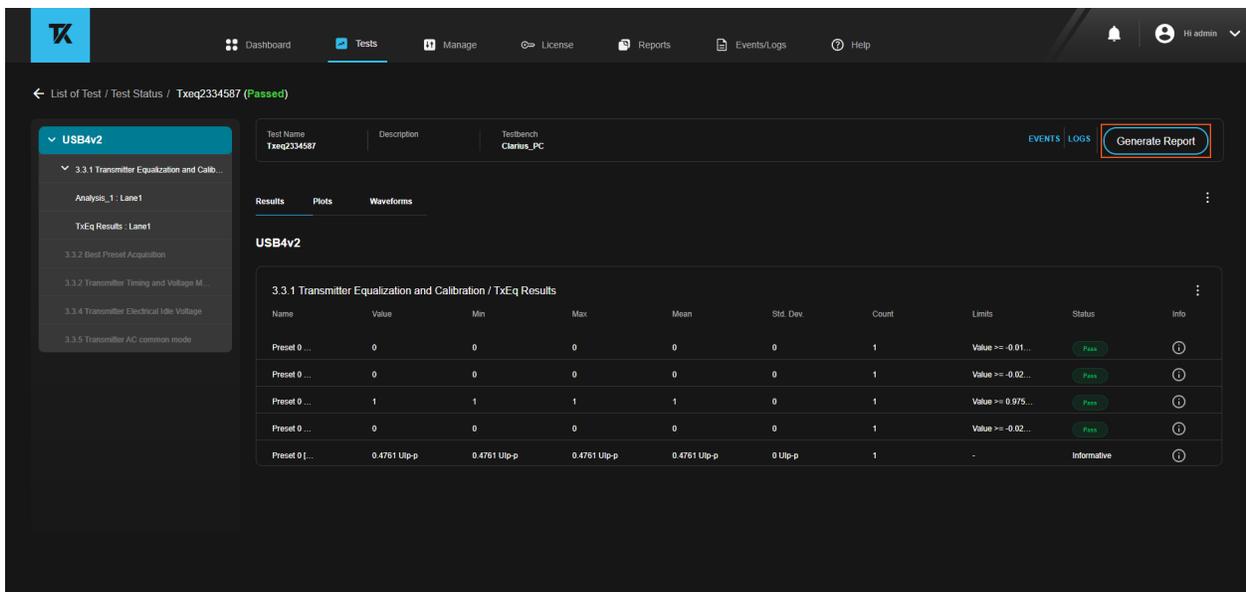


Figure 92: Generate report of a particular test

3. Select the report template from the drop-down.

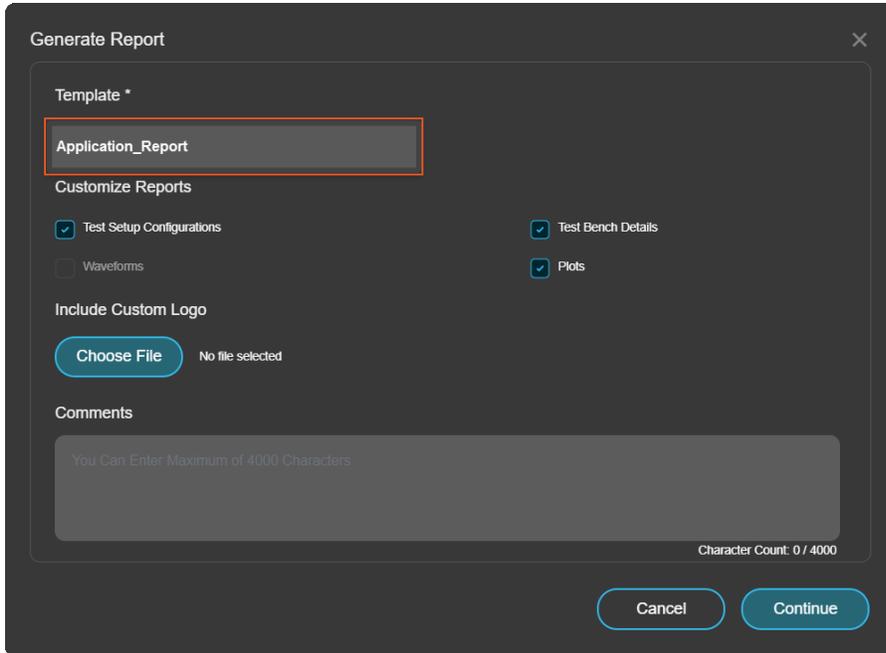


Figure 93: Generate report: Select template

4. Check the options to customize the reports.

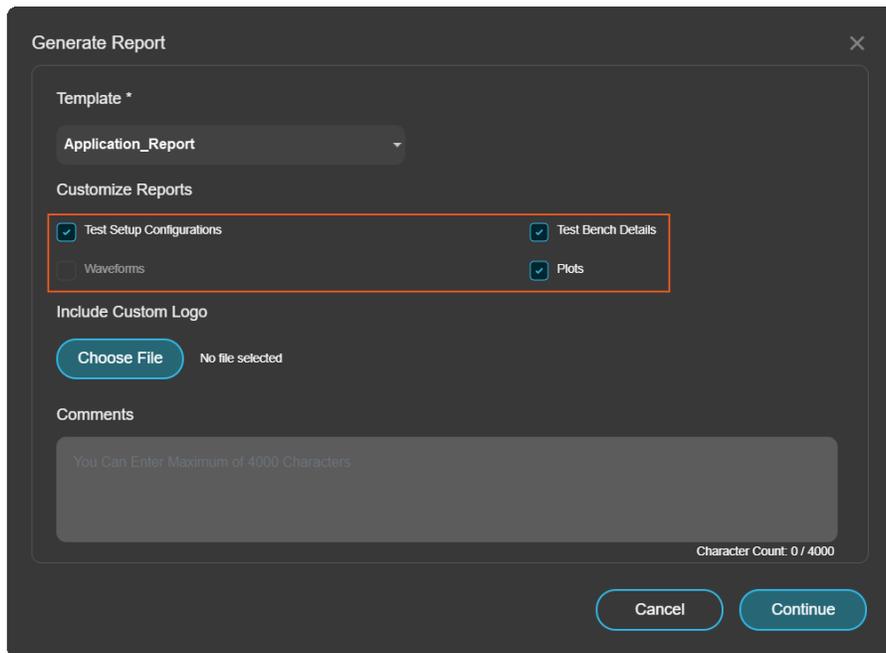


Figure 94: Generate report: Customize report

5. Click **Choose File** and browse to add a custom logo to get printed in the test report.

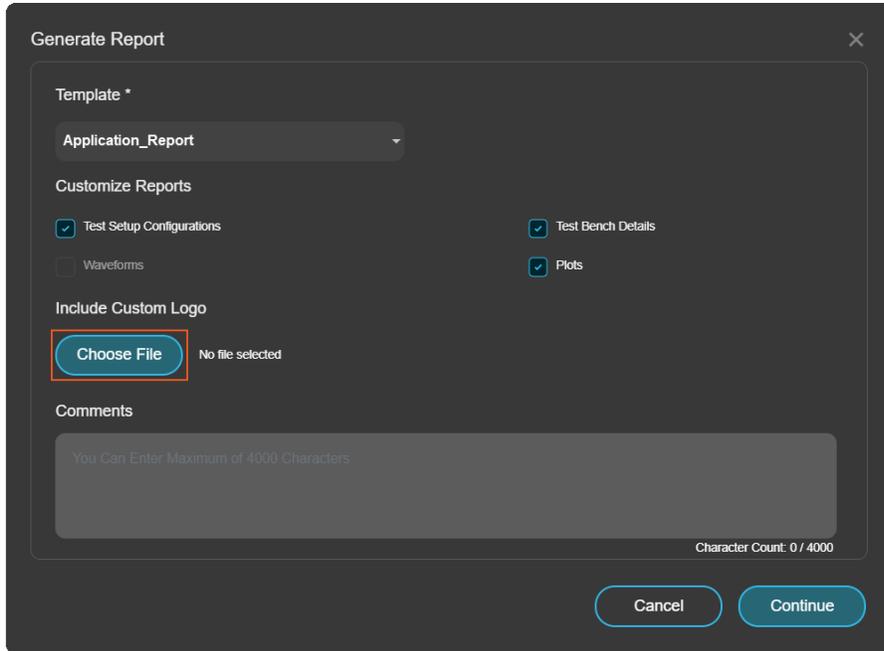


Figure 95: Generate report: Include custom logo

6. Enter additional comments in the field if required and click **Continue**.

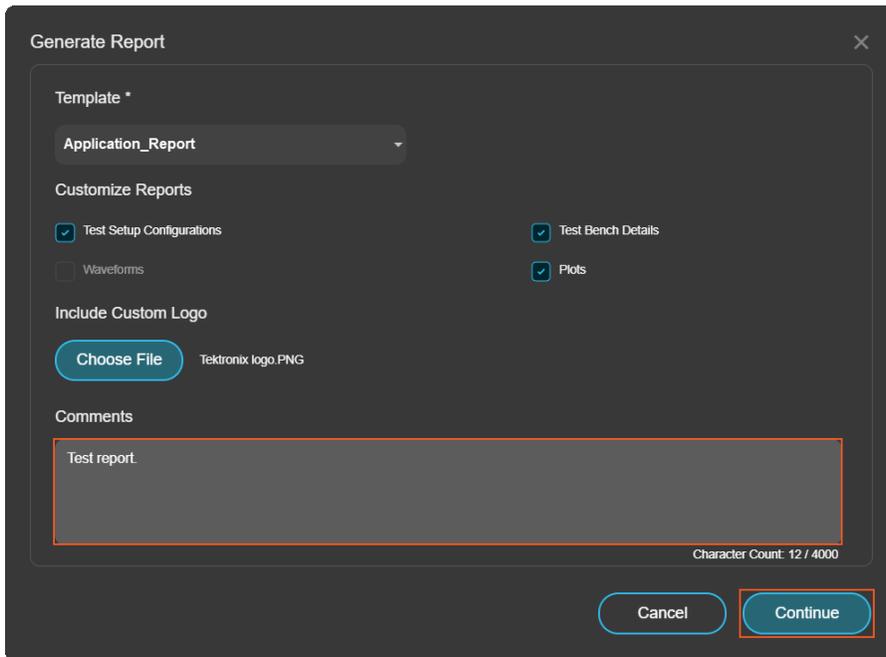


Figure 96: Generate report: Add additional comments in the field

Generate report for a group of test

Follow the steps to generate a report for a group of test:

1. Go to **Reports** tab and click **Generate Report**.

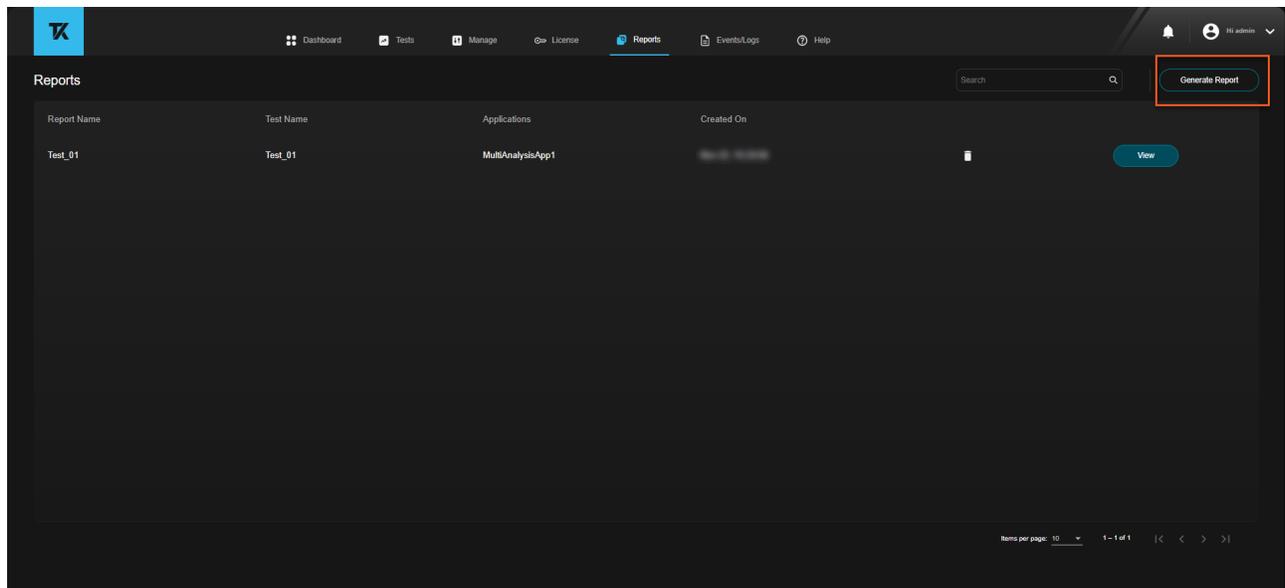


Figure 97: Generate report for a group of test

2. Enter the **Report Name** and click **Select Tests**.

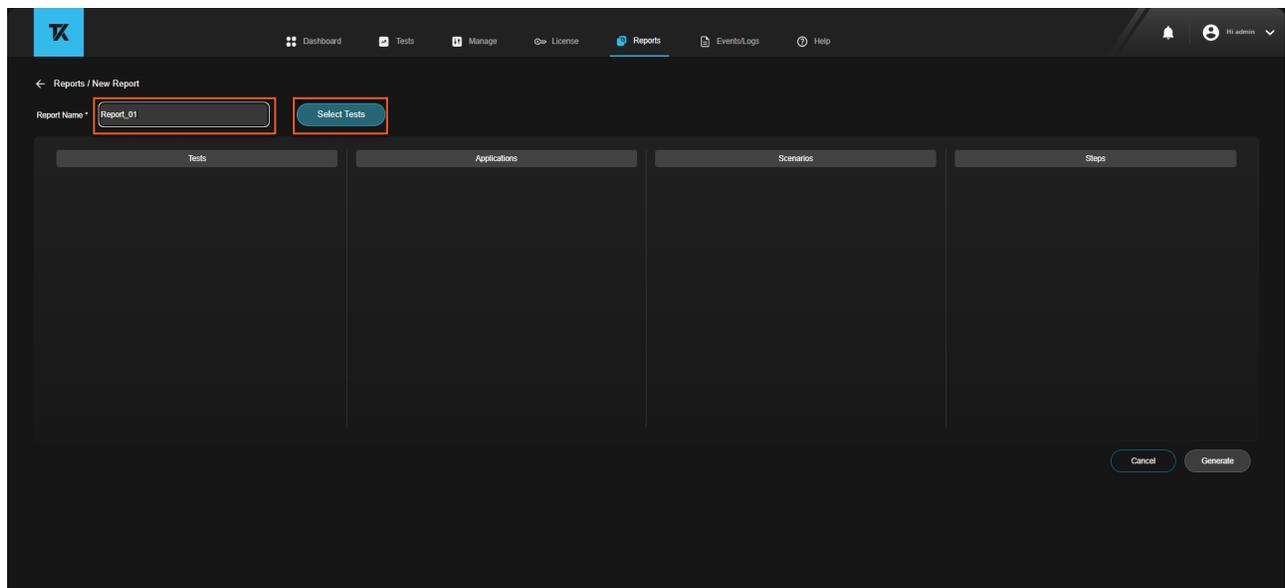


Figure 98: Reports tab: Select tests

3. Select the list of tests that needs to be generated and click **Continue**.

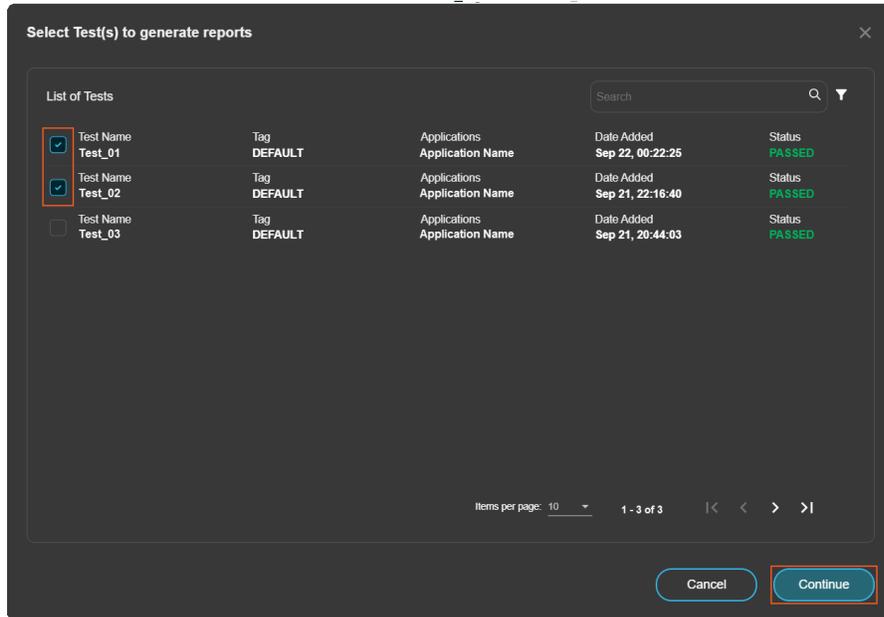


Figure 99: Select list of tests

4. Select the **Tests** and **Applications** from the sub menu.

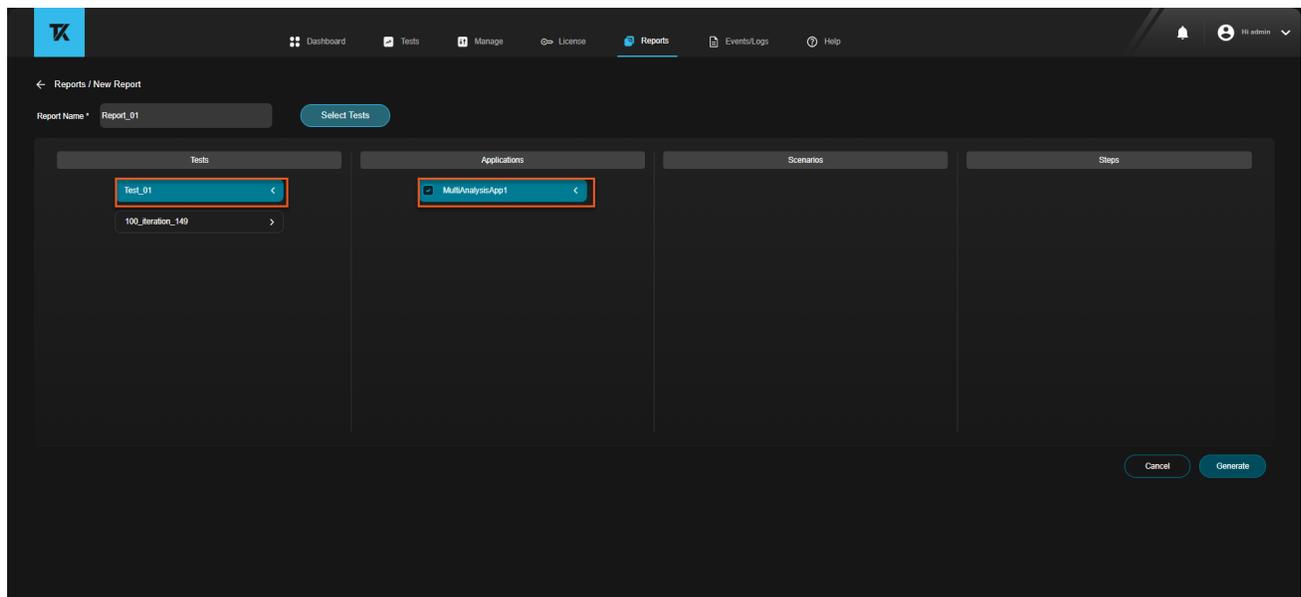


Figure 100: Reports: Select tests and applications

5. Click **Generate**. A dialog window appears to customize the report.

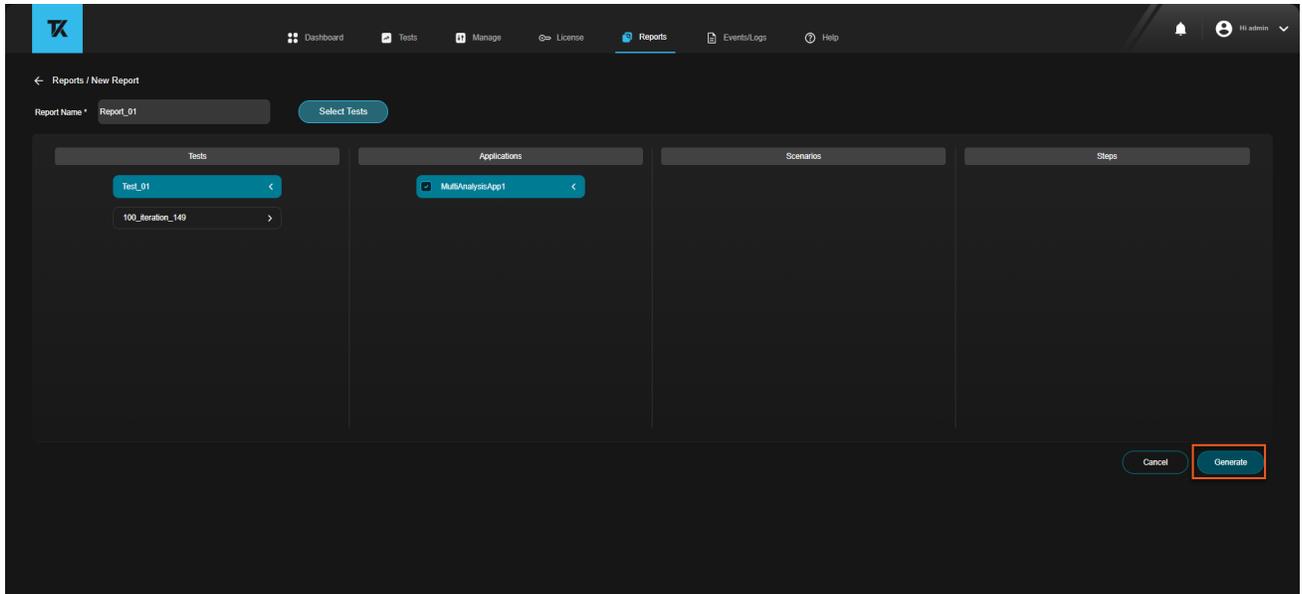


Figure 101: Reports: Generate the report

6. Select the report template from the drop-down.

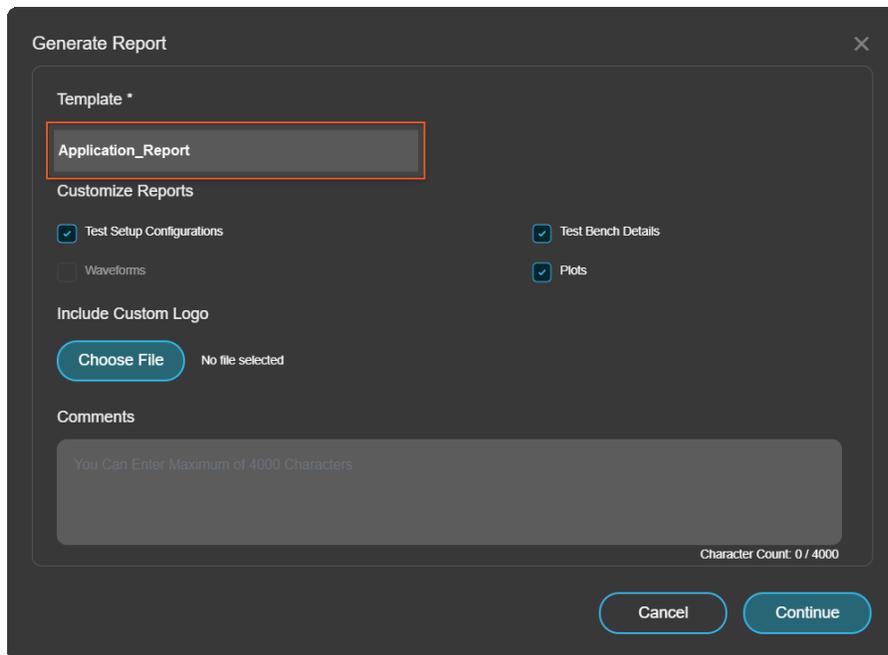


Figure 102: Generate report: Select template

7. Check the options to customize the reports.

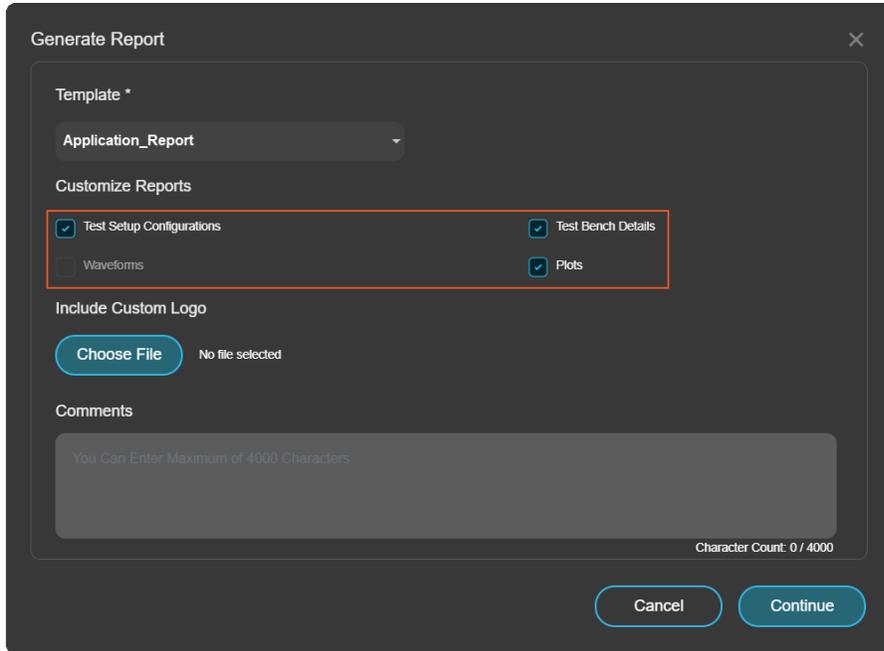


Figure 103: Generate report: Customize report

8. Click **Choose File** and browse to add a custom logo to get printed in the report.

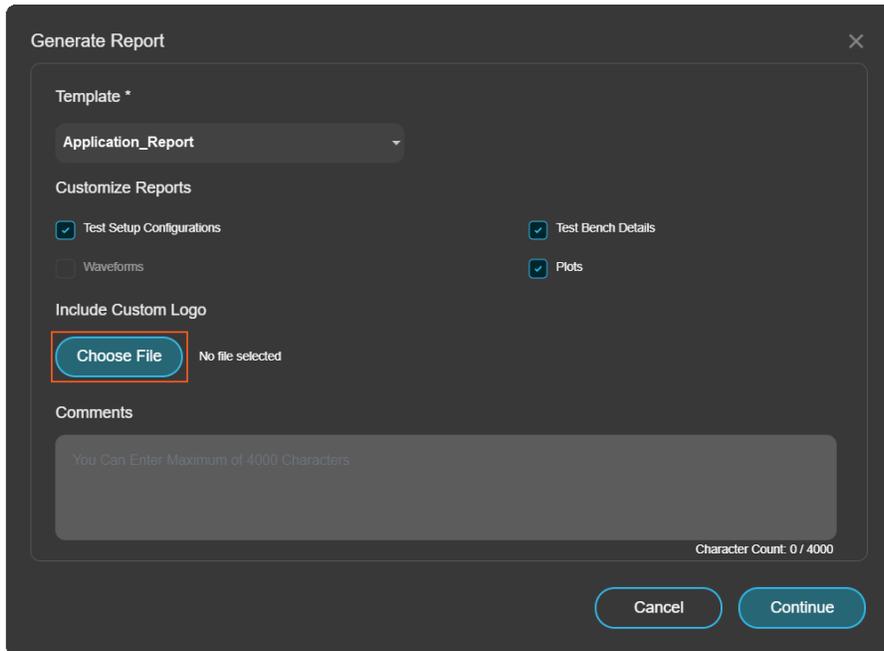


Figure 104: Generate report: Include custom logo

9. Enter additional comments in the field if required and click **Continue**.

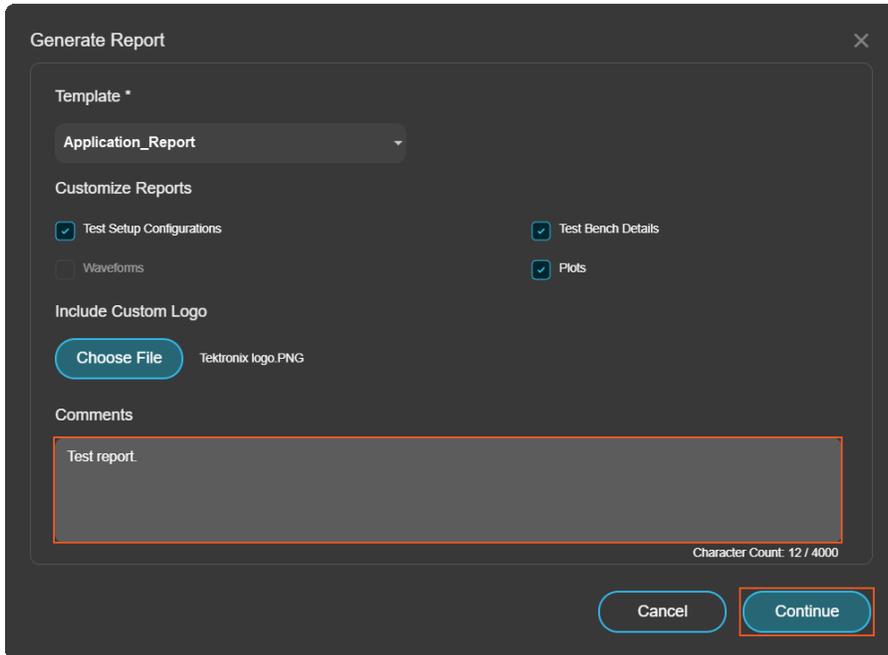


Figure 105: Generate report: Add additional comments in the field

View and export a report

Pre-requisites: Make sure the report is generated after successful execution of a test.

Follow the steps to view and export the generated report:

1. Go to **Reports** tab and click **View** of a particular report.

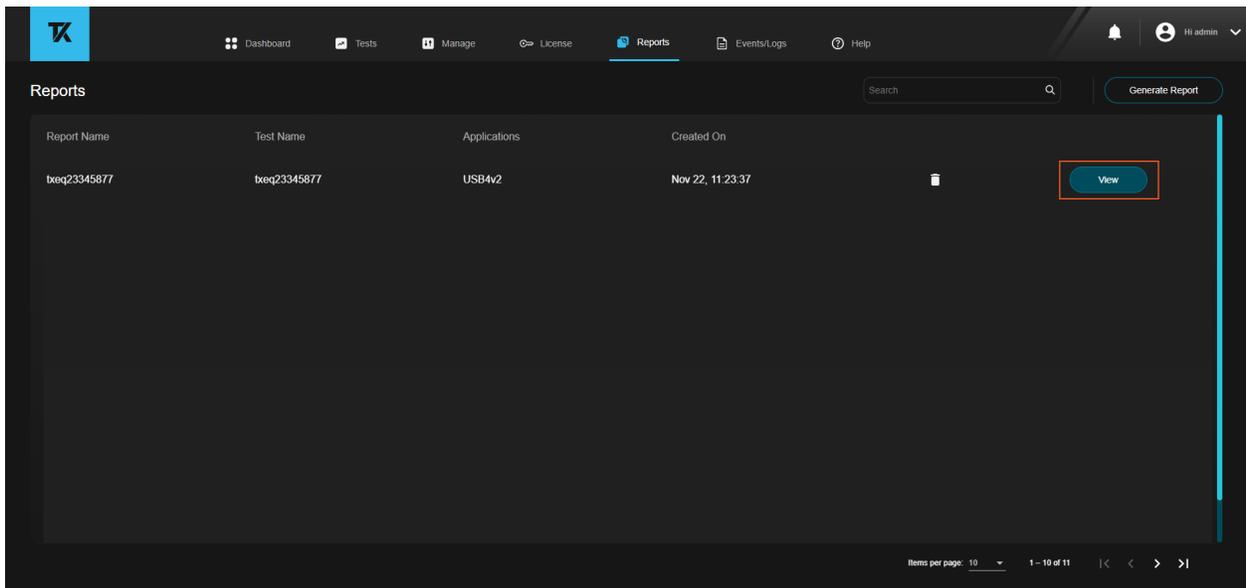


Figure 107: Reports tab: View

2. Enter the title and select the format (PDF) of the report. By default the title will be displayed as the test name.

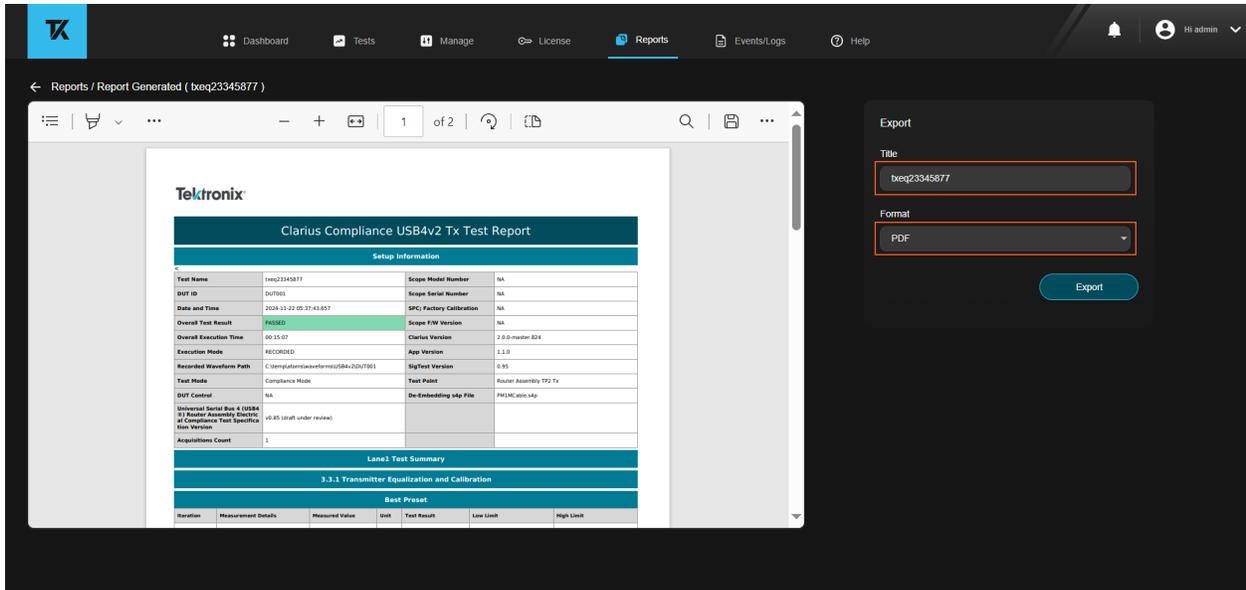


Figure 108: Reports tab: Enter title and format

3. Click **Export**.

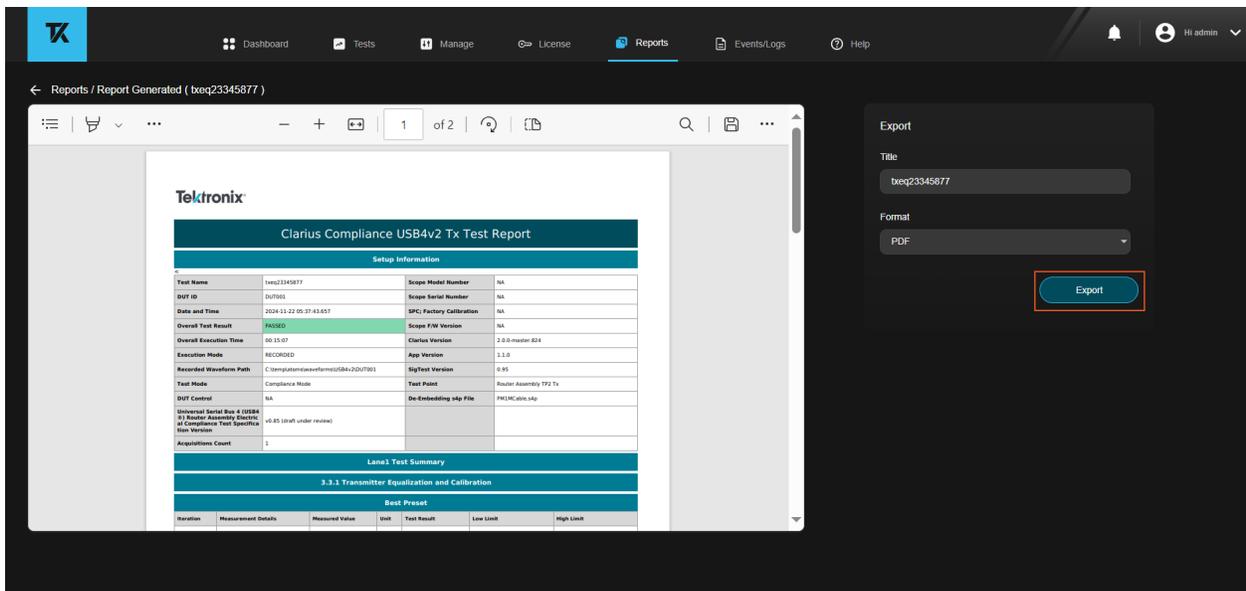


Figure 109: Reports tab: Export the report

Events and logs

The **Events and logs** tab displays the overall record of events and logs captured during a test acquisition and analysis.

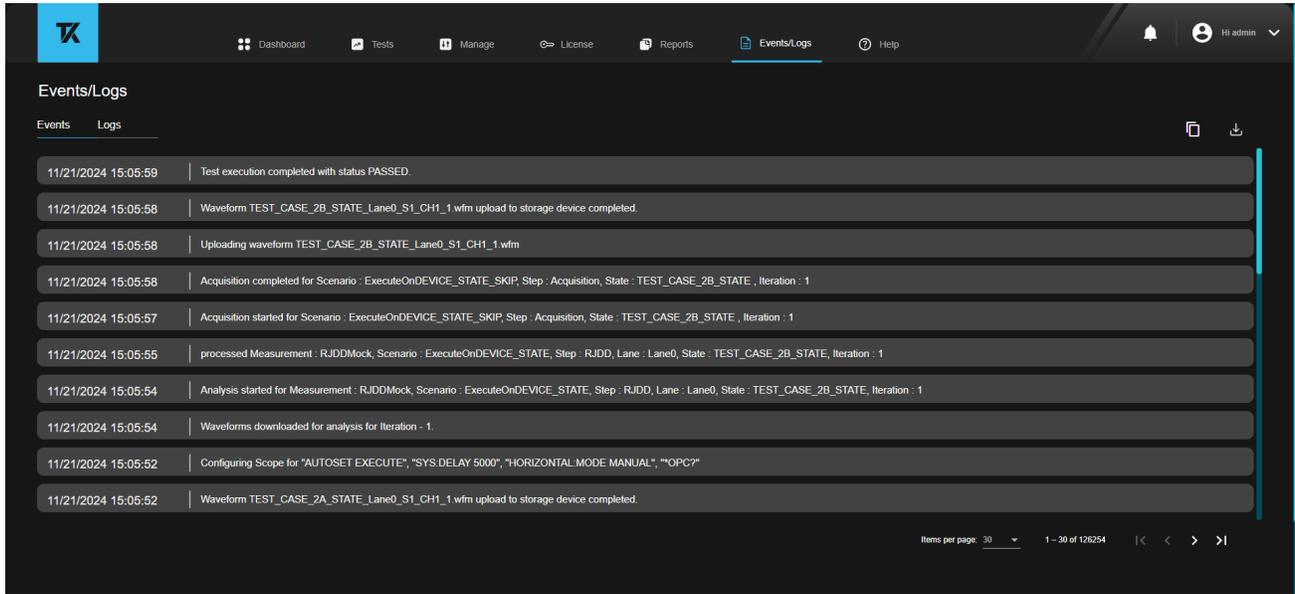


Figure 110: Events tab

| Option | Element | Description |
|---|-----------------|--|
|  | Copy Events | Click to copy the events and paste it in the clipboard for further analysis. |
|  | Download Events | Click to download the events in the target system. |

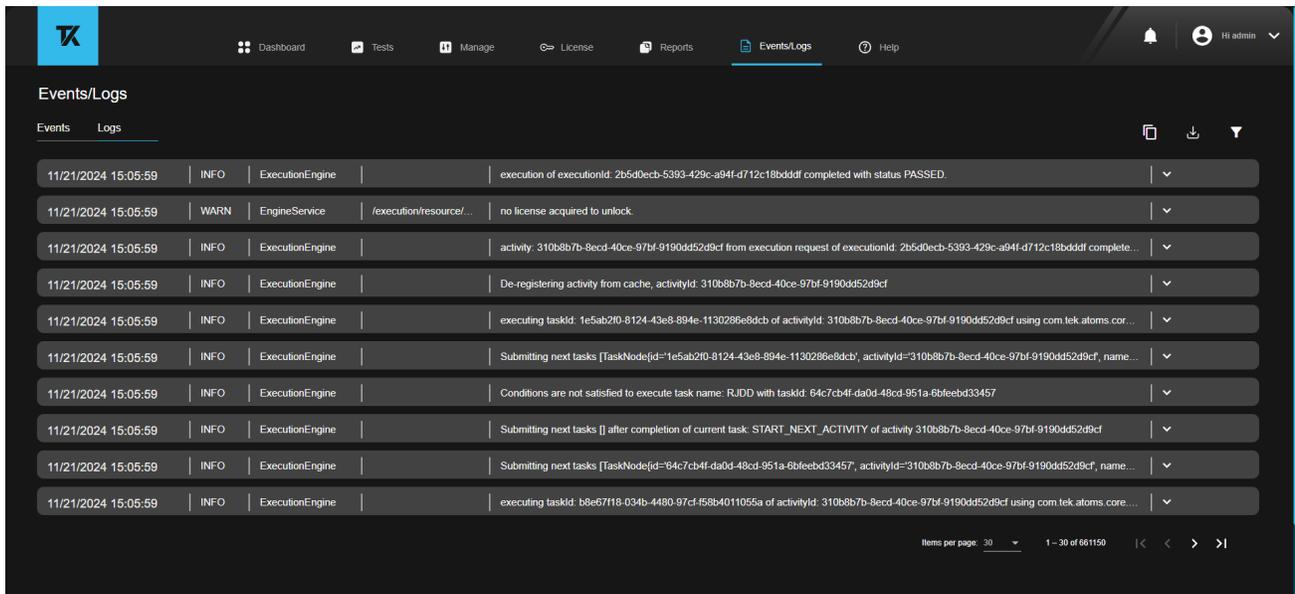


Figure 111: Logs tab

| Option | Element | Description |
|---|---------------|--|
|  | Copy Logs | Click to copy logs and paste it in the clipboard for further analysis. |
|  | Download Logs | Click to download the logs in the target system. |
|  | Filter | Click to filter the logs. |

Filter logs

The **Filter By** option under logs tab allows you to filter the logs based on the criteria such as Component, Data Added, Level, Service, and Transaction Type.

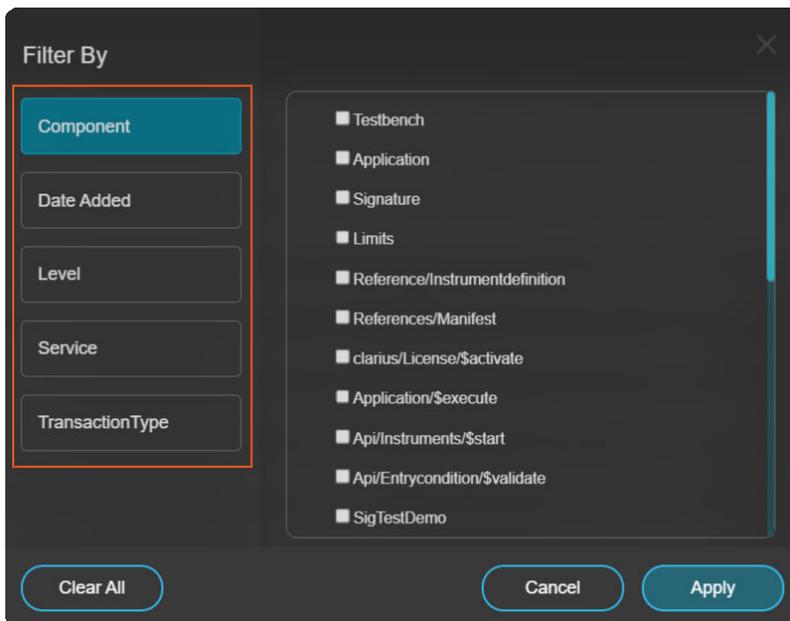


Figure 112: Filter logs

| Filter type | Description |
|-------------|---|
| Component | <p>Select the required component(s) to filter the logs.</p> <ul style="list-style-type: none"> • Testbench • Application • Signature • Limits • Reference/Instrumentdefinition • References/Manifest • Clarius/License/\$activate • Application/\$execute • Api/Instruments/\$start • Api/Entrycondition/\$validate • SigTestDemo • Build_Catalog • Application/SourceNames • Application/Source • Api/Rules/\$validate • Limits/RJ_Mean_Limits • Config/Instrument • RiseTime • Ui • Application/\$execute/Status • Sequence • Histogram • SSFreqDevPlot • TimeTrendPlot • EyePlot • EyeMaskPlot |
| Date Added | <p>Select the date and time range to filter the logs.</p> |
| Level | <p>Displays the level of logs.</p> <ul style="list-style-type: none"> • WARN • ERROR • INFO |

Table continued...

| Filter type | Description |
|------------------|--|
| Service | Select the required service(s) to filter the logs. <ul style="list-style-type: none"> • Measurement_Service • Instrument_Service • Reporting-Service • License_Service • Gateway-Service • EngineService • Pre-Processor-Service • Constraints_Service • CatalogService • CalibrationService • Infra_Service/Infra-Service • Monitor_Service/Monitor-Service • Plots_Service/Plot-Service • ui_service/ui-service • UserManagement_Service/UserManagement-Service • RequestTransformer • Waveform_Service/Waveform-Service • ExecutiveEngine • Blob_Service |
| Transaction Type | Select the required transaction type(s) to filter the logs. <ul style="list-style-type: none"> • TEST • RESOURCE |
| Clear All | Clear all the filters. |
| Apply | Applies the filter based on the log criteria selected. |
| Cancel | Click to cancel all the changes. |

USB4v2 Tx compliance measurements

Introduction of the measurements

PRTS7 test pattern is used for all the tests except Electrical Idle Voltage.

- **AC Common Mode Voltage**

The AC Common Mode Voltage refers to the voltage that passes through the differential signal pair. It is important to keep the common mode voltage noise at low level. USB4v2 has set limits to ensure the compliance with transmitter requirements.

- **Electrical Idle Voltage**

The Electrical Idle Voltage refers to the voltage where the DUT does not transmit data on lane. This is expected to be low as defined in the limit table.

- **Transmitter Timing and Voltage measurements**

| Transmitter timing and voltage measurement subsets | Sub test | Unit | Description |
|--|-----------------------|-----------------|---|
| Timing parameters subset | UI | ps | Minimum unit interval to test DUT baseline Baud rate of 25.6 GB with an uncertainty range of -300 ppm to 300 ppm. |
| | SSC_DOWN_SPREAD_RANGE | % | Dynamic range of the SSC down-spreading |
| | SSC_DOWN_SPREAD_RATE | KHz | SSC down-spreading modulation rate |
| | SSC_PHASE_DEVIATION | ns pp | Phase jitter associated with the SSC modulation. |
| | SSC_SLEW_RATE | ppm/us | SSC modulation frequency slew rate (df/dt) |
| | UJ | UI pp | Sum of uncorrelated DJ and RJ components |
| | UDJ | UI pp | Deterministic jitter that is uncorrelated to the transmitted data. |
| | UDJ_LF | UI pp | Low frequency Uncorrelated Deterministic Jitter (UDJ) |
| Voltage parameters subset | DCD | UI pp | Duty Cycle Distortion Jitter (DCD) |
| | V_SWING | mV p | Peak differential voltage swing |
| | TX_LEVELS_MISMATCH | NA | Levels separation mismatch ratio |
| | TX_SNR | dB | Signal to Noise and Distortion Ratio (SNDR) |
| Informative parameter subset | TX_ISI_MARGIN | dB | Signal to Residual ISI Ratio |
| | EyeHeight | mV | Base TXFFE EyeHeight |
| | EyeWidth | ps | Base TXFFE EyeWidth |
| | Intrinsic Scope Noise | mV-rms | Intrinsic noise, in the context of oscilloscopes, refers to the noise generated by the instrument itself, independent of the signal being measured, when there is no DUT connected to the oscilloscope. |
| Symbol Rate | GHz | DUT symbol rate | |

Transmitter voltage swing

$$V_{SWING} = \frac{\sum_{n=1}^{M-Ntaps} p(n)}{M \cdot \sum_{n=-2}^1 C[n]}$$

Where,

p is the linear fit pulse response.

M is the number of samples per UI.

$Ntaps$ is the linear fit pulse response length.

$C[n]$ are the normalized values of the transmitter preset taps applied during the measurement.

Transmitter levels mismatch

$$TX LEVEL MISMATCH = \min \left\{ \frac{(V_2 - V_1)}{\Delta}, \frac{(V_1 - V_0)}{\Delta} \right\}$$

Where,

V_0 , V_1 , and V_2 are the mean constellation levels corresponding to PAM3 symbols 0, 1, and 2 (V_0 is the bottom level, V_1 is the middle level, and V_2 is the upper level).

$$\Delta = (V_2 - V_0) / 2$$

Transmitter signal-to-noise and distortion

The transmitter signal-to-noise and distortion ratio (TX_SNR) is calculated as the ratio between the linear fit pulse peak and the root square sum of the linear fit error (σ_e) and the additive noise (σ_n).

$$TX SNDR = 20 \cdot \log_{10} \left(\frac{P_{max}}{\sqrt{\sigma_e^2 + \sigma_n^2}} \right)$$

Transmitter ISI margin

The transmitter ISI margin (TX_ISI_MARGIN) is calculated as the ratio between the equalized linear fit pulse peak and the sum of the absolute values of the precursor ISI and the postcursor ISI from 13 and above.

$$TX ISI MARGIN = \text{dB} \left(\frac{\text{Signal}}{\sum_{i=1}^{18} \text{Stored ISI}[i]} \right)$$

Transmitter equalization test

A router assembly transmitter supports coefficient based Feed Forward Equalization (FFE) at its output. The equalizer's structure is based on a 4-tap UI-spaced Finite Impulse Response (FIR) filter.

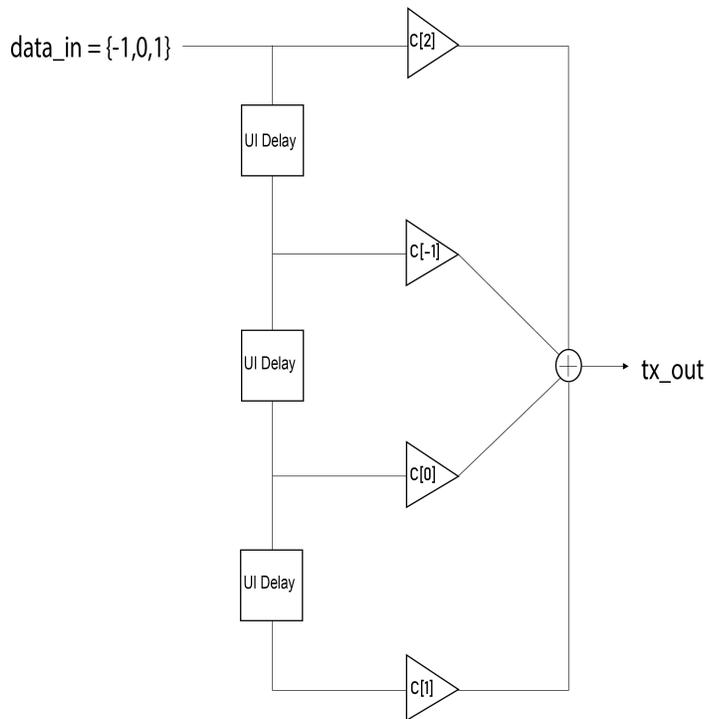


Figure 113: Transmitter Equalizer

| Parameter | Description | Value | Units |
|-----------|------------------------------------|---------|-------|
| Ntaps | Linear fit pulse length | 200 | UI |
| Npost | Linear fit pulse postcursor length | Ntaps-6 | UI |
| Npre | Linear fit pulse precursor length | 5 | UI |
| M | Number of samples per UI | 32 | |

The transmitter supports 42 preset configurations, numbered from 0 to 41. P0 to P39 represents operation mode with full-swing transmitter output, while P0 to P41 defines low swing mode. When one of configurations P40 or P41 is selected, the transmitter's output swing will be attenuated by 6 ± 1 dB compared to its full-swing mode of operation. The default equalization preset of the transmitter will be configured to the setting that obtains the lowest Data Dependent Jitter (DDJ).

- **Low Frequency Periodic Signaling (LFPS)**

Low frequency periodic signaling (LFPS) is used for in-band communication between two Link Partners when exiting power management Link states.

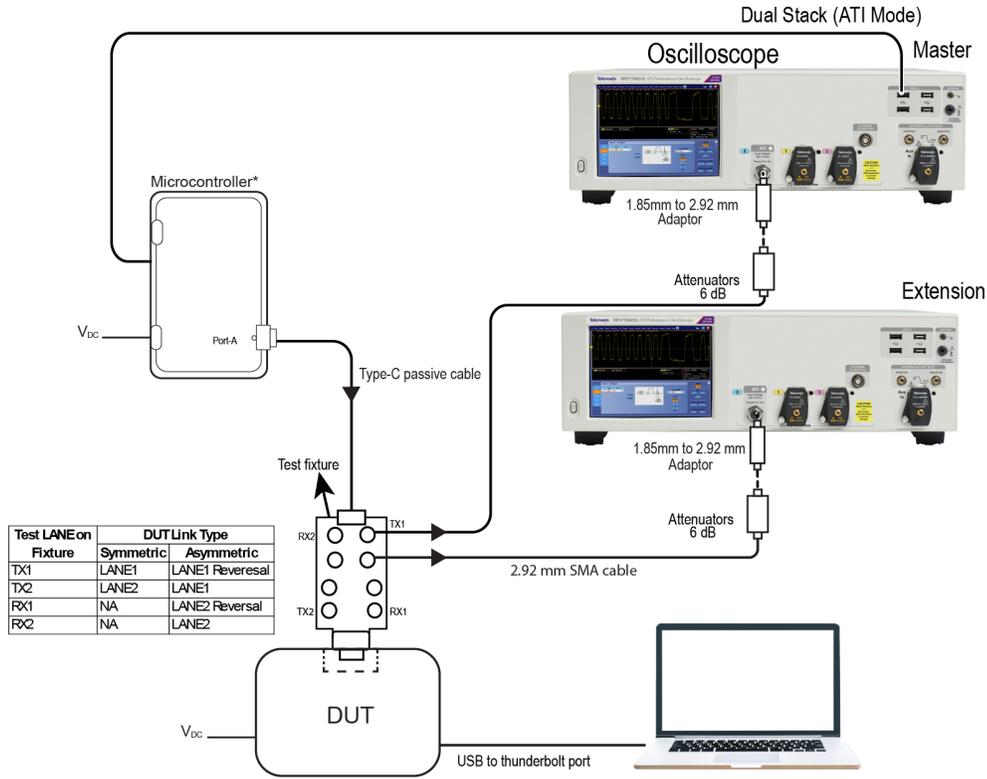
| LFPS Test | LFPS Sub Test | Unit | Description |
|--------------------------|-------------------|--------|---|
| Timing Parameters Subset | tPeriod | ns | Period of LFPS cycle (clock pattern) |
| | tPerData | ns | Period of time in which electrical-idle shall be set after the LFPS sequence |
| | tRiseFall | ns | Rise/Fall time of LFPS signal, measured from 20% to 80% of the signal dynamic range |
| | LFPS_DUTY_CYCLE | % | Duty-Cycle of LFPS signal |
| Voltage Parameter subset | V_CM_AC_LFPS | mV p-p | Common mode noise |
| | V_TX_DIFF_PP_LFPS | mV p-p | LFPS peak-to-peak differential amplitude |

TP2 test setup for USB4v2 Tx

Follow the test setup for the USB4v2 Tx TP2.

Steps to connect the hardware

1. Connect the DUT to plug test fixture as shown in transmitter TP2 test setup figure.
2. Connect the Microcontroller port to the test fixture.
3. Connect one end of the SMA cable pair to the TP2 test fixture and the other end of the cable to the oscilloscope.



Note:

* User can use microcontroller and other way to control the DUT.

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Figure 114: Transmitter TP2 Test setup

The following table shows the test fixture connection for each DUT link type.

Table 10: DUT link type and test fixture lane mapping

| Test LANE on Fixture | DUT Link Type | |
|----------------------|---------------|----------------|
| | Symmetric | Asymmetric |
| TX1 | LANE1 | LANE1 Reversal |
| TX2 | LANE2 | LANE1 |
| RX1 | NA | LANE2 Reversal |
| RX2 | NA | LANE2 |

List of test for TP2 USB4v2 Tx

The following tables show the list of supported test and its measurements for USB4v2 software solutions.

Table 11: List of supported tests for USB4v2 software solutions

| Test | Sub test | Lower limit | Upper limit | Unit |
|---|-----------------------|-------------|-------------|--------|
| Transmitter AC common mode | NA | NA | < 100 | mVp-p |
| Transmitter Electrical Idle Voltage | NA | NA | ≤ 20 | mV |
| Transmitter Timing and Voltage measurement subsets | | | | |
| Timing Parameters subset | UI | 39.0508 | 39.0742 | ps |
| | SSC_DOWN_SPREAD_RANGE | 0.2 | 0.3 | % |
| | SSC_DOWN_SPREAD_RATE | 30 | 33 | KHz |
| | SSC_PHASE_DEVIATION | 2.5 | 15.5 | ns pp |
| | SSC_SLEW_RATE | NA | 500 | ppm/us |
| | UJ | | 0.17 | UI pp |
| | UDJ | | 0.075 | UI pp |
| | UDJ_LF | | 0.03 | UI pp |
| | DCD | | 0.02 | UI pp |
| Voltage Parameters subset | V_SWING | 410 | 545 | mV p |
| | TX_LEVELS_MISMATCH | 0.975 | NA | NA |
| | TX_SNR | 32.5 | | dB |
| | TX_ISI_MARGIN | 11 | | dB |
| Transmitter Equalization and Calibration | | | | |
| Best Preset | NA | | | |
| Coefficient tolerance test | | | | |

Table 12: List of sub test for transmitter equalization

| Preset number | C(-2) | C(-1) | C(0) | C(1) |
|---------------|-------|-------|-------|-------|
| P0 | 0 | 0 | 1 | 0 |
| P1 | | | 0.95 | -0.05 |
| P2 | | | 0.9 | -0.1 |
| P3 | | 0.85 | -0.15 | |
| P4 | | -0.05 | 0.95 | 0 |
| P5 | | | 0.9 | -0.05 |
| P6 | | | 0.85 | -0.1 |
| P7 | | 0.8 | -0.15 | |
| P8 | | -0.1 | 0.9 | 0 |
| P9 | | | 0.85 | -0.05 |
| P10 | | | 0.8 | -0.1 |
| P11 | | 0.75 | -0.15 | |
| P12 | | -0.15 | 0.85 | 0 |
| P13 | | | 0.8 | -0.05 |
| P14 | | | 0.75 | -0.1 |
| P15 | 0.7 | | -0.15 | |
| P16 | 0.825 | | 0 | |
| P17 | 0.025 | 0.775 | -0.05 | |
| P18 | | 0.725 | -0.1 | |
| P19 | | 0.675 | -0.15 | |
| P20 | 0 | -0.2 | 0.8 | 0 |
| P21 | | | 0.75 | -0.05 |
| P22 | | | 0.7 | -0.1 |
| P23 | 0.65 | | -0.15 | |
| P24 | 0.025 | | 0.775 | 0 |
| P25 | | 0.725 | -0.05 | |
| P26 | | 0.675 | -0.1 | |
| P27 | 0.05 | 0.625 | -0.15 | |
| P28 | | 0.75 | 0 | |
| P29 | | 0.7 | -0.05 | |
| P30 | | 0.65 | -0.1 | |
| P31 | | | 0.6 | -0.15 |

Table continued...

| Preset number | C(-2) | C(-1) | C(0) | C(1) |
|---------------|-------|-------|-------|-------|
| P32 | 0 | -0.25 | 0.75 | 0 |
| P33 | | | 0.7 | -0.05 |
| P34 | 0.025 | | 0.725 | 0 |
| P35 | | | 0.675 | -0.05 |
| P36 | 0.05 | | 0.7 | 0 |
| P37 | | | 0.65 | -0.05 |
| P38 | 0.075 | | 0.675 | 0 |
| P39 | | | 0.625 | 0.05 |
| P40 | 0 | -0.1 | 0.4 | 0 |
| P41 | | 0 | 0.5 | |

Note:



- For both low and full swing modes, the tolerance of the normalized coefficients should be ± 0.015 for C(-2) and ± 0.025 for C(-1), C(0), and C(1) coefficients.
- For low swing mode, P40 and P41 the transmitter swing attenuation requirement is 6 ± 1 dB.

Table 13: Transmitter equalization sub test limits

| C(-2) | | C(-1) | | C(0) | | C(1) | |
|-------|-------|-------|-------|-------|-------|-------|-------|
| Lower | Upper | Lower | Upper | Lower | Upper | Lower | Upper |

Table continued...

| C(-2) | | C(-1) | | C(0) | | C(1) | |
|--------|--------|--------|--------|-------|--------|--------|--------|
| -0.015 | 0.015 | -0.025 | 0.025 | 0.975 | 1.025 | -0.025 | 0.025 |
| | | | | 0.925 | 0.975 | -0.075 | |
| | | | | 0.875 | 0.925 | -0.125 | -0.075 |
| | | | | 0.825 | 0.875 | -0.175 | -0.125 |
| | | 0.925 | | 0.975 | -0.025 | 0.025 | |
| | | 0.875 | | 0.925 | -0.075 | -0.025 | |
| | | 0.825 | | 0.875 | -0.125 | -0.075 | |
| | | 0.775 | | 0.825 | -0.175 | -0.125 | |
| | | -0.075 | -0.075 | 0.875 | 0.925 | -0.025 | 0.025 |
| | | | | 0.825 | 0.875 | -0.075 | -0.025 |
| | | | | 0.775 | 0.825 | -0.125 | -0.075 |
| | | | | 0.725 | 0.825 | -0.175 | -0.125 |
| -0.125 | -0.125 | -0.125 | 0.825 | 0.925 | -0.025 | 0.025 | |
| | | | 0.775 | 0.875 | -0.075 | -0.025 | |
| | | | 0.725 | 0.825 | -0.125 | -0.075 | |
| | | | 0.675 | 0.775 | -0.175 | -0.125 | |
| | | | 0.8 | 0.725 | -0.025 | 0.025 | |
| | | | 0.75 | 0.85 | -0.075 | -0.025 | |
| | | | 0.7 | 0.8 | -0.125 | -0.075 | |
| | | | 0.65 | 0.75 | -0.175 | -0.125 | |
| 0.01 | 0.04 | | | | | | |

Table continued...

| C(-2) | | C(-1) | | C(0) | | C(1) | | | | | | |
|--------|-------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|-------|
| -0.015 | 0.015 | -0.225 | -0.175 | 0.775 | 0.7 | -0.025 | 0.025 | | | | | |
| | | | | 0.725 | 0.825 | -0.075 | -0.025 | | | | | |
| | | | | 0.675 | 0.775 | -0.125 | -0.075 | | | | | |
| | | | | 0.625 | 0.725 | -0.175 | -0.125 | | | | | |
| 0.75 | 0.675 | | | -0.025 | 0.025 | | | | | | | |
| 0.7 | 0.8 | | | -0.075 | -0.025 | | | | | | | |
| 0.65 | 0.75 | | | -0.125 | -0.075 | | | | | | | |
| 0.6 | 0.7 | | | -0.175 | -0.125 | | | | | | | |
| 0.01 | 0.04 | | -0.225 | -0.175 | 0.725 | 0.65 | -0.025 | 0.025 | | | | |
| | | | | | 0.675 | 0.775 | -0.075 | -0.025 | | | | |
| | | | | | 0.625 | 0.725 | -0.125 | -0.075 | | | | |
| | | | | | 0.575 | 0.675 | -0.175 | -0.125 | | | | |
| 0.035 | 0.065 | -0.225 | -0.175 | 0.725 | 0.625 | -0.025 | 0.025 | | | | | |
| | | | | 0.675 | 0.775 | -0.075 | -0.025 | | | | | |
| | | | | 0.625 | 0.725 | -0.125 | -0.075 | | | | | |
| | | | | 0.575 | 0.675 | -0.175 | -0.125 | | | | | |
| -0.015 | 0.015 | -0.225 | -0.225 | 0.675 | 0.775 | -0.075 | -0.025 | | | | | |
| | | | | 0.7 | 0.725 | -0.125 | -0.075 | | | | | |
| 0.65 | 0.75 | | | -0.175 | -0.125 | | | | | | | |
| 0.675 | 0.7 | | | -0.025 | 0.025 | | | | | | | |
| 0.625 | 0.675 | | | -0.075 | -0.025 | | | | | | | |
| 0.65 | 0.7 | | | -0.025 | 0.025 | | | | | | | |
| 0.01 | 0.04 | | -0.225 | -0.225 | 0.65 | 0.7 | -0.025 | 0.025 | | | | |
| | | | | | 0.6 | 0.65 | 0.025 | 0.075 | | | | |
| 0.035 | 0.065 | | | | -0.225 | -0.225 | -0.075 | 0.375 | 0.425 | -0.025 | | |
| | | | | | | | 0.025 | 0.475 | 0.525 | -0.025 | | |
| 0.06 | 0.09 | | | | | | -0.275 | -0.225 | 0.375 | 0.425 | -0.025 | 0.025 |
| | 0.9 | | | | | | | | 0.475 | 0.525 | -0.025 | 0.025 |
| -0.015 | 0.015 | -0.125 | | -0.075 | | | 0.375 | 0.425 | -0.025 | 0.025 | | |
| | | | | 0.025 | | | 0.475 | 0.525 | -0.025 | 0.025 | | |

Table 14: Low Frequency Periodic Signal (LFPS) sub test limits

| LFPS Test | LFPS Sub Test | Min | Max | Unit | Description |
|--------------------------|-----------------|-----|-----|------|---|
| Timing Parameters Subset | tPeriod | 20 | 80 | ns | Period of LFPS cycle (clock pattern) |
| | tPerData | 80 | 120 | ns | Period of time in which electrical-idle shall be set after the LFPS sequence |
| | tRiseFall | | 4 | ns | Rise/Fall time of LFPS signal, measured from 20% to 80% of the signal dynamic range |
| | LFPS_DUTY_CYCLE | 45 | 55 | % | Duty-Cycle of LFPS signal |

Table continued...

| LFPS Test | LFPS Sub Test | Min | Max | Unit | Description |
|--------------------------|-------------------|-----|------|--------|--|
| Voltage Parameter subset | V_CM_AC_LFPS | | 100 | mV p-p | Common mode noise |
| | V_TX_DIFF_PP_LFPS | 800 | 1200 | mV p-p | LFPS peak-to-peak differential amplitude |

User profile

The **User Profile** displays the information about your user account.

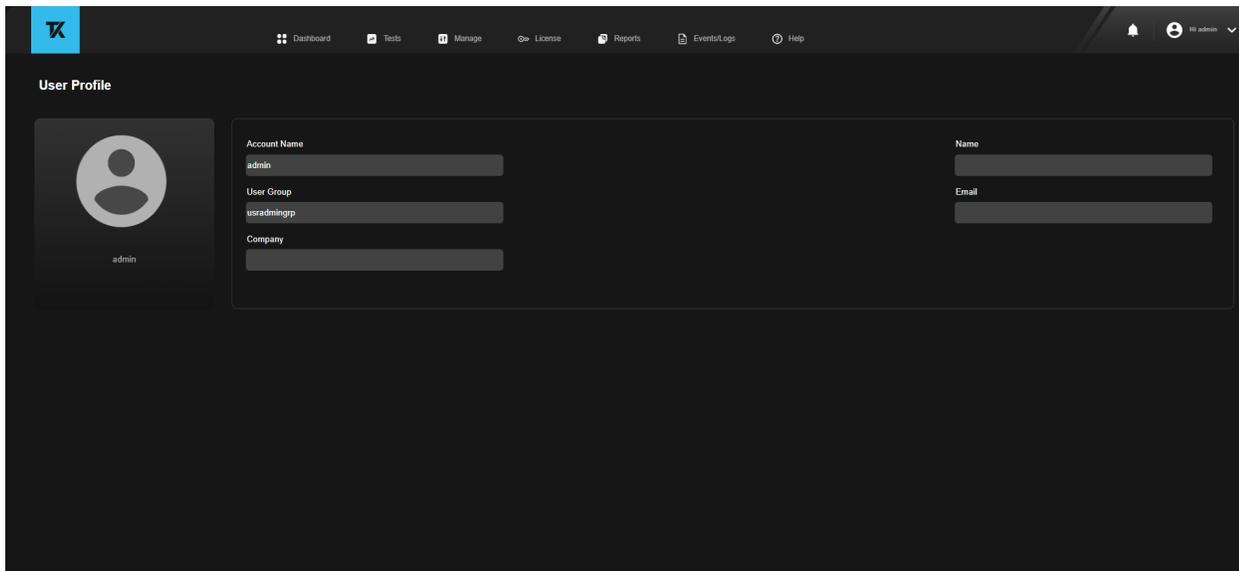


Figure 115: User profile

Manage accounts (admin only)

The **Manage Accounts** allows you to create a user account, update the existing user details, and delete an user account. Click **Manage Accounts** to access the **Manage Users** page.

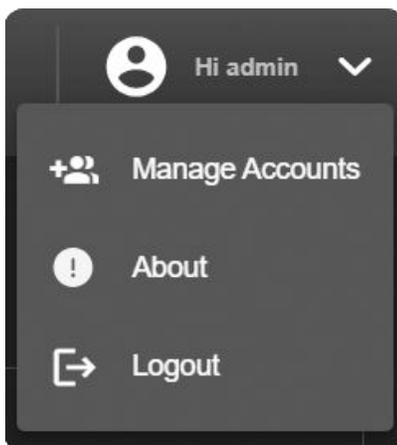


Figure 116: Manage accounts

My profile

My Profile displays information about user account.

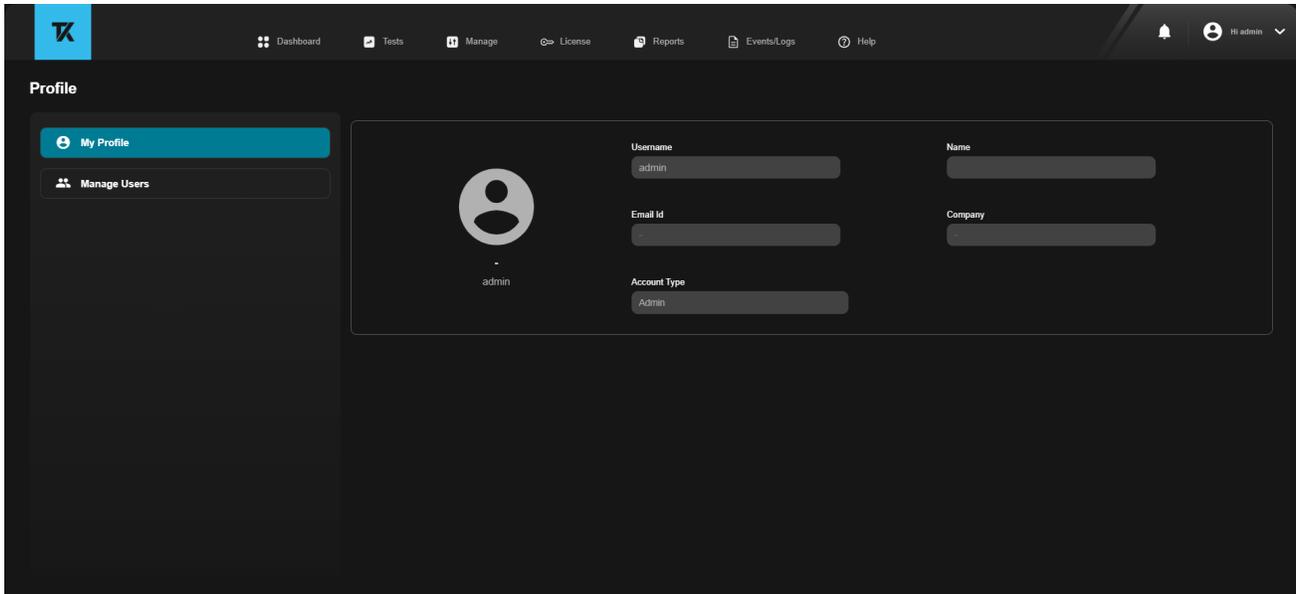


Figure 117: Profile details

Manage users

Manage Users allows you to add, modify, delete, lock, or unlock the user account.

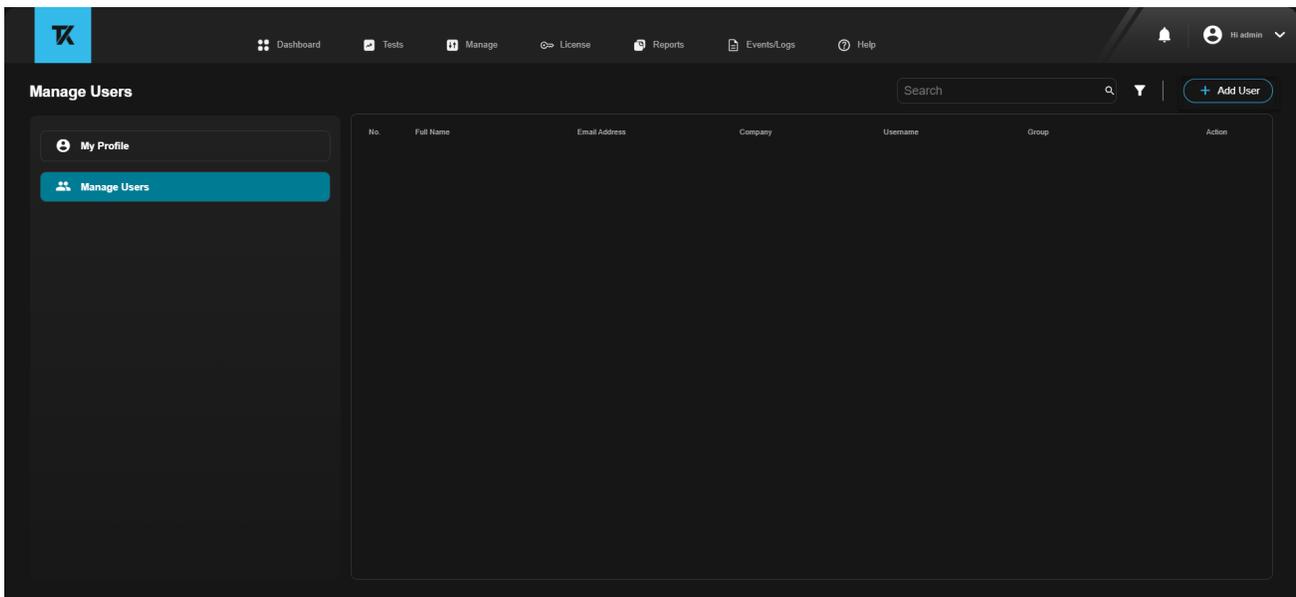


Figure 118: Manage users



Note: In Manage Users, if you reset password for admin (default user), then the password is reset only for Clarius UI login and not for Clarius Virtual machine login. It is recommended to use the [Clarius password reset utility](#) to reset the admin (default user account) password always.

Add user

The **Add User** allows you to create a new user account.

Follow the steps to add a user account.

- Select **Manage Accounts > Manage Users** and click **Add User**.

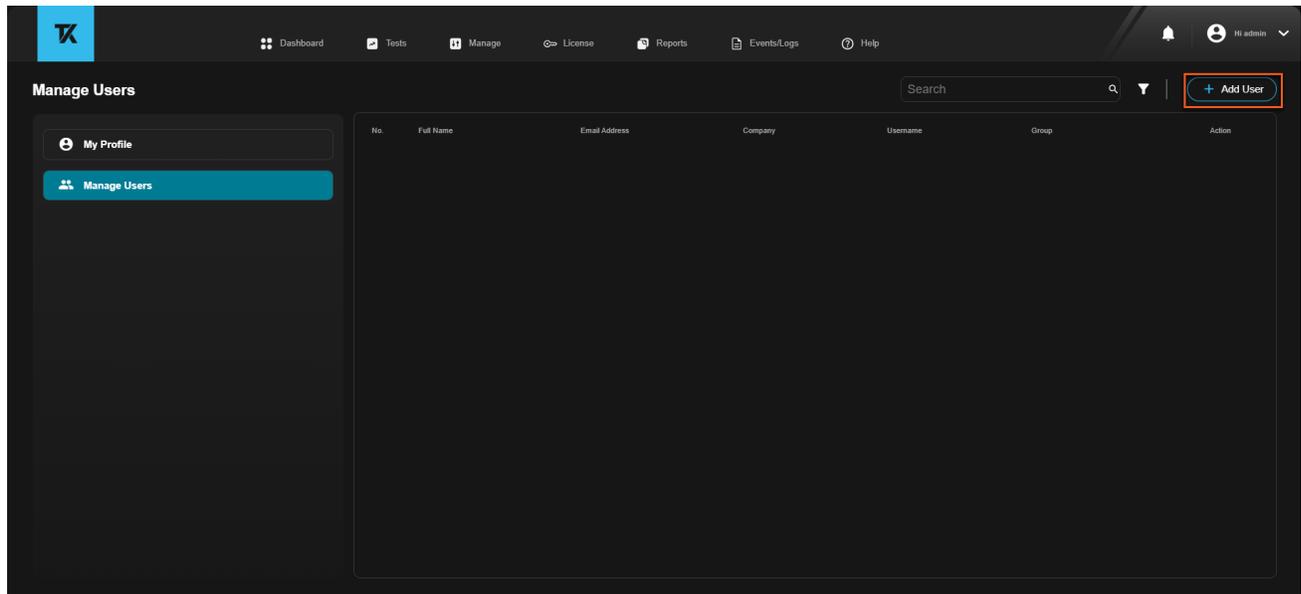


Figure 119: Add user

- Enter the details in the respective fields and click **Submit**.

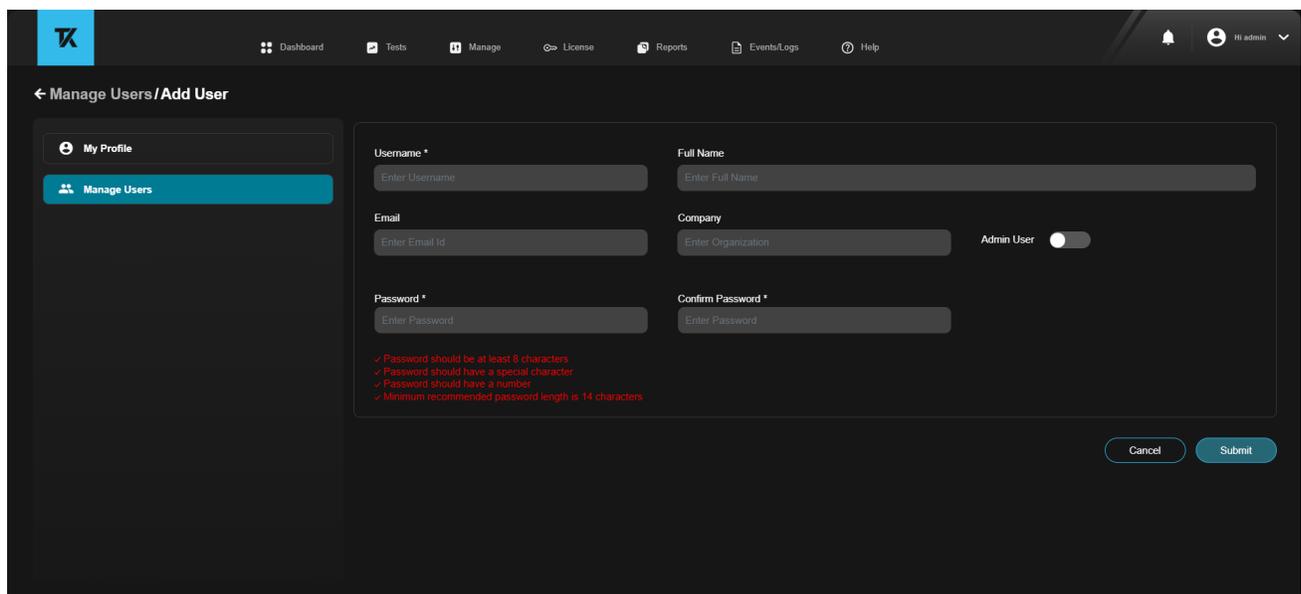


Figure 120: Add user details

| Element | Description |
|--------------------|-------------------------------------|
| Username | Enter the username to login the UI. |
| Table continued... | |

| Element | Description |
|------------------|---|
| Full Name | Enter the full name of the user. |
| Email | Enter the valid email id of the user. |
| Company | Enter the organization name of the user. |
| Admin User | Enable or disable to set the account as admin or non admin account. |
| Password | Set a password matching the criteria. |
| Confirm Password | Re-enter the password. |
| Submit | Click to save the configured details. |
| Cancel | Click to cancel. All the entered details will be discarded. |

Reset admin (default user account) password

This section describes the steps to reset the password of an admin (default user account). A default user is the user account that is created during the installation.

To reset the password, follow the steps:

1. Run the command prompt in **Administrator** mode.
2. Execute the command **clarius resetpwd -p "new password"**.

Note:



- It is recommended to use the Clarius password reset utility to reset the admin (default user account) password always.
- Clarius password reset utility will reset the admin (default user account) password. It will also reset the login password of Clarius virtual machine which can be used for debugging purposes.
- You cannot use this command to reset the password of non-admin/admin user accounts created in Clarius GUI.

Admin Console and Monitoring

The Monitoring and admin console provides a holistic view of the performance of the **Host** (Clarius installed PC) and the Clarius **Platform** (Virtual machine running critical services). This service allows users to monitor CPU load, memory usage, disk and storage status, ensuring optimal performance and facilitates troubleshooting.

Double-click Clarius **Admin Console** from the desktop to open the monitoring service.

System View

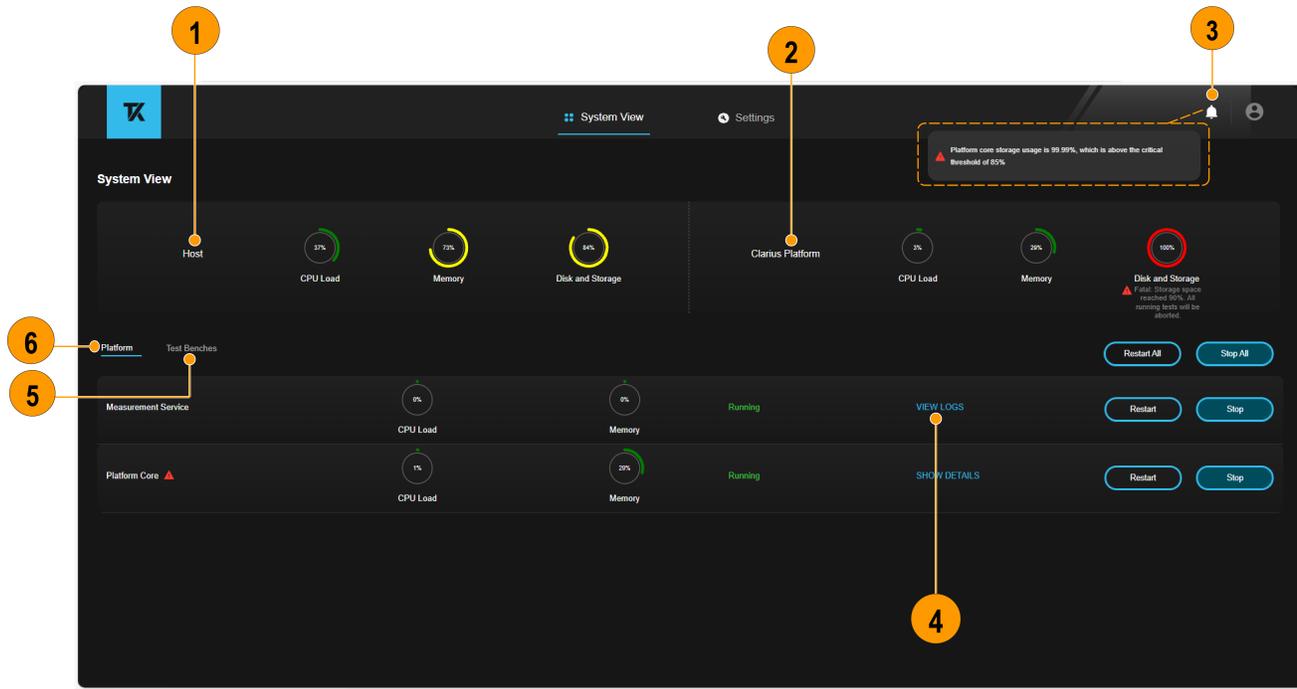


Figure 121: Clarius compliance monitoring service interface

Table 15: Components of monitoring service

| Identifier | Element | Description |
|------------|------------------|--|
| 1 | Host | The Host (Clarius installed PC) provides the hardware resources for the Clarius platform. You can view metrics related to CPU load, memory usage, disk and storage status for the host. |
| 2 | Clarius Platform | The Clarius platform is a virtual machine created on the host, running critical services essential for system operations. Metrics for the platform include CPU load, memory usage, disk and storage status. |
| 3 | Notifications | Warnings and alerts are displayed in the notification icon and Windows system tray, providing real-time updates on the system status. A red alert icon will be displayed next to the notification message for Memory, Storage and CPU if the threshold exceeds 90%. A yellow warning icon will be displayed next to the notification message for Memory, Storage and CPU if the threshold exceeds 70%. |

Table continued...

| Identifier | Element | Description |
|------------|--------------|--|
| 4 | Logs | The logs screen displays detailed logs for each service.  Note: If there is any issue with the service, save the log file and share it with the Tektronix support person for troubleshooting. |
| 5 | Test Benches | Users can view the real-time status of the test benches, which includes CPU load and memory usage. The available status are <i>Available</i> , <i>Occupied</i> , <i>Unavailable</i> , and <i>Not Reachable</i> . |
| 6 | Platform | You can view the real-time status of Clarius services, which include CPU load and memory usage. The available status are Running, Not Running, and Exited. |

Test bench status scenarios

The **Test Benches** tab in the monitoring service allows you to view the status of the test bench.

The following table explains the scenarios for using the test bench to perform a test.

| Test bench status | Description |
|-------------------|---|
| Available | If both instrument service and instrument service agent (ClariusSAgent) are running, but no test is executed on the test bench. |
| | If instrument service is running and instrument service agent (ClariusSAgent) is down; Technical difficulties to Restart or Stop the service. |
| Occupied | If instrument service and instrument service agent (ClariusSAgent) are running, and a test is being executed on the test bench. |
| Unavailable | If instrument service is down and instrument service agent (ClariusSAgent) is running; Use Start to bring up the setup. |
| Not Reachable | If both instrument service and instrument service agent (ClariusSAgent) are not reachable. |

Note:



- You can check the status of instrument service agent (ClariusSAgent) from the **Services** window. Click **Start > Run** and then type `services.msc` to launch the Services window.
- Clarius Monitoring and Admin console is only accessible from the target system where the Clarius automation framework is installed.
- File Store Create Buckets service operates as an internal start-up service and will cease its operations post-initialization. It is not essential for the ongoing test procedures, and its absence will not affect the test runs or their outcomes.

Settings

The settings tab allows you to view the list of warnings and alerts in the notifications pane and the details of the TLS certificate.

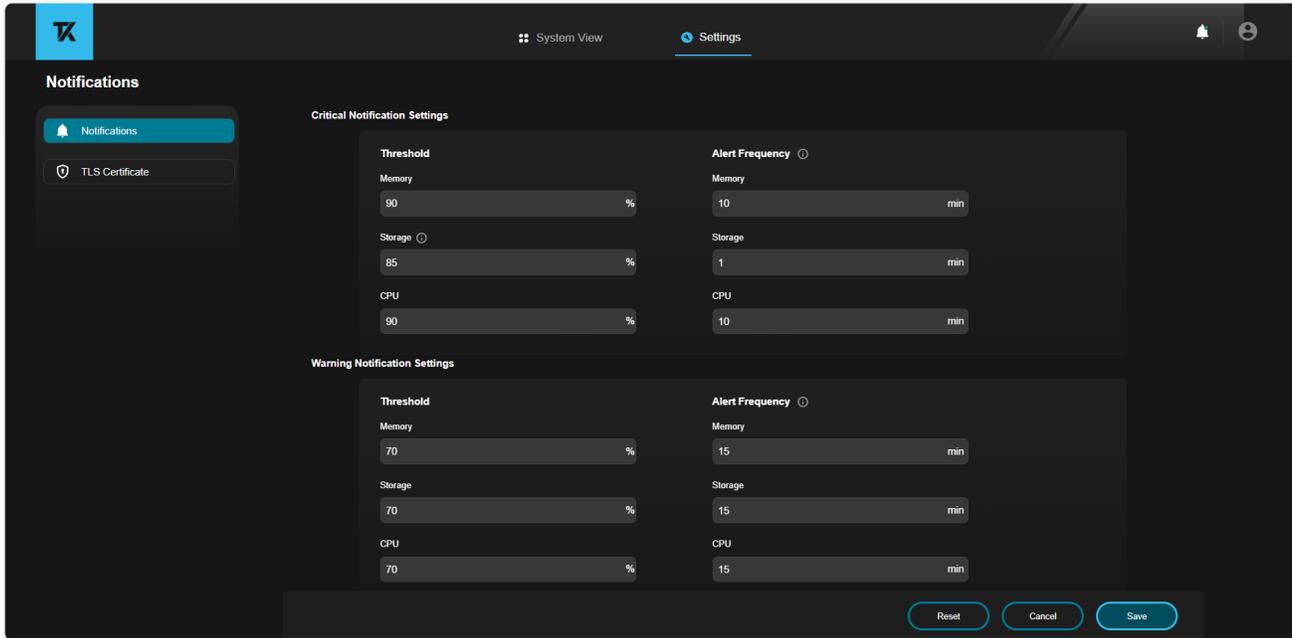


Figure 122: Settings tab: Notifications

Users can configure the values for Critical and Warning notifications, and click **Save** to apply the changes.

Warning Threshold: An alert is triggered when the metric exceeds the set value (For example, 70%)¹².

Critical Threshold: A critical alert is triggered when the metric exceeds the set value (For example, 90%).

TLS/SSL Certificate

Transport Layer Security (**TLS**) encrypts information sent over network, ensuring **privacy** between a **client** and a **server** or **load balancer**. This section describes the steps to renew the TLS certificate of an admin (default user account) and view the status of the certificate. A default user is the user account that is created during the installation.

¹² If the alert is from hard disk, delete old test data from **Tests > List of Tests** to free up the hard disk space.

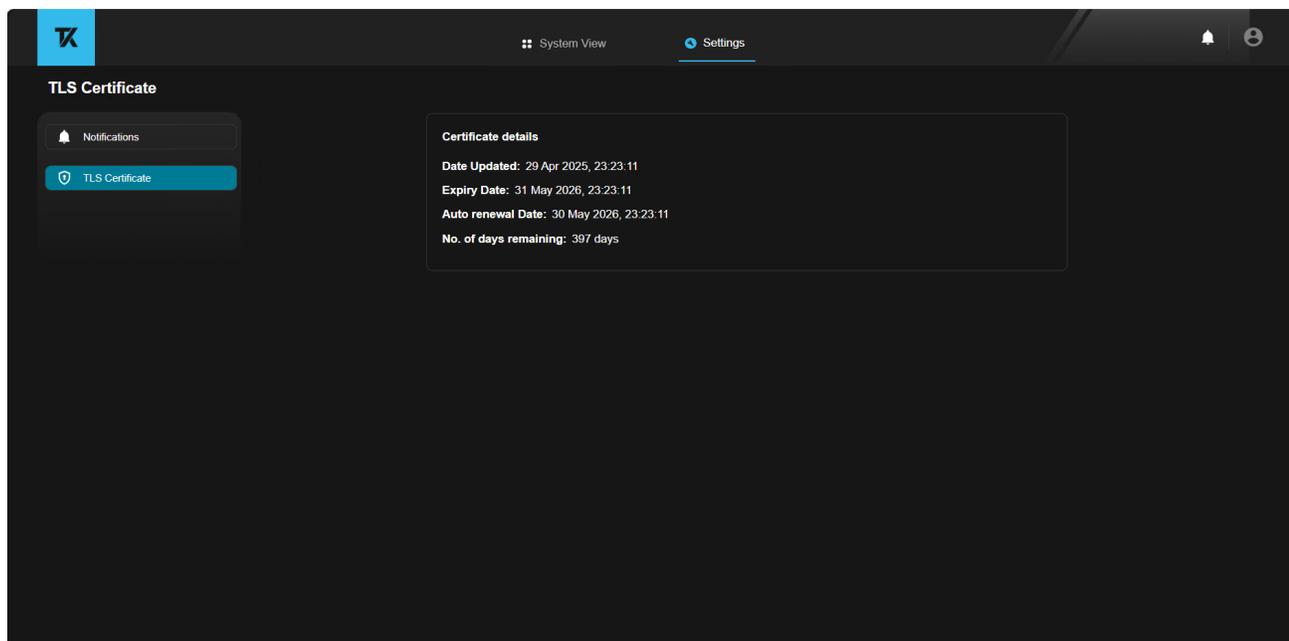


Figure 123: Settings tab: TLS certificate

The TLS certificate can be viewed from the **Admin Console** or by running the command **clarius sslcert -d** in the command prompt as Administrator¹³.

To renew the TLS certificate, follow the steps:

1. Launch command prompt as **Administrator**¹³.
2. Run the command **clarius sslcert -r**.
3. Close the **Clarius** tab in the browser, clear the cookies/cache, and restart the browser once the certificate is renewed successfully.

Note:



1. Stop all running tests and close the browser before renewing the certificate.
2. If any services fail, you can restart the failed services from the **Admin console**.

¹³ Click **Start** and type Command Prompt or CMD. Right-click on **Command Prompt** in the search results, and then select **Run as administrator**. This will open the Command Prompt with administrator privileges.

Tutorial

Steps to execute a test

This section describes the steps to run a test in the Clarius automation framework.

Prerequisite

1. Install Clarius automation framework
2. Install Clarius application in the Clarius automation framework
3. Activate the license for Clarius application
4. Run the services

Steps to execute a test

1. Double-click the **Clarius** icon from desktop to launch Clarius automation framework.



Note: To remotely access Clarius use the host name or IP address of the Clarius automation framework installed device.

2. After successful login, you will be navigated to the home page. It displays the navigation panel and the widgets in the dashboard.
3. Create Test Bench. A test bench is an environment that is used to verify the correctness of a test setup. [Creating a Test bench:](#)
 - a. Go to **Manage > Test Benches** and click **New Test Bench**.
 - b. Enter test bench details in the respective fields.
 - c. Add the required instruments into the test bench.
 - d. Click **Save** and save the test bench
4. Create Test. [Creating a Test:](#)
 - a. Go to **Tests > Add Test**.
 - b. Enter the test details in the respective fields.
 - c. Select the acquisition mode as Live or Recorded and select the Test bench or waveforms respectively.
 - d. Select the technology and active application from the drop-down list and click **Add Sequence**. To import an already created sequence, click **Load Sequence**.
 - e. Click  and configure the **Sources and Signals** for the test setup.
 - f. Click  and configure the **Global Settings** for the test setup.
 - g. Click  and to view the **Connection Diagram**.
 - h. Click  to view the scenarios. Click  from Local Settings to configure the settings for the respective scenario or the steps.
5. Select **Run** to run the measurements with the configured settings. You can also save the test and run later.
6. Navigate to the **Tests** tab to view the executed test [status and results](#).
7. In **Tests** tab, click **View Results** to view the results of a particular test.
8. In the Reports page, click **Generate Report** to generate the report in PDF. You can view the PDF report and download.

References

File name extensions

The USB Tx application uses the following file name extensions:

Table 16: File name extension

| File name extension | Description |
|---------------------|---|
| *.py | Python files. |
| *.xml | Test-specific configuration information (encrypted) files. Application log files |
| *.csv | Test result reports Plot data |
| *.mht | Test result reports (default) Test reports can also be saved in HTML format |
| *.pdf | Test result reports Application help document |
| *.xslt | Style sheet used to generate reports |
| *.png | Captured images |
| *.flt | Filter files |

Error messages

The following error messages may be displayed in the Clarius automation framework and description section helps you understand the error messages and the possible solution.

Table 17: Clarius error messages

| Error message | Description |
|--|---|
| Invalid login credentials, Username or Password cannot be blank | Please enter username and password. |
| Error, Unrecognized client. Please contact Tektronix support | Configuration error. Please contact Tektronix field engineer for support. |
| Error, Error connecting to the system. Please contact tek support. | Configuration/Connection error. Access Admin console and check if all services are running. Start the services which are not running and check again. If the issue stills exist, please contact Tektronix field engineer for support. |
| Error, New user creation failed; Username already exists | Username already exists. Please enter a unique username. |
| Error, Please select a test bench to configure the sources and signals | Select a test bench to configure the sources and signals. |

Table continued...

| Error message | Description |
|---|--|
| Error, Please select the instruments and channels for all the defined signals and then click Apply | Validation Error - Select instruments and channels for all defined signals before you select Apply. |
| Invalid Grouping, 'Duplicate instrument channels configured in ' <channels> | Channels in a group are used to signals in a single acquisition hence multiple occurrence of a channel in a single group is not allowed. |
| Cannot add new signal, Please select the instruments and channels for all the defined signals before adding new signal. | Please select the instruments and channels for all the defined signals before adding new signal. |
| Unable to find internal application for technology | Multi-lane grouping is not supported in this technology or the technology is deleted. |
| Locking application failed, Execution id <execution id> | Indicates an error occurred while locking the application, license is already used, try after the completion of the test using license. |
| Duplicate test name, name <test name> | Test name already exists. Please enter a unique test name. |
| Test Bench not available, <test bench id> | Test bench is not available or deleted. Please select an available test bench. |
| Error, Limits ID already exist | Limits ID already exists. Please enter a unique Limits ID. |
| Error, Rule catalog already exists | Rule catalog name already exists. Please enter a unique Rule catalog name. |
| Your account is currently locked. Please login after <remaining> of minute(s) or contact the system administrator. | Account is locked due to 5 incorrect login attempts. Please wait for five minutes and then try again. |
| Account locks after <remaining> login attempts | Account is locked due to 5 incorrect login attempts. Please wait for five minutes and then try again. |
| Cannot update instrument | An address is mandatory to proceed with the instrument update. |
| Error in test-bench instrument connection | The instrument service is not running. Please start or restart the instrument service. |
| Source Validation Error | Unable to combine applications. The selected applications have conflicting default sources and cannot be combined. |

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