



**PCIe PLL BW
Transmitter Test
Application Help**



077-1740-02



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Transmitter Test
Application Help**

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077-1740-02 June 2023

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Welcome

The PCIe PLL BW Tx application performs the test as per the PCI Express Base Specification Revision 6.0.

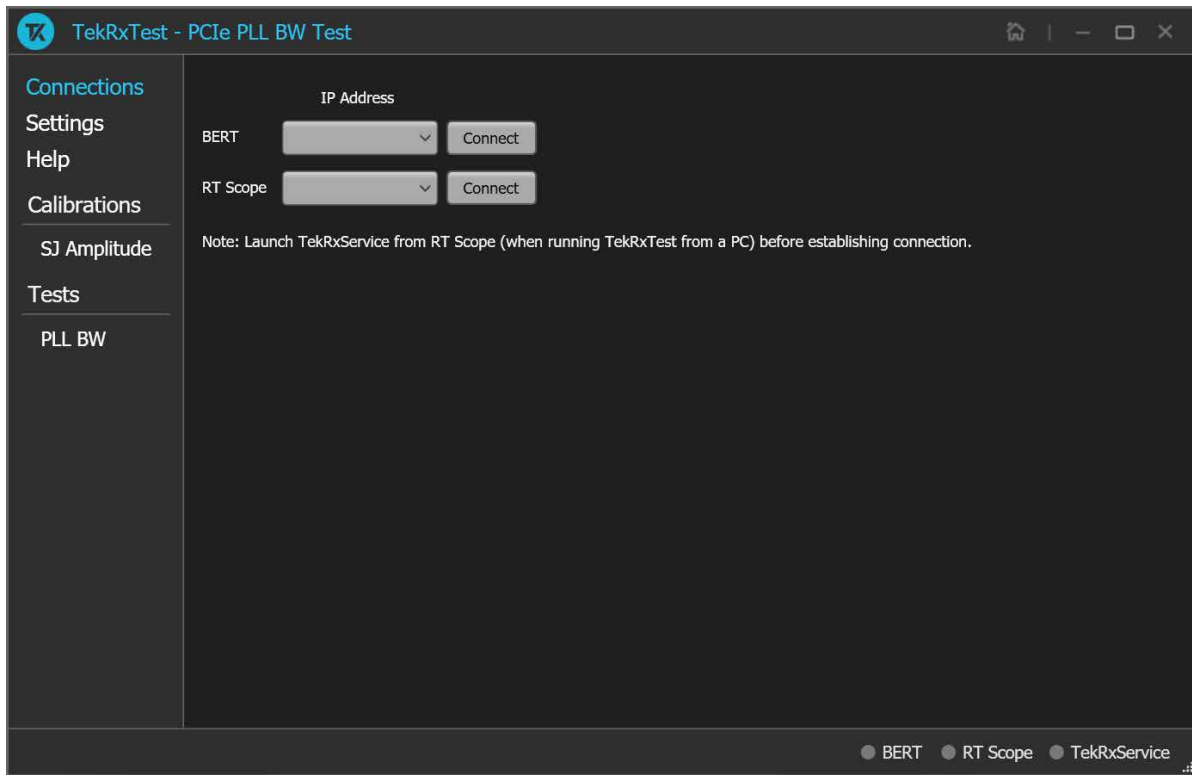


Figure 1: TekRxTest - PCIe PLL BW Tx application

PCIe PLL Bandwidth and Peaking test is accomplished by connecting the output of BERT PPG (which can produce specific PCIe PLL BW 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 sinusoidal jitter at the configured SJ tones to a reference clock waveform. Output of the DUT is connected to the RT Scope to measure how much SJ passes through the DUT's Tx PLL for a certain SJ tone. Upon performing the process across multiple tones gives us the PLL frequency response indicating the PLL Bandwidth and peaking.

Key features and benefits

- SJ Amplitude Calibration and PLL BW test comes as a part of the receiver solution.
- Jointly with Anritsu BERT MP1900A series, the solution provides the tools and flexibility required to observe real-time performance for PLL BW devices for PCIe Gen3, Gen4, Gen5, and Gen6.
- Reliable and accurate results reduce the test execution time and minimize the skillset required to perform calibration and testing.
- Detailed reports are at one's disposal for the calibration and test modules.

Getting help and support

Related documentation

The following documentation is available as part of the **PCIe PLL BW TekRxTest** application.

Table 1: Product documentation

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

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.

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

This section lists the accessories and test fixtures required to perform the tests.

Table 2: Required equipment and accessories

Equipment	Vendor	Type	R/O	Qty	Description
MP1900A	Anritsu	Equipment	Required	1	BERT
DPS73304SX	Tektronix	Equipment	Required	1	Single Stack 33GHz or better (e.g. Dual Stack 50GHz Sx Scope)
DPO7AFP	Tektronix	Accessory	Required	1	Auxiliary Front Panel
DPO7RFK2	Tektronix	Accessory	Optional	2	Attenuator Kit (Only for ATI channels)
103-047-00	Tektronix	Accessory	Optional	2	Connector Savers (1.85mm) (Only for ATI channels)
Adaptor (1.85 mm M – 2.92 mm F)	Tektronix	Accessory	Optional	2	Only for ATI channels
PMCABLE1M	Tektronix	Accessory	Required	2	Cable pair; 2.92-to-2.92mm, Straight, 1.5ps matched, 1000mm, 40GHz
DJA	Tektronix	Software	Required	1	DPOJET Advanced option
TF-PCIE5-CEM-X1* ¹	Tektronix or PCI-SIG	Accessory	Required	1	Gen 5 and Gen 6 CEM Test Fixtures
TF-PCIE5-CEM-X16*		Accessory	Required		
Z2025A PCIe CBB Controller	Anritsu	Equipment	Optional	1	PCIe CBB Controller
RXSW-NLP-PLLBW-PCEG5 or	Tektronix	Software	Required	1	License; PLLBW Gen 6/5/4/3 automation software for TEK scopes and Anritsu BERT; Perpetual; Node-Locked
RXSW-NL1-PLLBW-PCEG5 or					License; PLLBW Gen 6/5/4/3 Receiver automation software for TEK scopes and Anritsu BERT; 1 year subscription; Node-Locked
RXSW-FLP-PLLBW-PCEG5 or					License; PLLBW Gen 6/5/4/3 Receiver automation software for TEK scopes and Anritsu BERT; Perpetual; Floating
RXSW-FL1-PLLBW-PCEG5					License; PLLBW Gen 6/5/4/3 automation software for TEK scopes and Anritsu BERT; 1 year subscription; Floating

Installing the software

Follow the below steps to download and install the latest PCIe PLL BW TekRxTest application.

¹ * MMPX cables and MMPX to SMA adaptor cables for test fixture connections are included with the fixture kit

1. Go to www.tek.com.
2. Click **Downloads**. In the Download menu, select DOWNLOAD TYPE as Software and enter **PCIe PLL BW** 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 to install the software (Real-time oscilloscope or PC).
5. Follow the installation instructions that is available in the website. The software is installed at `C:\ProgramFiles\Tektronix\BERTScope\RxTest60`.
6. Click the shortcut icon on the desktop to launch the application.



Note:


- The PCIe PLL BW TekRxTest application can be installed on a Tektronix real-time oscilloscope or a PC (Optional).

Operating basics

Launch the application

To launch the PCIe PLL BW TekRxTest application, click the shortcut icon **TekRxTest** on the desktop and select **PCIe PLL BW Test** in the 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.

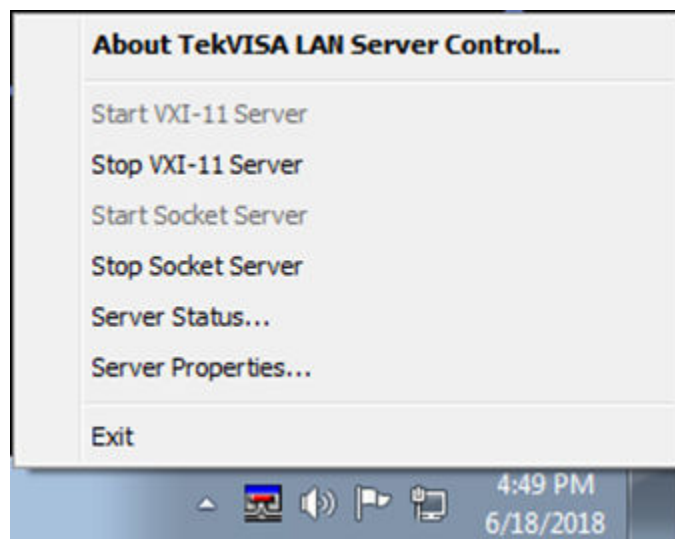


Figure 2: Launch Real-Time Oscilloscope



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 PCIe PLL BW 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.



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 PCIe PLL BW test application uses panels to group the configurations and settings. Click 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.

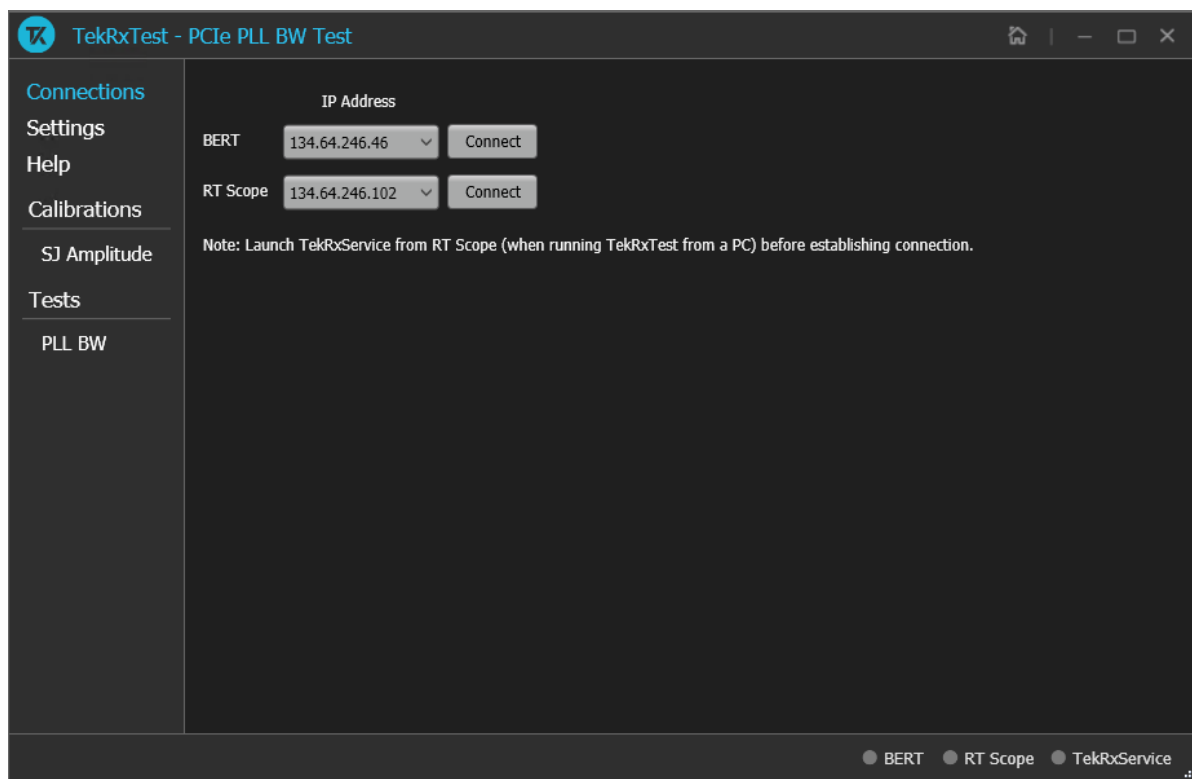


Figure 3: Application panels overview


Table 3: Application panels overview

Parameter	Description
Connections	This panel displays the Real-Time Oscilloscope and Bit Error Rate Tester (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 BERT, RT Scope, and the Remote Access.
Help	This panel displays the application help.
Calibrations	This panel allows you to configure the calibration parameters for SJ Amplitude and save the results.
Tests	This panel allows you to configure the PLL BW test settings and save the results.

Connections panel

The connections panel allows you to connect to a real-time oscilloscope and BERT with the PCIe PLL BW TekRxTest application. Enter the IP address of these instruments and click **Connect** to establish the connection.

Table 4: Connections panel

Connections	Description
BERT	<p>Enter the BERT IP address in the address field and click Connect. When the BERT is connected successfully, the BERT indicator in the right end corner of the application turns green.</p> <p> Note: It is recommended to launch the MP1900A software in the administrator mode to use the TekRxTest Application in the BERT.</p>
RT Scope	<p>Enter the RT Scope IP address in the address field and click Connect. When the RT Scope is connected successfully, the RT Scope indicator in the right end corner of the application turns green.</p>

Settings panel

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

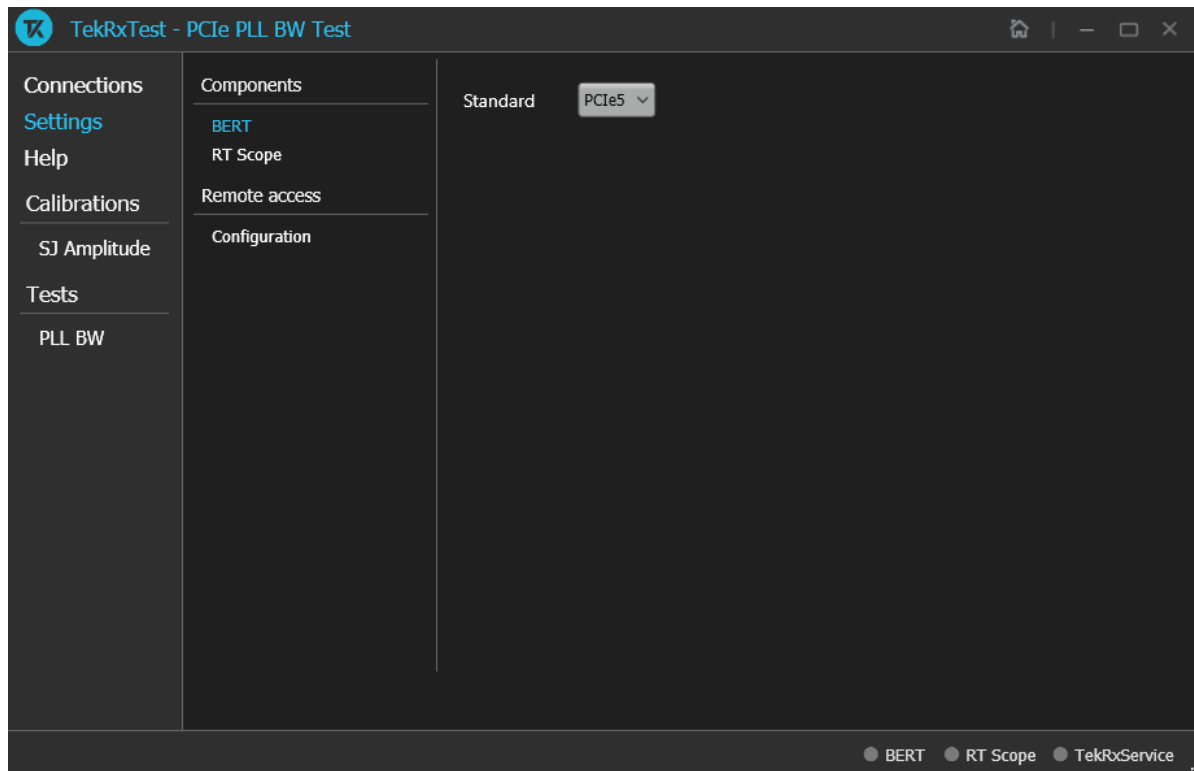


Figure 4: Settings panel

Components settings

The basic settings display the parameters for BERT, RT Scope, and Remote access.

Components: BERT

Table 5: Components - BERT

Parameter	Description
Standard	Select the generation of the DUT for which PLL Bandwidth and Peaking test has to run.

Components: RT Scope

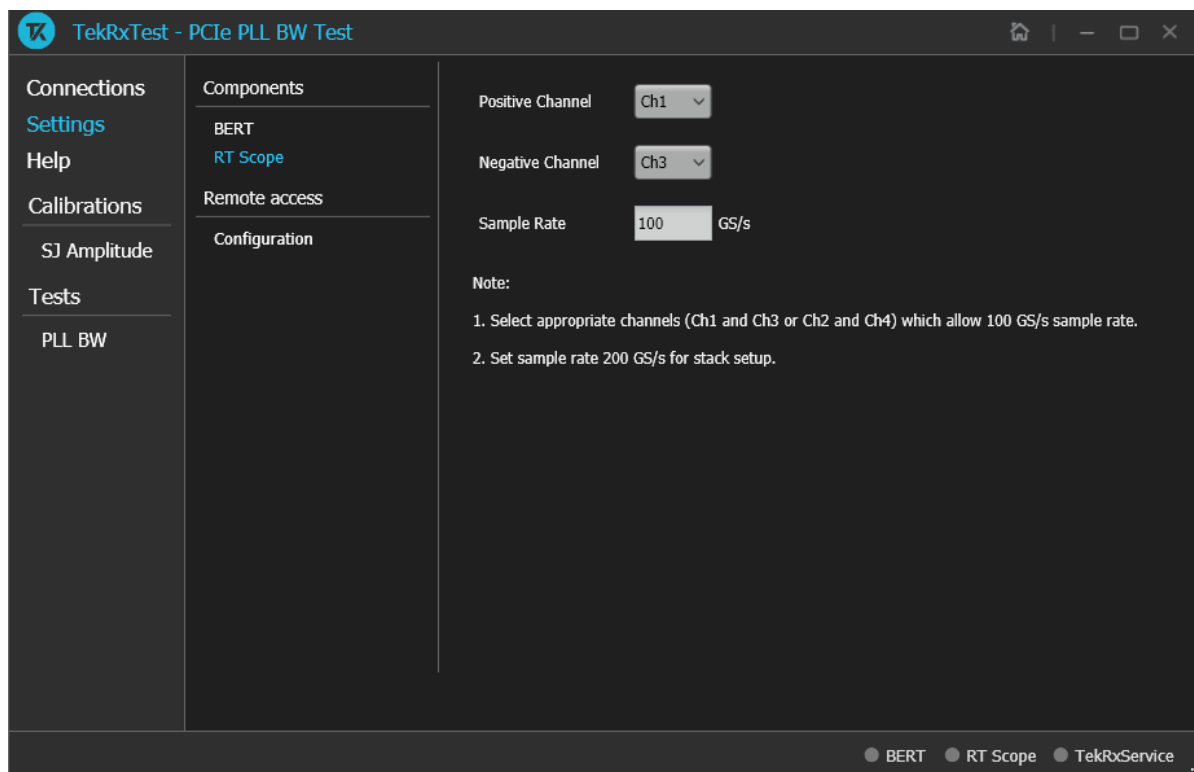


Figure 5: Components - RT Scope

Table 6: 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	Enter the sample rate in GS/s (Range: 50 to 200 GS/s).



Note:

- Select appropriate channels (Ch1 and Ch3 or Ch2 and Ch4) which allow 100 GS/s sample rate.

- Set sample rate as 200 GS/s for stack setup.

Remote access: Configuration

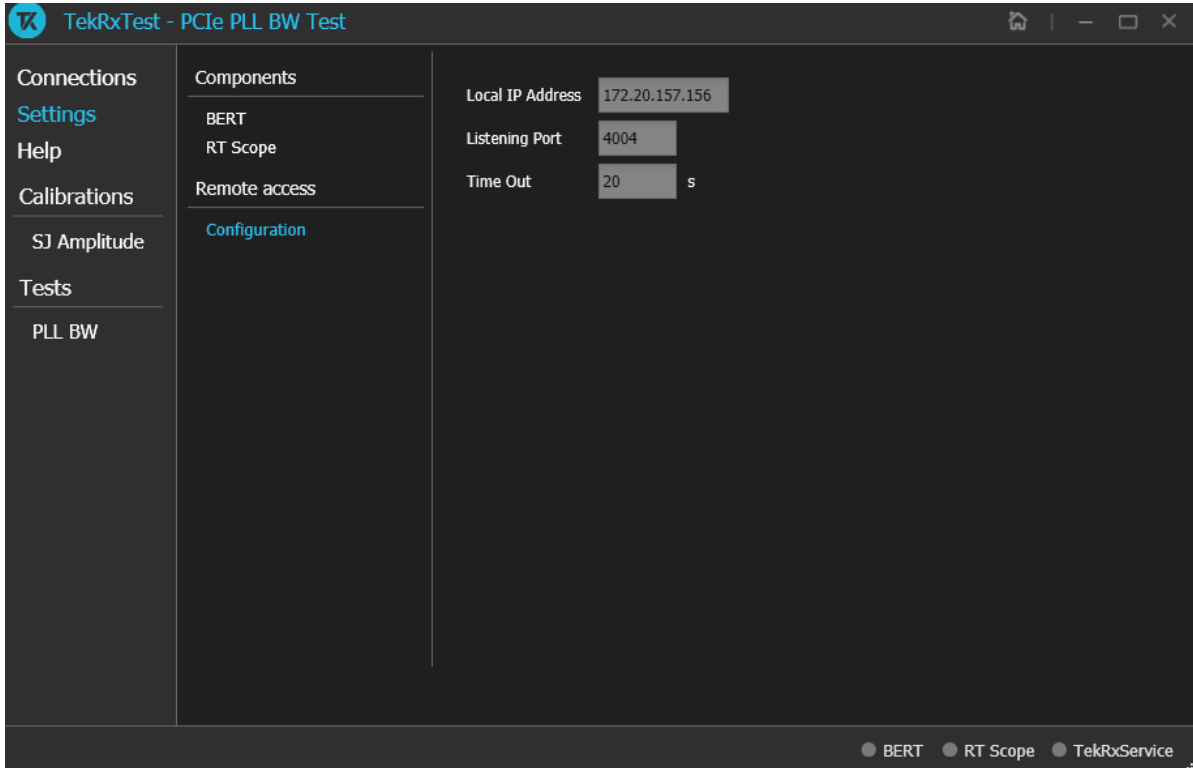


Figure 6: Remote access - Configuration

Table 7: 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. Default Value: 4004
Time Out	Displays the timeout value used when communicating with the socket server. Default Value: 20 Seconds

Help panel

The help panel launches the PCIe PLL BW TekRxTest application help document.


Calibrations panel

Complete SJ Amplitude calibration before you start the DUT testing using the PCIe PLL BW TekRxTest application. After calibrating for the SJ tones, you can save the results.

SJ Amplitude

The SJ Amplitude calibration panel allows you to manually perform SJ Amplitude calibration for the DUT and save the results.

SJ Amplitude Calibration Procedure

Click **SJ Amplitude** under the calibration tab to view the previously run calibration reports. Select the as and click  at the right end corner of the application to launch the SJ Amplitude calibration wizard. This wizard will guide you through the sequential procedure to perform the calibration.

1. **Connection Diagram:** This page displays the connection diagram for the SJ amplitude calibration setup.

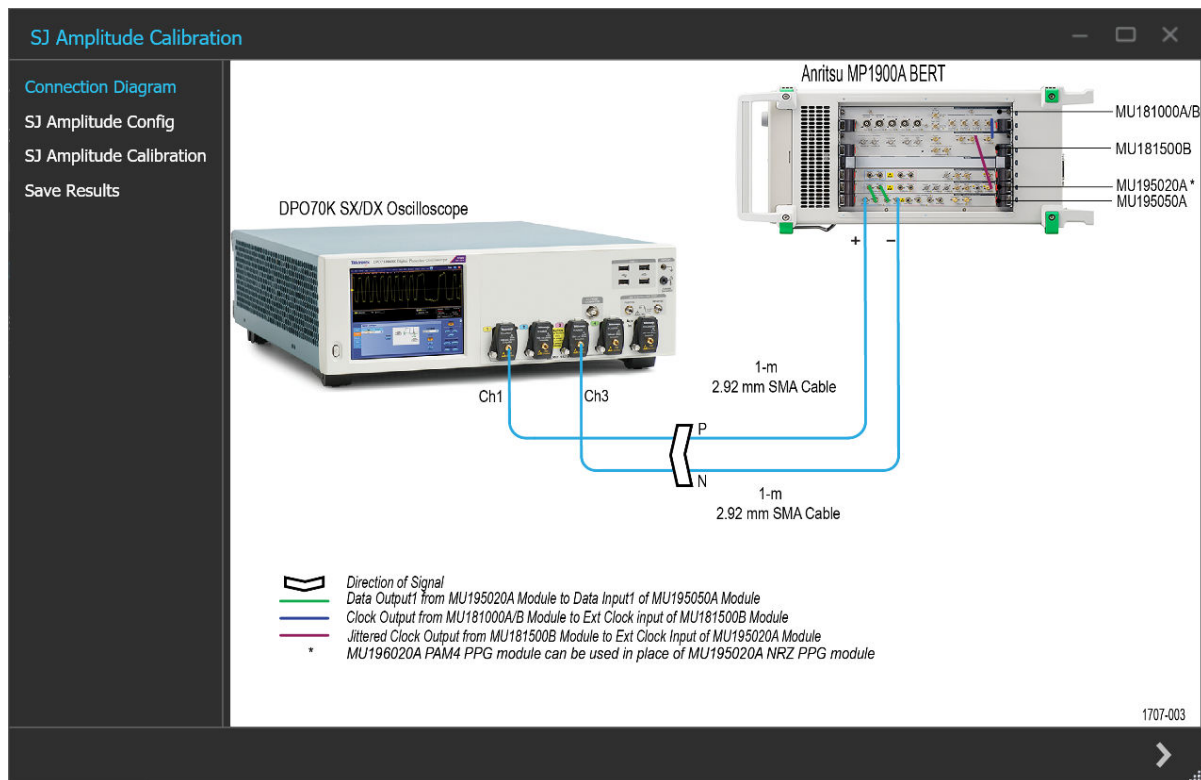


Figure 7: SJ Amplitude Calibration - Connection diagram

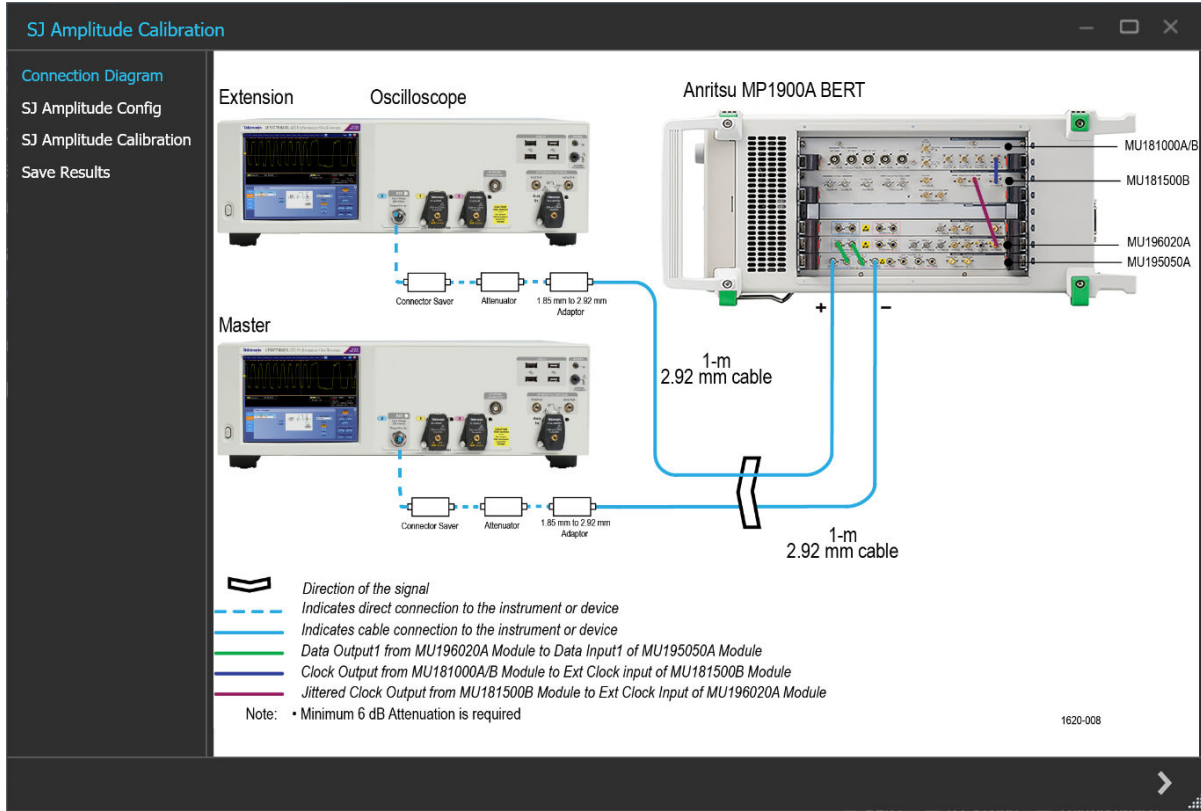



Figure 8: SJ Amplitude Calibration for 200 GS/s - Connection Diagram

Click  to move to the next screen.

2. SJ Amplitude Config:

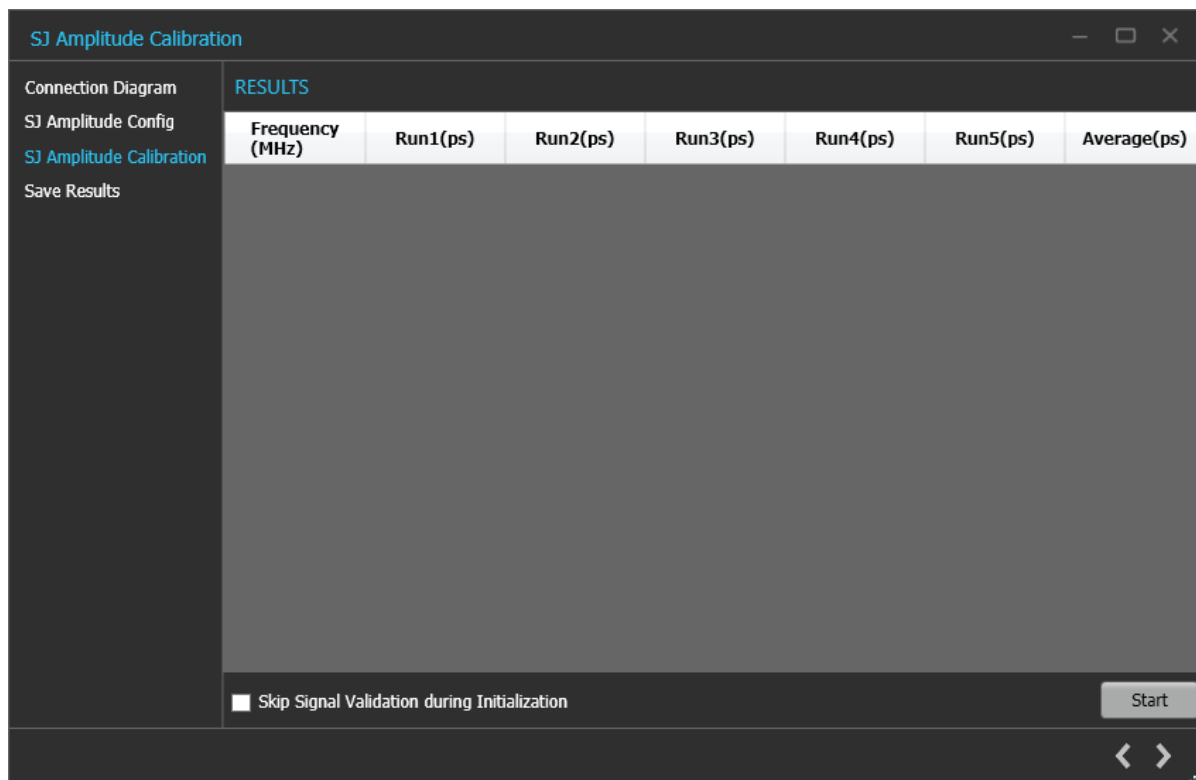


Figure 9: SJ Amplitude Calibration-SJ Amplitude Config

Table 8: SJ Amplitude Config

Parameter	Description
SJ Amplitude	Enter the amplitude for sinusoidal jitter for chosen tones in UI p-p (Range: 0-1 UI p-p)
Samples for Averaging	Enter the number of runs to be used for averaging (Range: 1-10)
No. of Frequency Intervals	Enter the number of intervals the calibration needs to be performed for (Range: 1-2)
Frequency Interval Settings	
Frequency Interval #	Displays the current frequency interval
Start Frequency	Enter the starting frequency (only applicable for 1st Frequency Interval). From the 2nd interval, it displays the stop frequency for the previous interval
Stop Frequency	Enter the last frequency for a given frequency interval
# Frequencies	Enter the number of frequencies the calibration needs to be performed for the given interval
Frequency (MHz)	Displays the list of all generated frequencies for which the calibration will be performed
Default	Click to recall the default settings

3. SJ Amplitude Calibration:

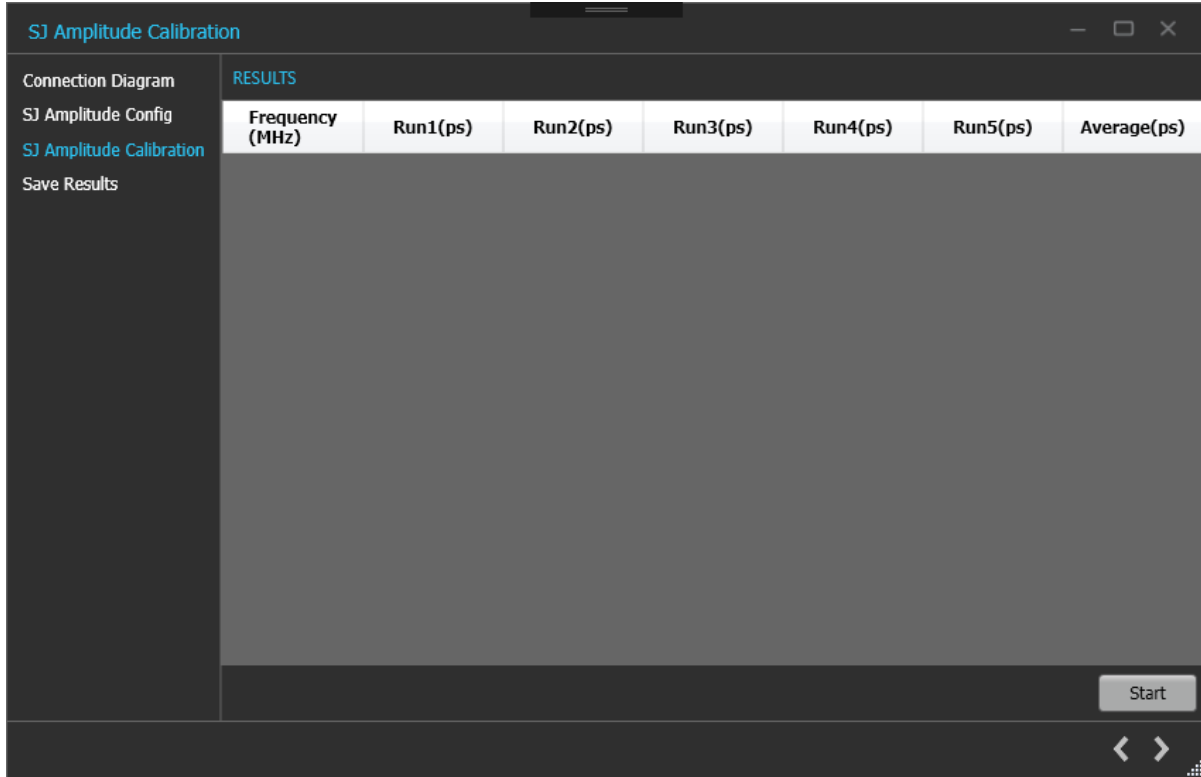


Figure 10: SJ Amplitude Calibration-SJ Amplitude Calibration

Table 9: SJ Amplitude Calibration

Parameter	Description
Frequency(MHz)	Displays the frequency at which SJ Amplitude calibration was performed
Run#(ps)	Displays the calibrated SJ amplitude for the given frequency
Average(ps)	Displays the average of the calibrated SJ amplitude across all runs

- 4. Save Results:** This page allows you to save all the SJ Amplitude calibration results.

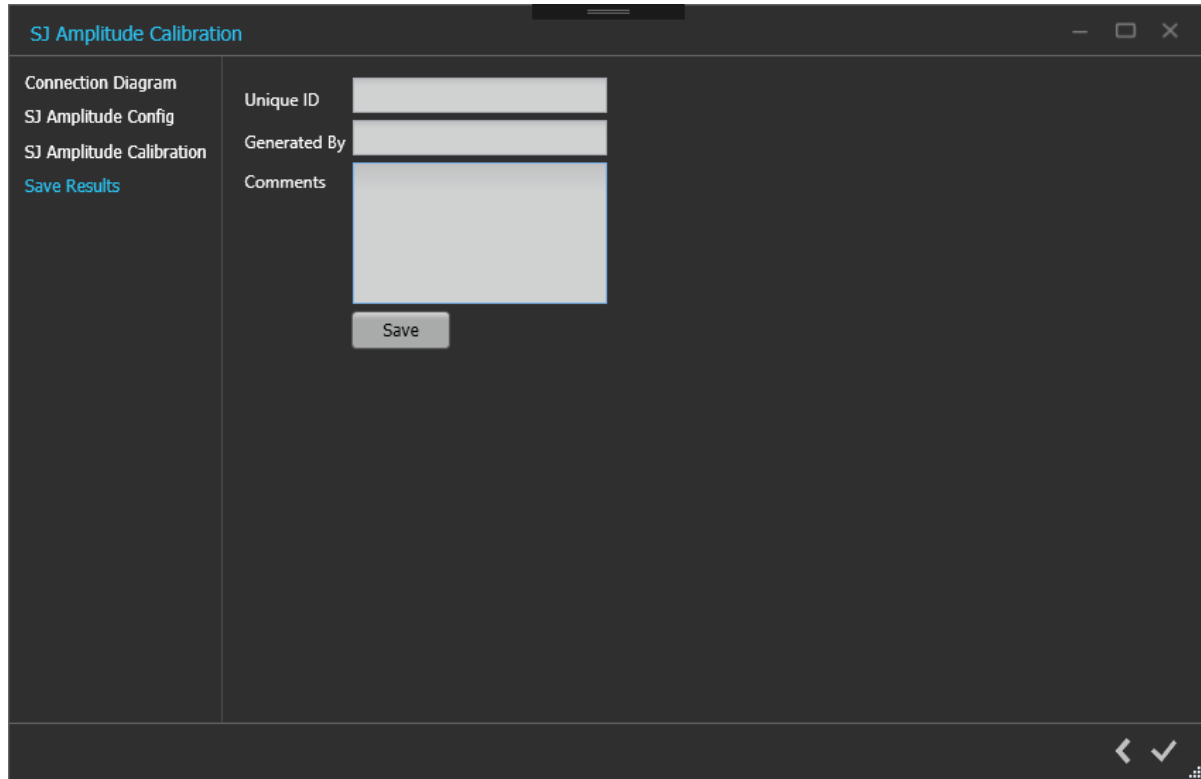


Figure 11: SJ Amplitude Calibration-Save Results

Table 10: SJ Amplitude 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	Enter the required comments in the comment box (optional).
Save	Click to save the results.

Click to complete the SJ Amplitude calibration and close the wizard.



Note: Upon completion of the SJ Amplitude calibration process or in the event of cancellation of the process, the BERT data generator will be turned off automatically by the TekRxTest application.


Tests panel

PLL BW Test

To test how much SJ passes through the DUT's Tx PLL for a certain SJ tone, you need to perform the SJ Amplitude calibration for the required tones ranging from 0.04 MHz to 23 MHz with a maximum of 100 different tones.

The Frequency Interval Settings lists the frequencies calibrated during SJ Amplitude Calibration.

PLL BW Test procedure

Click **PLL BW Test** under the Tests panel to view the previously run calibration reports. Click  at the right end corner of the application, to launch the PLL BW test wizard. This wizard will guide you through the sequential procedure to perform the test.

1. **Calibration Selection:** This page allows you to select the calibration file from the drop-down list.

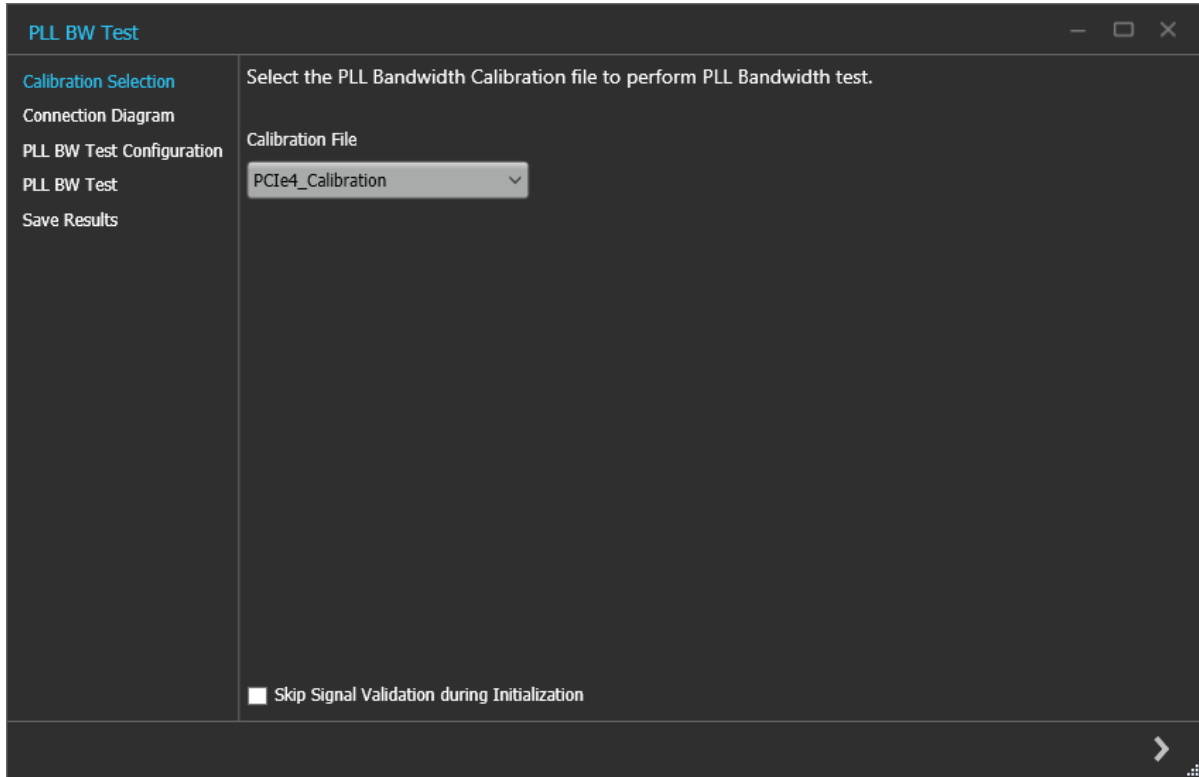



Figure 12: PLL BW Test-Calibration Selection

Click  to move to the next screen.

2. **Connection Diagram:** This page displays the connection diagram for the PLL BW test.

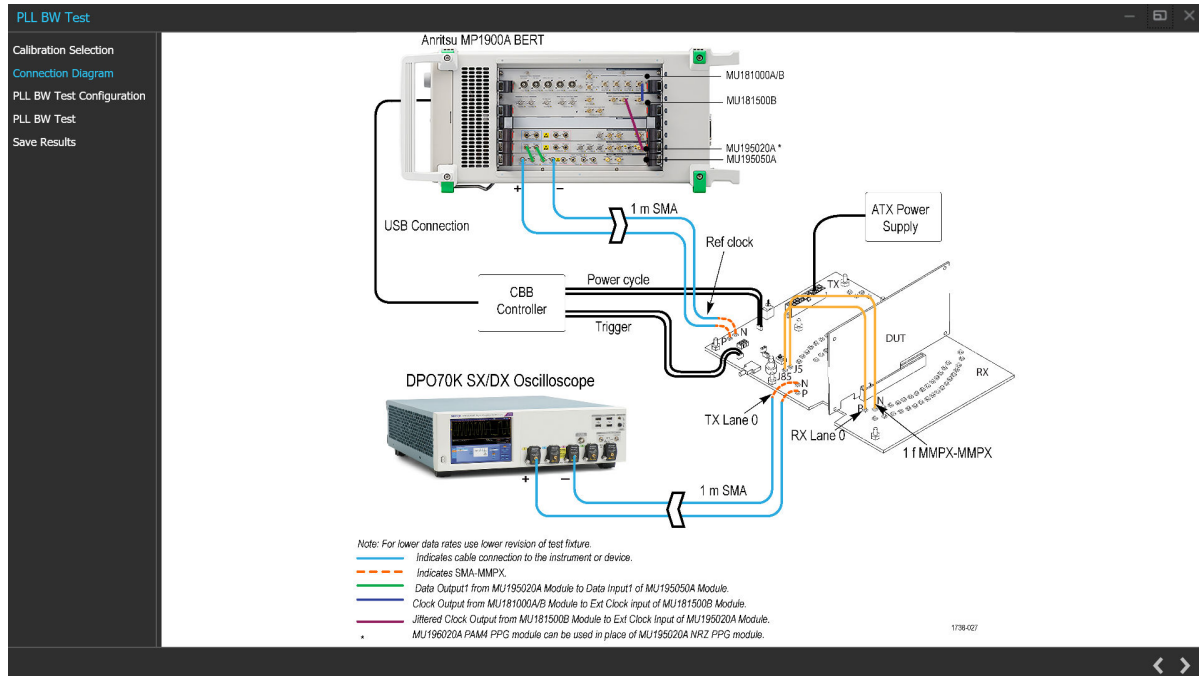


Figure 13: PLL BW Test - Connection Diagram

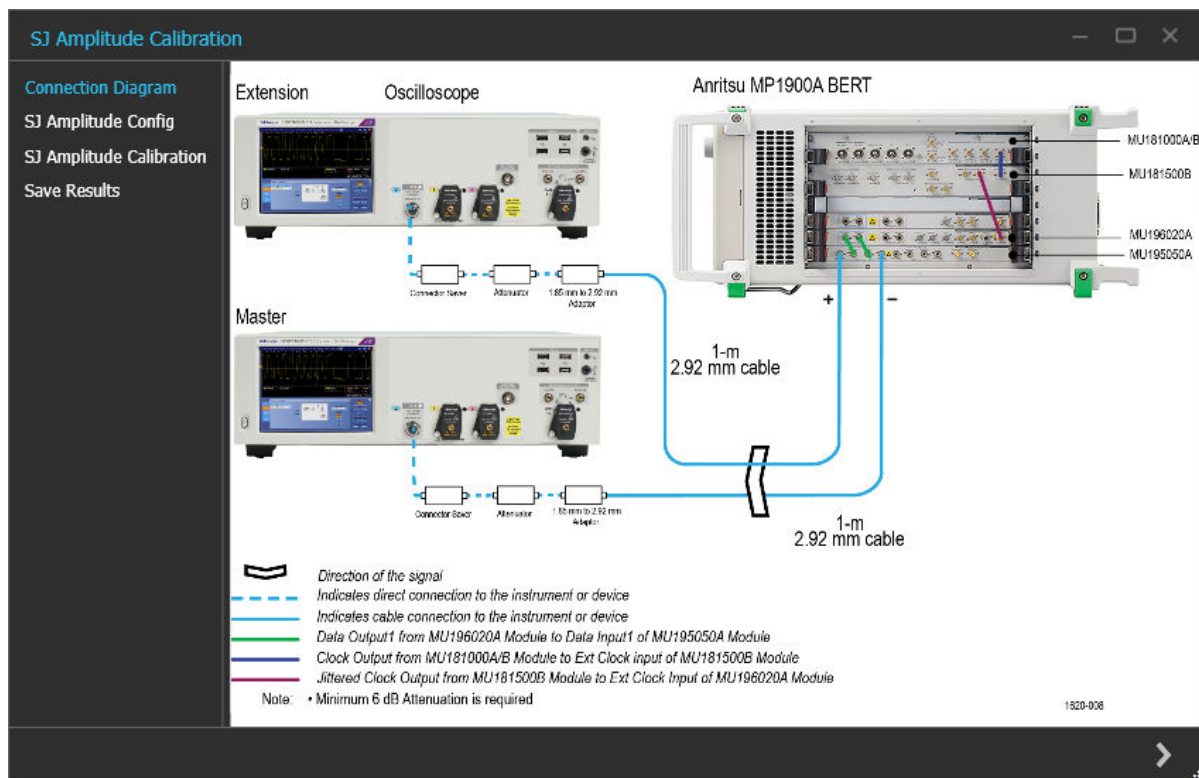



Figure 14: PLL BW Test for 200 GS/s - Connection Diagram

Click  to move to the next screen.

- PLL BW Test Configuration:** This page allows you to view the configurations and tones used during the selected SJ Amplitude calibration. You can also configure the DUT Power upon connecting Z2025A PCIe CBB Controller to BERT.

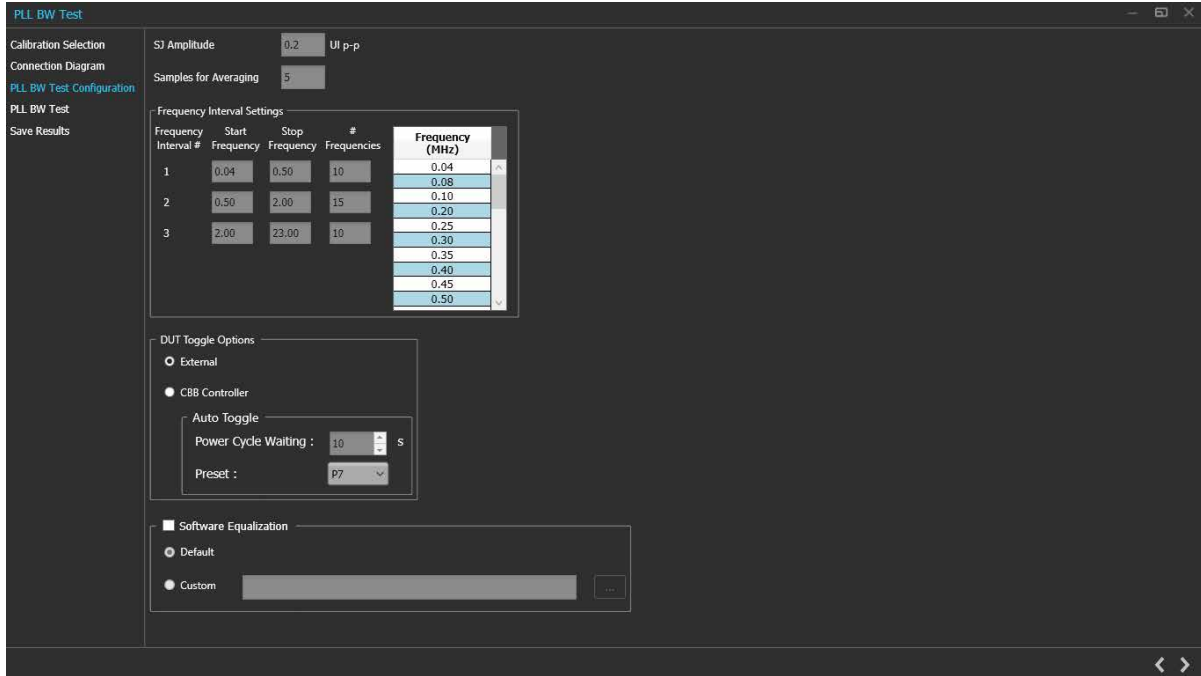


Figure 15: PLL BW Test-Configure Test

Table 11: PLL BW Test-Configure Test

Parameter	Description	
SJ Amplitude	Displays the amplitude for sinusoidal jitter for chosen tones in UI p-p (Range: 0-1 UI p-p).Displays the number of runs used for averaging in the chosen calibration file.	
Samples for Averaging		
Frequency Interval Settings		
Frequency Interval #	Displays the current frequency interval.	
Start Frequency	Displays the starting frequency for each interval in the chosen calibration file.	
Stop Frequency	Displays the last frequency for a given frequency interval in the chosen calibration file.	
# Frequencies	Displays the number of frequencies for which the calibration was performed for the given interval.	
Frequency (MHz)	Displays the list of all generated frequencies for which the calibration was performed.	
DUT Power Options		
External	Click on it to manually configure the DUT transmitter for the desired preset and generation.	
CBB Controller	Click on it to automate the process of transmitting the signal with selected preset for the configured DUT generation	
	Auto Toggle	
	Power Cycle Waiting	Configure the waiting time to power cycle the DUT.
	Preset	Choose the preset for which the PLL BW test will be performed.
Table continued...		

Parameter	Description	
Software Equalization	Check on it to apply a CTLE filter on the signal during runtime	
	Default	This will apply a predefined CTLE filter file during waveform acquisition (only applicable for Gen5)
	Custom	User can browse and apply CTLE filter file which will be applied during waveform acquisition

Table 12: Manual toggle pattern

Toggle Sequence	Compliance Pattern from the DUT	Data Rate (GT/s)
Power ON	Gen1	2.5
1	Gen2-3.5 dB	2.5
2	Gen2-6.0 dB	5
3	Gen3-P0	5
4	Gen3-P1	8
5	Gen3-P2	8
6	Gen3-P3	8
7	Gen3-P4	8
8	Gen3-P5	8
9	Gen3-P6	8
10	Gen3-P7	8
11	Gen3-P8	8
12	Gen3-P9	8
13	Gen3-P10	8
14	Gen4-P0	16
15	Gen4-P1	16
16	Gen4-P2	16
17	Gen4-P3	16
18	Gen4-P4	16
19	Gen4-P5	16
20	Gen4-P6	16
21	Gen4-P7	16
22	Gen4-P8	16
23	Gen4-P9	16
24	Gen4-P10	16
25	Jitter Measurement Pattern on all Lanes	16
26	Jitter Measurement Pattern on Lanes 0/8/16/24 and Compliance pattern on all other Lanes	16
27	Jitter Measurement Pattern on Lanes 1/8/16/24 and Compliance pattern on all other Lanes	16

Table continued...

Toggle Sequence	Compliance Pattern from the DUT	Data Rate (GT/s)
28	Jitter Measurement Pattern on Lanes 2/8/16/24 and Compliance pattern on all other Lanes	16
29	Jitter Measurement Pattern on Lanes 3/8/16/24 and Compliance pattern on all other Lanes	16
30	Jitter Measurement Pattern on Lanes 4/8/16/24 and Compliance pattern on all other Lanes	16
31	Jitter Measurement Pattern on Lanes 5/8/16/24 and Compliance pattern on all other Lanes	16
32	Jitter Measurement Pattern on Lanes 6/8/16/24 and Compliance pattern on all other Lanes	16
33	Jitter Measurement Pattern on Lanes 7/8/16/24 and Compliance pattern on all other Lanes	16
34	Gen5-P0	32
35	Gen5-P1	32
36	Gen5-P2	32
37	Gen5-P3	32
38	Gen5-P4	32
39	Gen5-P5	32
40	Gen5-P6	32
41	Gen5-P7	32
42	Gen5-P8	32
43	Gen5-P9	32
44	Gen5-P10	32

4. **PLL BW Test:** This page displays a graphical representation of the PLL BW test result. It includes a result table tab which displays the PLL BW test results in a tabular format.

Table 13: PLLBW Test

Parameter	Description
Frequency(MHz)	Displays the frequency at which SJ Amplitude calibration was performed
Run#(ps)	Displays the calibrated SJ amplitude for the given frequency
CalAverage(ps)	Displays the average of the calibrated SJ amplitude from the chosen calibration file
Average(ps)	Displays the average of the tested SJ amplitude across all runs
Final Value	$20\log(\text{Average}/\text{CalAverage})$
Start	Click Start to run the measurement.
Cancel	Click Cancel to stop the measurement.

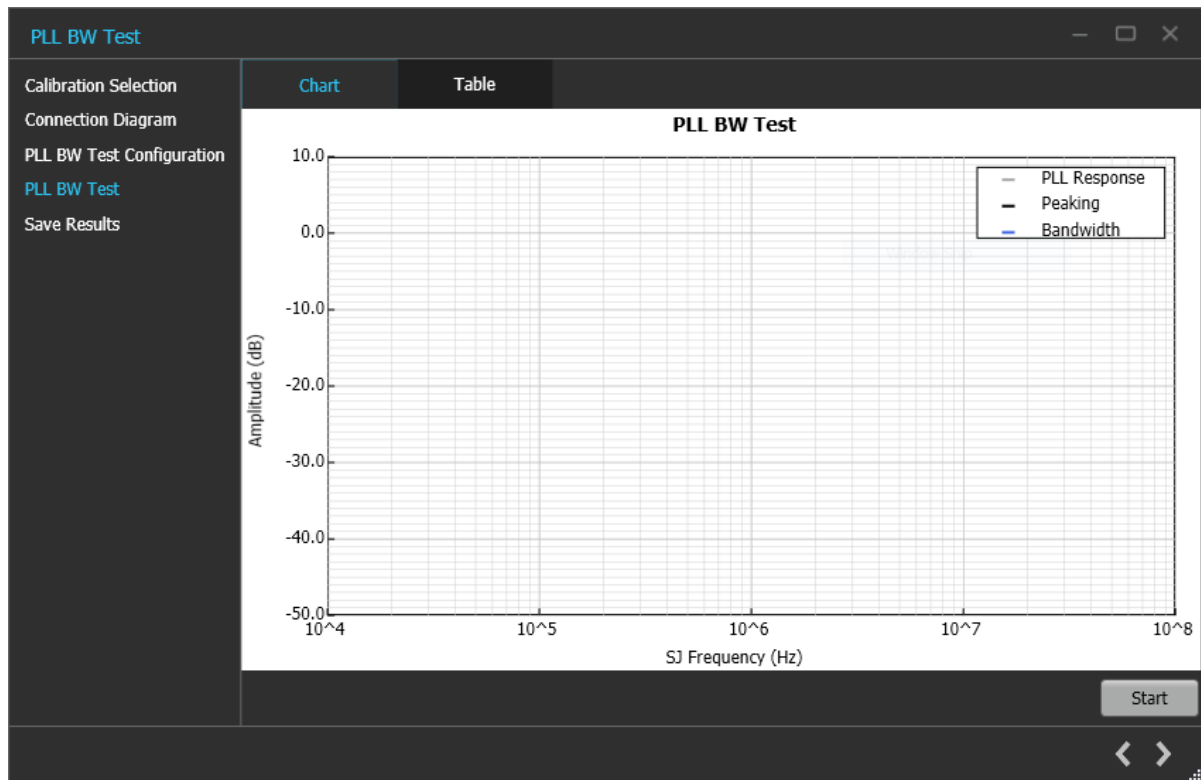



Figure 16: PLL BW Test-Run Test

Click  to move to the next screen.

5. **Save Results:** This page allows you to save the PLL BW test results.

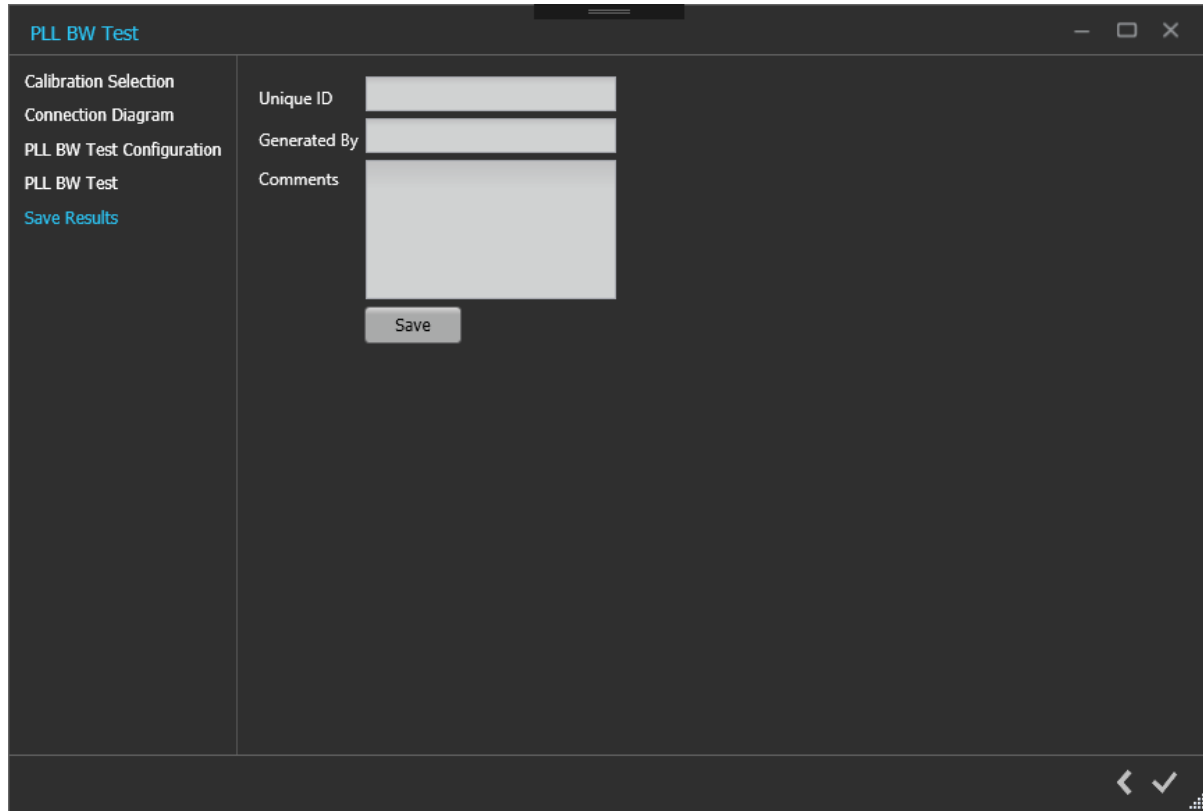



Figure 17: PLL BW Test-Save Results

Table 14: PLL BW 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	Enter the required comments in the comment box (optional).
Save	Click to save the results.

Click  to complete the PLL BW test and close the wizard.

Programmatic interface commands

PLLBWTEST:APPLYSOFTTEQ<1/0>

Indicates if Software Equalization has been applied.

Syntax

```
PLLBWTEST:APPLYSOFTTEQ<1/0>
```

Inputs

<0|1>

0 - Software Equalization Applied

1 - Software Equalization not Applied

Outputs

<0 | 1>

PLLBWTEST:FILTERFILE <String>

Indicates the Filter File path when the Software Equalization chosen is custom.

Syntax

```
PLLBWTEST:FILTERFILE <String>
```

Inputs

<0|1>

0 - Software Equalization Applied

1 - Software Equalization not Applied

Outputs

<0 | 1>

PLLBWTEST:WIZARD:OPEN

This command opens the PLL BW test wizard.

Syntax

```
PLLBWTEST:WIZARD:OPEN
```

Inputs

NA

Outputs

NA

PLLWTEST:WIZARD:CLOSE

This command closes the PLL BW test wizard.

Syntax

```
PLLWTEST:WIZARD:CLOSE
```

Inputs

NA

Outputs

NA

PLLWTEST:SJAMPLITUDE

This command queries the SJ Amplitude configured for the PLLBW test.

Syntax

```
PLLWTEST:SJAMPLITUDE
```

Inputs

NA

Outputs

<double>

PLLWTest:SKIPSIGNALVALIDATION

This allows the user to skip signal validation as a part of PLL BW test.

Syntax

```
PLLWTest:SKIPSIGNALVALIDATION <0 | 1>
```

```
PLLWTest:SKIPSIGNALVALIDATION?
```

Inputs

<0 | 1>

1- Skip signal validation.

0 - Perform signal validation.

Outputs

<0 | 1>

PLLBWTEST:SHOW:CONNECTIONDIAGRAM

This command navigates to the connection diagram in PLL BW test.

Syntax

```
PLLBWTEST:SHOW:CONNECTIONDIAGRAM
```

Inputs

NA

Outputs

NA

PLLBWTEST:SAVE:STATUS

This command queries the result's save status.

Syntax

```
PLLBWTEST:SAVE:STATUS?
```

Inputs

NA

Outputs

<string>

PLLBWTEST:SAVE:ID

This command sets or queries the Unique Id for saving the result

Syntax

```
PLLBWTEST:SAVE:ID <string>
```

```
PLLBWTEST:SAVE:ID?
```

Inputs

<string>

Outputs

<string>

PLLBWTEST:SAVE:GENERATEDBY

This command sets or queries the Generated By input for saving the result.

Syntax

```
PLLBWTEST:SAVE:GENERATEDBY <string>
```

```
PLLBWTEST:SAVE:GENERATEDBY?
```

Inputs

<string>

Outputs

<string>

PLLBWTEST:SAVE:COMMENTS

This command sets or queries the Comments for saving the result.

Syntax

```
PLLBWTEST:SAVE:COMMENTS <string>
```

```
PLLBWTEST:SAVE:COMMENTS?
```

Inputs

<string>

Outputs

<string>

PLLBWTEST:SAVE

This command saves the PLL BW test result.

Syntax

```
PLLBWTEST:SAVE
```

Inputs

NA

Outputs

NA

PLLWTEST:SAMPLESFORAVERAGE

This command queries the Samples for average configured for the PLLBW test

Syntax

```
PLLWTEST : SAMPLESFORAVERAGE ?
```

Inputs

<int>

Outputs

<int>

PLLWTest:SOFTWAREQTYPE <0/1>

Indicates the type of Software Equalization applied.

Syntax

```
PLLWTest : SOFTWAREQTYPE <0/1>
```

Inputs

<0|1>

0 - indicates the Software Equalization chosen is Default

1 - indicates the Software Equalization chosen is Custom

Outputs

<0 | 1>

PLLWTEST:RUNSTATUS

This command queries the PLL BW test run status.

Syntax

```
PLLWTEST : RUNSTATUS ?
```

Inputs

NA

Outputs

<InProgress|Done>

PLLWTEST:RUN

This command starts or cancels the PLL BW test.

Syntax

```
PLLWTEST:RUN <0 | 1>
```

Inputs

<0 | 1>

0 - Starts the PLL BW test

1 - Cancels the PLL BW test

Outputs

NA

PLLWTEST:RESULT:FINALVALUE

This command queries the FinalValue of the different calibration run results.

Syntax

```
PLLWTEST:RESULT:FINALVALUE?
```

Inputs

NA

Outputs

<string>

PLLWTEST:RESULT:DISPLAYTYPE

This command sets the result view as Chart or Table.

Syntax

```
PLLWTEST:RESULT:DISPLAYTYPE <0 | 1>
```

```
PLLWTEST:RESULT:DISPLAYTYPE?
```

Inputs

<0 | 1>

0 - Chart view

1 - Table view

Outputs

<0 | 1>

0 - Chart view

1 - Table view

PLLWTEST:RESULTCAL:AVERAGES

This command queries the CalAverages of the different calibration run results.

Syntax

```
PLLWTEST:RESULTCAL:AVERAGES?
```

Inputs

NA

Outputs

<string>

PLLWTEST:RESULT:AVERAGES

This command queries the average of the different Calibration run results.

Syntax

```
PLLWTEST:RESULT:AVERAGES?
```

Inputs

NA

Outputs

<string>

PLLWTEST:OPEN

This command selects the in the Tests tab.

Syntax

```
PLLWTEST:OPEN
```

Inputs

NA

Outputs

NA

PLLBWTEST:FREQUENCY

This command queries the number of frequency value.

Syntax

```
PLLBWTEST:FREQUENCY <INTERVAL>?
```

Inputs

<Interval> Frequency Interval #

Outputs

<int>

PLLBWTEST:FREQ:STOP

This command queries the Stop Frequency value.

Syntax

```
PLLBWTEST:FREQ:STOP <INTERVAL>?
```

Inputs

<Interval> Frequency Interval #

Outputs

<double>

PLLBWTEST:FREQ:START

This command queries the Start Frequency value.

Syntax

```
PLLBWTEST:FREQ:START <INTERVAL>?
```

Inputs

<Interval> Frequency Interval #

Outputs

<double>

PLLBWTEST:DUTPOWERTYPE

This command switches between the DUT power options (CBB or External).

Syntax

```
PLLBWTEST:DUTPOWERTYPE <0 | 1>
```

```
PLLBWTEST:DUTPOWERTYPE?
```

Inputs

<0 | 1>

0 - CBB

1 - External

Outputs

<0 | 1>

PLLBWTEST:CBBAUTOTOGGLE:WAITTIME

This command sets or queries the Power Cycle waiting time for CBB Auto Toggle.

Syntax

```
PLLBWTEST:CBBAUTOTOGGLE:WAITTIME <int>
```

```
PLLBWTEST:CBBAUTOTOGGLE:WAITTIME?
```

Inputs

<int>

Outputs

<int>

PLLBWTEST:CBBAUTOTOGGLE:PRESET

This command sets or queries the BER Pattern.

Syntax

```
PLLBWTEST:CBBAUTOTOGGLE:PRESET <INDEX>
```

Inputs

<int>

Outputs

<int>

PLLBWTEST:CALSEL

This command sets or queries the calibration file from combo-box.

Syntax

PLLBWTEST:CALSEL <CALNAME>

Inputs

<CALNAME>

Outputs

<CALNAME>

PLLBWTEST:ALLFREQUENCIES

This command queries information for all frequencies.

Syntax

PLLBWTEST:ALLFREQUENCIES?

Inputs

NA

Outputs

<string> returns all frequencies as string

SETTINGS:STANDARD

This command sets or queries the standard for PLL test.

Syntax

SETTINGS:STANDARD <0 | 1 | 2>

SETTINGS:STANDARD?

Inputs

<int> - Range 0 to 2

- 0 - PCIe3
- 1 - PCIe4
- 2 - PCIe5

Outputs

<int> - Range 0 to 2

- 0 - PCIe3
- 1 - PCIe4
- 2 - PCIe5

SETTINGS:RTS:SAMPLERATE

This command sets or queries the sample rate of Real Time Oscilloscope.

Syntax

```
SETTINGS:RTS:SAMPLERATE <int>
```

```
SETTINGS:RTS:SAMPLERATE?
```

Inputs

<int> - Range: 50 to 200 GS/s

Outputs

<int> - Range: 50 to 200 GS/s

SETTINGS:RTS:POSITIVECHANNEL

This command sets or queries the Real Time Oscilloscope setting for positive channel.

Syntax

```
SETTINGS:RTS:POSITIVECHANNEL <int>
```

```
SETTINGS:RTS:POSITIVECHANNEL?
```

Inputs

<int> - Range: 0 to 3

- 0 - CH1
- 1 - CH2
- 2 - CH3
- 3 - CH4

Outputs

<int> - Range: 0 to 3

- 0 - CH1
- 1 - CH2
- 2- CH3
- 3 - CH4

SETTINGS:RTS:NEGATIVECHANNEL

This command sets or queries the Real Time Oscilloscope setting for negative channel.

Syntax

```
SETTINGS:RTS:NEGATIVECHANNEL <int>
```

```
SETTINGS:RTS:NEGATIVECHANNEL?
```

Inputs

<int> - Range: 0 to 3

- 0 - CH1
- 1 - CH2
- 2- CH3
- 3 - CH4

Outputs

<int> - Range: 0 to 3

- 0 - CH1
- 1 - CH2
- 2- CH3
- 3 - CH4

SJAMPCAL:ALLFREQUENCIES

This command reads all the frequencies.

Syntax

```
SJAMPCAL:ALLFREQUENCIES?
```

Inputs

NA

Outputs

<string>

SJAMPCAL:FREQ:START

This command reads or writes the start frequency value.

Syntax

```
SJAMPCAL:FREQ:START <INTERVAL> <VALUE>
```

```
SJAMPCAL:FREQ:START <INTERVAL>?
```

Inputs

<Interval> Frequency Interval #

<double>

Outputs

<double>

SJAMPCAL:FREQ:STOP

This command reads or writes the stop frequency value.

Syntax

```
SJAMPCAL:FREQ:STOP <INTERVAL> <VALUE>
```

```
SJAMPCAL:FREQ:STOP <INTERVAL>?
```

Inputs

<Interval> Frequency Interval #

<double>

Outputs

<double>

SJAMPCAL:FREQUENCIES:DEFAULT

This command sets SJ Amplitude to default frequency settings.

Syntax

```
SJAMPCAL:FREQUENCIES:DEFAULT
```

Inputs

NA

Outputs

NA

SJAMPCAL:FREQUENCY

This command reads or writes the number of frequency value.

Syntax

```
SJAMPCAL:FREQUENCY <INTERVAL> <value>
```

```
SJAMPCAL:FREQUENCY <INTERVAL>?
```

Inputs

<Interval> Frequency Interval #

<int>

Outputs

<int>

SJAMPCAL:FREQUENCYINTERVALS

This command reads or writes the number of frequency intervals value.

Syntax

```
SJAMPCAL:FREQUENCYINTERVALS <value>
```

```
SJAMPCAL:FREQUENCYINTERVALS?
```

Inputs

<int>

Outputs

<int>

SJAMPCAL:OPEN

This command opens the SJ Amplitude calibration page.

Syntax

```
SJAMPCAL:OPEN
```

Inputs

NA

Outputs

NA

SJAMPCAL:RESULT

This command gets the specified calibration run results.

Syntax

```
SJAMPCAL:RESULT <Index of Run #>?
```

Inputs

<int> - Index of Run #

Outputs

<double>

SJAMPCAL:RESULT:AVERAGES

This command gets the average of the different Calibration run Results.

Syntax

```
SJAMPCAL:RESULT:AVERAGES?
```

Inputs

NA

Outputs

<string>

SJAMPCAL:RESULT:FREQAVG

This command gets the average of the calibration run results for specific frequency.

Syntax

```
SJAMPCAL:RESULT:FREQAVG <FREQ>?
```

Inputs

<FREQ>

Outputs

<double>

SJAMPCAL:RUN

This command runs or cancels the PLL BW SJ Amplitude calibration.

Syntax

SJAMPCAL:RUN <0|1>

Inputs

<0|1>

0 - Stop the SJ Amplitude test run.

1 - Start the SJ Amplitude test run.

Outputs

NA

SJAMPCAL:RUNSTATUS

This command gets the PLL BW SJ Amplitude calibration run status.

Syntax

SJAMPCAL:RUNSTATUS?

Inputs

NA

Outputs

{InProgress | Done}

SJAMPCAL:RESULT:AVERAGES

This command gets the average of the different dalibration run results.

Syntax

SJAMPCAL:RESULT:AVERAGES?

Inputs

NA

Outputs

NA

SJAMPCAL:SAVE

This command saves the calibration result.

Syntax

```
SJAMPCAL:SAVE
```

Inputs

NA

Outputs

NA

SJAMPCAL:SAVE:COMMENTS

This command sets or gets the save comment.

Syntax

```
SJAMPCAL:SAVE:COMMENTS <Comments>
```

```
SJAMPCAL:SAVE:COMMENTS?
```

Inputs

<string>

Outputs

<string>

SJAMPCAL:SAVE:GENERATEDBY

This command sets or gets the name of the person who generated the report.

Syntax

```
SJAMPCAL:SAVE:GENERATEDBY <string>
```

```
SJAMPCAL:SAVE:GENERATEDBY?
```

Inputs

<string>

Outputs

<string>

SJAMPCAL:SAVE:ID

This command sets or gets the save Unique ID.

Syntax

SJAMPCAL:SAVE:ID <string>

SJAMPCAL:SAVE:ID?

Inputs

<string>

Outputs

<string>

SJAMPCAL:SAVE:STATUS

This command gets the save status.

Syntax

SJAMPCAL:SAVE:STATUS?

Inputs

NA

Outputs

<string>

SJAMPCAL:SKIPSIGNALVALIDATION

This allows the user to skip signal validation as a part of SJ amplitude value.

Syntax

SJAMPCAL:SKIPSIGNALVALIDATION <0 | 1>

SJAMPCAL:SKIPSIGNALVALIDATION?

Inputs

<0 | 1>

1- Skip signal validation.

0 - Perform signal validation.

Outputs

<0 | 1>

SJAMPCAL:SHOW:CONNECTIONDIAGRAM

This command opens the connection diagram for SJ Amplitude calibration.

Syntax

```
SJAMPCAL:SHOW:CONNECTIONDIAGRAM
```

Inputs

NA

Outputs

NA

SJAMPCAL:RESULT:SJAMPLITUDE

This command reads or writes the SJ amplitude value.

Syntax

```
SJAMPCAL:RESULT:SJAMPLITUDE <int>
```

```
SJAMPCAL:RESULT:SJAMPLITUDE?
```

Inputs

NA

Inputs

<string>

Outputs

<string>

SJAMPCAL:WIZARD:CLOSE

This command closes the SJ Amplitude calibration wizard.

Syntax

```
SJAMPCAL:WIZARD:CLOSE
```

Inputs

NA

Outputs

NA

SJAMPCAL:WIZARD:OPEN

This command opens the SJ Amplitude calibration wizard.

Syntax

`SJAMPCAL:WIZARD:OPEN`

Inputs

NA

Outputs

NA

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