TekExpress® XGbT-10GBASE-T
Automated Solution

Reference

Tektronix

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Getting Started with XGbT

You can use this Reference document to get started with testing the Ethernet physical layer using the TekExpress XGbT-10GBASE-T application that provides the capability for multi-equipment control.

> **NOTE.** *For complete operating instructions, refer to the application online help.*

XGbT application is an easy-to-use software and uses a Windows-based interface. It helps in debugging and designing of the 10GBASE-T physical layer.

It provides an IEEE Std 802.3an-2006 compliance solution for performing Clock Frequency, Droop, Jitter-Master, and Jitter-Slave measurements. Using the spectral features of the oscilloscope, the application also facilitates performing the spectral-based measurements such as Power Spectral Density, Power Level, Linearity (All Tones), and Return Loss. You can select, configure, and run measurements.

XGbT users will also have to qualify their DUTs for 1000BASE-T/100BASE-T/10BASE-T compliance. To meet this, Tektronix provides the necessary softwares (TekExpress XGbT-10GBASE-T Automated Solution and TDSET3 Ethernet Compliance Software), fixture (TF-XGbT and TF-GBE), oscilloscopes, Arbitrary Waveform Generators, and probes.
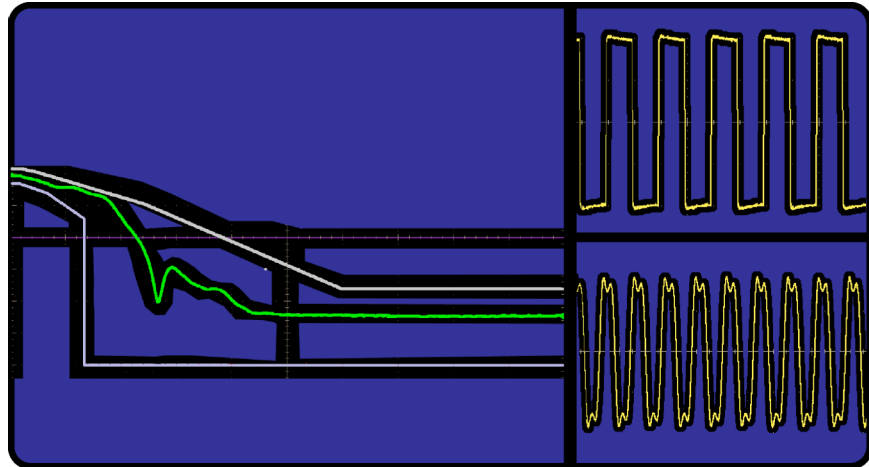
For up-to-date information on Tektronix XGbT-10GBASE-T Automated Solution, access the www.tektronix.com Web page.

Products supported   Tektronix DP07354 oscilloscope

Tektronix DPO/DSA70404, DPO/DSA70604, DPO/DSA70804, DPO/DSA71254, DPO/DSA71604, and DPO/DSA72004 series oscilloscopes

Tektronix DPO/DSA70404B, DPO/DSA70604B, DPO/DSA70804B, DPO/DSA71254B, DPO/DSA71604B, and DPO/DSA72004B series oscilloscopes

Tektronix MSO70404, MSO70604, MSO70804, MSO71254, MSO71604, and MSO72004 series oscilloscopes

Recommended AWGs for Return Loss Measurement. Tektronix AWG7101, AWG7101B, AWG7102, and AWG7102B

Table 1: Recommended probes

| Oscilloscope	For Droop, Power Spectral Density, Linearity, Clock Frequency, Jitter-Master, and Jitter-Slave measurements	For Return Loss measurement
Tektronix DPO7000 Series	Tektronix P6330 - A minimum of one and a maximum of four are required.	Tektronix P6330 - A minimum of two are required.
	Tektronix SMA cables - A minimum of two are required.	TDP3500 - A minimum of two are required.
	Tektronix TDP3500 - A minimum of one and a maximum of four are required.	
Tektronix DPO70000, DSA70000, MSO70000, DPO70000B, and DSA70000B Series	Tektronix P6330 - A minimum of one and a maximum of four are required.	Tektronix P6330 - A minimum of two are required.
	Tektronix P7330 and P7350 - A minimum of one and a maximum of four are required.	Tektronix P7330 and P7350 - A minimum of two are required.
	Tektronix Trimode probes (P7520, P7516, P7513A, P7508, P7506, and P7504) - A minimum of one and a maximum of four are required.	Tektronix Trimode probes (P7520, P7516, P7513A, P7508, P7506, P7504) - A minimum of two are required.
	Tektronix SMA cables - A minimum of two are required.	Tektronix P7340A, P7360A, P7313, and P7380A - A minimum of two are required.
	Tektronix P7350SMA, P7380SMA, and P7313SMA - A minimum of one and a maximum of four are required.	

Example Measurement

In the following example, we are providing the details on performing the Droop measurement.

For more details on performing the Droop, Power Spectral Density, Linearity, Clock Frequency, Jitter-Master, Jitter-Slave, and Return Loss measurements, refer to the TekExpress XGbT-10GBASE-T Automated Solution Online Help (076-0195-XX).

Running the Droop Measurement

The steps for performing the Droop measurement are as follows:

1. Connect the Device Under Test (DUT) and the test fixture (TF-XGbT) to the configured oscilloscope channel using the above mentioned probes or SMA cables. The test setup is as shown:
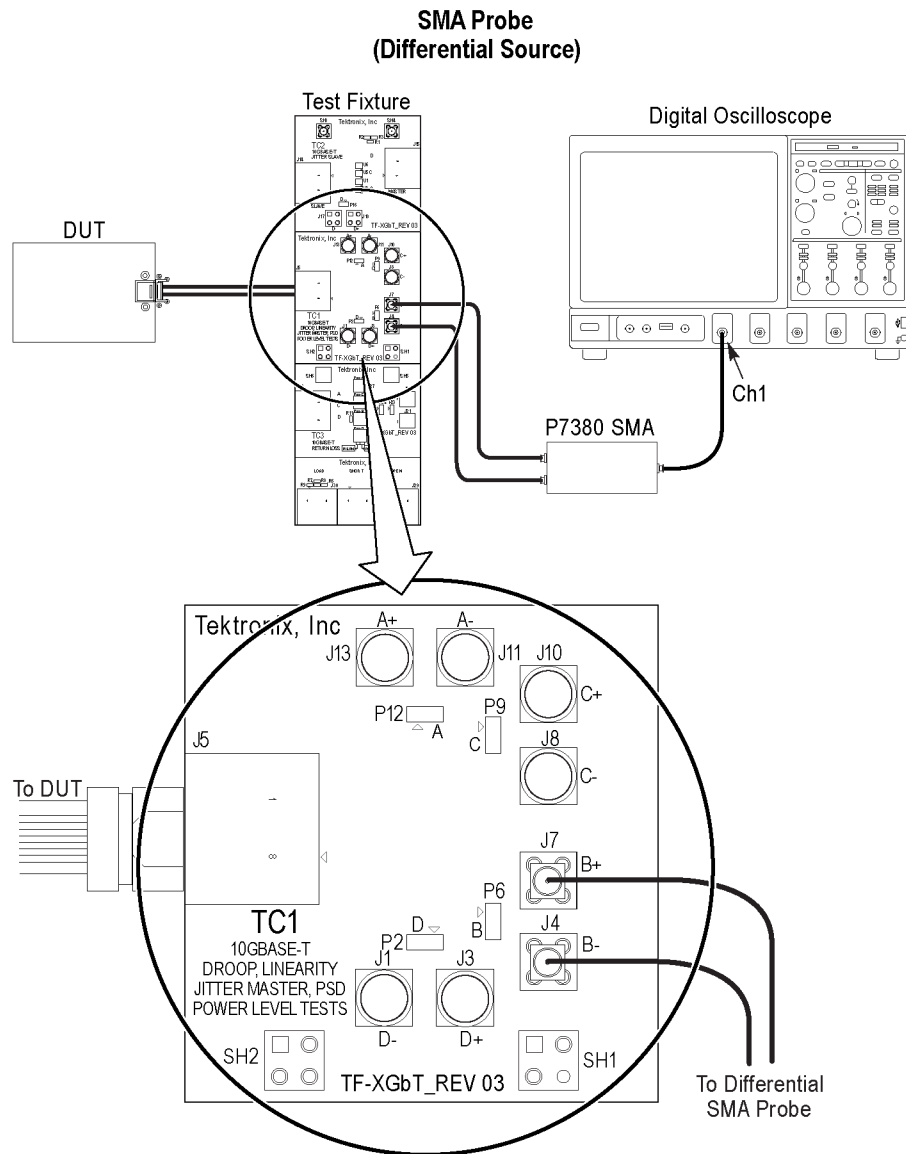
Note: When using high input impedance differential probe, ensure that each of the single ended lanes is terminated with 50 Ω.

Figure 1: Connections with an SMA Probe (Differential Source) for Droop Measurement
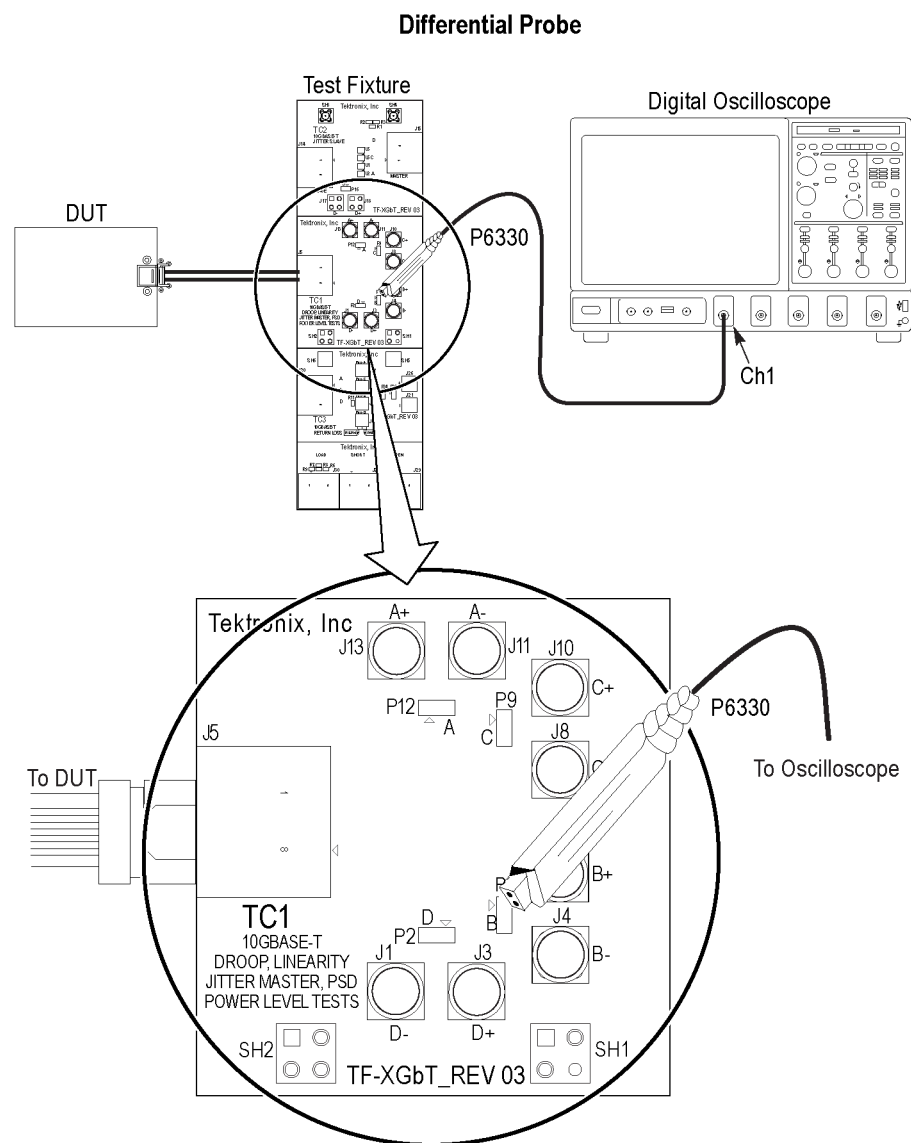
Differential Probe

Note: When using high input impedance differential probe, ensure that each of the single ended lanes is terminated with 50 Ω.

0390-003

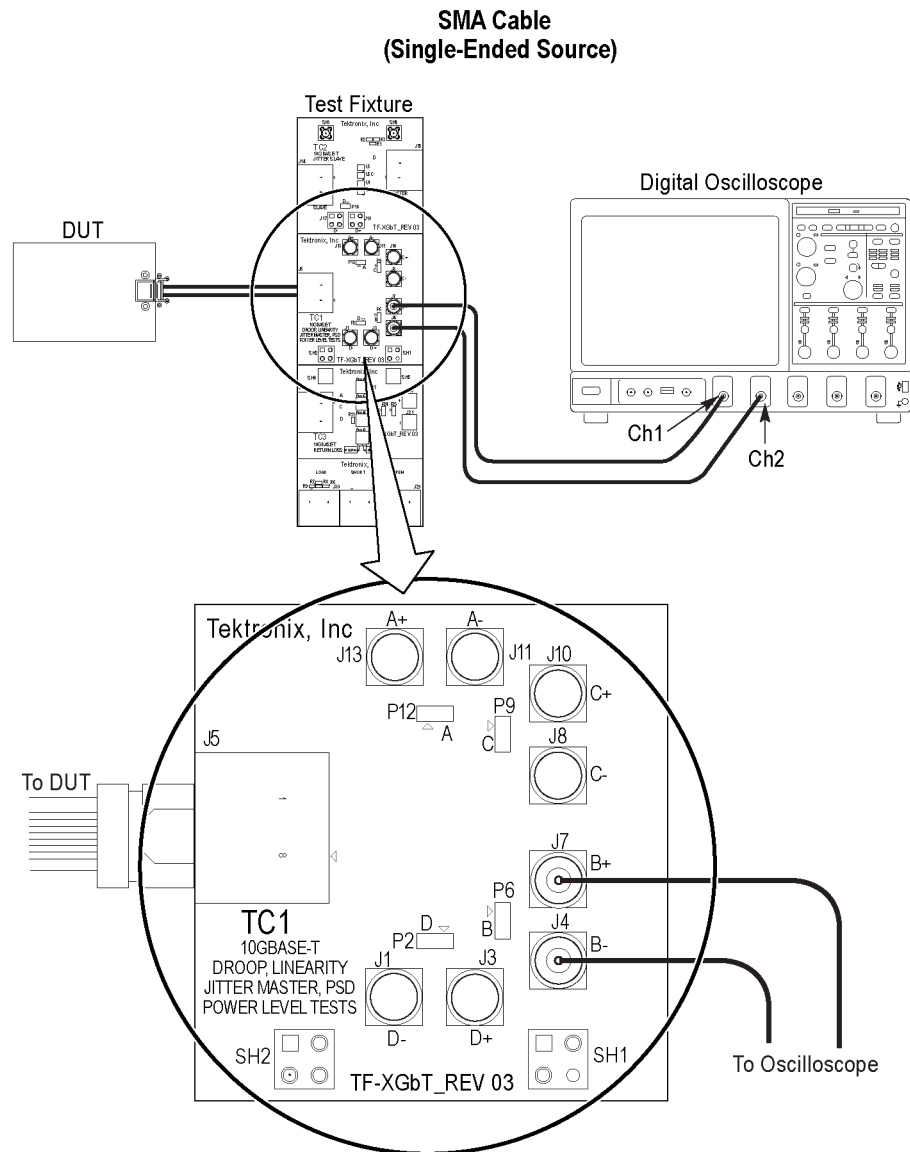**Figure 2: Connections with a Differential Probe (Differential Source) for Droop Measurement**

SMA Cable
(Single-Ended Source)

Test Fixture

DUT

Digital Oscilloscope

Ch1

Ch2

Tektronix, Inc

A+   A-
J13   J11   J10
P12   P9
A   C
J8   C-

J5

To DUT

J7   B+

P6
B
J4   B-

TC1
10GBASE-T
DROOP, LINEARITY
JITTER MASTER, PSD
POWER LEVEL TESTS

P2   D
J1   J3
D-   D+

SH2   SH1

TF-XGbT_REV 03

To Oscilloscope

Note: When using high input impedance differential probe, ensure
that each of the single ended lanes is terminated with 50 Ω.

0390-004

**Figure 3: Connections with a SMA Cable (Single-Ended Source) for Droop
Measurement**

2. Double-click the icon ![icon] on the desktop.

3. Click the Select tab and select **Differential or Single Ended** as the source. Select one of the test lanes. Enter the DUT ID. Select the Droop measurement. You can select **Click to view image of the waveform** to see a snapshot of the Droop signal.
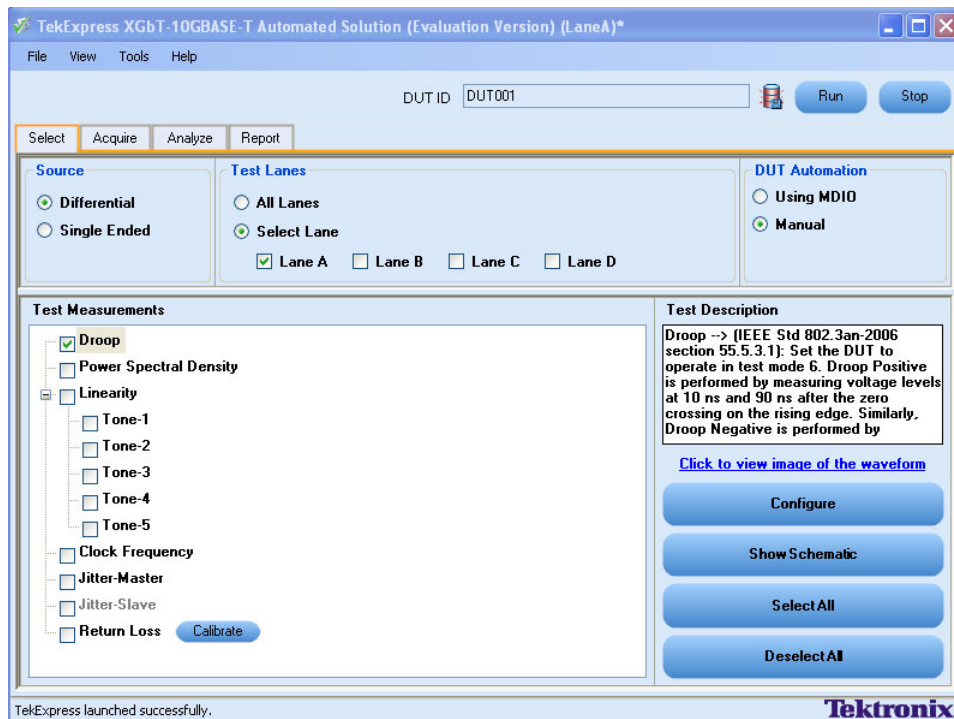

Figure 4: Select Panel with Droop Measurement Selected

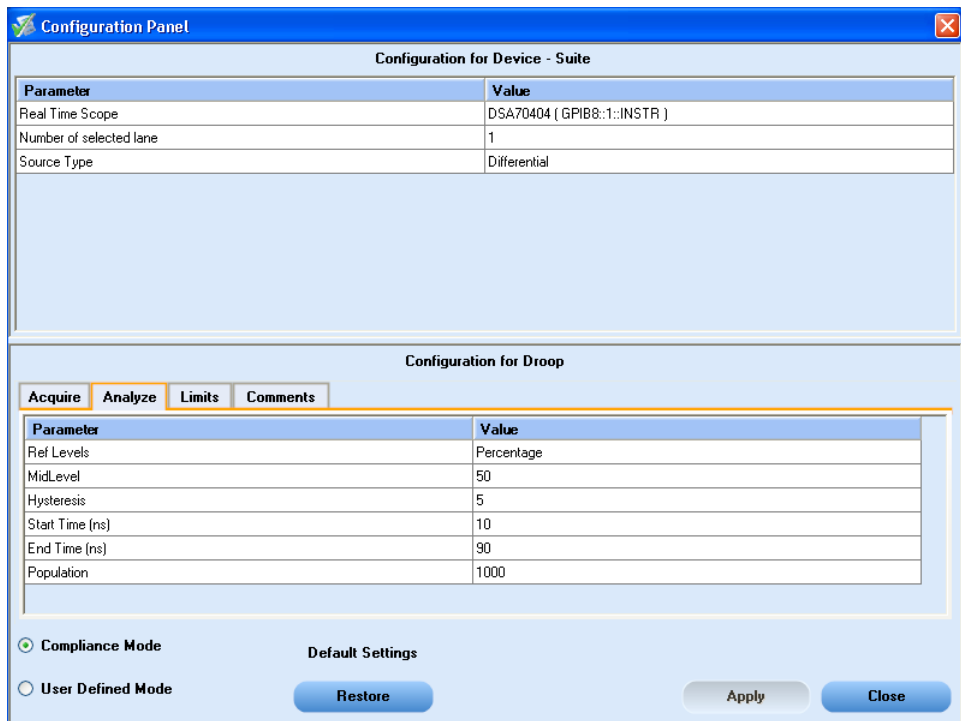**4.** Click **Configure** to configure the test parameters for the Droop measurement.

Figure 5: Configuration panel to set the Droop Parameters

5. In the Acquire panel, select either Acquire Live Waveform to analyze the live waveform or select Use Pre-recorded (See page 11, *Performing Analysis Using Prerecorded Waveforms*.) to analyze the prerecorded waveform files.

NOTE. When using prerecorded waveform files, the waveforms in the Report panel are not available after the measurement is run.

6. Click **Acquire** and select **Acquire Step By Step**, to display a snapshot of the input signal of the Droop measurement. This helps you to compare the applied input signal with the snapshot of a typical Droop input signal, allowing you to change the setup before acquisition. The application then prompts you to configure the DUT to transmit the Droop signal in the correct test mode.

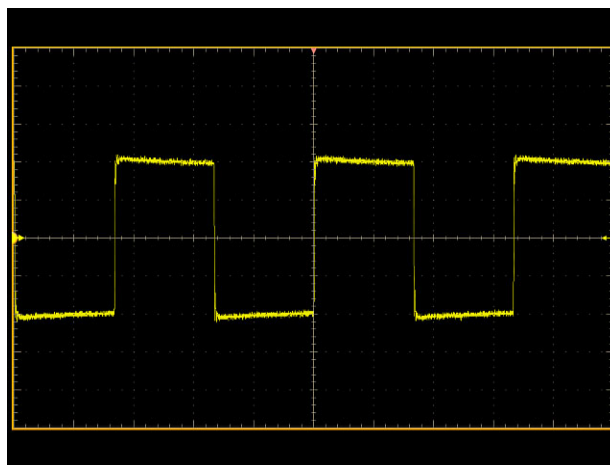*NOTE. When using prerecorded waveform files, the **Acquire Step By Step** option is not available.*

Figure 6: Snapshot of the Droop Signal for Differential Source

7. Click **Run**.

8. The status of the measurement is displayed in the **Analyze** panel.

Figure 7: Analyze panel after Droop Measurement is Run

9. After the measurement runs successfully, a summary report of all lanes and detailed reports of each of the lanes are displayed in the Report panel.
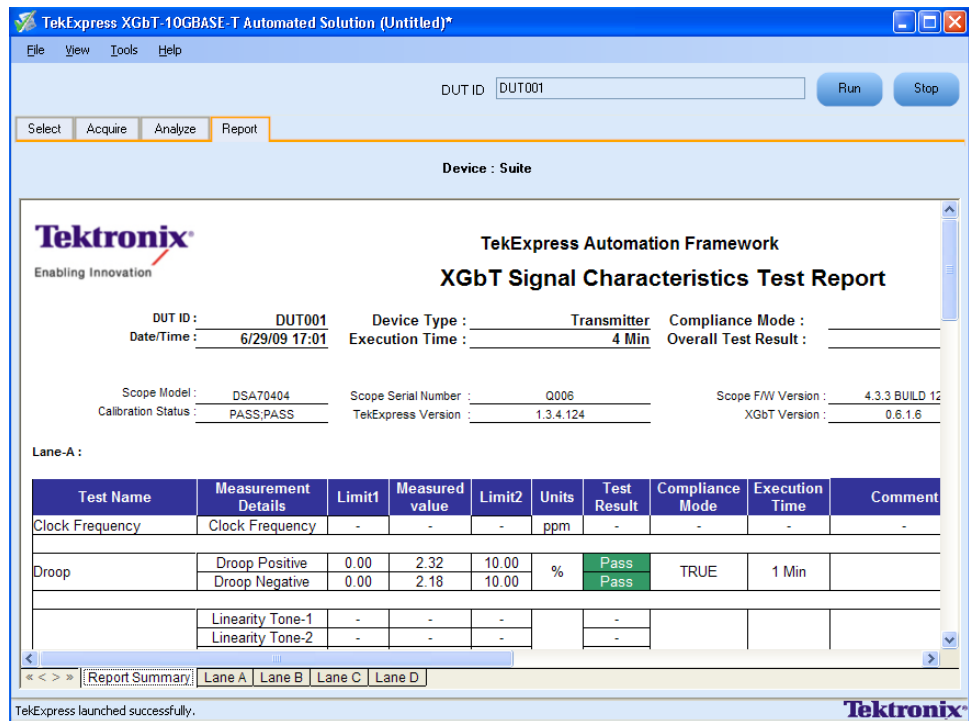
Figure 8: Report panel after Droop Measurement is Run

The reports are automatically saved in MHT format to the default location:

```
X:\XGbT-10GBASE-T\Untitled Session\<DUTID>\<DATE>
(YYYYMMDD)_<TIME> (HHMMSS)
```

or

```
My Documents\My TekExpress\XGbT-10GBASE-T\Untitled
Session\<DUTID>\<DATE> (YYYYMMDD)_<TIME> (HHMMSS)
```
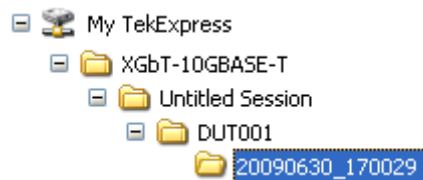

Figure 9: Location of the saved report file

NOTE. After a measurement is complete and a report is generated, if you select File>Save Report As and save the file in MHT format a blank .mht file is created at the target location. This is a known problem and happens because of an issue with Internet Explorer. Instead copy the generated .mht file to a different location manually.

Performing Analysis Using Prerecorded Waveforms

1. Open the session that you have saved using **File** > **Open Session** or **File** > **Recently Recalled Setup** (a recent file). Then a drop-down box appears showing the session name with the date details.

2. Select **Use Pre-recorded** in the Acquire panel and select one of the sessions listed in the drop-down box.

3. You have options to modify the waveform file for each lane of the measurements, add or delete a lane, and even add or delete a new measurement to the existing test suite. Once you select run, data corresponding for that run is populated (such as the selected test, the test configuration settings, and the test summary status).
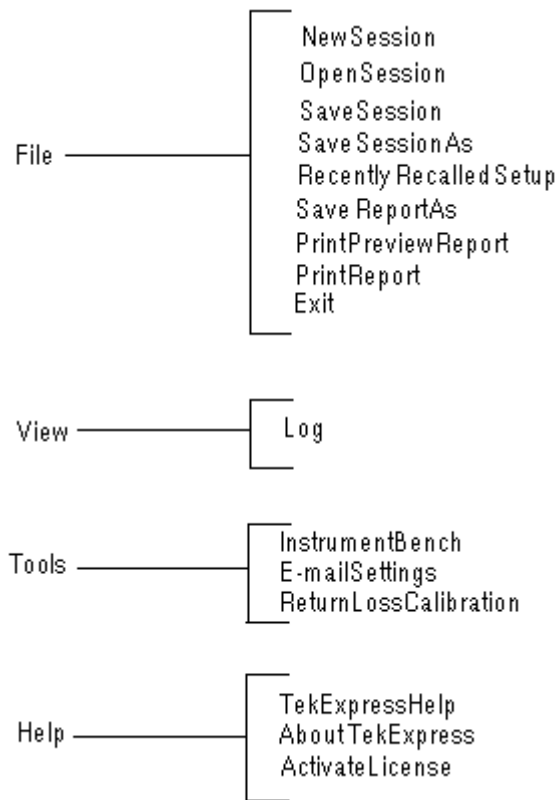
XGbT Menu Tree

Figure 10: XGbT menu tree