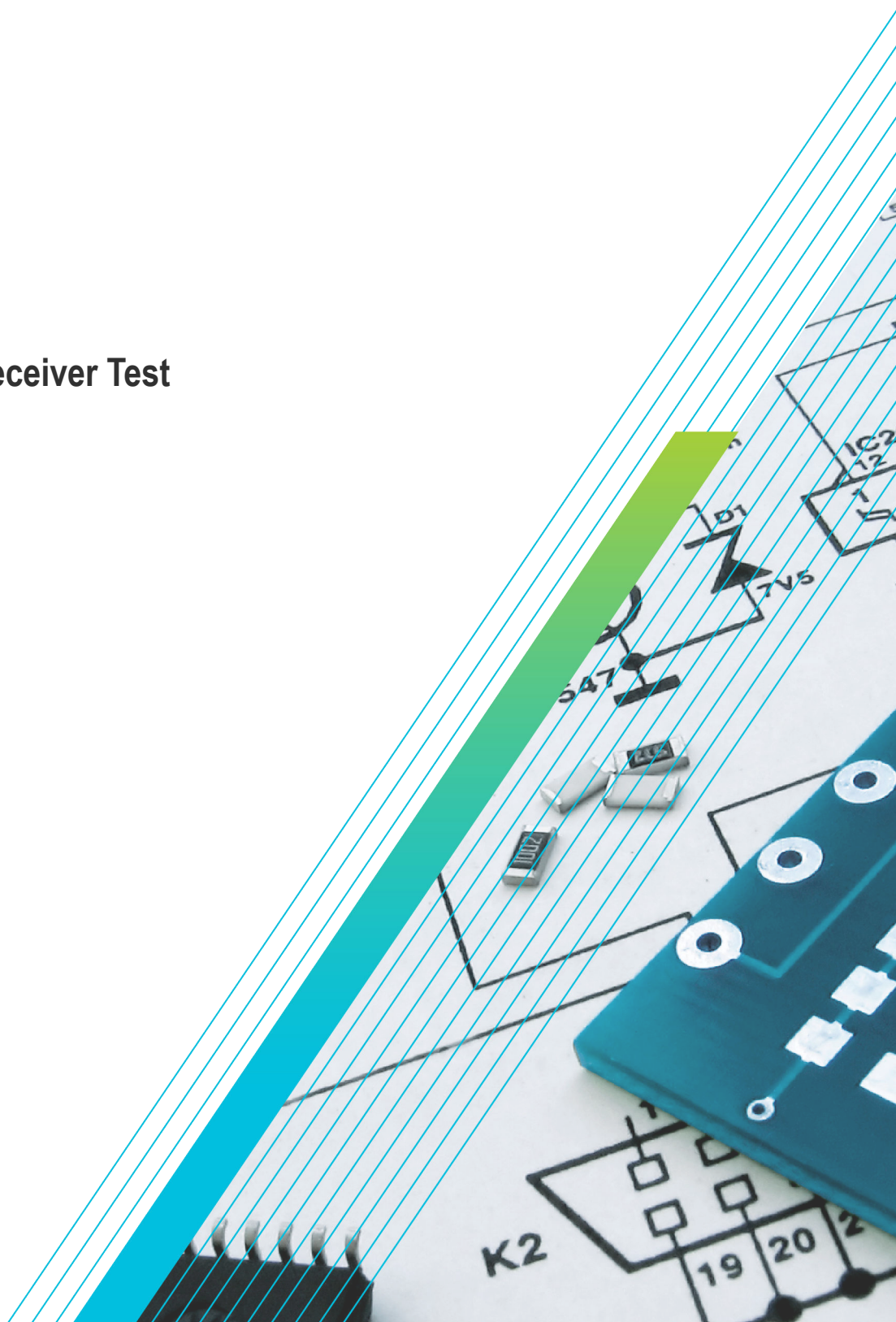




## PCIe5.0 (Base) Receiver Test Application Help



077-1620-02







## **PCIe5.0 (Base) Receiver Test Application Help**

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- Worldwide, visit to [www.tek.com](http://www.tek.com) find contacts in your area.

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# Welcome

Welcome to the PCIe5.0 (Base) TekRxTest application. This application performs the test as per the Gen 5 Base specification Revision 5.0 Version 1.0.

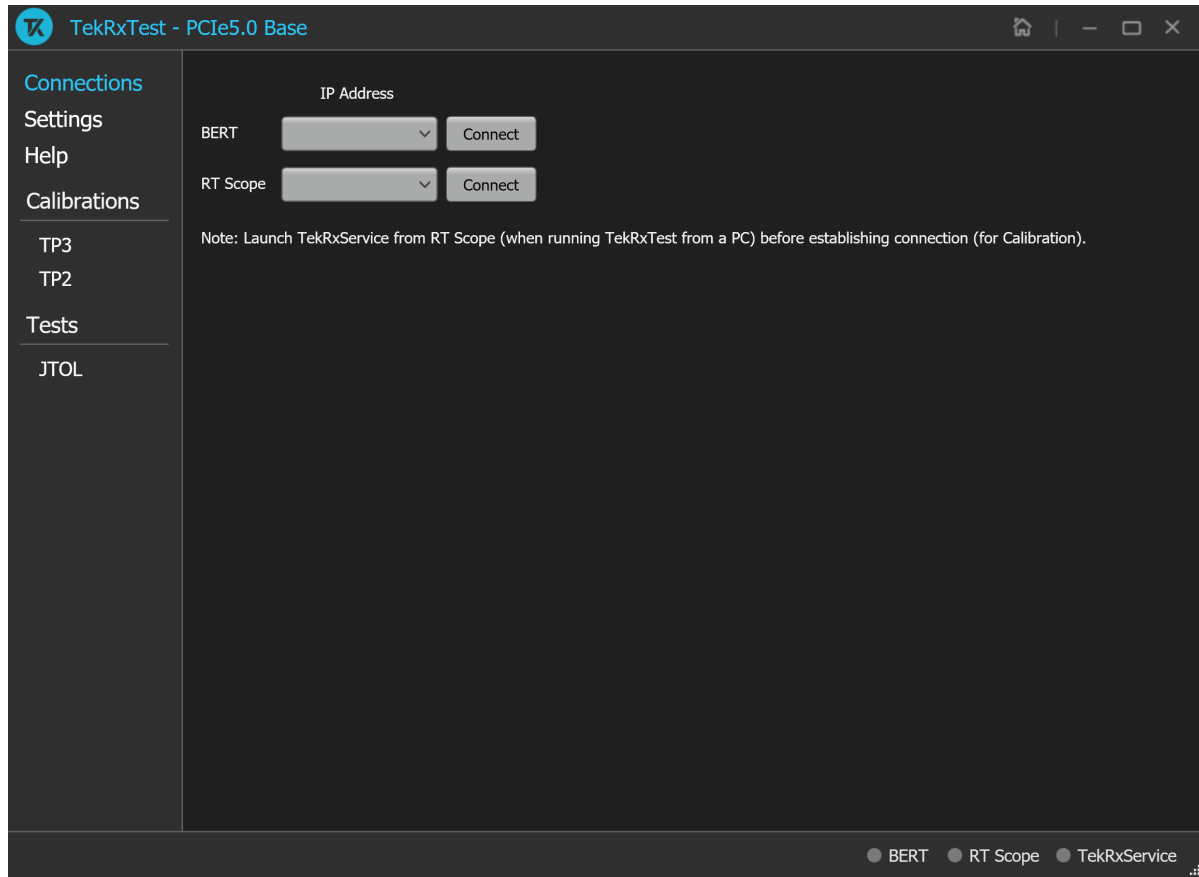


Figure 1: TekRxTest - PCIe5.0 Base application

Receiver testing is accomplished by connecting the output of BERT PPG (which can produce specific PCIe test patterns) to the input of the DUT through a specialized set of fixtures and cables. The BERT can be programmed to add different amounts of random jitter, sinusoidal jitter, differential, Common mode interference along with variable signal amplitude, preshoot, and de-emphasis. Output of the DUT is connected to the BERT error detector to identify bit errors on the DUT Tx traffic, either during loopback or during sweep of one of the stress parameters. Any error detected can be assumed to be generated from the DUT Tx path as a result of either the DUT experiencing a bad bit-decision at its receiver or uncompensated back channel loss at the error detector of the BERT.

## Key features and benefits

- PCIe Gen5 Receiver JTOL Testing as per Base specification for Non-Root complex / Root Complex devices.
- Automated calibration, forced loopback initiation, and testing.
- Jointly with Anritsu BERT MP1900A series, the receiver solution provides the tools and flexibility needed to visualize and control impairments, observe real-time eye performance, etc. for PCIe Gen5 devices.
- Reliable and accurate results reduce the test execution time and minimize the skill-set required to perform calibration and testing.

# Getting help and support

## Related documentation

The following documentation is available as part of the **PCIe5.0 (Base)** test application.

**Table 1: Product documentation**

Item	Purpose	Location
Application Help	Application operation and User Interface details	Help panel of the application

## See also

[Technical support](#) on page 15

## 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 Real Time Oscilloscope. Contact Tektronix through mail, telephone, or the Web site. See [Contacting Tektronix](#) on page 0 at the front of this document for contact 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, and FAX number
- Please indicate if you would like to be contacted by Tektronix about your suggestion or comments.

### Application specific information

- Software version number
- Description of the problem such that technical support can duplicate the problem
- If possible, save the setup files for all the instruments used and the application

# Getting started

## Required equipment and accessories

Item	Vendor	Type	R/O	Qty	Description	Notes
DPS75004SX	Tektronix	Equipment	Required	1	Dual-Stack 50 GHz Sx oscilloscope	50 GHz or better
DPO7RFBK2	Tektronix	Tek accessory	Required	2	Attenuator kit	Attenuator kit + DC blocks
103047400	Tektronix	Tek accessory	Required	2	Connector savers (1.85 mm)	1.85 mm oscilloscope channel input connection
Anritsu MP1900A <sup>1</sup>	Anritsu	3 <sup>rd</sup> party equipment	Required	1	Bit Error Rate Tester (BERT)	Configuration provided by 3 <sup>rd</sup> party
DJA	Tektronix	Equipment SW option	Required	1	DPOJET advanced option	DPOJET advanced Jitter, Eye and Timing Analysis SW option
SDLA64	Tektronix	Equipment SW option	Required	1	Serial Data Link Analysis (SDLA) Software	Embedding/De-embedding/s-parameter filter generation/ Receiver Virtualization and Analysis Software
174-6659-01	Tektronix	Tek accessory	Required	1	Cable pair; SMA - SMP	Refclk connection between DUT & BERT
PMCABLE1M	Swiftbridge	Tek accessory	Required	2	Cable pair; 2.92-to-2.92 mm, Straight, 1.5 ps phase-matched, 40 GHz	Equipment connections to replica channel & DUT
Gen5 Base Test Fixture Set	PCI-SIG	Test fixtures	Required	1	Gen 5 Base Rev3 Test Fixtures <sup>2</sup>	Rev3 is Meg6 material with MMPX connectors <sup>3</sup>
RXSW-NLP-PCIE5	Tektronix	SW option	Required	1	PCIe Gen5 Receiver Software	Gen5 BASE and CEM Rx test software - Node-Locked, Perpetual
RXSW-NL1-PCIE5						Gen5 BASE and CEM Rx test software - Node Locked, Time Based, 1 year
RXSW-FLP-PCIE5						Gen5 BASE and CEM Rx test software - Floating, Perpetual
RXSW-FL1-PCIE5						Gen5 BASE and CEM Rx test software - Floating, Time Based, 1 year

## Installing the software

Complete the following steps to download and install the latest PCIe5.0 (Base) TekRx test application.

1. Go to [www.tek.com](http://www.tek.com).

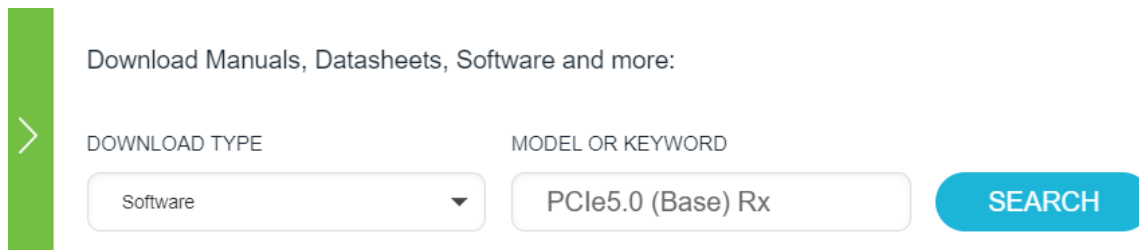
<sup>1</sup> Gen5 BaseTest Fixtures are not backwards compatible for Gen3 & Gen4 Base Rx

<sup>2</sup> Gen5 BaseTest Fixtures are not backwards compatible for Gen3 & Gen4 Base Rx

<sup>3</sup> It is assumed MMPX cables and MMPX to SMA adaptor cables for test fixture connections are included with the fixture kit



2. Click **Downloads**. In the Download menu, select DOWNLOAD TYPE as Software and enter **PCIe5.0 (Base)** in the MODEL OR KEYWORD field and click **SEARCH**.



3. Select the latest version of the software and follow the instructions to download.
4. Copy the executable file into the instrument you wish to install the software (Real-time oscilloscope or PC).
5. Follow the installation instruction that is available in the website. The software is installed at C:\Program Files\Tektronix\BERTScope\RxTest60
6. Double click the shortcut icon on the desktop to launch the application.

**Note:**

- The PCIe5.0 (Base) TekRx test application can be installed on a Tektronix real-time oscilloscope or a PC (optional).
- You must install the TekRxService and SigTest application in the real-time oscilloscope to successfully connect the application with the real-time oscilloscope.

## Operating basics


### Launch the application

To launch the PCIe5.0 (Base) test application, double click the shortcut icon **TekRxTest** on the desktop and select **PCIe5.0 (Base)** in the application window.



Figure 2: TekRxTest application window

### Close the application

To exit the application, click  on the application title bar. Follow on-screen instructions to save the unsaved session or test setup.



**Note:** Using other methods to exit the application may result in abnormal termination of the application.

### Launch Real-Time Oscilloscope

The TekVISA Socket Server application on the oscilloscope provides the necessary connectivity between the TekRxTest application and scope. Although it is launched in the background when the scope boots up and the socket is initialized for communication, it is recommended to verify the status by clicking on the Desktop Tray → TekVISA LAN Server Control as shown in the image below. If it is ready to exchange data, then a wizard would appear as in the below image.

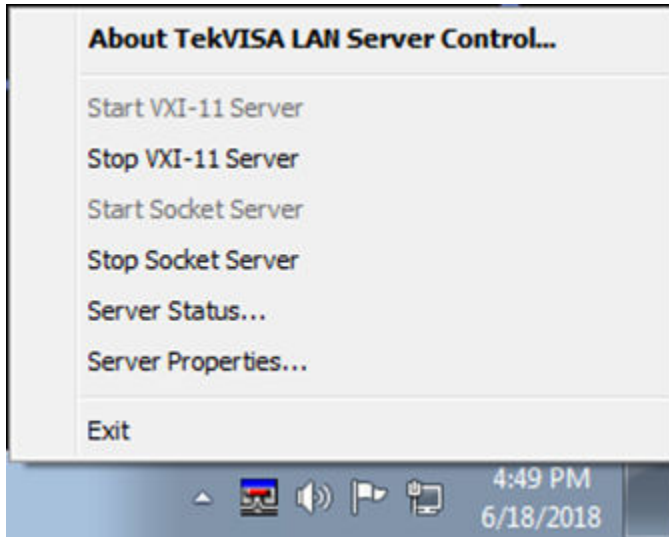


Figure 3: Launch Real-Time Oscilloscope



**Note:** In the unlikely event when the socket is not initialized, the process can be started by clicking on “Start Socket Server” which gets enabled during such a scenario.

## Launch TekRxService

The PCIe5.0 (Base) TekRxTest application interfaces with the oscilloscope for data acquisition, analysis and data retrieval utilizing TekRxService application. This software module should be launched at the time of initiating the TekRxTest application.

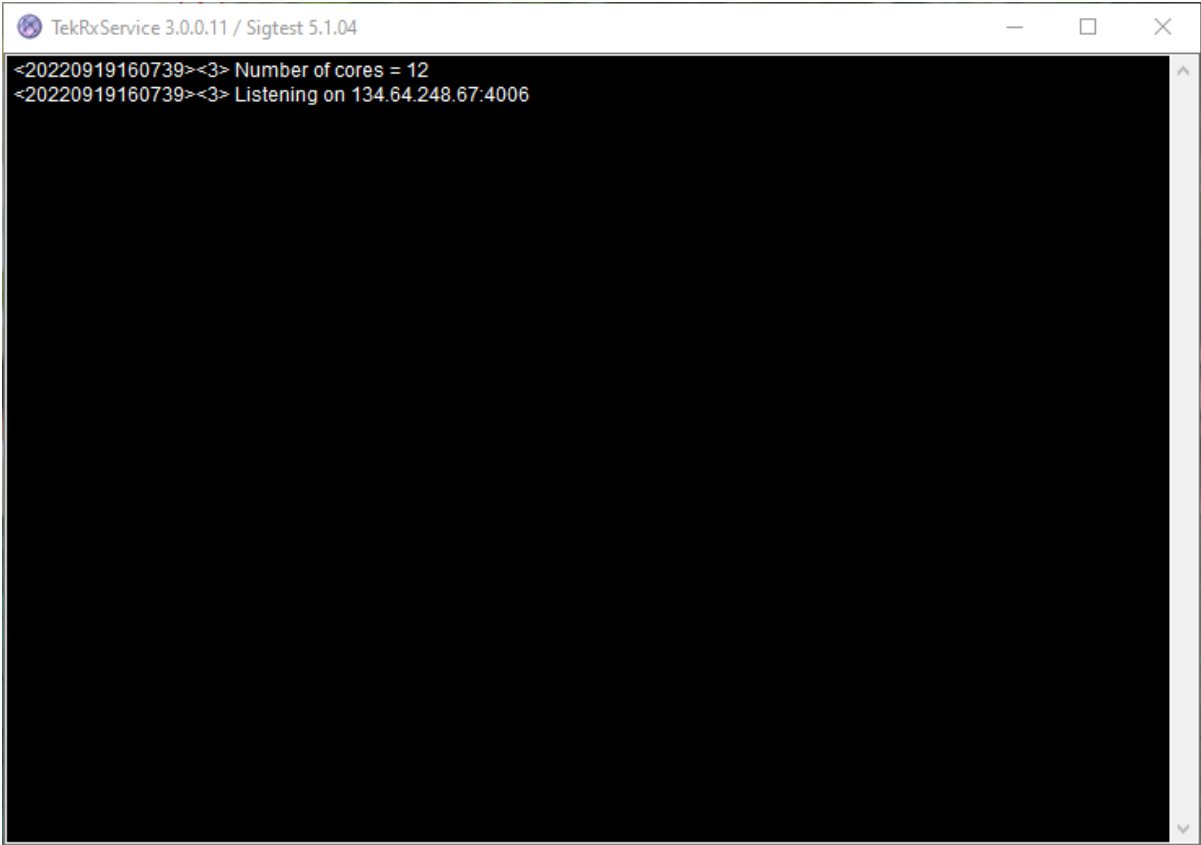



Figure 4: TekRxService application window

 **Note:** TekRxService has to be launched if the application is being run on an external PC. To launch the application, double click the TekRxService batch file shortcut icon in the desktop of the real-time oscilloscope.

## Application panels

### Application panels overview

The PCIe5.0 (Base) TekRxTest application uses panels to group the configurations and settings. Click on any panel to configure the associated settings. A panel may have one or more tabs that lists the selections available in that panel. Controls in a tab may change depending on the settings made in the same tab or another tab.

Table 2: Application panels overview

Parameter	Description
Connections	This panel displays the real-time oscilloscope and BERT connection settings. You can connect to a real-time oscilloscope and BERT by entering the IP address of the instruments.
Settings	This panel allows configuring various settings for the Components, TP3 and TP2 Calibration.
Help	This panel displays the application help.

Table continued...

Parameter	Description
Calibrations	This panel allows you to configure the calibration parameters for TP3/TP2 and save the results.
Tests	This panel allows you to configure the JTOL test settings and view the results.

## Connections panel

The connections panel allows you to connect to a real-time oscilloscope and BERT with the PCIe5.0 (Base) TekRxTest application. Enter the IP address of the instruments and click **Connect** to establish the connection.

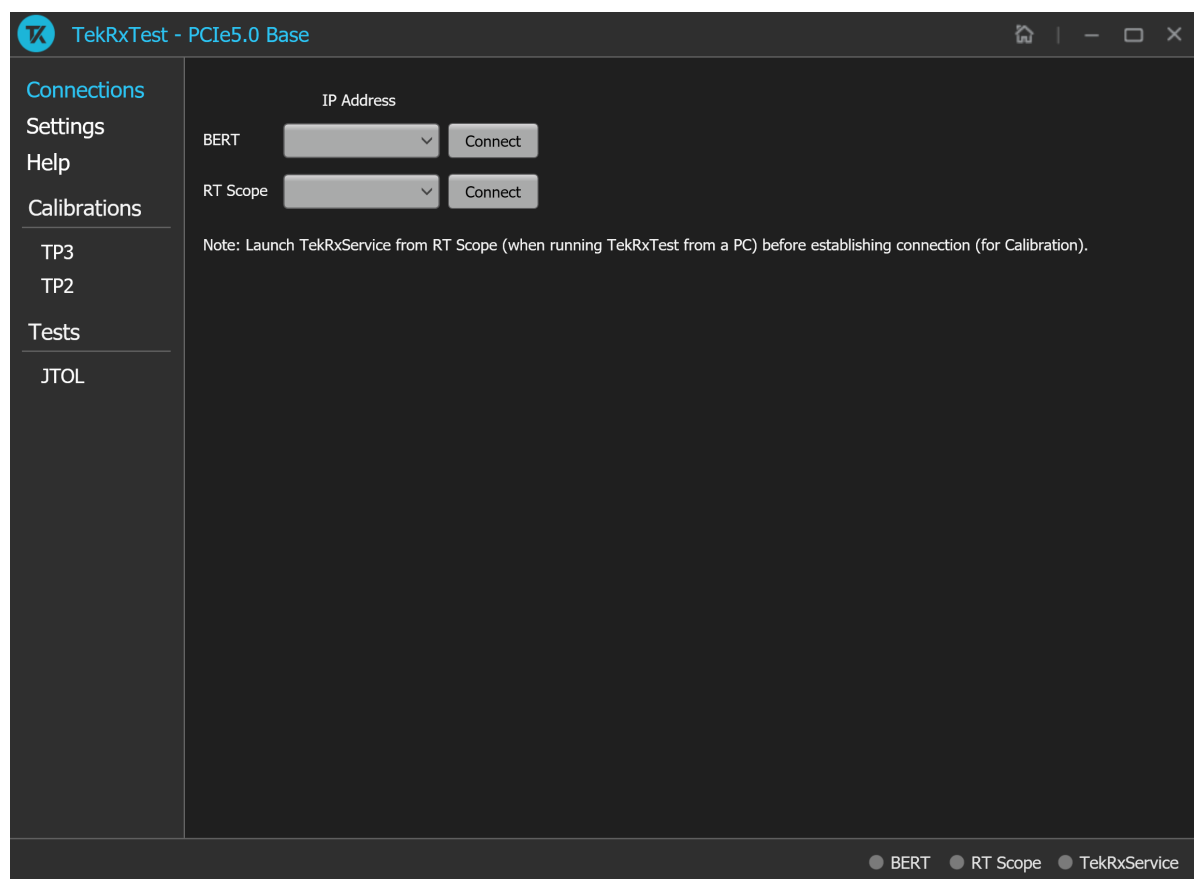



Figure 5: Connections panel

Table 3: Connections panel

Connections	Description
BERT	Enter the BERT IP address in the address field and click <b>Connect</b> . When the BERT is connected successfully, the circle next to <b>BERT</b> in the right end corner turns green.
RT Scope	<p>Enter the RT Scope IP address in the address field and click <b>Connect</b>. When the RT Scope is connected successfully, the circle next to <b>RT Scope</b> and TekRxService in the right end corner turns green.</p> <p> <b>Note:</b> Before you click Connect, if the TekRxTest application is running on an external PC, make sure to launch the TekRxService in the real-time oscilloscope.</p>

# Settings panel

This panel allows you to configure the settings for instruments, calibrations, and remote access. Click any tab to configure the associated settings.

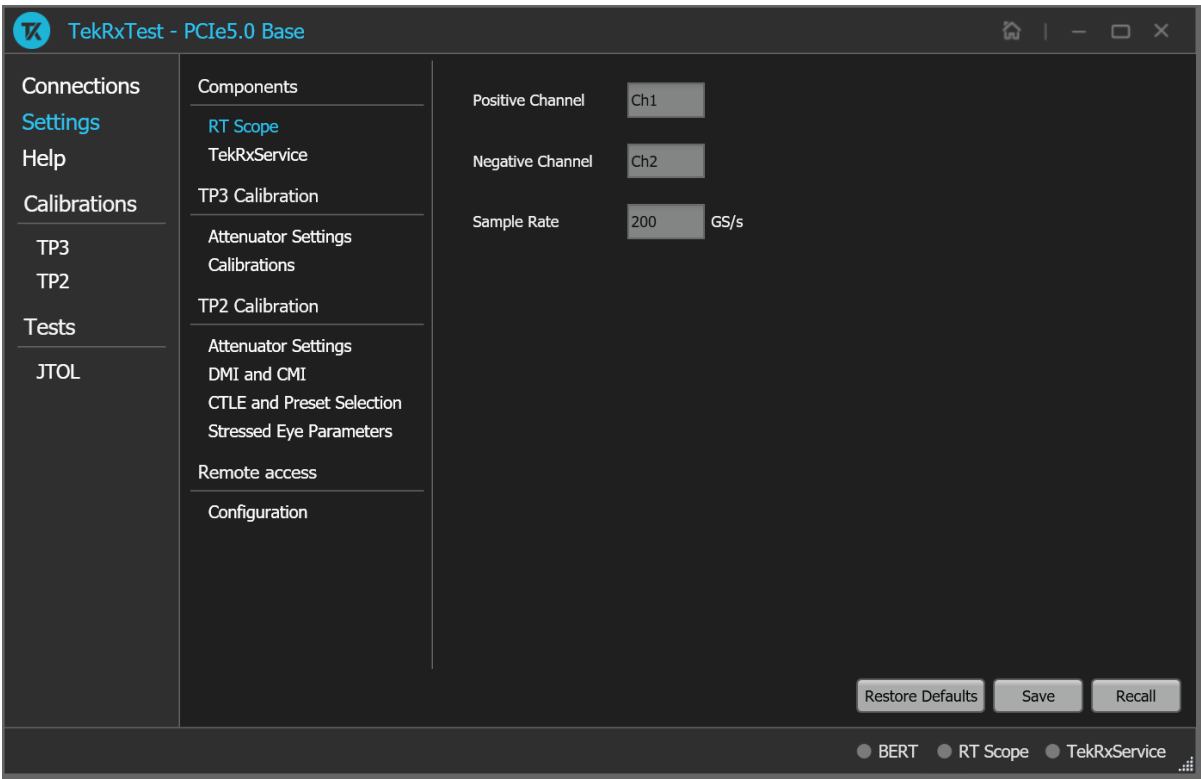


Figure 6: Settings panel

Table 4: Settings panel configurations

Item	Description
Restore Defaults	Restores the application with default settings.
Save	Saves the current test setup.
Recall	Recalls the saved test setup.

## Components settings

The components settings display the parameters for RT Scope and TekRxService.

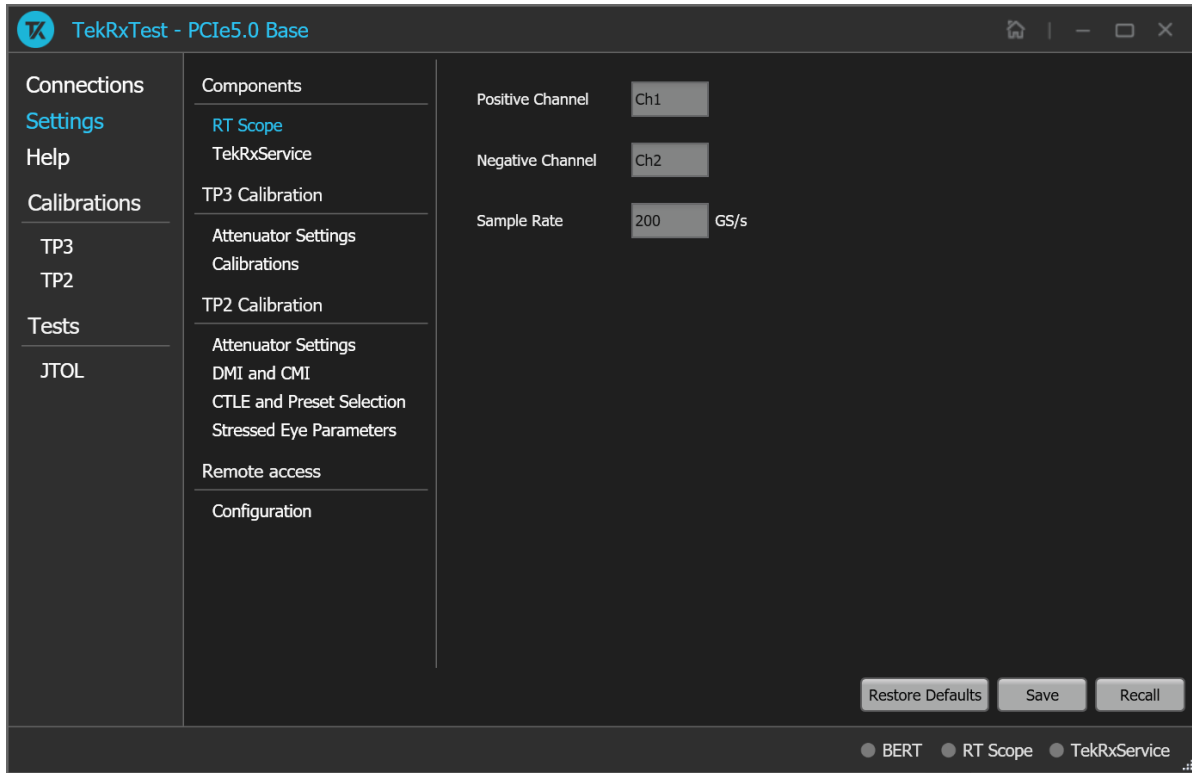


Figure 7: Components: RT Scope

Table 5: Components: RT Scope

Parameter	Description
Positive Channel	Select the generator data positive channel from BERT.
Negative Channel	Select the generator data negative channel from BERT.
Sample Rate	Displays the RT Scope sample rate in GS/s.

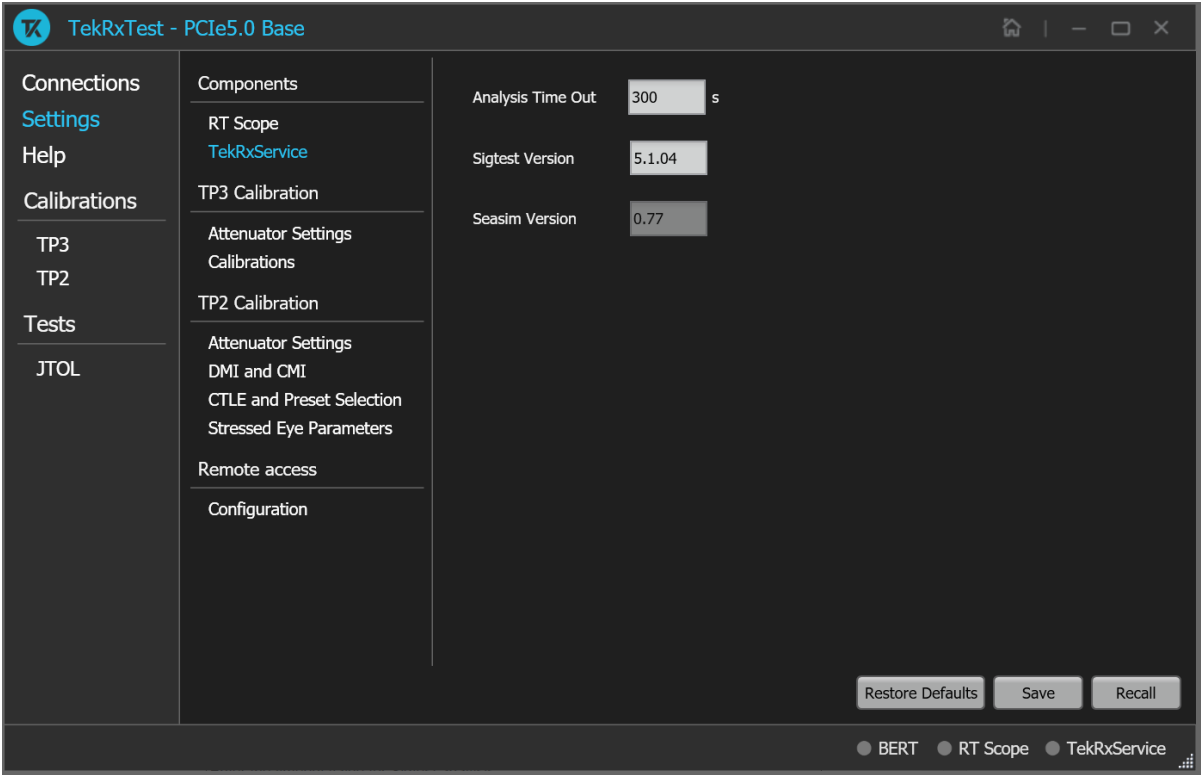


Figure 8: Components: TekRxService

Table 6: Components: TekRxService

Parameter	Description
Analysis Time Out	Enter the timeout value for Sigtest analysis.
Sigtest Version	Enter the Sigtest version.
Seasim Version	Displays the Seasim version.

TP3 Calibration

The TP3 calibration tab allows you to configure the channel settings including the attenuators and component de-embedding, multi-tone calibration, and insertion loss calculation.



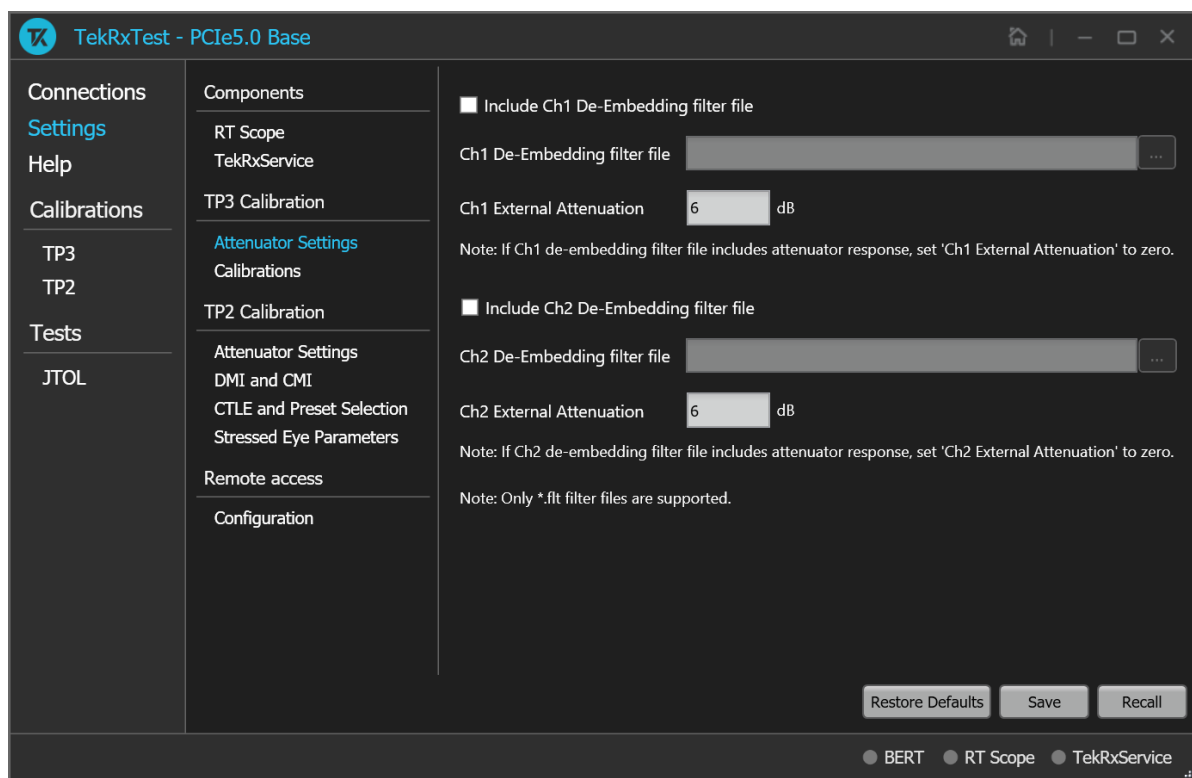


Figure 9: TP3 Calibration: Attenuator Settings

Table 7: TP3 Calibration: Attenuator Settings

Parameter	Description
Include Ch1 De-Embedding filter file	Enable to apply Ch1 de-embedding filter file.
Ch1 De-Embedding filter file	Click to browse and navigate to the path and select the required Ch1 de-embedding filter file.
Ch1 External Attenuation	Enter the Ch1 external attenuation value in dB.
Include Ch2 De-Embedding filter file	Enable to apply Ch2 de-embedding filter file.
Ch2 De-Embedding filter file	Click to browse and navigate to the path and select the required Ch2 de-embedding filter file.
Ch2 External Attenuation	Enter the Ch2 external attenuation value in dB.

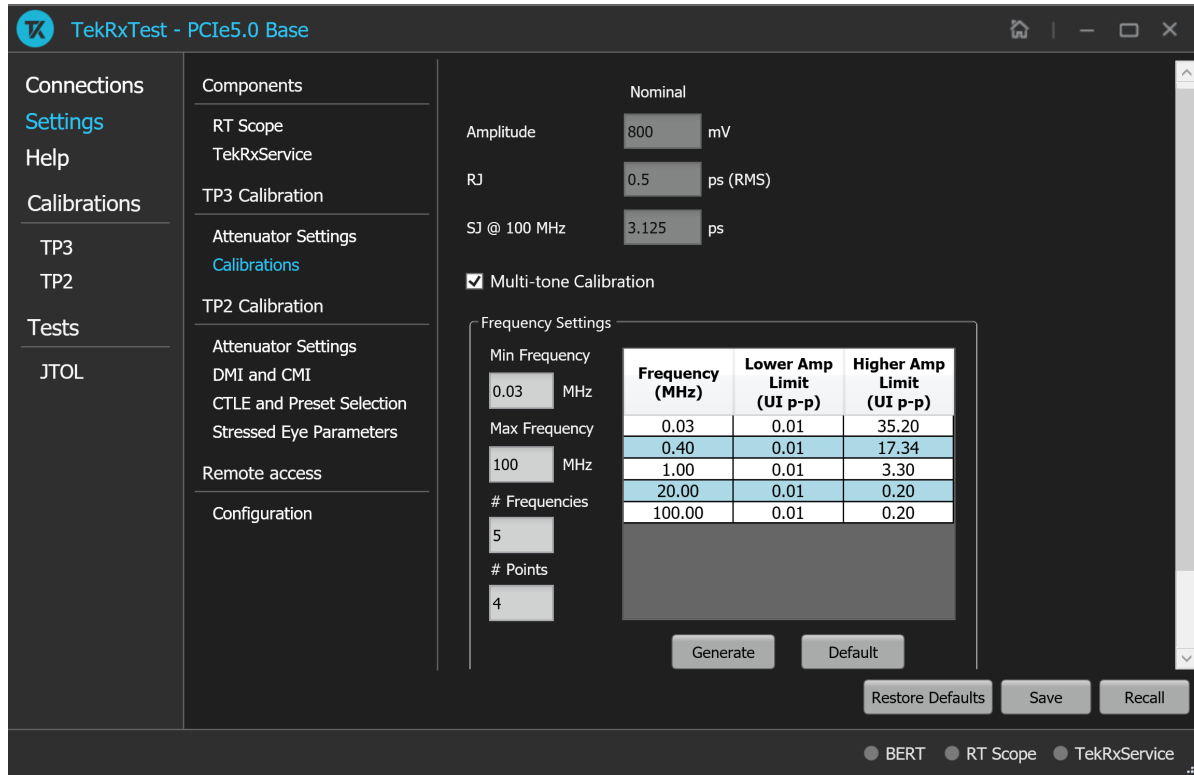


Figure 10: TP3 Calibration: Calibrations

Table 8: TP3 Calibration: Calibrations

Parameter	Description
Amplitude	Displays the calibration target for generator amplitude source.
RJ	Displays the calibration target for random jitter source.
SJ @ 100 MHz	Displays the calibration target for sinusoidal jitter source @ 100 MHz.
Multi-tone Calibration	Select to enable the multi-tone calibration. It displays the calibration settings for multiple tones.
Frequency Settings: Frequencies at which the SJ calibration needs to be performed for JTOL Test.	
Frequency (MHz)	Displays the table of frequencies in MHz for which Multi-tone calibration is to be performed.
Lower Amplitude Limit (UI p-p)	Displays the table of lower amplitude limit values at which SJ calibration starts for that frequency.
Higher Amplitude Limit (UI p-p)	Displays the table of higher amplitude limit values at which SJ calibration ends for that frequency.
Min Frequency	Enter the minimum frequency value.
Max Frequency	Enter the maximum frequency value.
# Frequencies	Enter the desired number of frequencies within the specified range.
# Points	Enter the desired number of points used for calibration.
Generate	Click to view the table populated with the frequencies.
Default	Click to view the table populated with default list of frequencies.

## TP2 Calibration

The TP2 calibration tab allows you to configure the Attenuator Settings, DMI and CMI calibration, CTLE and Preset Selection, and Stressed Eye Parameters.

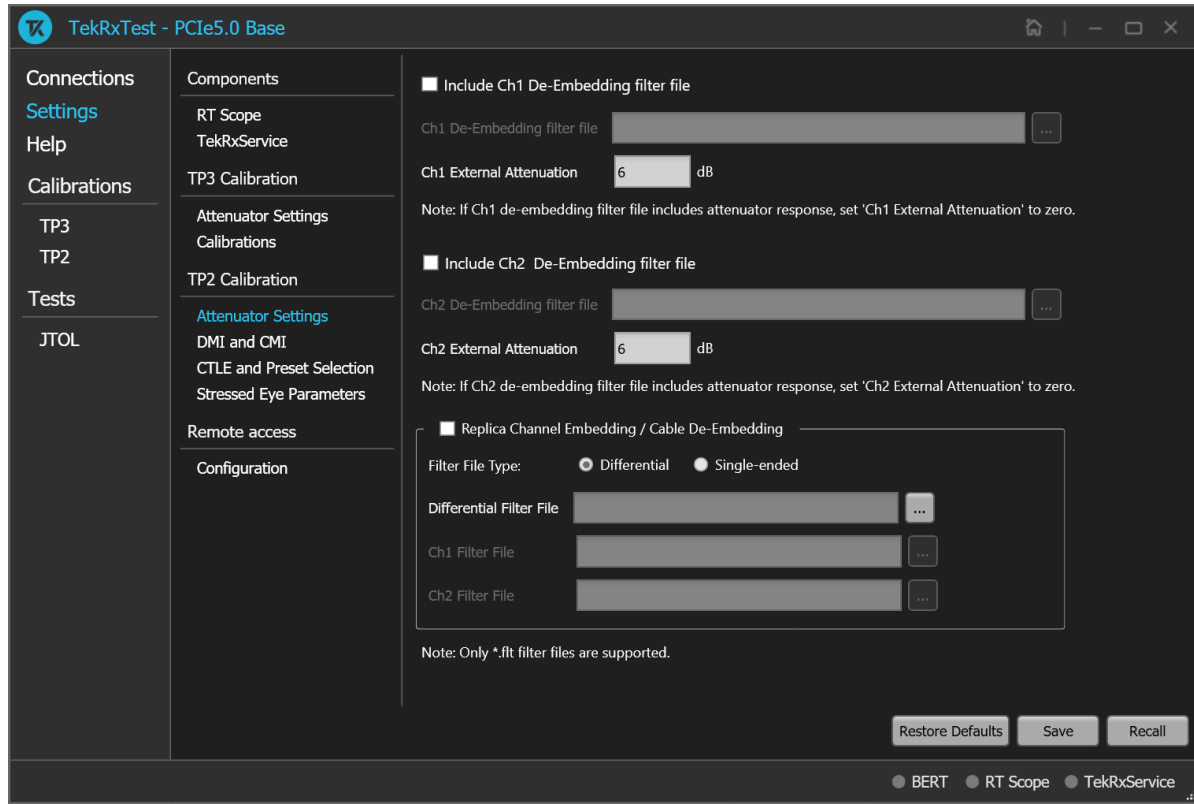


Figure 11: TP2 Calibration: Attenuator Settings

Table 9: TP2 Calibration: Attenuator Settings

Parameter	Description
Include Ch1 De-Embedding filter file	Enable to apply Ch1 de-embedding filter file.
Ch1 De-Embedding filter file	Click to browse and navigate to the path and select the required Ch1 de-embedding filter file.
Ch1 External Attenuation	Enter the Ch1 external attenuation value in dB.
Include Ch2 De-Embedding filter file	Enable to apply Ch2 de-embedding filter file.
Ch2 De-Embedding filter file	Click to browse and navigate to the path and select the required Ch2 de-embedding filter file.
Ch2 External Attenuation	Enter the Ch2 external attenuation value in dB.
Replica Channel Embedding / Cable De-Embedding	Select to enable the replica channel embedding or the cable de-embedding.
Filter File Type	Select the required filter type.
Differential Filter File	Browse and navigate to the path and select the required differential filter file. Enabled only when filter file type is selected as Differential.
Ch1 Filter File	Click to browse and navigate to the path and select the required Ch1 filter file. Enabled only when filter file type is selected as Single ended.

Table continued...

Parameter	Description
Ch2 Filter File	Click to browse and navigate to the path and select the required Ch2 filter file. Enabled only when filter file type is selected as Single ended.

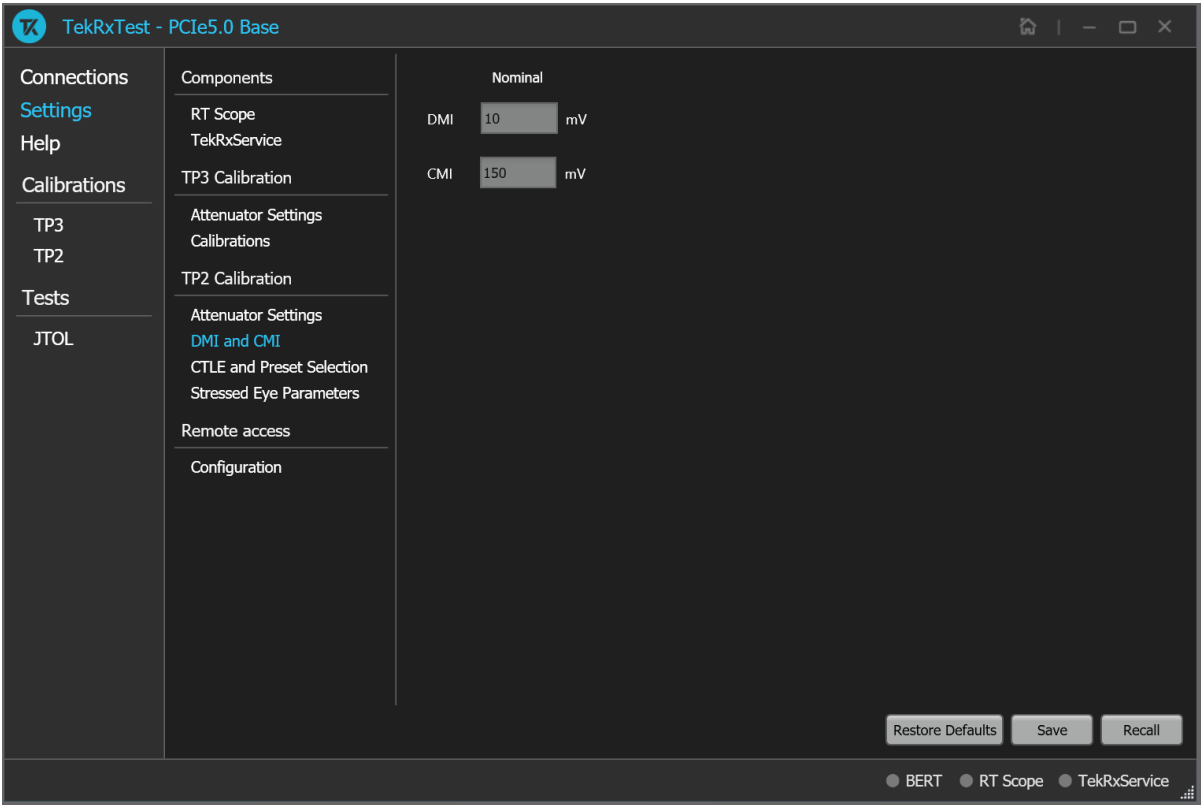


Figure 12: TP2 Calibration: DMI and CMI

Table 10: TP2 Calibration: DMI and CMI

Parameter	Description
DMI	Displays the nominal DMI value in mV.
CMI	Displays the nominal CMI value in mV.

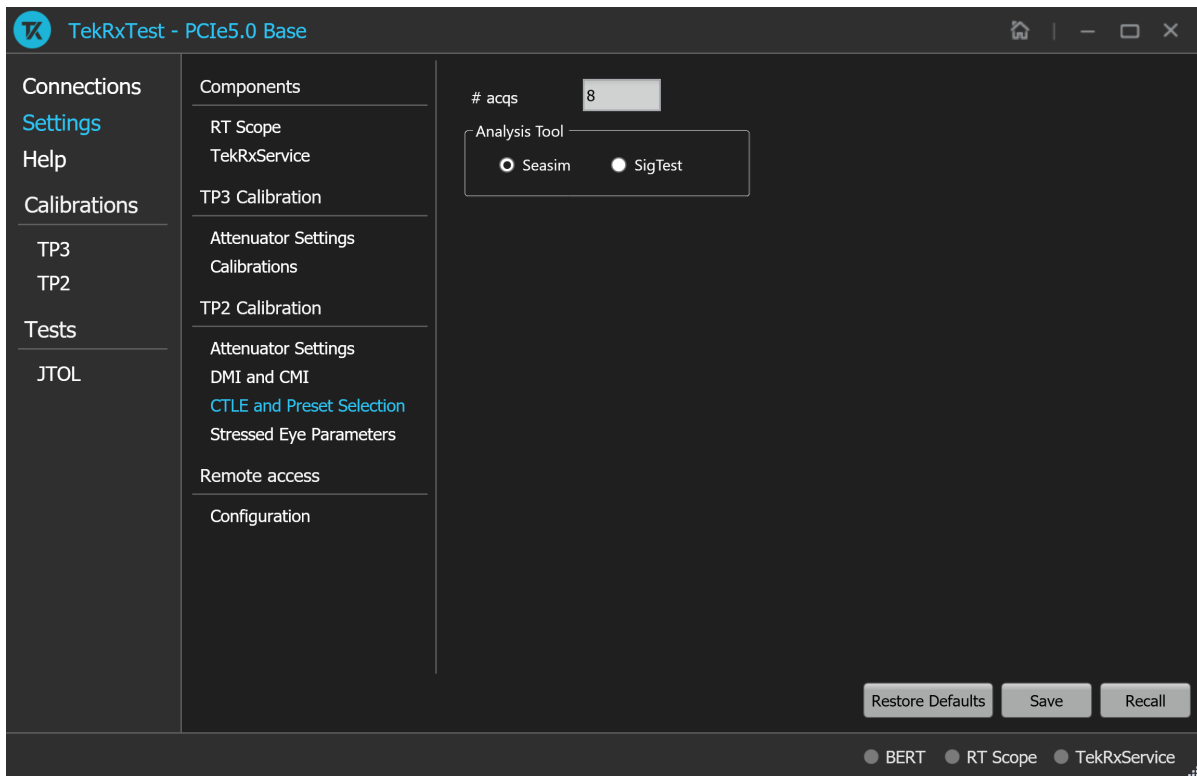


Figure 13: TP2 Calibration: CTLE and Preset Selection

Table 11: TP2 Calibration: CTLE and Preset Selection

Parameter	Description
# acqs	Enter the number of waveform acquisitions to be carried out for averaging during this measurement.
Analysis Tool	Select the required analysis tool. <ul style="list-style-type: none"> <li>Seasim</li> <li>Sigtest</li> </ul>

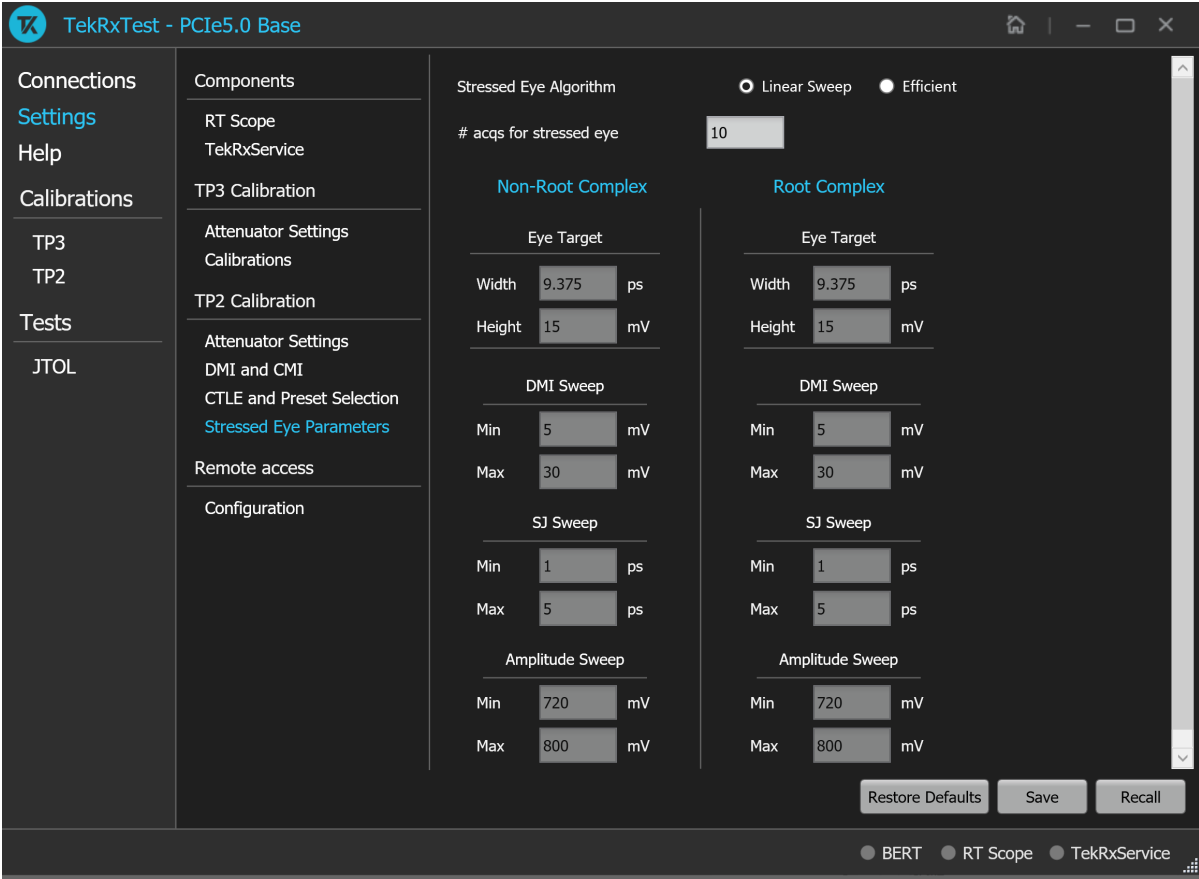


Figure 14: TP2 Calibration: Stressed Eye Parameters

Table 12: TP2 Calibration: Stressed Eye Parameters

Parameter	Description
Stressed Eye Algorithm	Select the required algorithm. <ul style="list-style-type: none"><li>Linear Sweep</li><li>Efficient</li></ul>
No. of acqs for stressed eye	Displays the number of acquisitions value for stressed eye.
<b>Eye Target</b>	
Width	Displays the target eye width value as per PCIe specification.
Height	Displays the target eye height value as per PCIe specification.
<b>DMI Sweep</b>	
Min	Displays the minimum value of DMI sweep during stressed eye calibration.
Max	Displays the maximum value of DMI sweep during stressed eye calibration.
<b>SJ Sweep</b>	
Min	Displays the minimum value of SJ sweep during stressed eye calibration.
Table continued...	

Parameter	Description
Max	Displays the maximum value of SJ sweep during stressed eye calibration.
<b>Amplitude Sweep</b>	
Min	Displays the minimum value of amplitude sweep during stressed eye calibration.
Max	Displays the maximum value of amplitude sweep during stressed eye calibration.

## Remote access: Configuration

The remote access tab allows you to configure the remote setting parameters to access the equipment remotely.

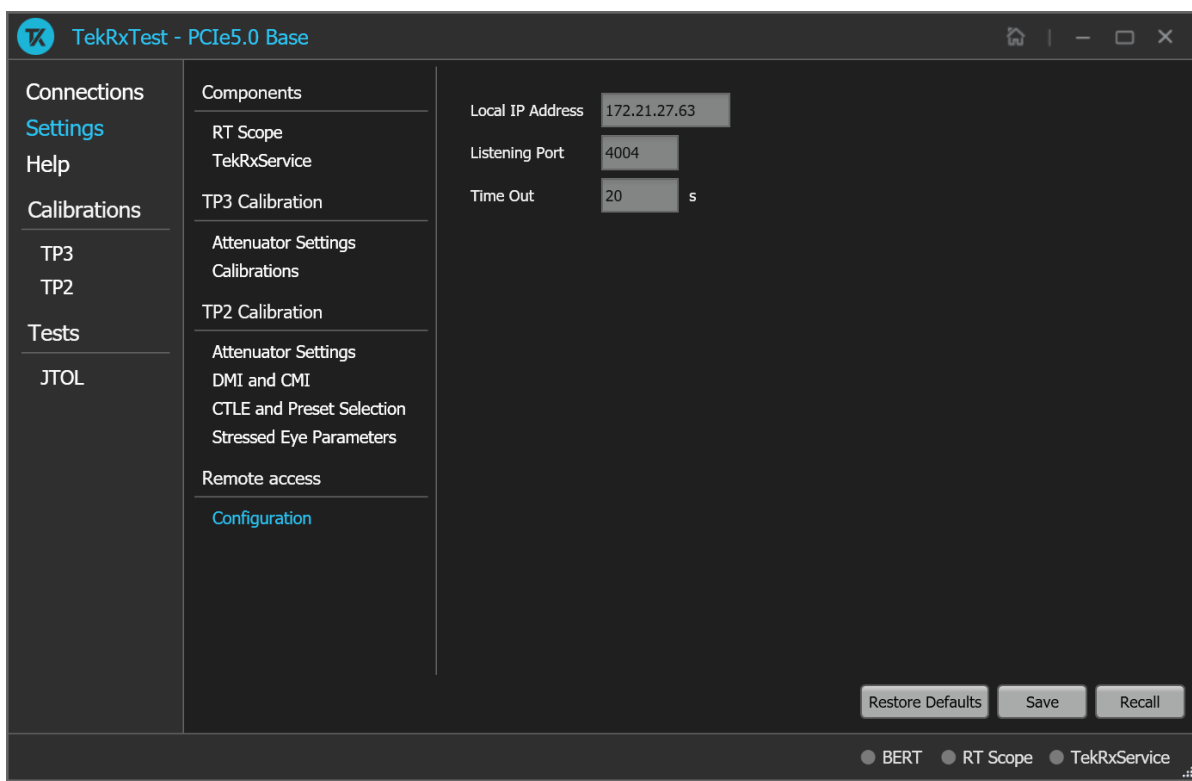


Figure 15: Remote access: Configuration

Table 13: Remote access: Configuration

Parameter	Description
Local IP Address	Displays the IP address for connecting to the application over socket server.
Listening Port	Displays the TCP/IP port number of the port that the socket server is listening. <b>Default Value: 4004</b>
Time Out	Displays the timeout value used when communicating with the socket server. <b>Default Value: 20 Seconds</b>

## Help panel

The help panel launches the PCIe5.0 (Base) TekRxTest application help document.

## Calibrations panel

Complete TP3 and TP2 calibrations before you start the DUT testing using the PCIe5.0 (Base) test application. Follow the instructions in the calibration wizards to automate the calibration for the test points. After calibrating the test points, you can save the results.

### TP3 Calibration

The TP3 calibration panel allows you to perform calibration for TP3 and save the results. You can perform calibration for Signal Amplitude, Preset, Random Jitter (RJ), Sinusoidal Jitter (SJ), SJ@210 MHz, and Multi-tone. Additionally, there is a provision to perform AC-DC Balancing, and Insertion Loss measurement for the TP3 channel.

The PCIe5.0 (Base) TekRxTest application calibrates the following at TP3:

1. Amplitude - The differential voltage swing is required to be within 720 - 800 mV. This is done only after the transition and non-transition bit levels are made equal using de-emphasis.
2. Tx Equalization Presets - The various levels of de-emphasis and preshoot are required to be calibrated within the tolerance as specified.
3. RJ - It is calibrated to be 0.5 ps (RMS value).
4. SJ - The SJ is calibrated over the desired range of 1-5 ps (pk-pk) including the nominal SJ specification of 0.1 UI ( or 3.125 at 100 MHz frequency).
5. SJ @ 210 MHz - If the stressed eye calibration requires sinusoidal jitter levels greater than 0.1 UI, then SJ@210 MHz is used during JTOL test.
6. Multi-tone - It is calibrated over a specific range for multiple user-defined frequencies.



## TP3 Calibration procedure



Figure 16: TP3 Calibration

Click **TP3** under the calibration tab to view the calibration results. Click  at the right end corner of the application to launch the TP3 calibration wizard. This wizard will guide you through the sequential procedure to perform the calibration.

1. **Connection Diagram:** This tab displays the connection diagram for TP3 calibration. The connection diagram is same for Non-Root Complex / Root Complex.

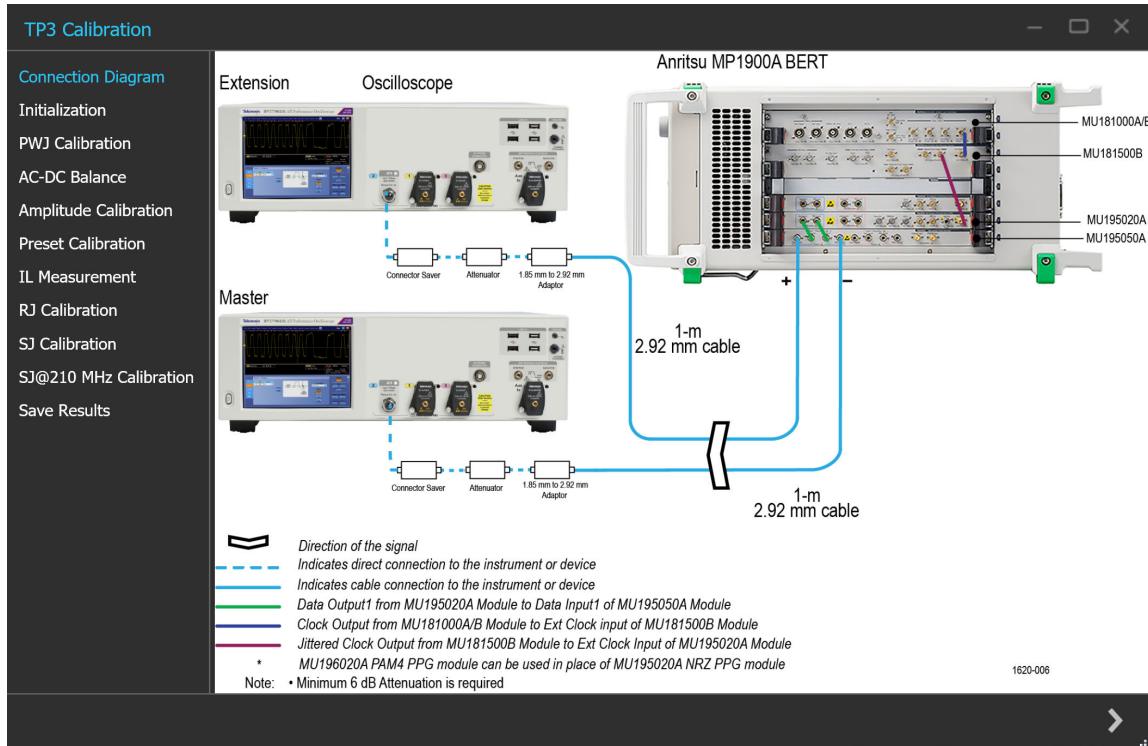



Figure 17: TP3 Calibration: Connection Diagram

Click  to move to the next screen.

- Initialization:** This tab displays the description and allows you to initialize the equipment. Click **Initialize Equipment** and complete the initialization process.

You can click **Automatic Calibration** to perform the automatic calibration with the default settings for amplitude, Tx Equalization Presets, RJ, and SJ parameters without user intervention.

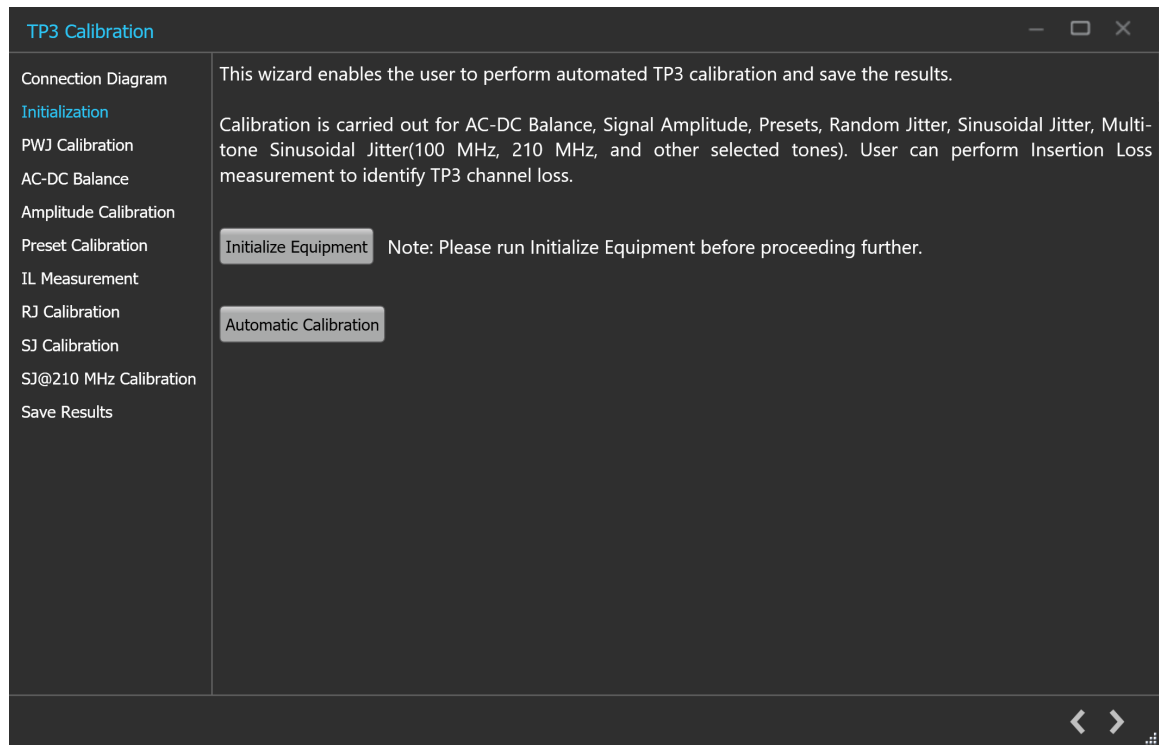



Figure 18: TP3 Calibration: Initialization

Click  to move to the next screen.

3. **PWJ Calibration:** This tab displays the description and allows you to perform PWJ Calibration.

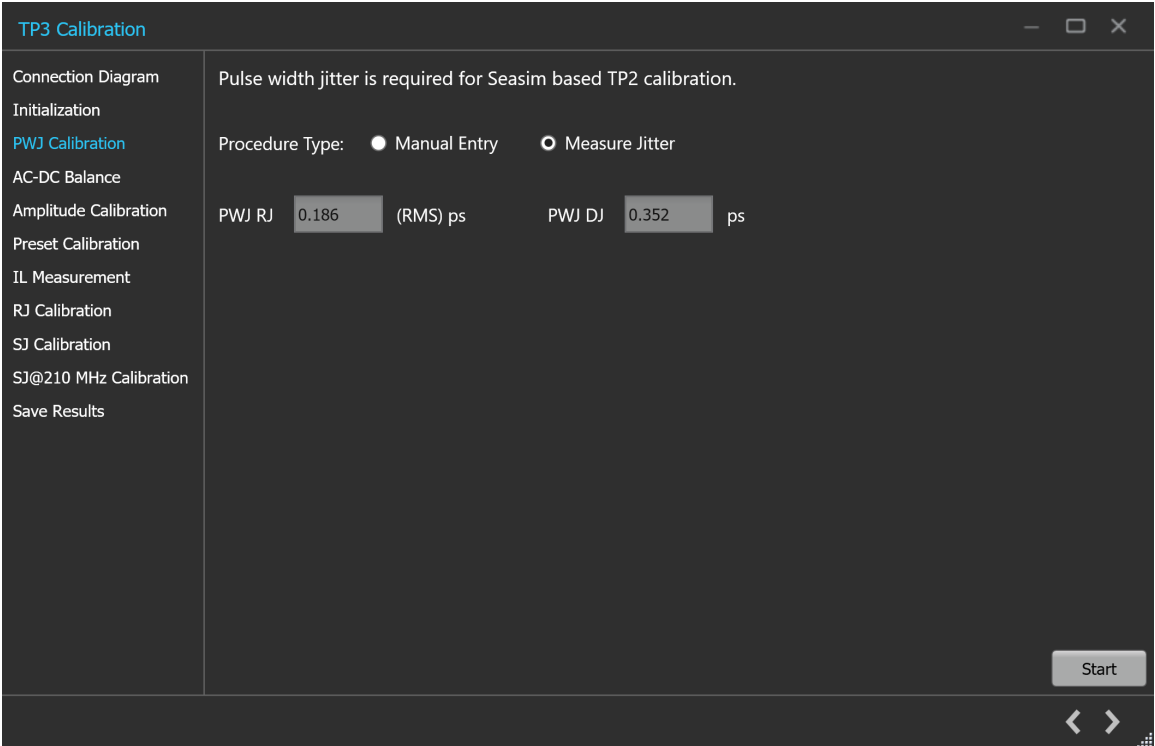



Figure 19: TP3 Calibration: PWJ Calibration

Table 14: TP3 Calibration: PWJ Calibration

Parameter	Discription
Procedure Type	Select the required procedure type. <ul style="list-style-type: none"><li>• Measure Jitter</li><li>• Manual entry</li></ul>
Manual Entry	Select the manual entry option and enter the calibration values in PWJ RJ value in (RMS) ps and PWJ DJ value in ps. Click on <b>Start</b> to start measurement.
Measure Jitter	Select the option and click on <b>Start</b> to initiate the measurement.
PWJ RJ / PWJ DJ	Displays the PWJ/RJ and PWJ/DJ values.
Start	Click on <b>Start</b> to start the measurement.

Click  to move to the next screen.

4. **AC-DC Balance:** This tab displays the graph plots of AC-DC balance.

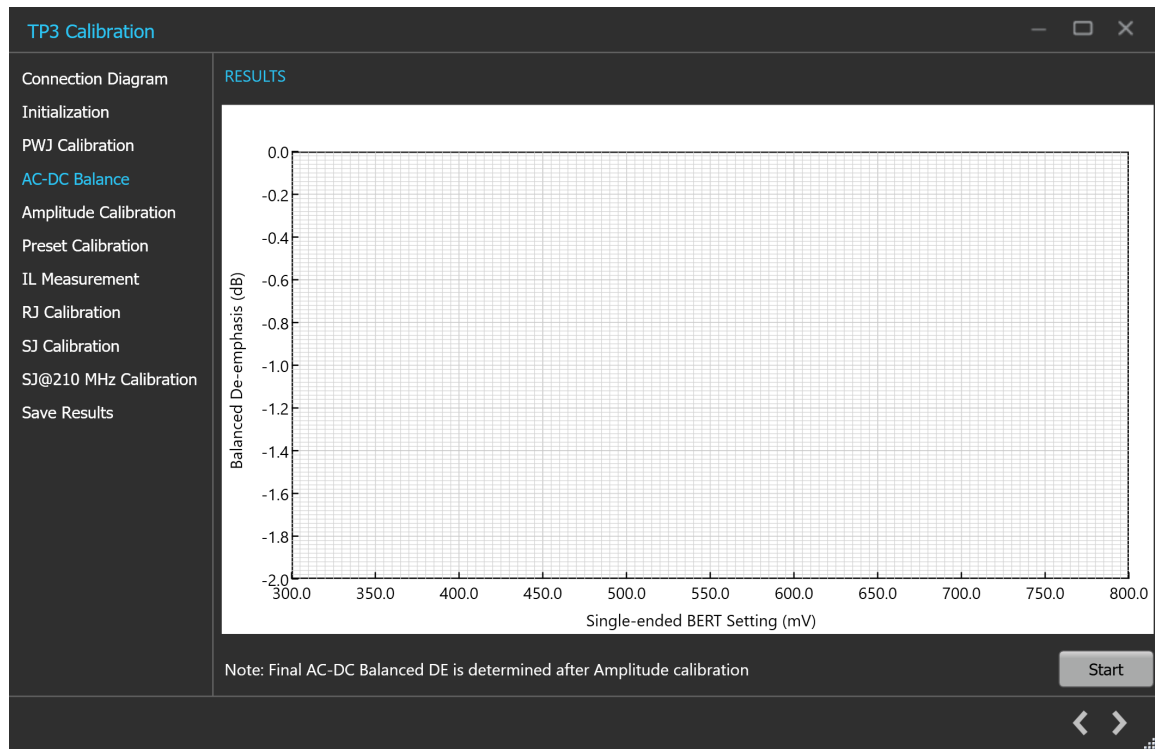



Figure 20: TP3 Calibration: AC-DC Balance

Table 15: TP3 Calibration: AC-DC Balance

Parameter	Description
Start	Click <b>Start</b> to run the measurements.

Click  to move to the next screen.

5. **Amplitude Calibration:** This tab displays the graph plots of amplitude calibration.

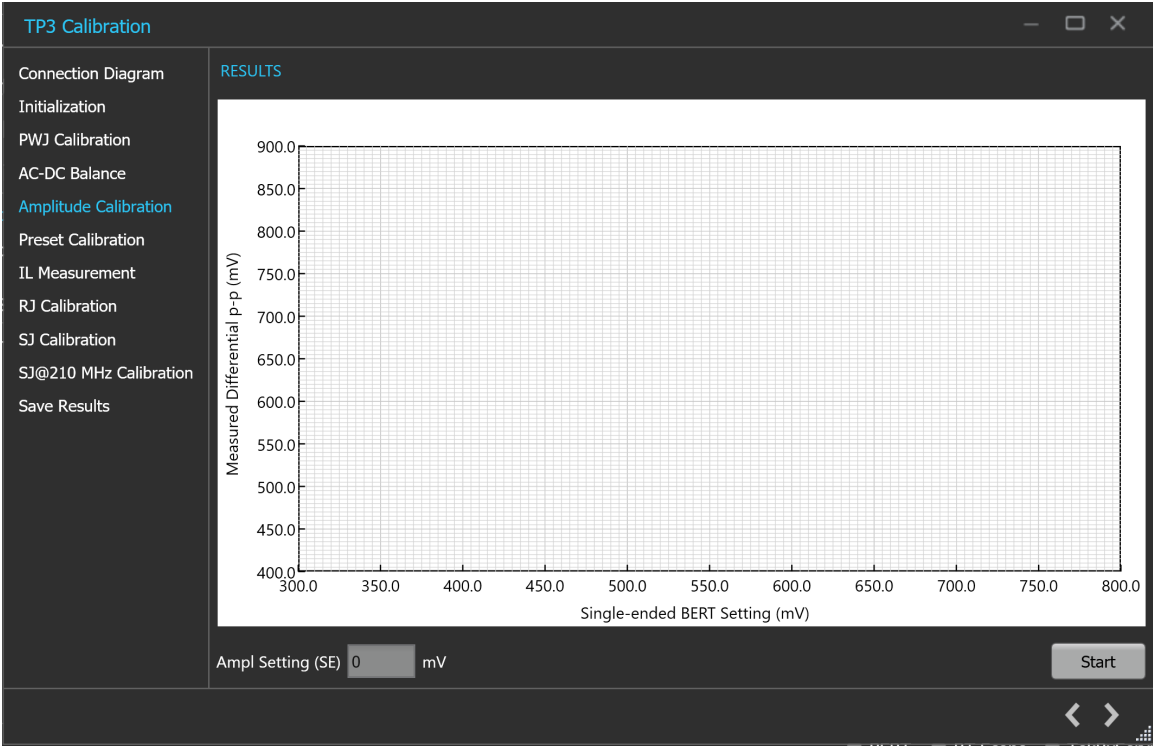



Figure 21: TP3 Calibration: Amplitude Calibration

Table 16: TP3 Calibration: Amplitude Calibration

Parameter	Description
Ampl Setting (SE)	Displays the single-ended calibrated amplitude value corresponding to 800 mV differential.
Start	Click <b>Start</b> to run the measurements.

Click  to move to the next screen.

6. **Preset Calibration:** This tab displays the graph plots of preset calibration.

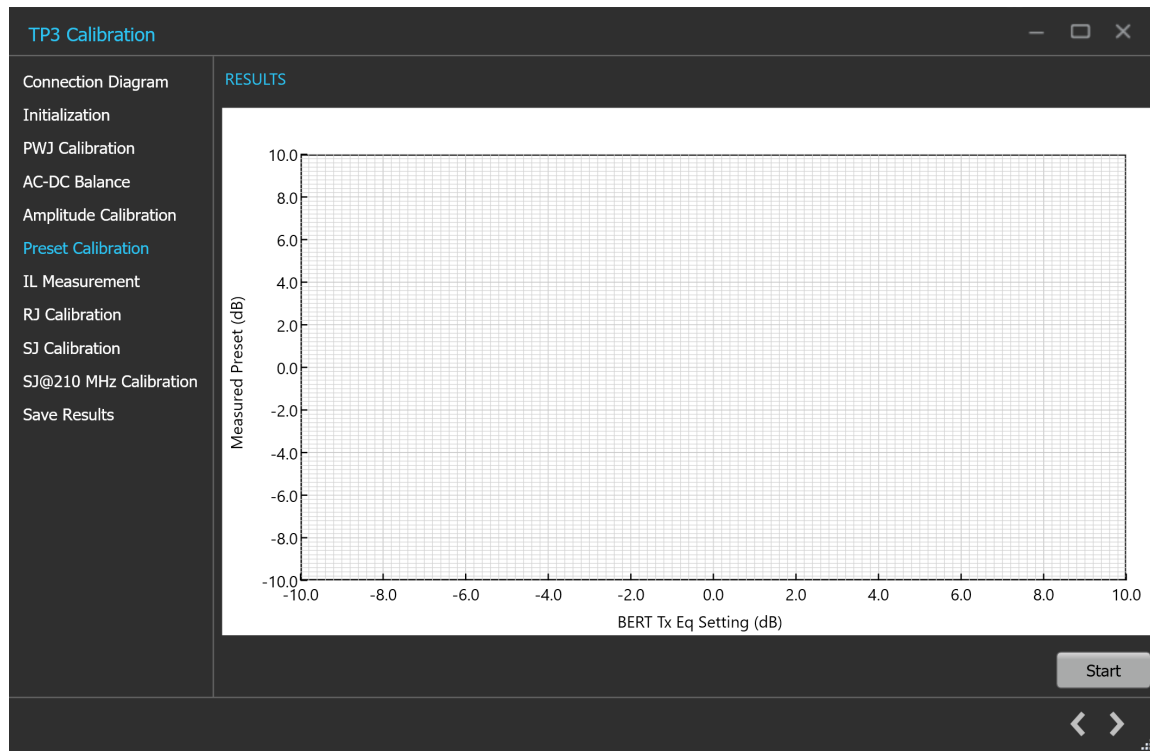



Figure 22: TP3 Calibration: Preset Calibration

Table 17: TP3 Calibration: Preset Calibration

Parameter	Description
Start	Click <b>Start</b> to run the measurements.

Click  to move to the next screen.

7. **IL Measurement:** This tab displays the description and allows you to perform IL Measurement.

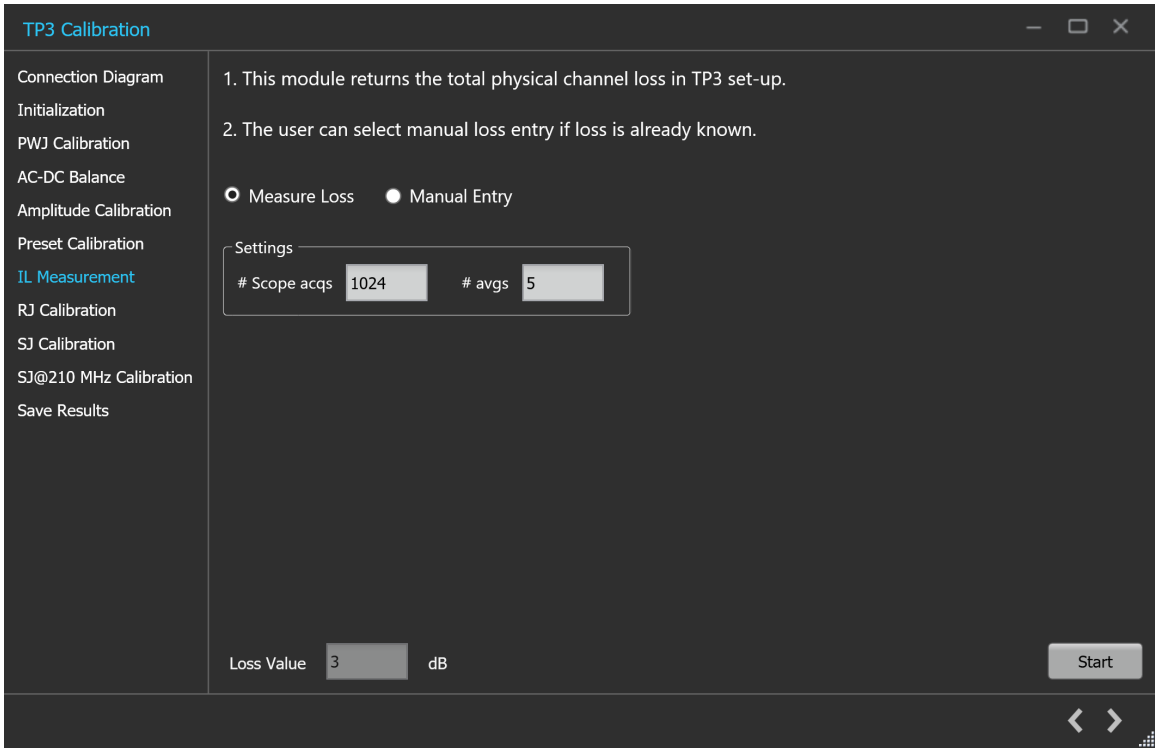



Figure 23: TP3 Calibration: IL Measurement

Table 18: TP3 Calibration: IL Measurement

Parameter	Description
Manual Entry	Select the manual entry option and enter the loss value in dB.
Measure Loss	Select the measure loss option for the TekRxTest application to initiate measure loss.
Settings	
#Scope acqs	The number of scope acquisitions that allows the algorithm to make multiple insertion loss measurements and report the mean insertion loss. This way, any error in a particular acquisition will get averaged out. The mean of scope noise is usually zero. If we have a large number of samples and we average out those samples, then the noise component in the averaged sample will be zero.
# avgs	The number of averages that will run the insertion loss measurement multiple times and calculate the average value. This way, any error in a particular acquisition will get averaged out.
Loss Value	Displays the Final Loss value after computing.
Start	Click <b>Start</b> to run the measurements.

Click  to move to the next screen.

8. **RJ Calibration:** This tab displays the graph plots of RJ calibration.



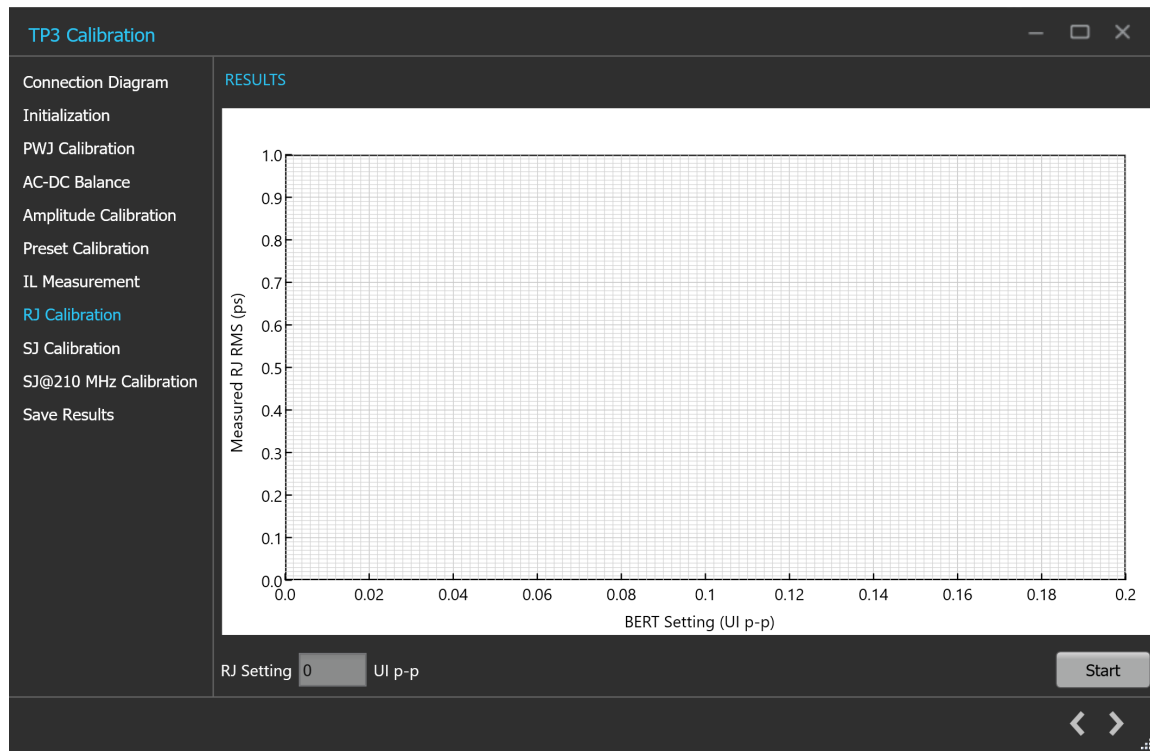



Figure 24: TP3 Calibration: RJ Calibration

Table 19: TP3 Calibration: RJ Calibration

Parameter	Description
RJ Setting	Displays the calibrated RJ setting corresponding to the nominal value.
Start	Click <b>Start</b> to run the measurements.

Click  to move to the next screen.

- SJ Calibration:** This tab displays the graph plots of SJ calibration.

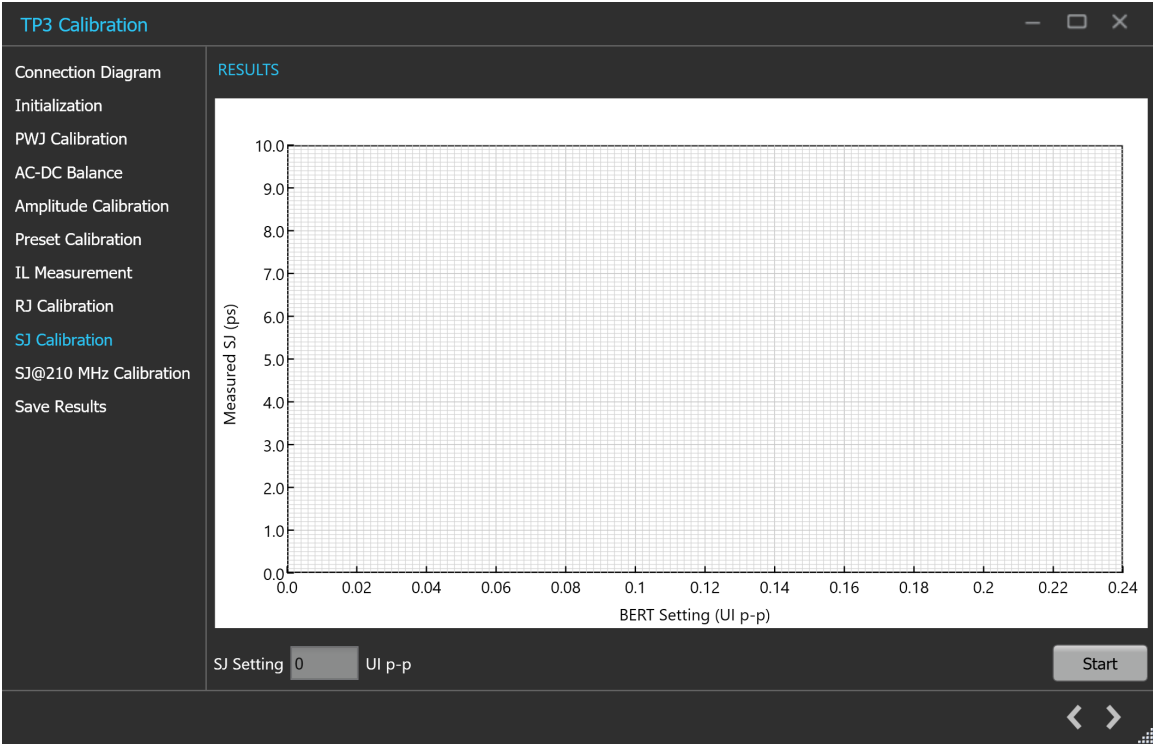



Figure 25: TP3 Calibration: SJ Calibration

Table 20: TP3 Calibration: SJ Calibration

Parameter	Description
SJ Setting	Displays the calibrated SJ setting corresponding to the nominal target value.
Start	Click <b>Start</b> to run the measurements.

Click  to move to the next screen.

10. **SJ@210 MHz Calibration:** This tab displays the graph plots of SJ@210 MHz calibration.

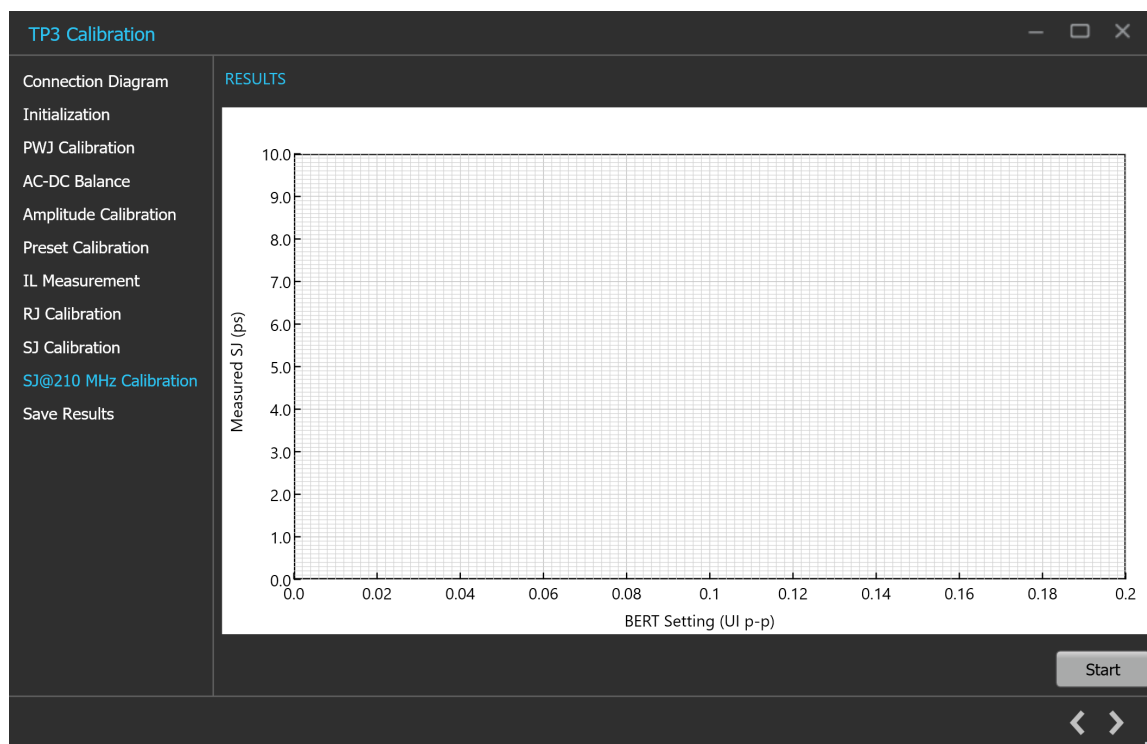


Figure 26: TP3 Calibration: SJ@210 MHz Calibration

Table 21: TP3 Calibration: SJ@210 MHz Calibration

Parameter	Description
Start	Click <b>Start</b> to run the measurements.

11. **Multi-tone SJ:** This tab displays the graph plots of multi-tone SJ calibration.



**Note:** Enable the multi-tone option in the settings panel to display the Multi-tone SJ calibration panel in the TP3 calibration wizard window.

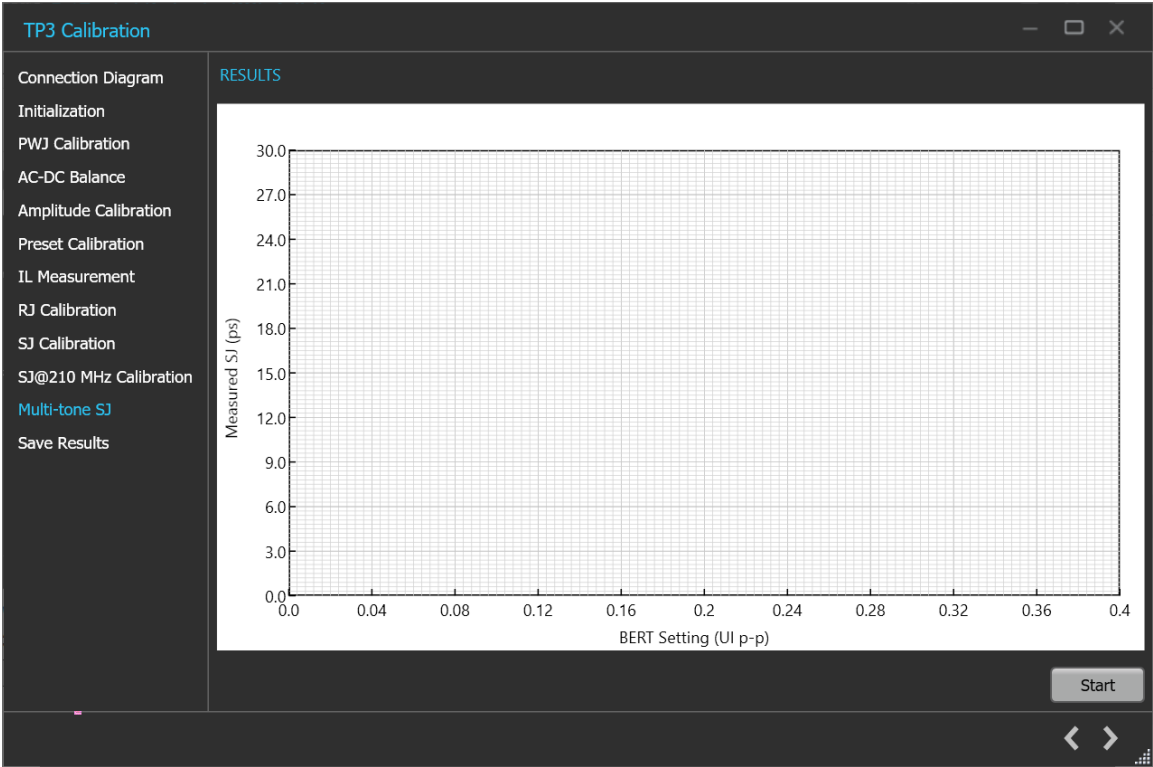


Figure 27: TP3 Calibration: Multi-tone SJ

Table 22: TP3 Calibration: Multi-tone SJ


Parameter	Description
Start	Click <b>Start</b> to run the measurements.

12. **Save Results:** This tab allows you to save all the TP3 calibration results.

Figure 28: TP3 Calibration: Save Results

Table 23: TP3 Calibration: Save Results

Parameter	Description
Unique ID	Enter the Unique ID of the calibrated equipment in the text box.
Generated By	Enter the user name in the text box.
Comments (Optional)	Enter the required comments in the comment box.
Save	Click to save the results.

Click  to complete the TP3 calibration and close the wizard.



**Note:** Completion of the TP3 calibration process or in the event of cancellation of the process, the BERT data generator is turned off automatically by the PCIe5.0 (Base) TekRxTest application.

## TP2 Calibration

The TP2 calibration panel allows you to manually perform calibration for the equipment and save the results. TP2 Calibration is carried out for DMI, CMI, Physical channel loss, CTLE/Preset selection, and Stressed Eye. This procedure sets SJ, DMI, and Amplitude levels to achieve target eye-opening.

You must perform TP3 calibration before you start performing the calibration for TP2.

The PCIe5.0 (Base) TekRx test application calibrates the following at TP2:

1. DMI - The differential mode sinusoidal interference is required to be calibrated within 5 - 30 mV (pk-pk) by capturing the 2.1 GHz sinusoidal output for a duration of at least 125 us.
2. CMI - The common-mode sinusoidal interference is required to be calibrated for a nominal voltage of 150 mV (pk-pk) by capturing the 120 MHz sinusoidal output for a duration of at least 125 us.

- 3. Preset selection - Tx equalization presets P5, P6, P8, and P9 are used to find the optimal eye area with the optimal CTLE.
- 4. Stressed Eye calibration - As per the specification, various signal parameters and stress levels are computed to generate a signal that meets the stressed eye targets.

TP2 Calibration procedure



Figure 29: TP2 Calibration

Click TP2 under the calibration tab to view the calibration results. Click  at the right end corner of the application, to launch the TP2 calibration wizard. This wizard will guide you through the sequential procedure to perform the calibration.

You must perform TP3 calibration before you start performing the calibration for TP2.

- 1. **Description:** This tab displays the description and allows you to select the DUT Type as Non-Root Complex or Root Complex.

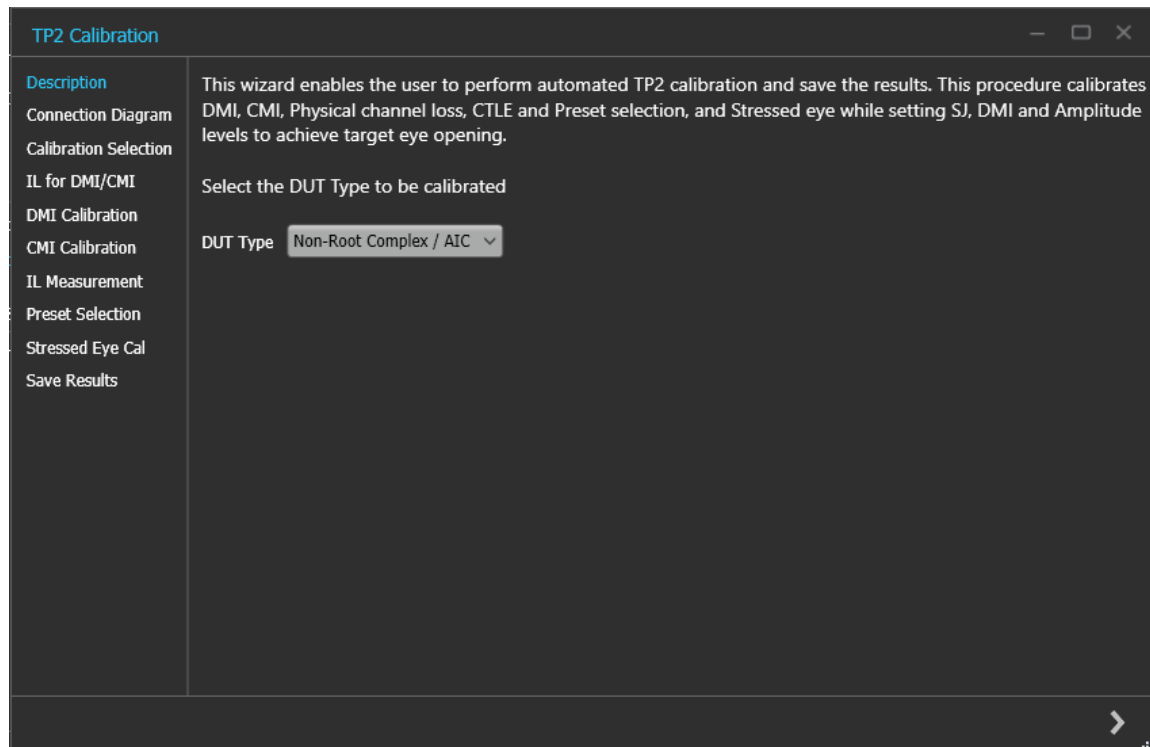



Figure 30: TP2 Calibration: Description

**Table 24: TP2 Calibration: Description**

Parameter	Description
DUT Type	<ul style="list-style-type: none"> <li>Non-Root Complex / AIC Card</li> <li>Root Complex / System</li> </ul>

Click  to move to the next screen.

- Connection Diagram:** This tab displays the connection diagram for the DUT Type selected in description screen.

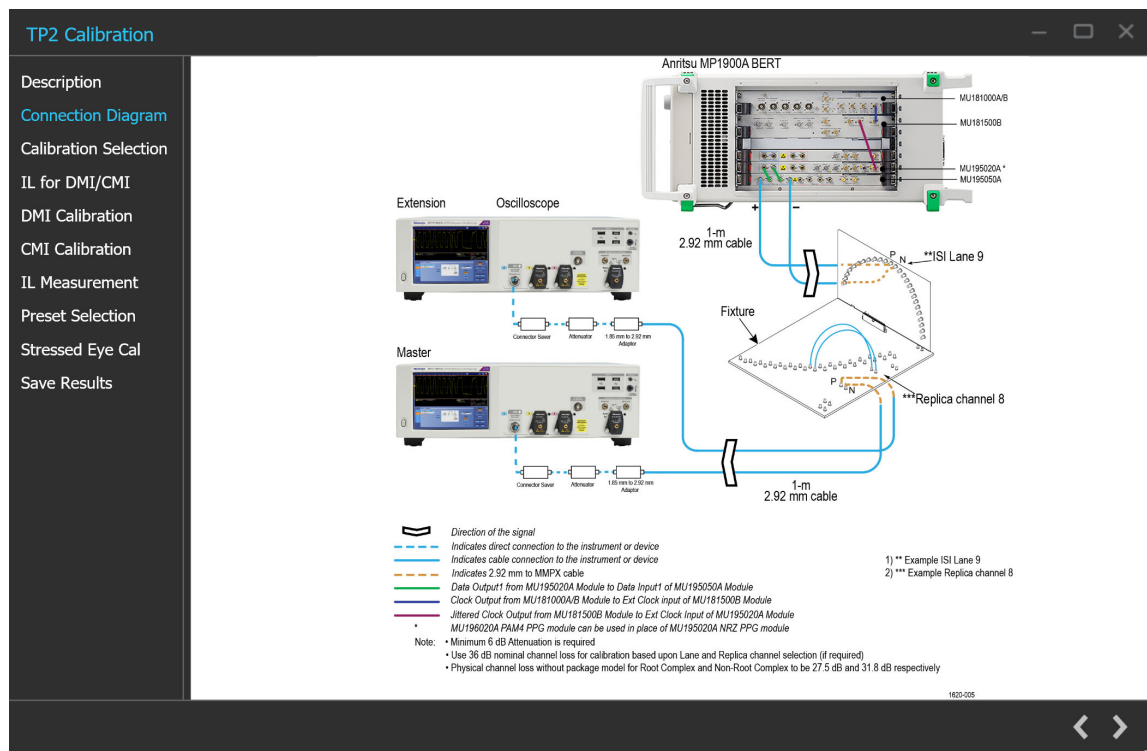


Figure 31: TP2 Calibration: Connection Diagram-AIC

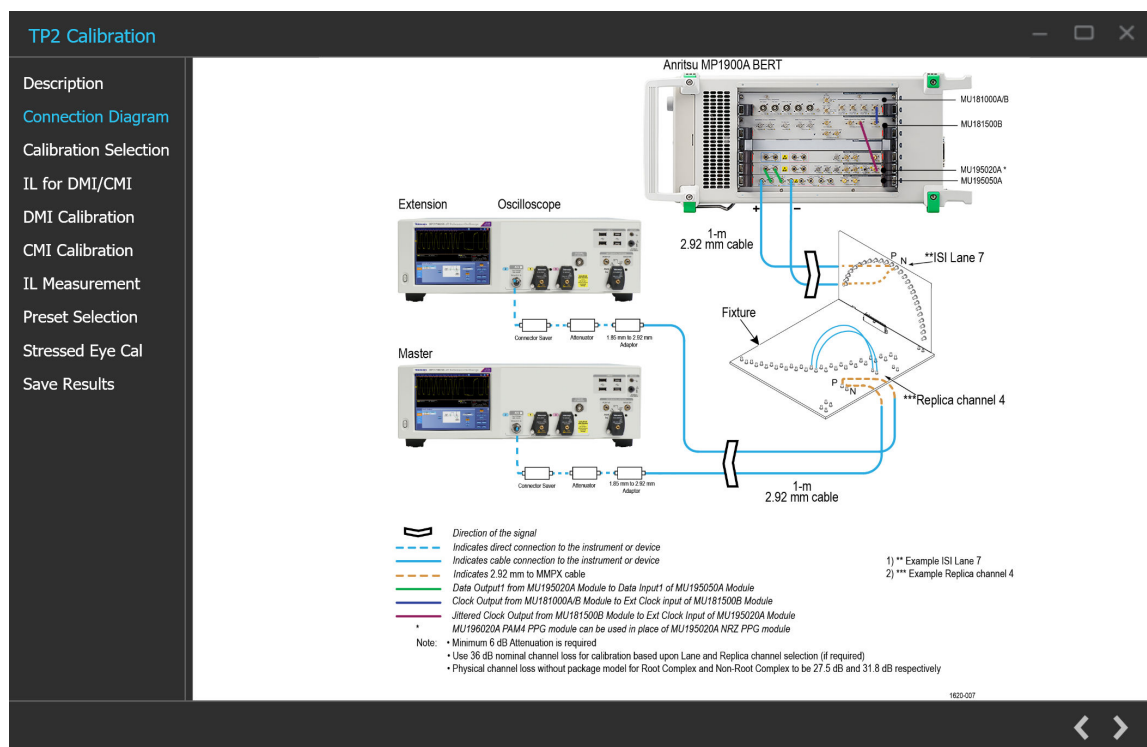


Figure 32: TP2 Calibration: Connection Diagram-System



3. **Calibration Selection:** This tab allows you to select the TP3 Calibration file from the drop-down list and click **Initialize Equipment**.

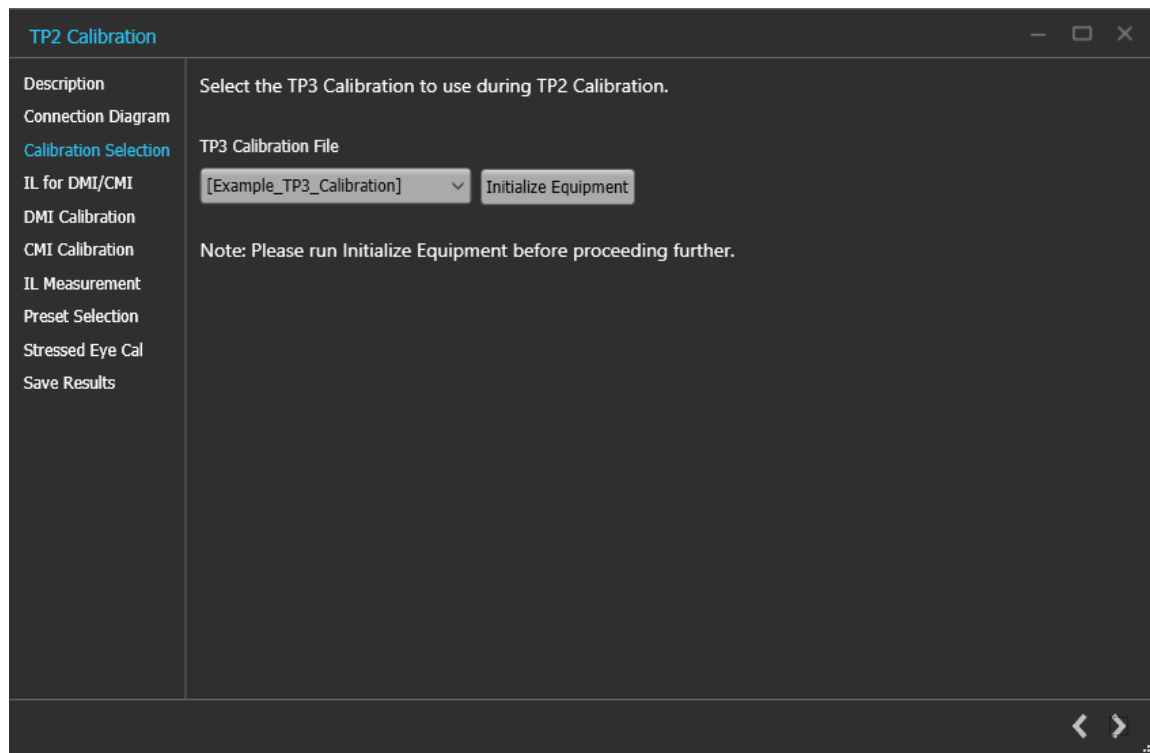



Figure 33: TP2 Calibration: Calibration Selection

**Table 25: TP2 Calibration: Calibration Selection**

Parameter	Description
TP3 Calibration File	Select the desired TP3 calibration file and initialize the equipment.

Click  to move to the next screen.

4. **IL for DMI/CMI:** This module returns physical channel loss without package embedding for DMI and CMI calibration.

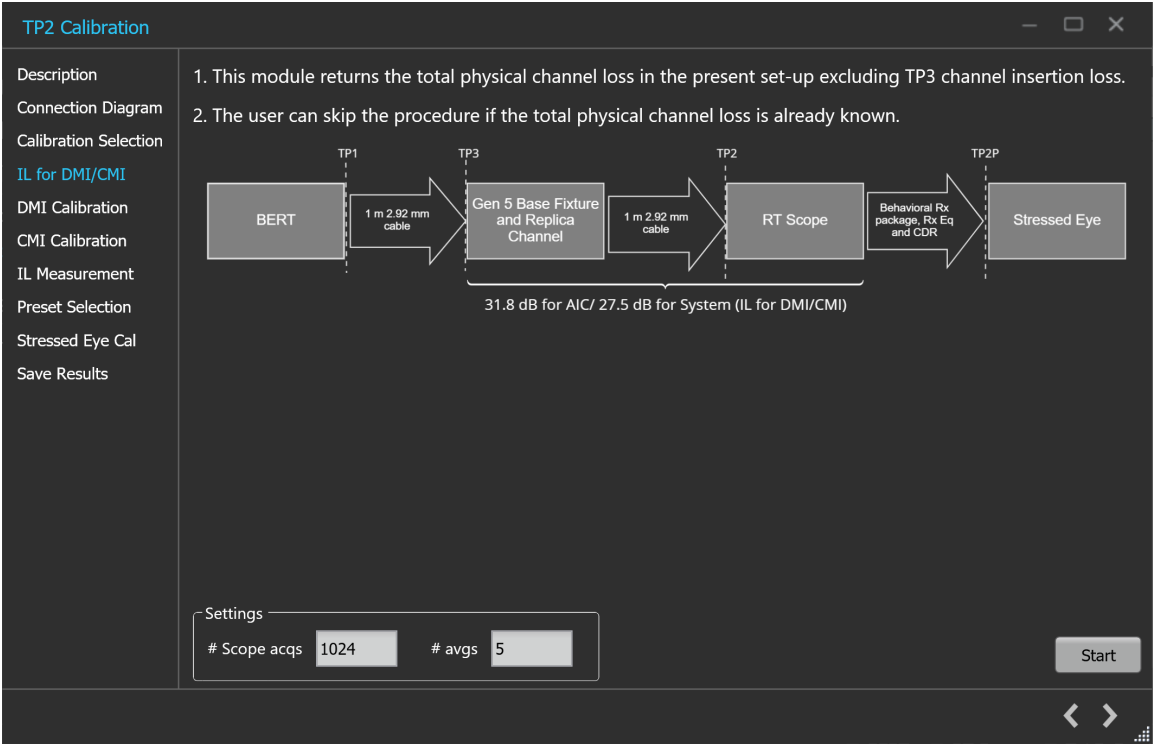



Figure 34: TP2 Calibration: IL for DMI/CMUI

Table 26: TP2 Calibration: IL for DMI/CMUI

Parameter	Description
#Scope acqs	The number of scope acquisitions that allows the algorithm to make multiple insertion loss measurements and report the mean insertion loss. This way, any error in a particular acquisition will get averaged out. The mean of scope noise is usually zero. If we have a large number of samples and we average out those samples, then the noise component in the averaged sample will be zero.
# avgs	The number of averages that will run the insertion loss measurement multiple times and calculate the average value. This way, any error in a particular acquisition will get averaged out.
Start	Click <b>Start</b> to run the measurements.

Click  to move to the next screen.

5. **DMI Calibration:** This tab displays the graph plots of DMI calibration.

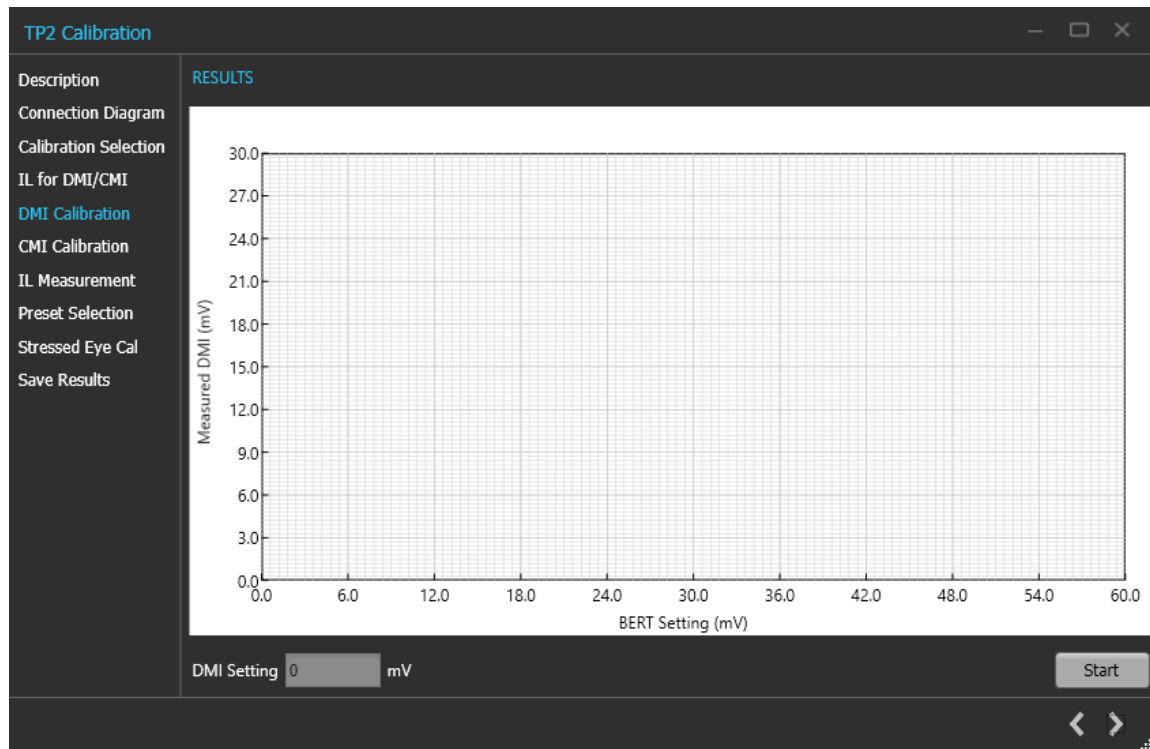



Figure 35: TP2 Calibration: DMI Calibration

Table 27: TP2 Calibration: DMI Calibration

Parameter	Description
DMI Setting	Displays the calibrated DMI setting corresponding to nominal value.
Start	Click <b>Start</b> to run the measurement.

Click  to move to the next screen.

- CMI Calibration:** This tab displays the graph plots of CMI calibration.

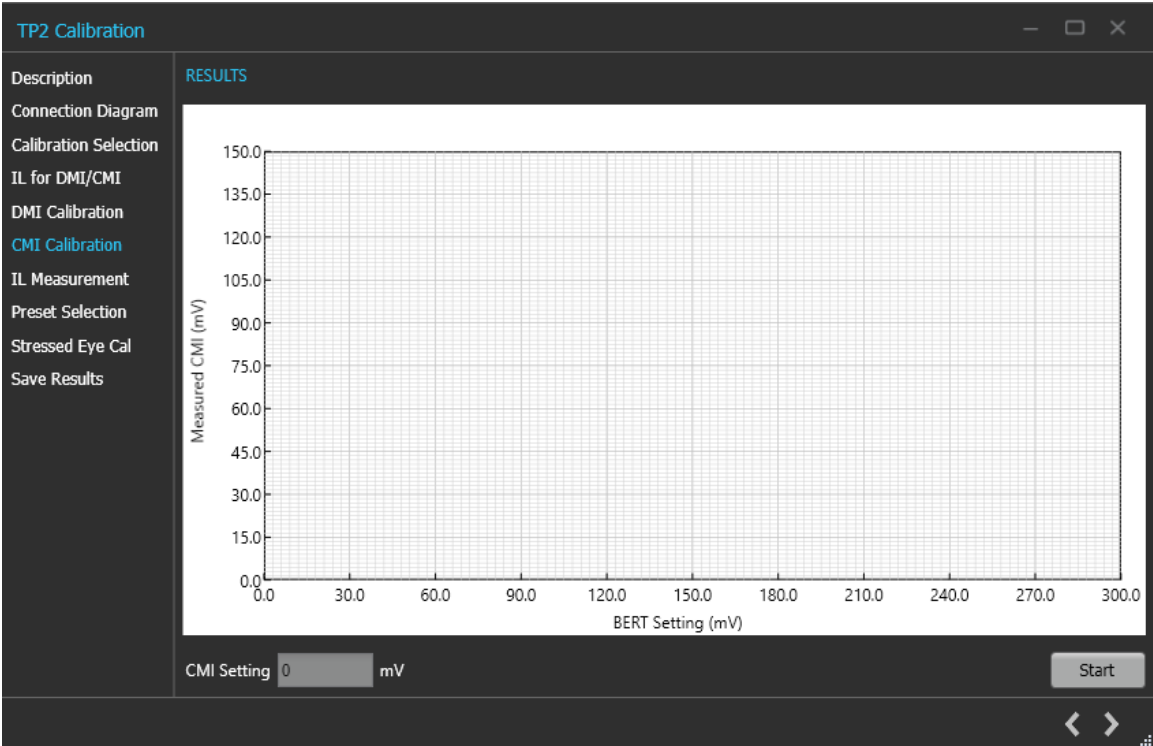



Figure 36: TP2 Calibration: CMI Calibration

Table 28: TP2 Calibration: CMI Calibration

Parameter	Description
CMI Setting	Displays the calibrated CMI setting corresponding to nominal value.
Start	Click <b>Start</b> to run the measurement.

Click  to move to the next screen.

7. IL Measurement:

The Stressed Eye calibration including CTLE selection and optimal preset identification needs to be performed with a full physical channel loss between 34 dB to 37 dB . This includes the package embedding loss.

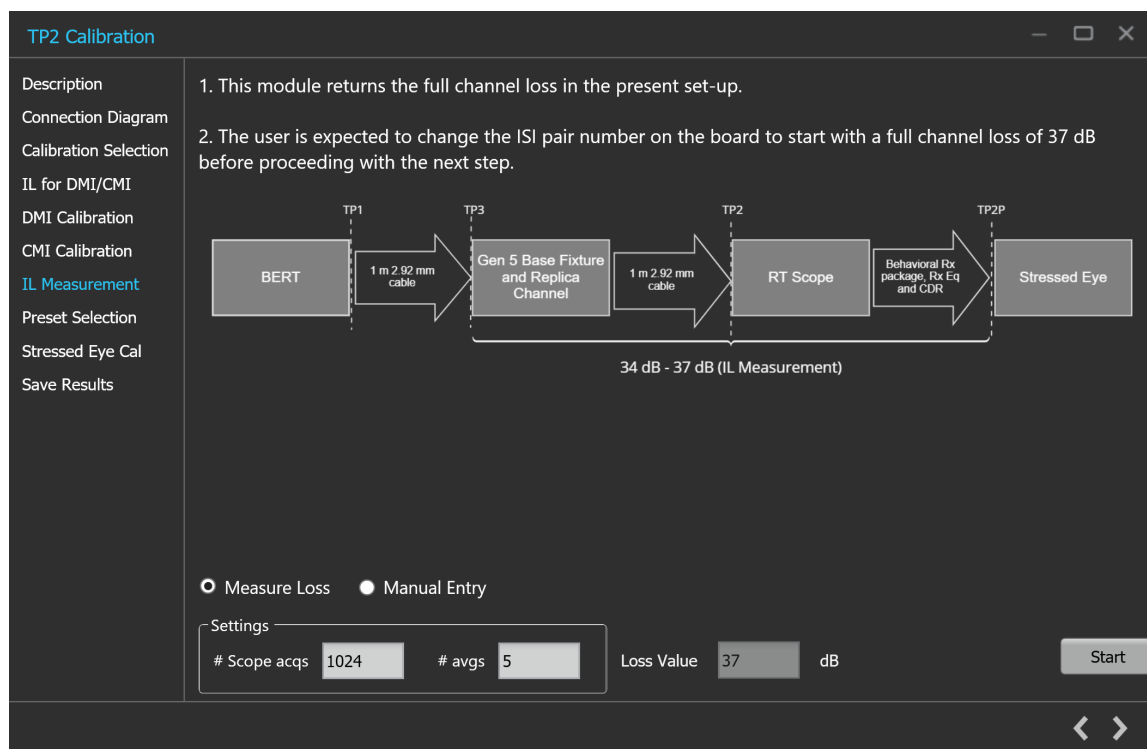



Figure 37: TP2 Calibration: IL Measurement

Table 29: TP2 Calibration: IL Measurement

Parameter	Description
Manual Entry	Select the manual entry option and enter the loss value in dB.
Measure Loss	Select the measure loss option for the TekRxTest application to initiate measure loss
Settings	
#Scope acqs	The number of scope acquisitions that allows the algorithm to make multiple insertion loss measurements and report the mean insertion loss. This way, any error in a particular acquisition will get averaged out. The mean of scope noise is usually zero. If we have a large number of samples and we average out those samples, then the noise component in the averaged sample will be zero.
# avgs	The number of averages that will run the insertion loss measurement multiple times and calculate the average value. This way, any error in a particular acquisition will get averaged out.
Loss Value	Displays the final loss value after computing.
Start	Click <b>Start</b> to run the measurements.

Click  to move to the next screen.

## 8. Preset Selection

The PCIe Gen5 TekRxTest application provides the facility to automatically compute and present the total physical channel loss in the TP2 set-up. Selection of optimum physical channel loss (obtained by means of changing the ISI pair), optimum CTLE, and Preset is a prerequisite for to obtain the stressed eye as per the specification. While arriving at the optimum combination of the parameters,

the TekRxTest application guides you through the various steps in this process by means of pop-up messages in taking suitable actions.

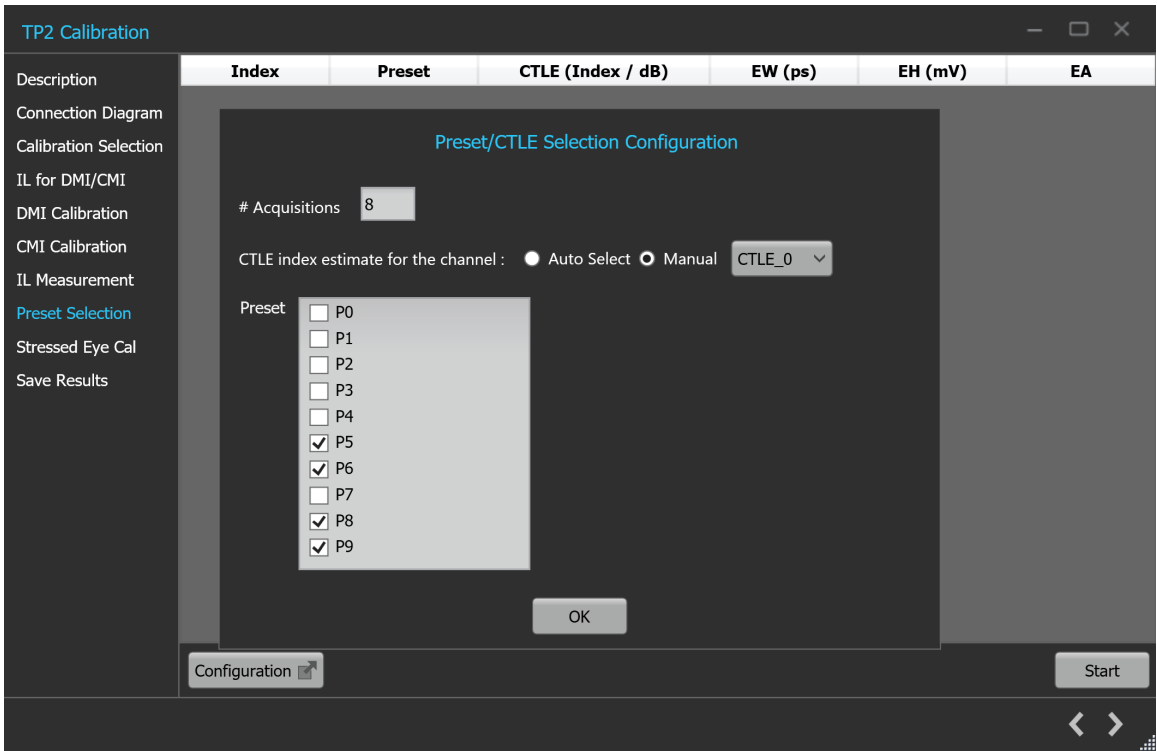



Figure 38: TP2 Calibration: Preset Selection

Table 30: TP2 Calibration: Preset Selection

Parameter	Description
# Acquisitions	Enter the number of waveforms to be acquired for Preset selection.
Preset	Select the presets from which the optimum will be chosen for TP2 calibration.
CTLE index estimate for the channel	Select the required CTLE index estimate method for the channel. <ul style="list-style-type: none"><li>• Auto Select</li><li>• Manual<ul style="list-style-type: none"><li>• CTLE_0</li><li>• CTLE_1</li><li>• CTLE_2</li><li>• CTLE_3</li><li>• CTLE_4</li><li>• CTLE_5</li><li>• CTLE_6</li><li>• CTLE_7</li><li>• CTLE_8</li><li>• CTLE_9</li><li>• CTLE_10</li></ul></li></ul>

Table continued...

Parameter	Description
Configuration	Select to Configure the Preset
OK	Select to apply the configuration for Preset
Start	Click <b>Start</b> to run the measurements.

Click  to move to the next screen.

## 9. Stressed Eye Cal:

TP2 calibration for stressed eye requires information from the TP3 calibration that is performed for the set-up under consideration or from one of the saved TP3 results. The relevant TP3 calibration file can be chosen from the calibration selection page shown from a drop-down button listing all the TP3 calibration files stored in the PCIe Gen5 TekRxTest application repository.



TP2 Calibration

Description  
 Connection Diagram  
 Calibration Selection  
 IL for DMI/DMI  
 DMI Calibration  
 CMI Calibration  
 IL Measurement  
 Preset Selection  
**Stressed Eye Cal**  
 Save Results

Index	SJ (ps)	SJ Setting (UI p-p)	DMI (mV)	DMI Setting (mV)	Ampl (mV)	Ampl Setting (mV)	EW (ps)	EH (mV)

☐ Manual Calibration Run
 ☐ Exhaustive Sweep

SJ 3.125 ps DMI 20 mV Amplitude 800 mV # acqs 10

Configuration Start

Eye Height Limit: ( 13.5 - 16.5 ) mV, Eye Width Limit: ( 8.875 - 9.875 ) ps, Selected Preset: NA, Selected CTLE Index: NA  
 SJ Limits: ( 1 - 5 ) ps, DMI Limits: ( 5 - 30 ) mV, Amplitude Limits: ( 720 - 800 ) mV

Figure 39: TP2 Calibration: Stressed Eye Cal

**Stressed Eye Configuration**

Initial Settings

SJ  ps    DMI  mV    Amplitude  mV

Step Size

SJ  ps    DMI  mV    Amplitude  mV

SJ

Min  ps

Max  ps

DMI

Min  mV

Max  mV

Amplitude

Min  mV

Max  mV

NOTE: Ensure Initial Settings are within the Sweep Range

Figure 40: TP2 Calibration: Stressed Eye Configuration


Table 31: TP2 Calibration: Stressed Eye Cal

Parameter	Description
Manual Calibration Run	Select to manually enter the SJ, DMI and Amplitude values for Stressed Eye calibration.
SJ	Displays the SJ value at which Eye Width (EW) and Eye height (EH) needs to be computed.
DMI	Displays the DMI value at which Eye Width (EW) and Eye height (EH) needs to be computed.
Amplitude	Displays the amplitude level at which Eye Width (EW) and Eye height (EH) needs to be computed.
Exhaustive Sweep	Select to run the stressed eye calibration for all combinations of Amplitude, SJ, and DMI within the sweep range with defined step sizes.
# acqs	Enter the number of waveforms used to obtain the average EW and EH.

Table continued...



Parameter	Description
Configuration	<p>Select to configure initial settings, step size, sweep range.</p> <ul style="list-style-type: none"> <li>Initial Settings - Configure the Initial SJ / DMI / Amplitude value from which your Linear Sweep should start (Not applicable for Exhaustive Sweep).</li> <li>Step Size - Configure the SJ / DMI / Amplitude step size value by which the increment or decrement of your SJ / DMI / Amplitude values should happen for Stressed Eye Calibration.</li> <li>Sweep Range - Configure the SJ / DMI / Amplitude min and max sweep range for which the Stressed Eye Calibration is executed.</li> <li>Default - Select to apply the initial settings, step size and sweep range to the default values.</li> <li>OK - Select to apply the configured values of initial settings, step size, sweep range.</li> </ul>
Start	Click <b>Start</b> to run the measurements.

Click  to move to the next screen.

**10. Save Results:** This tab allows you to save all the TP2 calibration results.

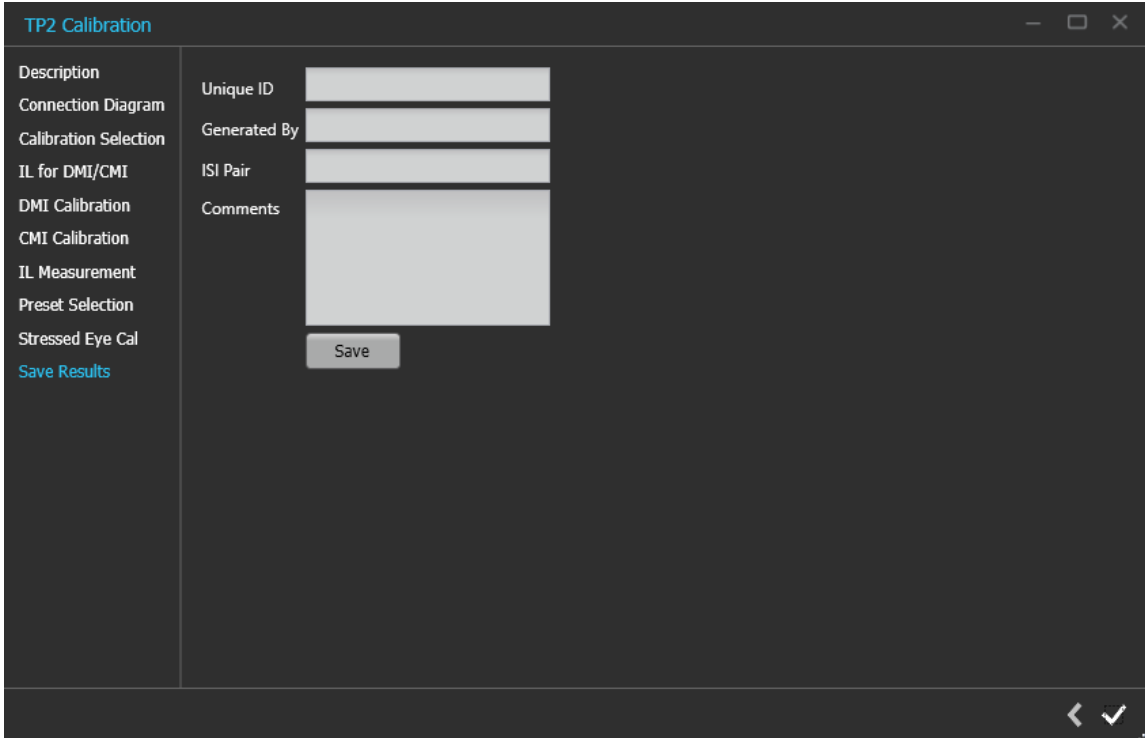




Figure 41: TP2 Calibration: Save Results

**Table 32: TP2 Calibration: Save Results**

Parameter	Description
Unique ID	Enter the Unique ID of the calibrated equipment in the text box.
Table continued...	

Parameter	Description
Generated By	Enter the user name in the text box.
ISI Pair	Enter the ISI pair used during calibration.
Comments (Optional)	Enter the required comments in the comment box.
Save	Click to save the results.

Click  to complete the TP2 calibration and close the wizard.

 **Note:** Completion of the TP2 calibration process or in the event of cancellation of the process, the BERT data generator is turned off automatically by the PCIe5.0 (Base) Test Application.

Tests panel

JTOL Test

To test SJ at multiple frequencies for the JTOL test, you need to perform Multi-tone SJ calibration during TP3 Calibration. You can generate 30 KHz to 100 MHz with a maximum of 14 different frequencies.

The frequency settings table lists the frequencies calibrated during Multi-tone SJ calibration while performing TP3 calibration. If the newly generated frequency doesn't match with the calibrated frequency, then nearby calibrated frequency data will be used for running the JTOL test.

JTOL Test procedure

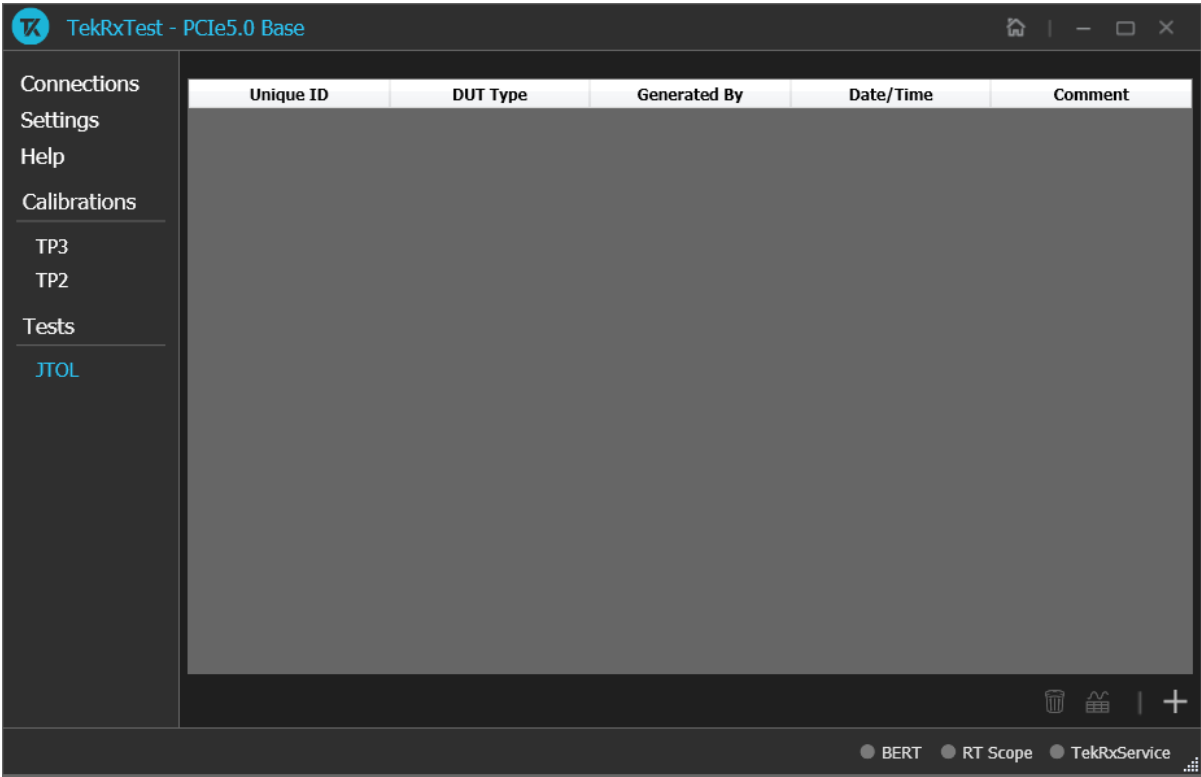



Figure 42: JTOL Test

Click **JTOL Test** under the Tests panel to view the measurement results. Click  at the right end corner of the application, to launch the JTOL test wizard. This wizard will guide you through the sequential procedure to perform the test.

1. **Calibration Selection:** This tab allows you to select the calibration file from the drop-down list. The drop-down lists all the TP2 calibration files available as per the choice made under DUT Type selection.

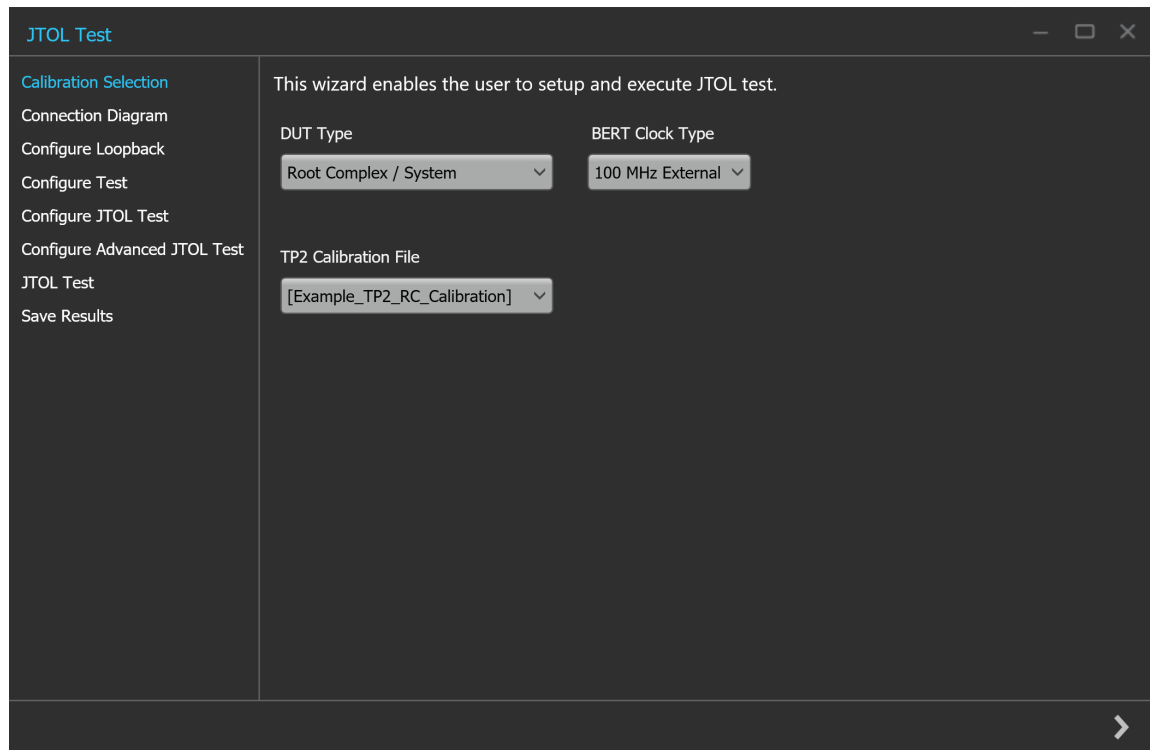



Figure 43: JTOL Test: Calibration Selection

Table 33: JTOL Test: Calibration Selection

Parameter	Description
DUT Type	Select the required DUT type. <ul style="list-style-type: none"> <li>• Non-Root Complex / AIC</li> <li>• Root Complex / System</li> </ul>
BERT Clock Type	Select the required DUT clock type. <ul style="list-style-type: none"> <li>• 100 MHz External</li> <li>• Internal</li> </ul>
TP2 Calibration File	Select the required TP2 calibration file.

Click  to move to the next screen.

2. **Connection Diagram:** This tab displays the connection diagram for the JTOL test. The connection diagram is the same for Non-Root Complex and Root Complex in case of JTOL test.

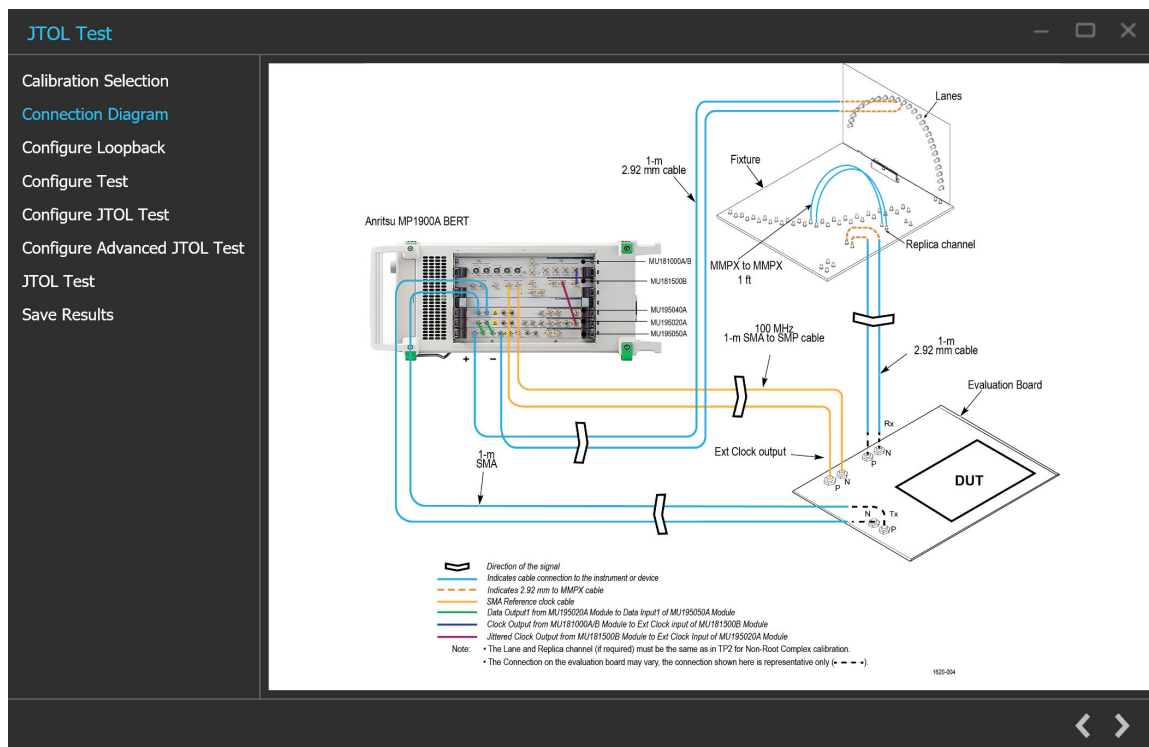


Figure 44: JTOL Test: Connection Diagram (AIC)

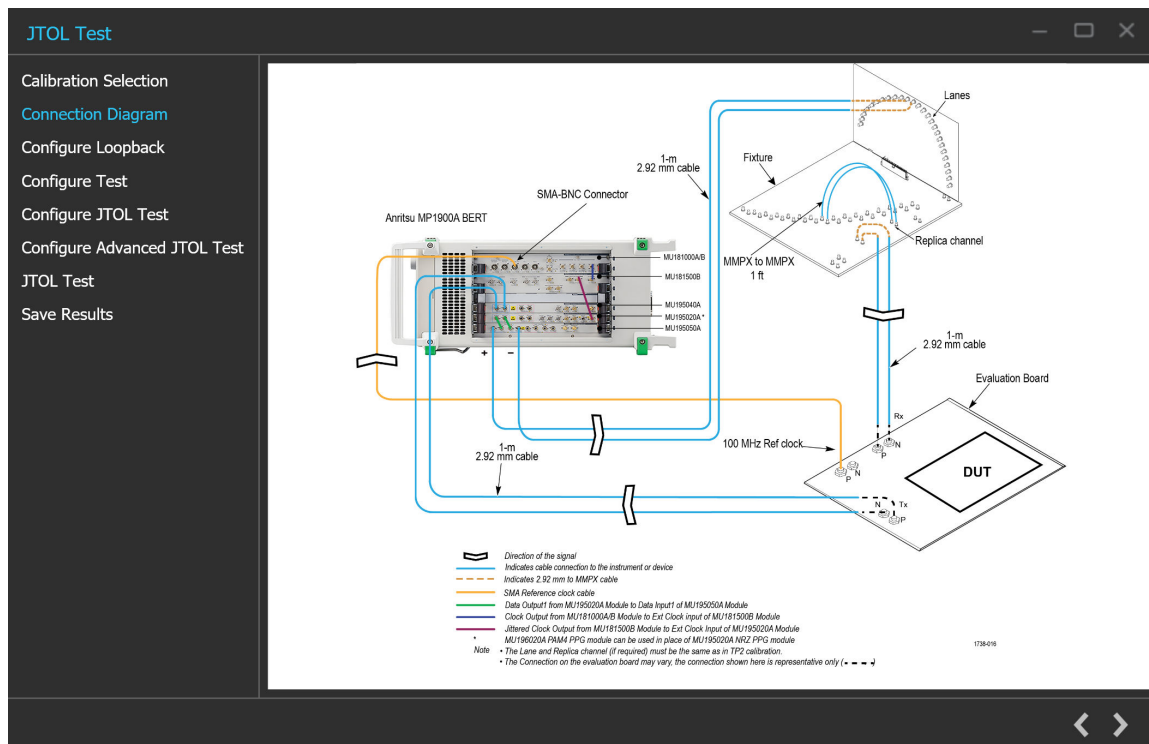



Figure 45: JTOL Test: Connection Diagram (System)



Click  to move to the next screen.

### 3. Configure Loopback:

This tab allows you to configure the loopback settings (Basic and Debug).

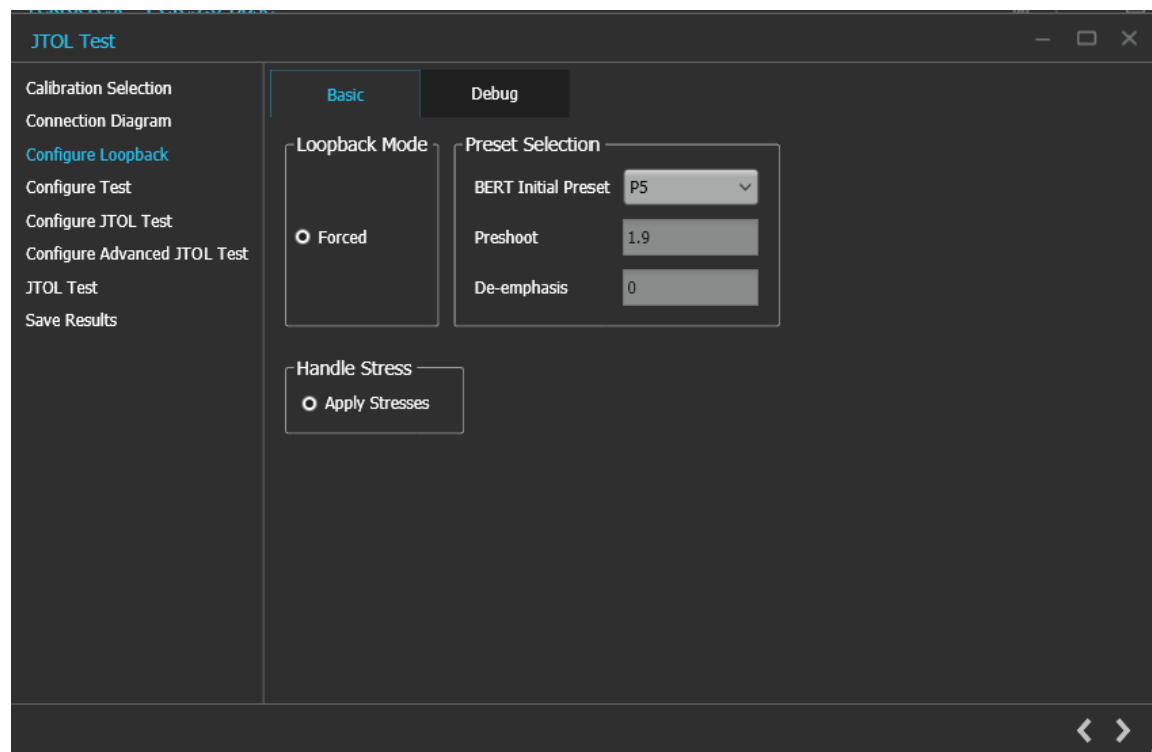


Figure 46: JTOL Test: Configure Loopback (Basic)

Table 34: JTOL Test: Configure Loopback (Basic)

Parameter	Description
Loopback Mode	Displays the default loopback mode selected.
Preset Selection	
BERT Initial Preset	Select the Preset to be set on the BERT PPG during loopback from the drop-down list.
Preshoot	Displays the Preshoot to be set on the BERT PPG during loopback.
De-emphasis	Displays the De-emphasis to be set on the BERT PPG during loopback.
Handle Stress	Displays the default handle stress option selected.

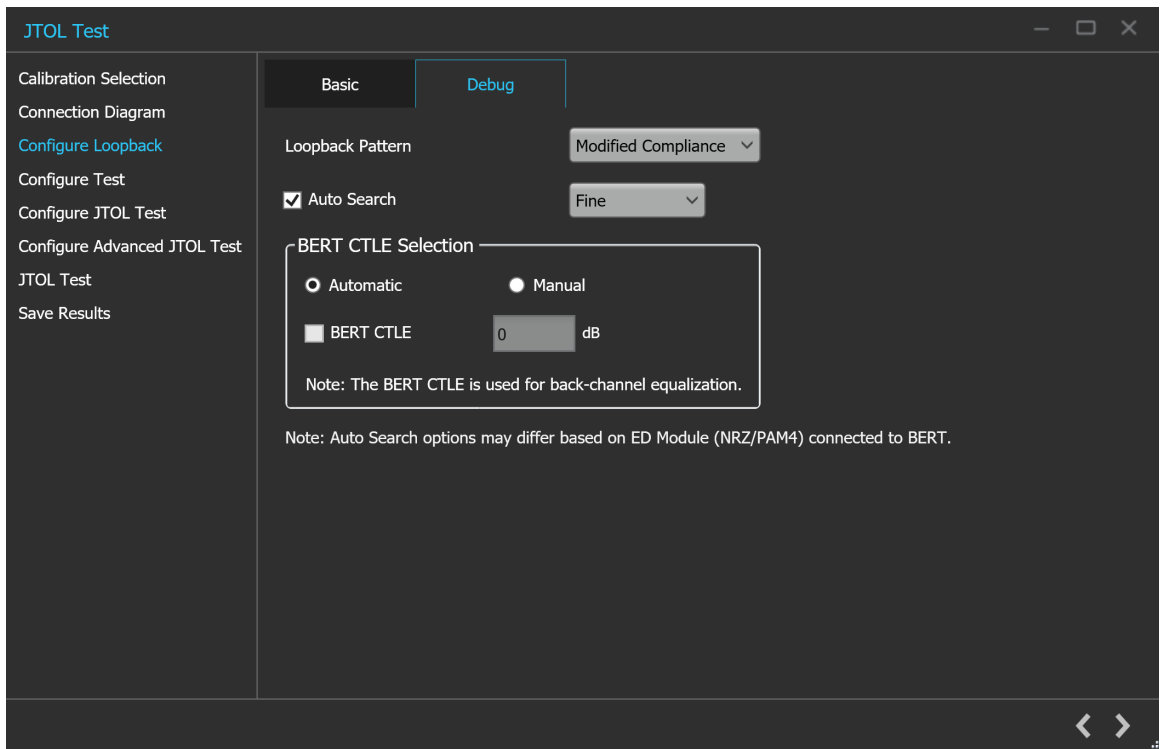



Figure 47: JTOL Test: Configure Loopback (Debug)

Table 35: JTOL Test: Configure Loopback (Debug)

Parameter	Description
Loopback pattern	Select the pattern to be used during loopback from the drop-down list. The drop-down list contains the following elements: <ul style="list-style-type: none"><li>• Modified Compliance</li><li>• Compliance</li><li>• Clock Pattern</li><li>• PRBS7</li><li>• PRBS9</li><li>• PRBS10</li><li>• PRBS11</li><li>• PRBS15</li><li>• PRBS20</li><li>• PRBS23</li><li>• PRBS31</li></ul>
Auto Search	Select to enable the auto search and choose from the drop-down list. The drop-down list contains the following elements: <ul style="list-style-type: none"><li>• PAM4 Fine</li><li>• PAM4 Coarse</li></ul>
BERT CTLE Selection	Select the type of CTLE selection.

Table continued...

Parameter	Description
BERT CTLE	Enable the BERT CTLE value in dB. This parameter is used for back channel equalization.

Click  to move to the next screen.

**4. Configure Test:** This tab allows you to configure the test settings.

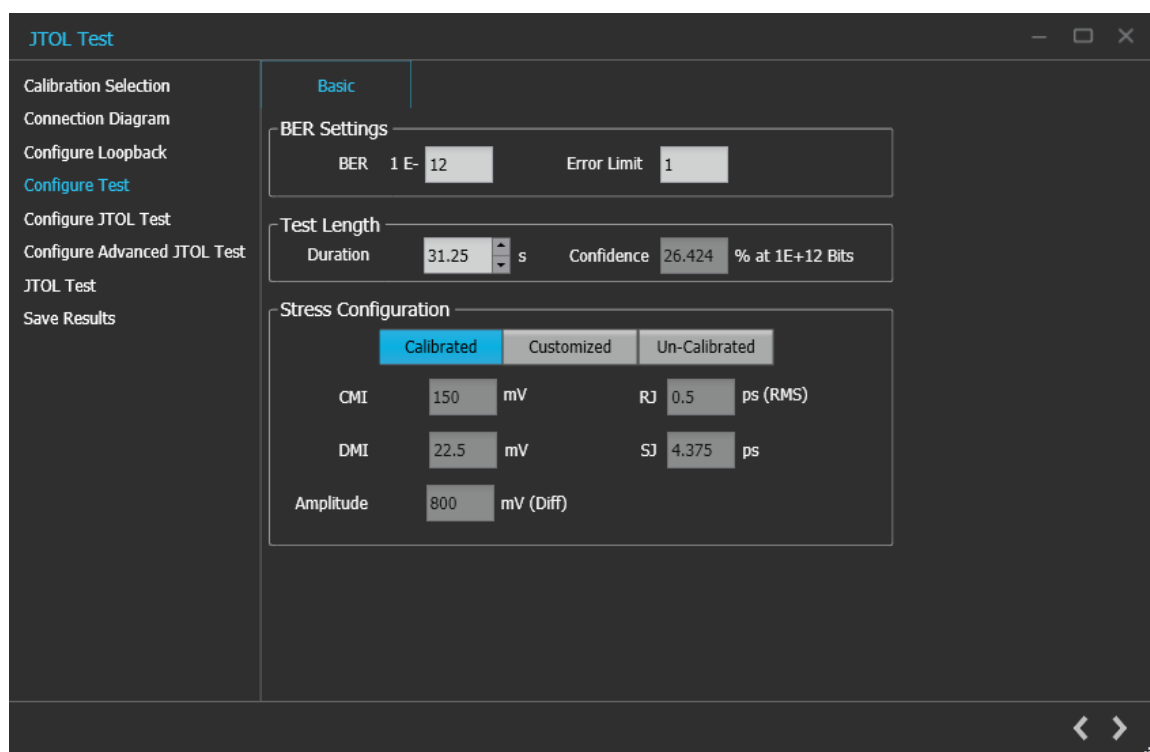



Figure 48: JTOL Test: Configure Test

**Table 36: JTOL Test: Configure Test (Basic)**

Parameter	Description
BER Settings	<ul style="list-style-type: none"> <li>BER - Enter the number of bits in error that can be tolerated.</li> <li>Error Limit - Enter the required error limit. The default value is 1.</li> </ul>
Test Length	<ul style="list-style-type: none"> <li>Duration - Enter the test length duration value.</li> <li>Confidence - Displays the test length confidence value.</li> </ul>
Stress Configuration	Select the required stress configuration among calibrated, customized, un-calibrated.
CMI	Displays the CMI value in mV. The stress on the waveform is defined by the parameters of CMI.
DMI	Displays the DMI value in mV. The stress on the waveform is defined by the parameters of DMI.

Table continued...

Parameter	Description
Amplitude	Displays the Amplitude value in mV. The stress on the waveform is defined by the parameters of Amplitude.
RJ	Displays the RJ value in ps or Ulp-p. The stress on the waveform is defined by the parameters of RJ.
SJ	Displays the SJ value in ps or Ulp-p. The stress on the waveform is defined by the parameters of SJ.

Click  to move to the next screen.

5. **Configure JTOL Test:** This tab allows you to configure the JTOL test settings.




Figure 49: JTOL Test: Configure JTOL Test

Table 37: JTOL Test: Configure JTOL Test

Parameter	Description
<b>Frequency Settings</b>	
Frequency (MHz)	Displays the table of frequencies in MHz for which JTOL test is to be performed.
Lower Amplitude Limit (UI p-p)	Displays the table of lower amplitude limit values at which JTOL test starts for that frequency.
Higher Amplitude Limit (UI p-p)	Displays the table of higher amplitude limit values at which JTOL test ends for that frequency.
Table continued...	



Parameter	Description
Min Frequency	Enter the minimum frequency value.
Max Frequency	Enter the maximum frequency value.
# Frequencies	Enter the desired number of frequencies within the specified range.
Generate	Click to view the table populated with the frequencies.
Default	Click to view the table populated with default list of frequencies.
JTOL Custom Mask	Select to enable the JTOL Custom mask. On JTOL custom mask selection with the defined mask settings, mask will get generated on the plot.
<b>Mask Settings</b>	
Frequency (MHz)	Displays the table of knee frequencies for the mask.
Amplitude (UI p-p)	Displays the amplitude of SJ at each knee frequency.

Click  to move to the next screen.

**6. Configure Advanced JTOL Test:** This tab allows you to configure the advanced JTOL test settings.

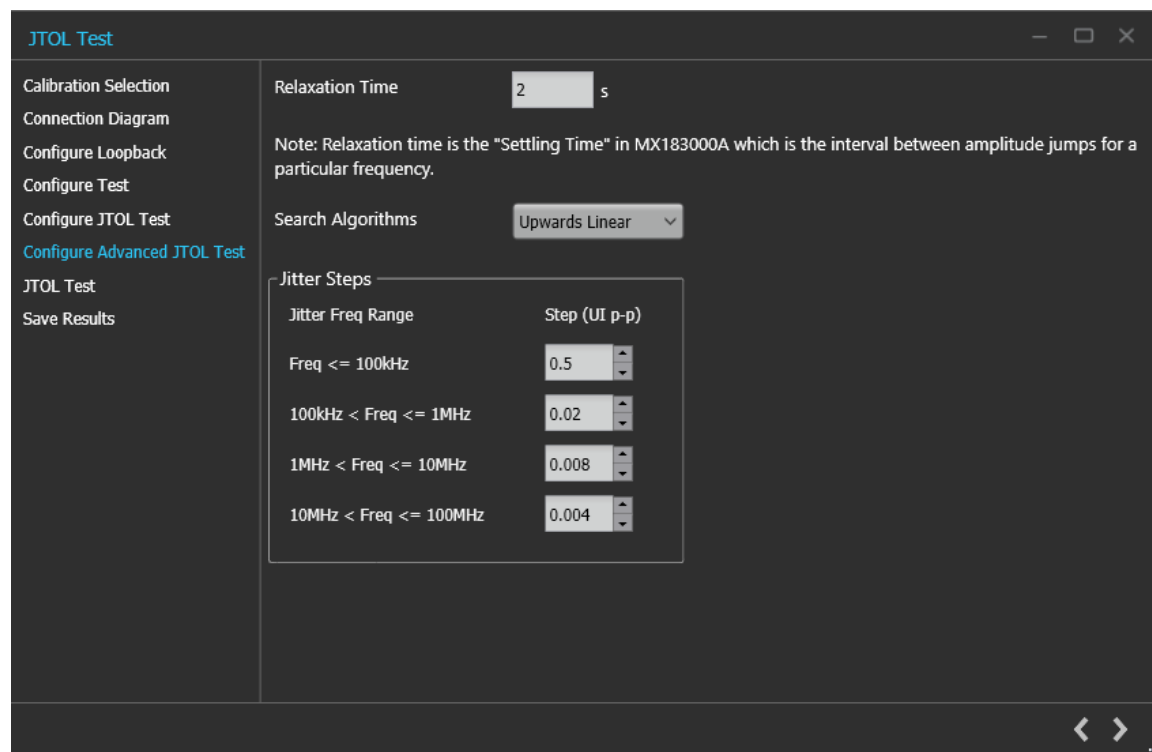



Figure 50: JTOL Test: Configure Advanced JTOL Test

**Table 38: JTOL Test: Configure Advanced JTOL Test**

Parameter	Description
Relaxation Time	Enter the amount of time BERT needs to relax before running BER for each amplitude point.
Search Algorithms	Select the required search algorithm from the drop-down for JTOL test. <ul style="list-style-type: none"> <li>• Binary</li> <li>• Downwards Linear</li> <li>• Downwards Log</li> <li>• Upwards Log</li> <li>• Upwards Linear</li> <li>• Binary + Linear</li> </ul>
Jitter Steps	
Jitter Freq Range	The different frequency ranges can have different step size for SJ amplitude sweep. <ul style="list-style-type: none"> <li>• Freq <math>\leq</math> 100 KHz</li> <li>• 100KHz &lt; Freq <math>\leq</math> 1 MHz</li> <li>• 1 MHz &lt; Freq <math>\leq</math> 10 MHz</li> <li>• 10 MHz &lt; Freq <math>\leq</math> 100 MHz</li> </ul>
Step (UI p-p)	Sets the SJ amplitude step size for different frequency ranges. Sets the ratios for Downward and Upward-Log search algorithms. No steps size is defined for Binary + Linear search algorithm.

Click  to move to the next screen.

- JTOL Test:** This tab displays a graphical representation of JTOL test result. It includes the result table tab which displays the JTOL test results in a tabular form.

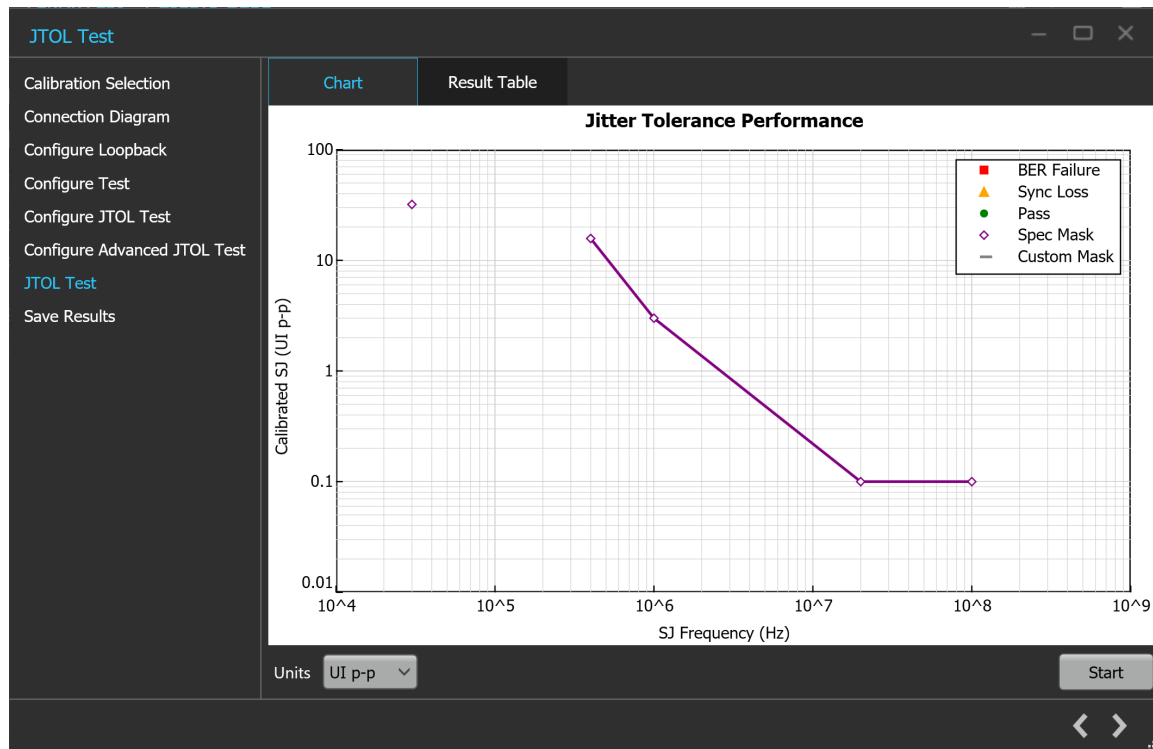


Figure 51: JTOL Test: JTOL Chart

Table 39: JTOL Test: JTOL Chart

Parameter	Description
Units	Select the required unit from the drop-down list. The list contains the following elements: <ul style="list-style-type: none"> <li>ps</li> <li>UI<sub>p-p</sub></li> </ul>
Start	Click <b>Start</b> to run the test.

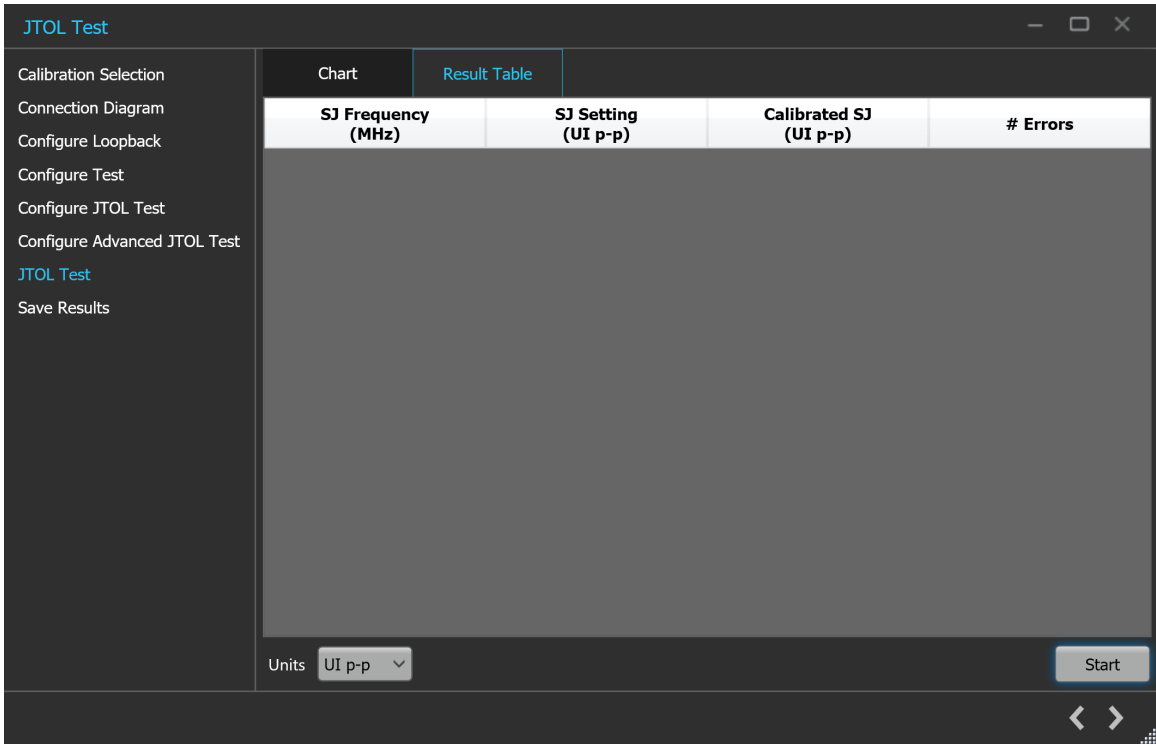



Figure 52: JTOL Test (Result Table)

Table 40: JTOL Test (Results Table)

Parameter	Description
SJ Frequency (MHz)	Displays the frequencies for which JTOL Test was performed.
SJ Setting (UI <sub>p-p</sub> / ps)	Displays the SJ Amplitude on the BERT.
Calibrated SJ (UI <sub>p-p</sub> / ps)	Displays the Calibrated SJ Amplitude.
#Errors	Displays the Error count reported by MX183000A.

Click  to move to the next screen.

8. **Save Results:** This tab allows you to save the JTOL test results.

Figure 53: JTOL Test: Save Results

Table 41: JTOL Test: Save Results

Parameter	Description
Unique ID	Enter the Unique ID of the calibrated equipment in the text box.
Generated By	Enter the user name in the text box.
Comments (Optional)	Enter the required comments in the comment box.
Save	Click to save the results.

Click  to complete the JTOL Test and close the wizard.

## Programmatic interface commands

### PREF:BERT:IP

This command sets or returns the IP address of the BERT used to connect with the PCIe5.0 (Base) TekRxTest application.

#### Syntax

```
PREF:BERT:IP <IP address>
```

```
PREF:BERT:IP?
```

#### Inputs

<IP address> = <String>

#### Outputs

<String>

### PREF:RTS:IP

This command sets or returns the IP address of the Real Time Oscilloscope used to connect with the PCIe5.0 (Base) TekRxTest application.

#### Syntax

```
PREF:RTS:IP <IP address>
```

```
PREF:RTS:IP?
```

#### Inputs

<IP address> = <String>

#### Outputs

<String>

### CONN:BERT

This command sets or returns the connection status of the BERT with PCIe5.0 (Base) TekRxTest application.

#### Syntax

```
CONN:BERT <0 | 1>
```

```
CONN:BERT?
```

#### Inputs

<0 | 1>

0 indicates to disconnect the BERT.

1 indicates to connect the BERT.

#### Outputs

<0 | 1>

## CONN:RTS

This command sets or returns the connection status of the Real Time Oscilloscope with PCIe5.0 (Base) TekRxTest application.

### Syntax

```
CONN:RTS <0 | 1>
```

```
CONN:RTS?
```

### Inputs

<0 | 1>

0 indicates to disconnect the Real Time Oscilloscope.

1 indicates to connect the Real Time Oscilloscope.

### Outputs

<0 | 1>

## SETTINGS:TEKRXSERVICE:ANALYSISTIMEOUT

This command sets or returns TekRxService analysis time out value.

### Syntax

```
SETTINGS:TEKRXSERVICE:ANALYSISTIMEOUT<int>
```

```
SETTINGS:TEKRXSERVICE:ANALYSISTIMEOUT?
```

### Inputs

<int> 15 to 1000

### Outputs

<int>

## SETTINGS:SIGTEST:VERSION

This command sets or returns the sigtest version number.

### Syntax

```
SETTINGS:SIGTEST:VERSION <String>
```

```
SETTINGS:SIGTEST:VERSION?
```

### Inputs

<String>

### Outputs

<String>

## SETTINGS:MULTITONESJCAL:ENABLE

This command sets or returns the enable or disable status of Multi-tone SJ calibration.

## Syntax

SETTINGS:MULTITONESJCAL:ENABLE {0|1}

SETTINGS:MULTITONESJCAL:ENABLE?

## Inputs

{0|1}

0 indicates to disable the multi-tone SJ calibration.

1 indicates to enable the multi-tone SJ calibration.

## Outputs

{0|1}

# SETTINGS:SOCKETSERVER:IP

This command returns the IP address of the socket server.

## Syntax

SETTINGS:SOCKETSERVER:IP?

## Inputs

NA

## Outputs

<String>

# SETTINGS:SOCKETSERVER:LISTENINGPORT

This command returns the listening port of the socket server.

## Syntax

SETTINGS:SOCKETSERVER:LISTENINGPORT?

## Inputs

NA

## Outputs

<String>

# SETTINGS:SOCKETSERVER:TIMEOUT

This command returns the time out value of the socket server.

## Syntax

SETTINGS:SOCKETSERVER:TIMEOUT?

## Inputs

NA



## Outputs

<int>

## SETTINGS:MULTITONESJCAL:FREQUENCYCOUNT

This command sets or returns the frequency count value for Multi-tone SJ calibration.

### Syntax

```
SETTINGS:MULTITONESJCAL:FREQUENCYCOUNT <NR1>
```

```
SETTINGS:MULTITONESJCAL:FREQUENCYCOUNT?
```

### Inputs

<NR1> 1 to 14

### Outputs

<NR1>

## SETTINGS:MULTITONESJCAL:MAXFREQUENCY

This command sets or returns the maximum frequency value for Multi-tone SJ calibration.

### Syntax

```
SETTINGS:MULTITONESJCAL:MAXFREQUENCY <NR1>
```

```
SETTINGS:MULTITONESJCAL:MAXFREQUENCY?
```

### Inputs

<NR1> 1 to 100 MHz

### Outputs

<NR1>

## SETTINGS:MULTITONESJCAL:MINFREQUENCY

This command sets or returns the minimum frequency value for Multi-tone SJ calibration.

### Syntax

```
SETTINGS:MULTITONESJCAL:MINFREQUENCY <NR1>
```

```
SETTINGS:MULTITONESJCAL:MINFREQUENCY?
```

### Inputs

<NR1> 0.03 to 99 MHz

### Outputs

<NR1>

## SETTINGS:MULTITONESJCAL:POINTS

This command sets or returns the number of points for Multi-tone SJ calibration.

## Syntax

```
SETTINGS:MULTITONESJCAL:POINTS <NR1>
```

```
SETTINGS:MULTITONESJCAL:POINTS?
```

## Inputs

<NR1> 2 to 8

## Outputs

<NR1>

# SETTINGS:CTLE:ACQUISITIONS

This command sets or returns the number of acquisitions for CTLE measurement.

## Syntax

```
SETTINGS:CTLE:ACQUISITIONS <int>
```

```
SETTINGS:CTLE:ACQUISITIONS?
```

## Inputs

<int> 1 to 20

## Outputs

<int>

# SETTINGS:EYE:ACQUISITIONS

This command sets or returns the number of acquisitions for stressed eye calibration.

## Syntax

```
SETTINGS:EYE:ACQUISITIONS <int>
```

```
SETTINGS:EYE:ACQUISITIONS?
```

## Inputs

<int> 1 to 20

## Outputs

<int>

# SETTINGS:TP1:CH1DEEMBEDFILE

This command sets or returns the CH1 de-embedding filter file path for TP3 calibration.

## Syntax

```
SETTINGS:TP1:CH1DEEMBEDFILE <"File path">
```

```
SETTINGS:TP1:CH1DEEMBEDFILE?
```

## Inputs

<"File path"> = <String>

**Outputs**

&lt;String&gt;

**SETTINGS:TP1:CH2DEEMBEDFILE**

This command sets or returns the CH2 de-embedding filter file path for TP3 calibration .

**Syntax**

```
SETTINGS:TP1:CH2DEEMBEDFILE <"File path">
```

```
SETTINGS:TP1:CH2DEEMBEDFILE?
```

**Inputs**

&lt;"File path"&gt; = &lt;String&gt;

**Outputs**

&lt;String&gt;

**SETTINGS:TP1:ENABLECH1DEEMBED**

This command sets or returns the enable or disable status of CH1 de-embedding for TP3 calibration.

**Syntax**

```
SETTINGS:TP1:ENABLECH1DEEMBED {0 | 1}
```

```
SETTINGS:TP1:ENABLECH1DEEMBED?
```

**Inputs**

{0 | 1}

0 - Indicates the CH1 de-embedding is disabled.

1 - Indicated the CH1 de-embedding is enabled

**Outputs**

{0 | 1}

**SETTINGS:TP1:ENABLECH2DEEMBED**

This command sets or returns the enable or disable status of CH2 de-embedding for TP3 calibration.

**Syntax**

```
SETTINGS:TP1:ENABLECH2DEEMBED {0 | 1}
```

```
SETTINGS:TP1:ENABLECH2DEEMBED?
```

**Inputs**

{0 | 1}

0 - Indicates the CH2 de-embedding is disabled.

1 - Indicates the CH2 de-embedding is enabled.

## Outputs

{0 | 1}

## SETTINGS:TP2:CH1DEEMBEDFILE

This command sets or returns the filter file path of CH1 de-embedding for TP2 calibration.

### Syntax

```
SETTINGS:TP2:CH1DEEMBEDFILE <"File path">
```

```
SETTINGS:TP2:CH1DEEMBEDFILE?
```

### Inputs

<"File path"> = <String>

### Outputs

<String>

## SETTINGS:TP2:CH2DEEMBEDFILE

This command sets or returns the filter file path of CH2 de-embedding for TP2 calibration.

### Syntax

```
SETTINGS:TP2:CH2DEEMBEDFILE <String>
```

```
SETTINGS:TP2:CH2DEEMBEDFILE?
```

### Inputs

<"File path"> = <String>

### Outputs

<String>

## SETTINGS:TP2:ENABLECH1DEEMBED

This command sets or returns the enable or disable status of CH1 de-embedding for TP2 calibration.

### Syntax

```
SETTINGS:TP2:ENABLECH1DEEMBED {0 | 1}
```

```
SETTINGS:TP2:ENABLECH1DEEMBED?
```

### Inputs

{0 | 1}

0 - Indicates the CH1 de-embedding is disabled.

1 - Indicates the CH1 de-embedding is enabled.

### Outputs

{0 | 1}

## SETTINGS:TP2:ENABLECH2DEEMBDED

This command sets or returns the enable or disable status of CH2 de-embedding for TP2 calibration.

### Syntax

```
SETTINGS:TP2:ENABLECH2DEEMBDED {0 | 1}
```

```
SETTINGS:TP2:ENABLECH2DEEMBDED?
```

### Inputs

{0 | 1}

0 - Indicates the CH2 de-embedding is disabled.

1 - Indicates the CH2 de-embedding is enabled.

### Outputs

{0 | 1}

## SETTINGS:MULTITONESJCAL:DEFAULT

This command sets the SJ Frequencies to its default value for multitone SJ calibration.

### Syntax

```
SETTINGS:MULTITONESJCAL:DEFAULT
```

### Inputs

NA

### Outputs

NA

## SETTINGS:MULTITONESJCAL:GENERATE

This command generates the SJ frequencies for multitone SJ calibration.

### Syntax

```
SETTINGS:MULTITONESJCAL:GENERATE
```

### Inputs

NA

### Outputs

NA

## SETTINGS:TP1:CH1:EXTERNALATTEN

This command sets or returns the external attenuation of CH1 for TP3 calibration.

### Syntax

```
SETTINGS:TP1:CH1:EXTERNALATTEN <int>
```

```
SETTINGS:TP1:CH1:EXTERNALATTEN?
```

### Inputs

<int> 0 to 10

### Outputs

<int>

## SETTINGS:TP1:CH2:EXTERNALATTEN

This command sets or returns the external attenuation of CH2 for TP3 calibration.

### Syntax

```
SETTINGS:TP1:CH2:EXTERNALATTEN <int>
```

```
SETTINGS:TP1:CH2:EXTERNALATTEN?
```

### Inputs

<int> 0 to 10

### Outputs

<int>

## SETTINGS:TP2:CH1:EXTERNALATTEN

This command sets or returns the external attenuation of CH1 for TP2 calibration.

### Syntax

```
SETTINGS:TP2:CH1:EXTERNALATTEN <int>
```

```
SETTINGS:TP2:CH1:EXTERNALATTEN?
```

### Inputs

<int> 0 to 10

### Outputs

<int>

## SETTINGS:TP2:CH2:EXTERNALATTEN

This command sets or returns the external attenuation of CH2 for TP2 calibration.

### Syntax

```
SETTINGS:TP2:CH2:EXTERNALATTEN <int>
```

```
SETTINGS:TP2:CH2:EXTERNALATTEN?
```

### Inputs

<int> 0 to 10

### Outputs

<int>

## SETTINGS:TP2:ENABLEREPLICACHDEMBED

This command sets or returns the enables or disable status for the use of replica channel cable de-embedding in TP2 calibration.

### Syntax

```
SETTINGS:TP2:ENABLEREPLICACHDEMBED {0 | 1}
```

```
SETTINGS:TP2:ENABLEREPLICACHDEMBED?
```

### Inputs

{0 | 1}

0 - Disable the use of replica channel cable de-embedding.

1 - Enable the use of replica channel cable de-embedding.

### Outputs

{0 | 1}

## SETTINGS:TP2:REPLICACHDEEMBEDDIFF

This command sets or returns the differential filter file path for replica channel cable de-embedding in TP2 calibration.

### Syntax

```
SETTINGS:TP2:REPLICACHDEEMBEDDIFF <"File path">
```

```
SETTINGS:TP2:REPLICACHDEEMBEDDIFF?
```

### Inputs

<"File path"> = <String>

### Outputs

<String>

## SETTINGS:TP2:REPLICACHDEEMBEDCH1

This command sets or returns the Ch1 filter file path for replica channel cable de-embedding in TP2 calibration.

### Syntax

```
SETTINGS:TP2:REPLICACHDEEMBEDCH1 <"File path">
```

```
SETTINGS:TP2:REPLICACHDEEMBEDCH1?
```

### Inputs

<"File path"> = <String>

### Outputs

<String>

## SETTINGS:TP2:REPLICACHDEEMBEDCH2

This command sets or returns the Ch2 filter file path for replica channel cable de-embedding in TP2 calibration.

### Syntax

```
SETTINGS:TP2:REPLICACHDEEMBEDCH2 <"File path">  
SETTINGS:TP2:REPLICACHDEEMBEDCH2?
```

### Inputs

<"File path"> = <String>

### Outputs

<String>

## SETTINGS:TP2:REPLICACHDEEMBEDFILETYPE

This command sets or returns the filter file type for replica channel deembedding in TP2 calibration.

### Syntax

```
SETTINGS:TP2:REPLICACHDEEMBEDFILETYPE <0 | 1>  
SETTINGS:TP2:REPLICACHDEEMBEDFILETYPE?
```

### Inputs

<0 | 1>

0 - Indicates Differential as the filter type for replica channel de-embedding.

1 - Indicates Single-ended as the filter type for replica channel de-embedding.

### Outputs

<0 | 1>

## SETTINGS:EYE:ALGO

This command sets or returns the algorithm for stressed eye.

### Syntax

```
SETTINGS:EYE:ALGO <0 | 1>  
SETTINGS:EYE:ALGO?
```

### Inputs

<0 | 1>

0 - Indicates linear sweep is the algorithm for stressed eye.

1 - Indicates Efficient is the algorithm for stressed eye.

### Outputs

<0 | 1>

## SETTINGS:CTLE:ANALYSISTOOL

This command sets or returns the analysis tool selected for preset selection and stressed eye calibration.



**Syntax**

```
SETTINGS:CTLE:ANALYSISTOOL <0 | 1>
```

```
SETTINGS:CTLE:ANALYSISTOOL?
```

**Inputs**

```
<0 | 1>
```

0 - Indicates Seasim is the the analysis tool.

1 - Indicates Sigtest is the analysis tool.

**Outputs**

```
<0 | 1>
```

**SETTINGS:RESTORE**

This command resets the application to default settings.

**Syntax**

```
Settings:Restore
```

**Inputs**

```
NA
```

**Outputs**

```
NA
```

**SETTINGS:RECALL**

This command recalls the settings as per specified file.

**Syntax**

```
SETTINGS:RECALL <"File path">
```

**Inputs**

```
<"File path"> = <String>
```

**Outputs**

```
NA
```

**SETTINGS:SAVE**

This command saves the settings into the specified file.

**Syntax**

```
Settings:Save <"File path">
```

**Inputs**

```
<"File path"> = <String>
```

## Outputs

NA

## SETTINGS:RECALL:STATUS

This command returns the status of the recall command execution.

### Syntax

SETTINGS:RECALL:STATUS?

### Inputs

NA

### Outputs

<String>

## SETTINGS:RESTORE:STATUS

This command returns the status of restore command execution.

### Syntax

SETTINGS:RESTORE:STATUS?

### Inputs

NA

### Outputs

<String>

## SETTINGS:SAVE:STATUS

This command returns the status of the save command execution.

### Syntax

SETTINGS:SAVE:STATUS?

### Inputs

NA

### Outputs

<String>

## TP1CAL:OPEN

This command opens the TP3 calibration panel.

### Syntax

TP1CAL:OPEN

**Inputs**

NA

**Outputs**

NA

**TP1CAL:WIZARD:OPEN**

This command opens the TP3 calibration wizard.

**Syntax**

```
TP1CAL:WIZARD:OPEN
```

**Inputs**

NA

**Outputs**

NA

**TP1CAL:WIZARD:CLOSE**

This command closes the TP3 calibration wizard.

**Syntax**

```
TP1CAL:WIZARD:CLOSE
```

**Inputs**

NA

**Outputs**

NA

**TP1CAL:DELETE**

This command deletes the selected TP3 calibration file.

**Syntax**

```
TP1CAL:DELETE
```

**Inputs**

NA

**Outputs**

NA

**TP1CAL:REPORT**

This command generates the report for the selected TP3 calibration.

## Syntax

TP1CAL:REPORT

## Inputs

NA

## Outputs

NA

# TP1CAL:SAVE

This command saves the current TP3 Calibration file to the database.

## Syntax

TP1CAL:SAVE

## Inputs

NA

## Outputs

NA

# TP1CAL:EQUIP:INIT

This command sets the equipment initialization run status for TP3 calibration.

## Syntax

TP1CAL:EQUIP:INIT <0 | 1>

## Inputs

<0 | 1>

0 - Stop the equipment initialization to run.

1 - Start the equipment initialization to run.

## Outputs

NA

# TP1CAL:AUTOCAL

This command sets the TP3 automatic calibration run status.

## Syntax

TP1CAL:AUTOCAL <0 | 1>

## Inputs

<0 | 1>

0 - Stop the TP3 automatic calibration run.

1 - Start the TP3 automatic calibration run.

## Outputs

NA

## TP1CAL:AMPLITUDE:RUN

This command sets the Amplitude calibration run status.

### Syntax

```
TP1CAL:AMPLITUDE:RUN <0 | 1>
```

### Inputs

<0 | 1>

0 - Stop the Amplitude calibration run.

1 - Start the Amplitude calibration run.

### Outputs

NA

## TP1CAL:PRESET:RUN

This command sets the Preset calibration run status.

### Syntax

```
TP1CAL:PRESET:RUN <0 | 1>
```

### Inputs

<0 | 1>

0 - Stop the the Preset calibration run.

1 - Start the the Preset calibration run.

### Outputs

NA

## TP1CAL:RJ:RUN

This command sets the RJ calibration run status.

### Syntax

```
TP1CAL:RJ:RUN <0 | 1>
```

### Inputs

<0 | 1>

0 - Stop the RJ calibration run.

1 - Start the RJ calibration run.

### Outputs

NA

## TP1CAL:SJ:RUN

This command sets the SJ calibration run status.

### Syntax

```
TP1CAL:SJ:RUN <0 | 1>
```

### Inputs

<0 | 1>

0 - Stop the SJ calibration run.

1 - Start the SJ calibration run.

### Outputs

NA

## TP1CAL:MULTITONESJCAL:RUN

This command sets the Multi-tone SJ calibration run status.

### Syntax

```
TP1CAL:MULTITONESJCAL:RUN <0 | 1>
```

### Inputs

<0 | 1>

0 - Stop the Multi-tone SJ calibration run.

1 - Start the Multi-tone SJ calibration run.

### Outputs

NA

## TP1CAL:PWJCAL:MODE

This command sets or returns the PWJ calibration type for TP3 calibration.

### Syntax

```
TP1CAL:PWJCAL:MODE <0 | 1>
```

```
TP1CAL:PWJCAL:MODE?
```

### Inputs

<0 | 1>

0 - Indicates the mode is manual.

1 - Indicates the mode is measure.

### Outputs

<0 | 1>

## TP1CAL:PWJCAL:DJ

This command sets or returns the PWJ DJ value in TP3 calibration.

### Syntax

```
TP1CAL:PWJCAL:DJ <float>
```

```
TP1CAL:PWJCAL:DJ?
```

### Inputs

<float> 0 to 1 ps

### Outputs

<float>

## TP1CAL:PWJCAL:RJ

This command sets or returns the PWJ RJ value in TP3 calibration.

### Syntax

```
TP1CAL:PWJCAL:RJ <float>
```

```
TP1CAL:PWJCAL:RJ?
```

### Inputs

<float> 0 to 1 (RMS) ps

### Outputs

<float>

## TP1CAL:PWJCAL:STATUS

This command returns the PWJ calibration test run status.

### Syntax

```
TP1CAL:PWJCAL:STATUS?
```

### Inputs

N/A

### Outputs

{InProgress | Done}

## TP1CAL:PWJCAL:START

This command starts or stops the PWJ Calibration.

### Syntax

```
TP1CAL:PWJCAL:START <0 | 1>
```

### Inputs

<0 | 1>

0 - Indicates to start the PWJ calibration test.

1 - Indicates to stop the PWJ calibration test.

### Outputs

<0 | 1>

## TP1CAL:EQUIP:STATUS

This command returns the equipment initialization run status for TP3 calibration.

### Syntax

TP1CAL:EQUIP:STATUS?

### Inputs

NA

### Outputs

{InProgress | Done}

## TP1CAL:AMPLITUDE:STATUS

This command returns the amplitude calibration run status.

### Syntax

TP1CAL:AMPLITUDE:STATUS?

### Inputs

NA

### Outputs

{InProgress | Done}

## TP1CAL:PRESET:STATUS

This command returns the preset calibration run status.

### Syntax

TP1CAL:PRESET:STATUS?

### Inputs

NA

### Outputs

{InProgress | Done}

## TP1CAL:RJ:STATUS

This command returns the RJ calibration run status.



**Syntax**

```
TP1CAL:RJ:STATUS?
```

**Inputs**

NA

**Outputs**

{InProgress | Done}

**TP1CAL:SJ:STATUS**

This command returns the SJ calibration run status.

**Syntax**

```
TP1CAL:SJ:STATUS?
```

**Inputs**

NA

**Outputs**

{InProgress | Done}

**TP1CAL:MULTITONESJCAL:STATUS**

This command returns the Multi-tone SJ calibration run status.

**Syntax**

```
TP1CAL:MULTITONESJCAL:STATUS?
```

**Inputs**

NA

**Outputs**

{InProgress | Done}

**TP1CAL:AMPLITUDE:SETTING**

This command returns the amplitude value for TP3 calibration.

**Syntax**

```
TP1CAL:AMPLITUDE:SETTING?
```

**Inputs**

NA

**Outputs**

<int>

## TP1CAL:RJ:SETTING

This command returns the RJ calibrated value for TP3 calibration.

### Syntax

TP1CAL:RJ:SETTING?

### Inputs

NA

### Outputs

<float>

## TP1CAL:SJ:SETTING

This command returns the SJ calibrated value for TP3 calibration.

### Syntax

TP1CAL:SJ:SETTING?

### Inputs

NA

### Outputs

<float>

## TP1CAL:SAVE:ID

This command sets or returns the unique identifier used as key to save the report in database for TP3 calibration.

### Syntax

TP1CAL:SAVE:ID <String>

TP1CAL:SAVE:ID?

### Inputs

<String>

### Outputs

<String>

## TP1CAL:SAVE:GENERATEDBY

This command sets or returns the creator name who save the report in database for TP3 calibration.

### Syntax

TP1CAL:SAVE:GENERATEDBY <String>

TP1CAL:SAVE:GENERATEDBY?

### Inputs

<String>

## Outputs

<String>

## TP1CAL:SAVE:COMMENTS

This command sets or returns the comments given to save the report in database for TP3 calibration.

### Syntax

TP1CAL:SAVE:COMMENTS <String>

TP1CAL:SAVE:COMMENTS?

### Inputs

<String>

### Outputs

<String>

## TP1CAL:ACDC:RUN

This command runs the TP3 AC-DC balance calibration process.

### Syntax

TP1CAL:ACDC:RUN <0 | 1>

### Inputs

<0 | 1>

1 - Start the AC-DC balance calibration run.

0 - Stop the AC-DC balance calibration run.

### Outputs

NA

## TP1CAL:ACDC:STATUS

This command returns the TP3 AC-DC balance calibration run status.

### Syntax

TP1CAL:ACDC:STATUS?

### Inputs

NA

### Outputs

{InProgress | Done}

## TP1CAL:ACDC:SETTING

This command returns the AC-DC balanced value for TP3 calibration.

## Syntax

TP1CAL:ACDC:SETTING?

## Inputs

NA

## Outputs

<float>

## TP1CAL:SJ@210MHz:RUN

This command sets the TP3 SJ@210MHz calibration run status.

## Syntax

TP1CAL:SJ@210MHz:RUN <0 | 1>

## Inputs

<0 | 1>

1 - Start the SJ@210 MHz calibration run.

0 - Stop the SJ@210 MHz calibration run.

## Outputs

NA

## TP1CAL:SJ@210MHz:STATUS

This command returns the status of SJ@210 MHz Calibration run status.

## Syntax

TP1CAL:SJ@210MHz:STATUS?

## Inputs

NA

## Outputs

{InProgress | Done}

## TP1CAL:IL:MODE

This command sets or returns the type of insertion loss in TP3 calibration.

## Syntax

TP1CAL:IL:MODE <0 | 1>

TP1CAL:IL:MODE?

## Inputs

<0 | 1>

0 - Indicates the insertion loss type is in manual mode.

1 - Indicates the insertion loss type is in measure mode.

### Outputs

<0 | 1>

## TP1CAL:MANUAL:IL

This command sets or returns the manual insertion loss value for TP3 calibration.

### Syntax

TP1CAL:MANUAL:IL <float>

TP1CAL:MANUAL:IL?

### Inputs

<float> 0 to 10

### Outputs

<float>

## TP1CAL:IL:SCOPEACQS

This command sets or returns the value for scope acquisitions for insertion loss in TP3 calibration.

### Syntax

TP1CAL:IL:SCOPEACQS <int>

TP1CAL:IL:SCOPEACQS?

### Inputs

16 to 2048

### Outputs

<int>

## TP1CAL:IL:AVGS

This command sets or returns the value for the number of waveforms averages for insertion loss in TP3 calibration.

### Syntax

TP1CAL:IL:AVGS<int>

TP1CAL:IL:AVGS?

### Inputs

1 to 10

### Outputs

<int>

## TP1CAL:MEASURELOSS:START

This command runs the automatic insertion loss calculation process.

### Syntax

```
TP1CAL:MEASURELOSS:START <0 | 1>
```

### Inputs

<0 | 1>

1 - Start the insertion loss measurement.

0 - Stop the insertion loss measurement.

### Outputs

NA

## TP1CAL:MEASURELOSS:STATUS

This command returns the automatic insertion loss measurement run status.

### Syntax

```
TP1CAL:MEASURELOSS:STATUS?
```

### Inputs

NA

### Outputs

{InProgress | Done}

## TP2CAL:OPEN

This command opens the TP2 calibration panel.

### Syntax

```
TP2CAL:OPEN
```

### Inputs

NA

### Outputs

NA

## TP2CAL:WIZARD:OPEN

This command opens the TP2 calibration wizard.

### Syntax

```
TP2CAL:WIZARD:OPEN
```

### Inputs

NA

## Outputs

NA

## TP2CAL:WIZARD:CLOSE

This command closes the TP2 calibration wizard.

### Syntax

```
TP2CAL:WIZARD:CLOSE
```

### Inputs

NA

### Outputs

NA

## TP2CAL:DUT:TYPE

This command sets or returns the DUT type used for TP2 calibration.

### Syntax

```
TP2CAL:DUT:TYPE <0 | 1>
```

```
TP2CAL:DUT:TYPE?
```

### Inputs

<0 | 1>

0 - Indicates the DUT type is Non-Root Complex.

1 - Indicates the DUT type is Root Complex.

### Outputs

<0 | 1>

## TP2CAL:SELECT:TP1

This command sets or returns the selected TP3 calibration file.

### Syntax

```
TP2CAL:SELECT:TP1 <String>
```

```
TP2CAL:SELECT:TP1?
```

### Inputs

<String>

### Outputs

<String>

## TP2CAL:DELETE

This command deletes the selected TP2 calibration file.

## Syntax

TP2CAL:DELETE

## Inputs

NA

## Outputs

NA

# TP2CAL:REPORT

This command generates the report for selected TP2 calibration.

## Syntax

TP2CAL:REPORT

## Inputs

NA

## Outputs

NA

# TP2CAL:SAVE

This command saves the current TP2 Calibration file to the database.

## Syntax

TP2CAL:SAVE

## Inputs

NA

## Outputs

NA

# TP2CAL:SAVE:ISIPAIR

This command sets or returns ISI Pair stored in Database.

## Syntax

TP2CAL:SAVE:ISIPAIR <String>

TP2CAL:SAVE:ISIPAIR?

## Inputs

<String>

## Outputs

<String>



## TP2CAL:EQUIP:INIT

This command sets the equipment initialization run status for TP2 calibration.

### Syntax

```
TP2CAL:EQUIP:INIT <0 | 1>
```

### Inputs

<0 | 1>

0 - Stop the equipment initialization run.

1 - Start the equipment initialization run.

### Outputs

NA

## TP2CAL:CMI:RUN

This command sets the CMI calibration run status.

### Syntax

```
TP2CAL:CMI:RUN <0 | 1>
```

### Inputs

<0 | 1>

0 - Stop the CMI calibration run.

1 - Start the CMI calibration run.

### Outputs

NA

## TP2CAL:ILMEAS:RUN

This command sets the channel loss calculation run status.

### Syntax

```
TP2CAL:ILMEAS:RUN <0 | 1>
```

### Inputs

<0 | 1>

0 - Stop the channel loss calculation run.

1 - Start the channel loss calculation run.

### Outputs

NA

## TP2CAL:CTLEANDPRESET:RUN

This command sets the CTLE and preset selection run status.

## Syntax

TP2CAL:CTLEANDPRESET:RUN <0 | 1>

## Inputs

<0 | 1>

0 - Stop the CTLE and preset selection run.

1 - Start the CTLE and preset selection run.

## Outputs

NA

## TP2CAL:STRESSEDEYE:RUN

This command sets the stressed eye calibration run status.

## Syntax

TP2CAL:STRESSEDEYE:RUN <0 | 1>

## Inputs

<0 | 1>

0 - Stop the stressed eye calibration run.

1 - Start the stressed eye calibration run.

## Outputs

NA

## TP2CAL:EQUIP:STATUS

This command returns the equipment initialization run status for TP2 calibration.

## Syntax

TP2CAL:EQUIP:STATUS?

## Inputs

NA

## Outputs

{InProgress | Done}

## TP2CAL:CMI:STATUS

This command returns the CMI calibration run status for TP2 calibration.

## Syntax

TP2CAL:CMI:STATUS?

## Inputs

NA

## Outputs

{InProgress | Done}

## TP2CAL:ILMEAS:STATUS

This command returns the channel loss calculation run status for TP2 calibration.

### Syntax

TP2CAL:ILMEAS:STATUS?

### Inputs

NA

### Outputs

{InProgress | Done}

## TP2CAL:CTLEANDPRESET:STATUS

This command returns the CTLe and Preset selection run status for TP2 calibration.

### Syntax

TP2CAL:CTLEANDPRESET:STATUS?

### Inputs

NA

### Outputs

{InProgress | Done}

## TP2CAL:STRESSEDEYE:STATUS

This command returns the stressed eye calibration run status for TP2 calibration.

### Syntax

TP2CAL:STRESSEDEYE:STATUS?

### Inputs

NA

### Outputs

{InProgress | Done}

## TP2CAL:DMI:SETTING

This command returns the DMI calibrated value for TP2 calibration.

### Syntax

TP2CAL:DMI:SETTING?

## Inputs

NA

## Outputs

<float>

# TP2CAL:CMI:SETTING

This command returns the CMI calibrated value for TP2 calibration.

## Syntax

TP2CAL:CMI:SETTING?

## Inputs

NA

## Outputs

<int>

# TP2CAL:SAVE:ID

This command sets or returns the unique identifier used as key to save the report in database for TP2 calibration.

## Syntax

TP2CAL:SAVE:ID <String>

TP2CAL:SAVE:ID?

## Inputs

<String>

## Outputs

<String>

# TP2CAL:SAVE:GENERATEDBY

This command sets or returns the creator name who save the report in database for TP2 calibration.

## Syntax

TP2CAL:SAVE:GENERATEDBY <String>

TP2CAL:SAVE:GENERATEDBY?

## Inputs

<String>

## Outputs

<String>

## TP2CAL:SAVE:COMMENTS

This command sets or returns the comments given to save the report in database for TP2 calibration.

### Syntax

```
TP2CAL:SAVE:COMMENTS <String>
```

```
TP2CAL:SAVE:COMMENTS?
```

### Inputs

<String>

### Outputs

<String>

## TP2CAL:ILMEASFORDMI:RUN

This command sets the run status for Insertion loss calculation before DMI/CMI in TP2 calibration.

### Syntax

```
TP2CAL:ILMEASFORDMI:RUN <0 | 1>
```

### Inputs

<0 | 1>

0 - Stop the Insertion loss calculation before DMI/CMI.

1 - Start the Insertion loss calculation before DMI/CMI.

### Outputs

NA

## TP2CAL:ILMEASFORDMI:STATUS

This command returns the run status of Insertion loss calculation before DMI/CMI in TP2 calibration.

### Syntax

```
TP2CAL:ILMEASFORDMI:STATUS?
```

### Inputs

NA

### Outputs

{InProgress | Done}

## TP2CAL:STRESSEDEYE:ACQUISITIONS

This command sets or returns the number of acquisitions value for TP2 stressed eye calibration.

### Syntax

```
TP2CAL:STRESSEDEYE:ACQUISITIONS<int>
```

```
TP2CAL:STRESSEDEYE:ACQUISITIONS?
```

## Inputs

<int> 1 to 20

## Outputs

<int>

# TP2CAL:DMI:RUN

This command sets the run status for TP2 DMI calibration.

## Syntax

TP2CAL:DMI:RUN <0 | 1>

## Inputs

<0 | 1>

0 - Stop the TP2 DMI calibration.

1 - Start the TP2 DMI calibration.

## Outputs

NA

# TP2CAL:DMI:STATUS

This command returns the TP2 DMI calibration run status.

## Syntax

TP2CAL:DMI:STATUS?

## Inputs

NA

## Outputs

{InProgress | Done}

# TP2CAL:CTLEANDPRESET:ACQUISITIONS

This command sets or returns the number of acquisitions value for CTLE or Preset selection in TP2 calibration.

## Syntax

TP2CAL:CTLEANDPRESET:ACQUISITIONS<int>

TP2CAL:CTLEANDPRESET:ACQUISITIONS?

## Inputs

<int> 1 to 20

## Outputs

<int>

## TP2CAL:CTLE:ESTIMATOR

This command sets or returns the CTLE Estimation method for TP2 calibration.

### Syntax

```
TP2CAL:CTLE:ESTIMATOR <0 | 1>
```

```
TP2CAL:CTLE:ESTIMATOR?
```

### Inputs

<0 | 1>

0 - Indicates the CTLE method is automatic.

1 - Indicates the CTLE method is manual.

### Outputs

<0 | 1>

## TP2CAL:SEASIMCTLE:GEN5

This command sets or returns the manual Seasim CTLE value to be applied on the waveform.

### Syntax

```
TP2CAL:SEASIMCTLE:Gen5 <int>
```

```
TP2CAL:SEASIMCTLE:Gen5?
```

### Inputs

<int> 0 to 10

### Outputs

<int>

## TP2CAL:STRESSEDEYE:SJ

This command sets or returns the SJ stress value for Manual Stressed Eye Calibration run.

### Syntax

```
TP2CAL:STRESSEDEYE:SJ <float>
```

```
TP2CAL:STRESSEDEYE:SJ?
```

### Inputs

<float> 1 to 5

### Outputs

<float>

## TP2CAL:STRESSEDEYE:DMI

This command sets or returns the DMI stress value for Manual Stressed Eye Calibration run.

## Syntax

TP2CAL:STRESSEDEYE:DMI <float>

TP2CAL:STRESSEDEYE:DMI?

## Inputs

<float> 5 to 30

## Outputs

<float>

# TP2CAL:STRESSEDEYE:AMPLITUDE

This command sets or returns the amplitude value for Manual Stressed Eye Calibration run.

## Syntax

TP2CAL:STRESSEDEYE:AMPLITUDE<int>

TP2CAL:STRESSEDEYE:AMPLITUDE?

## Inputs

<int> 720 to 800

## Outputs

<int>

# TP2CAL:STRESSEDEYE:MANUALCALRUN

This command sets or returns the enable or disable status of the manual calibration run for stressed eye.

## Syntax

TP2CAL:STRESSEDEYE:MANUALCALRUN {0 | 1}

TP2CAL:STRESSEDEYE:MANUALCALRUN?

## Inputs

{0 | 1}

0 - Indicates to disable the manual calibration run.

1 - Indicates to enable the manual calibration run.

## Outputs

{0 | 1}

# TP2CAL:IL:MODE

This command sets or returns the type of insertion loss in TP2 calibration.

## Syntax

TP1CAL:IL:MODE <0 | 1>

TP1CAL:IL:MODE?



## Inputs

<0 | 1>

0 - Indicates the insertion loss type is manual entry.

1 - Indicates the insertion loss type is Measure loss.

## Outputs

<0 | 1>

# TP2CAL:MANUAL:IL

This command sets or returns the manual insertion loss value for TP2 calibration.

## Syntax

TP2CAL:MANUAL:IL <float>

TP2CAL:MANUAL:IL?

## Inputs

<float> 0 to 50

## Outputs

<float>

# TP2CAL:IL:SCOPEACQS

This command sets or returns the value for scope acquisitions for insertion loss in TP2 calibration.

## Syntax

TP2CAL:IL:SCOPEACQS <int>

TP2CAL:IL:SCOPEACQS?

## Inputs

16 to 2048

## Outputs

<int>

# TP2CAL:IL:AVGS

This command sets or returns the value for the number of waveforms averages for insertion loss in TP2 calibration.

## Syntax

TP2CAL:IL:AVGS <int>

TP2CAL:IL:AVGS?

## Inputs

1 to 10

## Outputs

<int>

## TP2CAL:CTLEANDPRESET:CHKCTLE

This command check and uncheck the check box for specific CTLE's

### Syntax

```
TP2CAL:CTLEANDPRESET:CHKCTLE <5 to 15> <1 | 0>
```

```
TP2CAL:CTLEANDPRESET:CHKCTLE <5 to 15>?
```

### Inputs

<5 to 15> corresponds to CTLE's 5p5 to 15p5

<1 | 0>, 1 for check and 0 for uncheck

### Outputs

<1 | 0>

## TP2CAL:CTLEANDPRESET:CHKPRESET

This command check and uncheck the check box for specific Presets.

### Syntax

```
TP2CAL:CTLEANDPRESET:CHKPRESET <0 to 9> <1 | 0>
```

```
TP2CAL:CTLEANDPRESET:CHKPRESET <0 to 9>?
```

### Inputs

<0 to 9> corresponds to Presets P0 to P9

<1 | 0>, 1 for check and 0 for uncheck

### Outputs

<1 | 0>

## TP2CAL:STRESSEDEYE:EXHAUSTIVESWEEP

This command sets or returns the min, max settings for the specified sweep parameter for Exhaustive Sweep.

### Syntax

```
TP2CAL:STRESSEDEYE:EXHAUSTIVESWEEP <string> <double/int>
```

```
TP2CAL:STRESSEDEYE:EXHAUSTIVESWEEP? <string>
```

### Inputs

<string> (Sweep Parameter) - Indicates the parameter for which min, max value needs to be set. The Sweep parameters can be Amplitude, SJ, DMI

<double/int> (MIN,MAX) - Indicates the min, max settings for the specified sweep parameter.



**Note:** If sweep parameter is amplitude then min, max values should be of type <int> or <double>

The min, max values should be within the below range:

1. 720 – 800 mV for Amplitude.
2. 1 – 5 ps for SJ.
3. 5 – 30 mV for DMI.

#### Example

TP2CAL:STRESSEDEYE:EXHAUSTIVESWEEP SJ 1,5.

#### Output

<double/int>

#### Example

TP2CAL:STRESSEDEYE:EXHAUSTIVESWEEP SJ?

1,5.

## TP2CAL:STRESSEDEYE:LINEARSWEEP

This command sets or returns the initial, min, max settings for the specified sweep parameter for Linear Sweep.

#### Syntax

TP2CAL:STRESSEDEYE:LINEARSWEEP <string> <double/int>

TP2CAL:STRESSEDEYE:LINEARSWEEP? <string>

#### Inputs

<string> (Sweep Parameter) - Indicates the parameter for which initial, min, max value needs to be set. The Sweep parameters can be Amplitude, SJ, DMI

<double/int> (Initial,MIN,MAX) - Indicates the Initial, min, max settings for the specified sweep parameter.



**Note:** If sweep parameter is amplitude then initial, min, max values should be of type <int> or <double>

The initial min, max values should be within the below range:

1. 720 – 800 mV for Amplitude.
2. 1 – 5 ps for SJ.
3. 5 – 30 mV for DMI.

#### Example

TP2CAL:STRESSEDEYE:LINEARSWEEP SJ 3.125,1,5.

#### Output

<double/int>

#### Example

TP2CAL:STRESSEDEYE:LINEARSWEEP SJ?

3.125,1,5.

## TP2CAL:STRESSEDEYE:EXHAUSTIVE

This command sets or returns enable or disable status of Exhaustive Sweep for TP2 Stressed Eye Calibration

### Syntax

TP2CAL:STRESSEDEYE:EXHAUSTIVE <0 / 1>

TP2CAL:STRESSEDEYE:EXHAUSTIVE?

### Inputs

<0 / 1>

0 - Indicates the Exhaustive Sweep is disabled.

1 - Indicates the Exhaustive Sweep is enabled.

### Output

<0 | 1>

## TP2CAL:STRESSEDEYE:STEP SIZE

The Command sets or returns the step size settings for the specified sweep parameter of TP2 Calibration

### Syntax

TP2CAL:STRESSEDEYE:STEP SIZE <string> <double/int>

TP2CAL:STRESSEDEYE:STEP SIZE? <string>

### Inputs

<string> (Sweep Parameter) - Indicates the parameter for which step size value needs to be set. The Sweep parameters can be Amplitude, SJ, DMI

<double/int> (Step Size) - Indicates the step size value for the specified sweep parameter



**Note:** If sweep parameter is amplitude then step size value should be of type <int> or <double>

The Step Size values should be within the below range:

1. 2 – 20 mV for Amplitude.
2. 0.1 – 0.25 ps for SJ.
3. 0.1 – 2.5 mV for DMI.

### Example

TP2CAL:STRESSEDEYE:STEP SIZE SJ 0.25.

### Output

<double/int>

### Example

TP2CAL:STRESSEDEYE: STEP SIZE SJ?

0.25.

## LOOPBACK:SELECT:PRESETSNAME

This command sets or returns the PCIe Preset, controls preshoot and deemphasis values.

### Syntax

```
LOOPBACK:SELECT:PRESETSNAME <int>
```

```
LOOPBACK:SELECT:PRESETSNAME?
```

### Inputs

<int> 0-11; P0-P10 for Corresponding Preset and 11 for Custom Preset

### Outputs

<int>

## LOOPBACK:SELECT:PRESETSPRESHOOT

This command sets or returns the preshoot value to be applied during loopback training.

### Syntax

```
LOOPBACK:SELECT:PRESETSPRESHOOT <float>
```

```
LOOPBACK:SELECT:PRESETSPRESHOOT?
```

### Inputs

<float> 0 to 12

### Outputs

<float>

## LOOPBACK:SELECT:PRESETSDEEMPHASIS

This command sets or returns the preset deemphasis value to be applied during loopback training.

### Syntax

```
LOOPBACK:SELECT:PRESETSDEEMPHASIS <float>
```

```
LOOPBACK:SELECT:PRESETSDEEMPHASIS?
```

### Inputs

<float> -20 to 0

### Outputs

<float>

## LOOPBACK:SELECT:BERTCTLEMODE

This command sets or returns the BERT CTLE mode.

### Syntax

```
LOOPBACK:SELECT:BERTCTLEMODE <0 | 1>
```

```
LOOPBACK:SELECT:BERTCTLEMODE?
```

### Inputs

<0 | 1>

0 - Indicates BERT CTLE mode is Automatic.

1 - Indicates BERT CTLE mode is Manual.

### Outputs

<0 | 1>

## LOOPBACK:SELECT:BERTCTLETYPE

This command sets or returns the BERT CTLE Type when loopback configuration type selected is forced loopback.

### Syntax

```
LOOPBACK:SELECT:BERTCTLETYPE<0 | 1>
```

```
LOOPBACK:SELECT:BERTCTLETYPE?
```

### Inputs

<0 | 1>

0 - Indicates the BERT CTLE type is OFF.

1 - Indicates the BERT CTLE type is ON.

### Outputs

<0 | 1>

## LOOPBACK:SELECT:AUTOSEARCHMODE

This command sets or returns the auto search mode when loopback configuration type selected is forced loopback.

### Syntax

```
LOOPBACK:SELECT:AUTOSEARCHMODE <0 | 1>
```

```
LOOPBACK:SELECT:AUTOSEARCHMODE?
```

### Inputs

<0 | 1>

0 - Indicates the auto search mode is Fine.

1 - Indicates the auto search mode is Coarse.

### Outputs

<0 | 1>

## LOOPBACK:SELECT:BERTCTLEVALUE

This command sets or returns the BERT CTLE value.

### Syntax

```
LOOPBACK:SEL:BERTCTLEVALUE <float>
```

LOOPBACK:SEL:BERTCTLEVALUE?

### Inputs

<float> -12 to 0.

### Outputs

<float>

## LOOPBACK:SEL:PATTERN TYPE

This command sets or returns the pattern used for BER Measurement.

### Syntax

LOOPBACK:SELECT:PatternType <0 | 1 | 2 | 3 | 4 | 5 | 6 | 7>

LOOPBACK:SELECT:PatternType?

### Inputs

0 indicates that Pattern type is Modified Compliance.

1 indicates that Pattern type is Compliance.

2 indicates that Pattern type is Clock Pattern.

3 indicates that Pattern type is PRBS7.

4 indicates that Pattern type is PRBS11.

5 indicates that Pattern type is PRBS15.

6 indicates that Pattern type is PRBS20.

7 indicates that Pattern type is PRBS23.

### Outputs

<0 | 1 | 2 | 3 | 4 | 5 | 6 | 7>

## TEST:SELECT:TESTDURATION

This command sets or returns the test length duration value.

### Syntax

TEST:SELECT:TESTDURATION <float>

TEST:SELECT:TESTDURATION?

### Inputs

<float> 1 to 1000

### Outputs

<float>

## TEST:SELECT:STRESSCONFIGTYPE

This command sets or returns the required stress config type.

## Syntax

```
TEST:SELECT:STRESSCONFIGTYPE <0 | 1 | 2>
```

```
TEST:SELECT:STRESSCONFIGTYPE?
```

## Inputs

0 indicates that stress config type is calibrated.

1 indicates that stress config type is customized

2 indicates that stress config type is un-calibrated.

## Outputs

<0 | 1 | 2>

## TEST:SELECT:AMP

This command sets or returns the amplitude value used for the test.

## Syntax

```
TEST:SELECT:AMP <int>
```

```
TEST:SELECT:AMP?
```

## Inputs

<int> 100 to 800 for customized stress selection.

<int> 100 to 650 for un-calibrated stress selection.

## Outputs

<int>

## TEST:SELECT:DMI

This command sets or returns the DMI value to be used for non-compliance test.

## Syntax

```
TEST:SELECT:DMI <float>
```

```
TEST:SELECT:DMI?
```

## Inputs

<float> 0 to 200

## Outputs

<float>

## TEST:SELECT:CMI

This command sets or returns the CMI value to be used for non-compliance test.

## Syntax

```
TEST:SELECT:CMI <float>
```



```
TEST:SELECT:CMI?
```

### Inputs

<float> 0 to 250

### Outputs

<float>

## TEST:SELECT:RJ

This command sets or returns the RJ value used for the test.

### Syntax

```
TEST:SELECT:RJ <float>
```

```
TEST:SELECT:RJ?
```

### Inputs

<float> 0 to 15.5 for customized stress selection.

<float> 0 to 0.496 for un-calibrated stress selection.

### Outputs

<float>

## TEST:SELECT:SJ

This command sets or returns the SJ value used for the test.

### Syntax

```
TEST:SELECT:SJ <float>
```

```
TEST:SELECT:SJ?
```

### Inputs

<float> 0 to 15.62 for customized stress selection.

<float> 0 to 0.5 for un-calibrated stress selection.

### Outputs

<float>

## TEST:SELECT:BER

This command sets or returns the BER value over which the test should be done.

### Syntax

```
TEST:SELECT:BER <int>
```

```
TEST:SELECT:BER?
```

### Inputs

<int> 9 to 20

## Outputs

<int>

## TEST:SELECT:ERRORLIMIT

This command sets or returns the maximum errors limit value.

### Syntax

```
TEST:SELECT:ERRORLIMIT <int>
```

```
TEST:SELECT:ERRORLIMIT?
```

### Inputs

<int> 1 to 1000

### Outputs

<int>

## JTOLTEST:OPEN

This command opens the JTOL test panel.

### Syntax

```
JTOLTEST:OPEN
```

### Inputs

NA

### Outputs

NA

## JTOLTEST:WIZARD:OPEN

This command opens the JTOL test wizard.

### Syntax

```
JTOLTEST:WIZARD:OPEN
```

### Inputs

NA

### Outputs

NA

## JTOLTEST:WIZARD:CLOSE

This command closes the JTOL test wizard.

### Syntax

```
JTOLTEST:WIZARD:CLOSE
```

**Inputs**

NA

**Outputs**

NA

**JTOLTEST:SELECT:TP2FILE**

This command sets or returns the selected TP2 calibration file for the JTOL test.

**Syntax**

```
JTOLTEST:SELECT:TP2FILE <String>
```

```
JTOLTEST:SELECT:TP2FILE:FILE?
```

**Inputs**

&lt;String&gt;

**Outputs**

&lt;String&gt;

**JTOLTEST:SELECT:CUSTOM:MASK**

This command sets or returns the enable or disable status of configuring user-defined mask for the JTOL test.

**Syntax**

```
JTOLTEST:SELECT:CUSTOM:MASK {0 | 1}
```

```
JTOLTEST:SELECT:CUSTOM:MASK?
```

**Inputs**

{0 | 1}

0 - Indicates that custom mask is disabled.

1 - Indicates that custom mask is enabled.

**Outputs**

{0 | 1}

**JTOLTEST:MIN:FREQ**

This command sets or returns the minimum frequency value for JTOL test.

**Syntax**

```
JTOLTEST:MIN:FREQ <float>
```

```
JTOLTEST:MIN:FREQ?
```

**Inputs**

&lt;float&gt; 0.03 to 99

## Outputs

<float>

## JTOLTEST:MAX:FREQ

This command sets or returns the maximum frequency value for JTOL test.

### Syntax

```
JTOLTEST:MAX:FREQ <float>
```

```
JTOLTEST:MAX:FREQ?
```

### Inputs

<float> 1 to 100

## Outputs

<float>

## JTOLTEST:FREQ:POINTS

This command sets or returns the number of SJ Frequencies for JTOL Test.

### Syntax

```
JTOLTEST:FREQ:POINTS <int>
```

```
JTOLTEST:FREQ:POINTS?
```

### Inputs

<int> 1 to 14

## Outputs

<int>

## JTOLTEST:FREQ:GENERATE

This command generates frequency in grid view.

### Syntax

```
JTOLTEST:FREQ:GENERATE
```

### Inputs

NA

## Outputs

NA

## JTOLTEST:FREQ:DEFAULT

This command loads the grid with calibrated SJ-tone values.

**Syntax**

```
JTOLTEST:FREQ:DEFAULT
```

**Inputs**

NA

**Outputs**

NA

**JTOLTEST:SELECT:RELAXATION**

This command sets or returns the relaxation time to ignore the BER bits before running every amplitude points in JTOL test.

**Syntax**

```
JTOLTEST:SELECT:RELAXATION <int>
```

```
JTOLTEST:SELECT:RELAXATION?
```

**Inputs**

<int> 1 to 10

**Outputs**

<int>

**JTOLTEST:SEARCH:ALGO**

This command sets or returns the selected search algorithm type for JTOL test.

**Syntax**

```
JTOLTEST:SEARCH:ALGO <0 | 1 | 2 | 3 | 4 | 5>
```

```
JTOLTEST:SEARCH:ALGO?
```

**Inputs**

0 indicates that search algorithm type is Binary.

1 indicates that search algorithm type is Downwards linear.

2 indicates that search algorithm type is Downwards log.

3 indicates that search algorithm type is Upwards linear.

4 indicates that search algorithm type is Upwards log.

5 indicates that search algorithm type is Binary+Linear.

**Outputs**

<0 | 1 | 2 | 3 | 4 | 5>

**JTOLTEST:RUN**

This commands sets the run status of JTOL test.

## Syntax

JTOLTEST:RUN <0 | 1>

## Inputs

<0 | 1>

0 - Stop the JTOL test run.

1 - Start the JTOL test run.

## Outputs

NA

## JTOLTEST:SAVE:ID

This command sets or returns the unique identifier used as key to save the report in database for JTOL test.

## Syntax

JTOLTEST:SAVE:ID <String>

JTOLTEST:SAVE:ID?

## Inputs

<String>

## Outputs

<String>

## JTOLTEST:SAVE:GENERATEDBY

This command sets or returns the creator name who save the report in database for JTOL test.

## Syntax

JTOLTEST:SAVE:GENERATEDBY <String>

JTOLTEST:SAVE:GENERATEDBY?

## Inputs

<String>

## Outputs

<String>

## JTOLTEST:SAVE:COMMENTS

This command sets or returns the comments given to save the report in database for JTOL test.

## Syntax

JTOLTEST:SAVE:COMMENTS <String>

JTOLTEST:SAVE:COMMENTS?

**Inputs**

&lt;String&gt;

**Outputs**

&lt;String&gt;

**JTOLTEST:SAVE**

This command saves the current JTOL test file to the database.

**Syntax**`JTOLTEST:SAVE`**Inputs**

NA

**Outputs**

NA

**JTOLTEST:RUNSTATUS**

This command returns the JTOL test run status.

**Syntax**`JTOLTEST:RUNSTATUS?`**Inputs**

NA

**Outputs**

{InProgress | Done}

**JTOLTEST:FREQ**

This command returns the JTOL test result for the specified frequency.

**Syntax**`JTOLTEST:FREQ <Freq>?`**Inputs**

&lt;Freq&gt; = &lt;int&gt; Frequency for which JTOL results need to be shown.

**Outputs**

&lt;String&gt;

**JTOLTEST:PLOT:POINTS**

This command returns the number of plotted points in JTOL test plot.

## Syntax

JTOLTEST:PLOT:POINTS?

## Inputs

NA

## Outputs

<int>

# JTOLTEST:SELECT:SJAMPUNITS

This command sets or returns the SJ Amplitude unit for JTOL test.

## Syntax

JTOLTEST:SELECT:SJAMPUNITS <0 | 1>

JTOLTEST:SELECT:SJAMPUNITS?

## Inputs

<0 | 1>

0 - Indicates the unit is ps.

1 - Indicates the unit is UI p-p.

## Outputs

<0 | 1>

# JTOLTEST:SELECT:CLOCKTYPE

This command sets or returns the clock type used for JTOL test.

## Syntax

JTOLTEST:SELECT:CLOCKTYPE <0 | 1>

JTOLTEST:SELECT:CLOCKTYPE?

## Inputs

<0 | 1>

0 - Indicates the clock type is 100 MHz External.

1 - Indicates the clock type is Internal.

## Outputs

<0 | 1>

# JTOLTEST:PLOT

This command displays the JTOL test results plot.

## Syntax

JTOLTEST:PLOT



**Inputs**

NA

**Outputs**

NA

**JTOLTEST:TABLE**

This command displays the JTOL test results table.

**Syntax**

```
JTOLTEST:TABLE
```

**Inputs**

NA

**Outputs**

NA

**JTOLTEST:SELECT:DUTTYPE**

This command sets or returns the DUT Type used for JTOL test.

**Syntax**

```
JTOLTEST:SELECT:DUTTYPE <0 | 1>
```

```
JTOLTEST:SELECT:DUTTYPE?
```

**Inputs**

```
<0 | 1>
```

0 - Indicates the DUT type is Non-RootComplex.

1 - Indicates the DUT type is RootComplex.

**Outputs**

```
<0 | 1>
```

**JTOLTEST:JITTERSTEP:HIGHFREQ**

This command sets or returns the jitter step size/ratio (high frequency) value for linear and log based search algorithms respectively.

**Syntax**

```
JTOLTEST:JITTERSTEP:HIGHFREQ <int>
```

```
JTOLTEST:JITTERSTEP:HIGHFREQ?
```

**Inputs**

<int> = 0.01 to 1 for log algorithms / 0.004 to 0.5 for linear algorithms.

**Outputs**

```
<int>
```

## JTOLTEST:JITTERSTEP:LOWFREQ

This command sets or returns the jitter step size/ratio (low frequency) value for linear and log based search algorithms respectively.

### Syntax

```
JTOLTEST:JITTERSTEP:LOWFREQ <int>
```

```
JTOLTEST:JITTERSTEP:LOWFREQ?
```

### Inputs

<int> = 0.01 to 1 for log algorithms / 0.004 to 75 for linear algorithms.

### Outputs

<int>

## JTOLTEST:JITTERSTEP:MIDDLEFREQ

This command sets or returns the jitter step size/ratio (middle frequency) value for linear and log based search algorithms respectively.

### Syntax

```
JTOLTEST:JITTERSTEP:MIDDLEFREQ <int>
```

```
JTOLTEST:JITTERSTEP:MIDDLEFREQ?
```

### Inputs

<int> = 0.01 to 1 for log algorithms / 0.004 to 7.5 for linear algorithms.

### Outputs

<int>

## JTOLTEST:JITTERSTEP:VERYLOWFREQ

This command sets or returns the jitter step size/ratio (very low frequency) value for linear and log based search algorithms respectively.

### Syntax

```
JTOLTEST:JITTERSTEP:VERYLOWFREQ <int>
```

```
JTOLTEST:JITTERSTEP:VERYLOWFREQ?
```

### Inputs

<int> = 0.01 to 1 for log algorithms / 0.004 to 1000 for linear algorithms.

### Outputs

<int>