TekExpress® DiiVA Automated Solution

Quick Start User Manual

077-0508-00

Tektronix

TekExpress® DiiVA Automated Solution

Quick Start User Manual

www.tektronix.com
077-0508-00

Tektronix

Copyright © Tektronix. All rights reserved. Licensed software products are owned by Tektronix or its subsidiaries or suppliers, and are protected by national copyright laws and international treaty provisions.

Tektronix products are covered by U.S. and foreign patents, issued and pending. Information in this publication supersedes that in all previously published material. Specifications and price change privileges reserved.

TEKTRONIX and TEK are registered trademarks of Tektronix, Inc.

TekExpress is a registered trademark of Tektronix, Inc.

Contacting Tektronix

Tektronix, Inc.
14150 SW Karl Braun Drive
P.O. Box 500
Beaverton, OR 97077
USA

For product information, sales, service, and technical support:

- In North America, call 1-800-833-9200.
- Worldwide, visit www.tektronix.com to find contacts in your area.

Warranty

Tektronix warrants that this product will be free from defects in materials and workmanship for a period of one (1) year from the date of shipment. If any such product proves defective during this warranty period, Tektronix, at its option, either will repair the defective product without charge for parts and labor, or will provide a replacement in exchange for the defective product. Parts, modules and replacement products used by Tektronix for warranty work may be new or reconditioned to like new performance. All replaced parts, modules and products become the property of Tektronix.

In order to obtain service under this warranty, Customer must notify Tektronix of the defect before the expiration of the warranty period and make suitable arrangements for the performance of service. Customer shall be responsible for packaging and shipping the defective product to the service center designated by Tektronix, with shipping charges prepaid. Tektronix shall pay for the return of the product to Customer if the shipment is to a location within the country in which the Tektronix service center is located. Customer shall be responsible for paying all shipping charges, duties, taxes, and any other charges for products returned to any other locations.

This warranty shall not apply to any defect, failure or damage caused by improper use or improper or inadequate maintenance and care. Tektronix shall not be obligated to furnish service under this warranty a) to repair damage resulting from attempts by personnel other than Tektronix representatives to install, repair or service the product; b) to repair damage resulting from improper use or connection to incompatible equipment; c) to repair any damage or malfunction caused by the use of non-Tektronix supplies; or d) to service a product that has been modified or integrated with other products when the effect of such modification or integration increases the time or difficulty of servicing the product.

THIS WARRANTY IS GIVEN BY TEKTRONIX WITH RESPECT TO THE PRODUCT IN LIEU OF ANY OTHER WARRANTIES, EXPRESS OR IMPLIED. TEKTRONIX AND ITS VENDORS DISCLAIM ANY IMPLIED WARRANTIES OF MERCHANTABILITY OR FITNESS FOR A PARTICULAR PURPOSE. TEKTRONIX' RESPONSIBILITY TO REPAIR OR REPLACE DEFECTIVE PRODUCTS IS THE SOLE AND EXCLUSIVE REMEDY PROVIDED TO THE CUSTOMER FOR BREACH OF THIS WARRANTY. TEKTRONIX AND ITS VENDORS WILL NOT BE LIABLE FOR ANY INDIRECT, SPECIAL, INCIDENTAL, OR CONSEQUENTIAL DAMAGES IRRESPECTIVE OF WHETHER TEKTRONIX OR THE VENDOR HAS ADVANCE NOTICE OF THE POSSIBILITY OF SUCH DAMAGES.

[W2 – 15AUG04]

Table of Contents

Preface ii
Key Features ii
Documentation ii
Software Upgrades iii
Install the Software 1
Before Installation 1
Prerequisites 1
Installation 1
Required Test Equipment 2
Start the Software 2
Close the Software 2
Using the Software 3
Connect and Configure the Equipment 4
Select a Device, Lane Configuration, and Test 4
Configure the Test Parameters 5
Run the Test 8
Interpret the Test Result 9
Generate, Save, and Print a Report 9
Application Examples 10
Upstream Video Link Test: Differential Pk-Pk Voltage 10
Upstream Hybrid Link Test: Differential Pk-Pk Voltage 16
Index

Preface

TekExpress is the Tektronix Compliance Test Automation Framework, developed to support current and future test automation needs of customers. Developed using National Instruments' TestStand, TekExpress leverages on the capabilities of the Microsoft .NET framework. The TekExpress DiiVA Automated Solution meets the DiiVA draft specification, and automates a comprehensive range of tests, enabling unprecedented efficiency with reliable results.

Key Features

The key features of the application are:

- Reliable testing:
  - Conformance to DiiVA standards and test specifications CTS draft ensures reliable results
  - Complete validation to standards with wide range of tests
  - Sophisticated measurement techniques eliminate errors in jitter measurements
  - Closed loop measurements eliminate nonlinearities of test setup enable precise sink tests
  - Optimal setups ensure accurate results
- Quick testing:
  - Remote control of signal sources automates sink tests and cuts test times
  - Automatic Mask-fit, measurements and Pass/Fail notification delivers quick results
  - One-button selection of multiple tests ensures faster testing
  - Mask margins aid analysis and help find answers quickly
  - One-button .MHT report saves time

Documentation

This manual describes how to install and operate the TekExpress DiiVA application. For more detailed information, see the online help. The following information is available for this product:

Table i: Related documentation

TekExpress DiiVA Online Help, English	076-0225-XX	
TekExpress DiiVA User Manual, English (PDF)	077-0507-XX	(Documents folder)
TekExpress DiiVA Quick Start User Manual, English (PDF) (this manual)	077-0508-XX	

Software Upgrades

Periodic software upgrades may become available. To check for upgrades:

1. Go to the Tektronix Web site (www.tektronix.com/software).
2. Enter the product name (TekExpress DiiVA) in the Search Software field.
3. Click GO.

Install the Software

You must install the TekExpress application on a computer or on a Tektronix Microsoft Windows-based oscilloscope.

Before Installation

Read the `Readme.txt` file provided with the product software.

Prerequisites

The following items must already be installed before installing the TekExpress DiiVA application:

- Microsoft Windows XP Service Pack 2.
- Microsoft .NET Framework
- National Instruments TestStand Run time Engine
- OpenChoice TekVISA
- DK2 DESKey Driver
- TekExpress Framework

Installation

1. Close all applications.
2. Download `DiiVAWebinstaller_<version>.EXE` from the Web.
3. Double-click the executable to extract the files. After extraction, the DiiVA installer launches and the software is installed in `C:\Program Files\Tektronix\TekExpress`.

Required Test Equipment

The following equipment is required, depending on the tests that you will be running:

- Tektronix DPO/DSA71254, DPO/DSA71604, and DPO/DSA72004 Series Digital Oscilloscopes, Tektronix DPO/DSA71254B, DPO/DSA71604B, and DPO/DSA72004B Series Digital Oscilloscopes, Tektronix MSO71254, MSO71604, and MSO72004 Series Mixed Signal Oscilloscopes
- Tektronix P7313 SMA differential probes (quantity two or four) with matched pair cables
- Golden DiiVA Video Sink board
- Golden DiiVA Video Source board
- TF-DiiVA-TPA-P plug, TF-DiiVA-TPA-R receptacle, and TF-DiiVA-C calibration fixture
- SMA cables (quantity eight)
- DC blocks (quantity eight)
- Barrel connectors (quantity two or eight)

Start the Software

To start the software, do one of the following:

- From the Start menu, select **Start > Programs > Tektronix > TekExpress > TekExpress DiiVA**.
- Double-click the TekExpress DiiVA icon on the desktop.

Close the Software

To close the software, do one of the following:

- Select **File > Exit**.
- Click .

Using the Software

The following steps describe a typical compliance test process. Details for each of these steps are given on the following pages.

1. Set up the equipment.
2. Select a device.
3. Select the lane configuration (number of video lanes and target lanes) and CTS version.
4. Select the test.
5. Configure the test parameters.
6. View and select connected instruments.
7. Run the test.
8. View the progress of acquisition.
9. View the progress of analysis.
10. View and print the generated report.

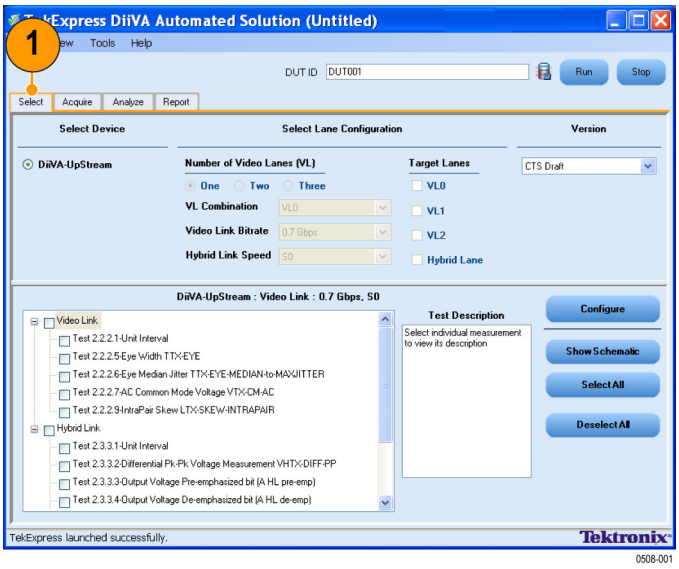
Connect and Configure the Equipment

The Application Examples section describes the equipment connections in detail.(See page 10, *Application Examples*.)

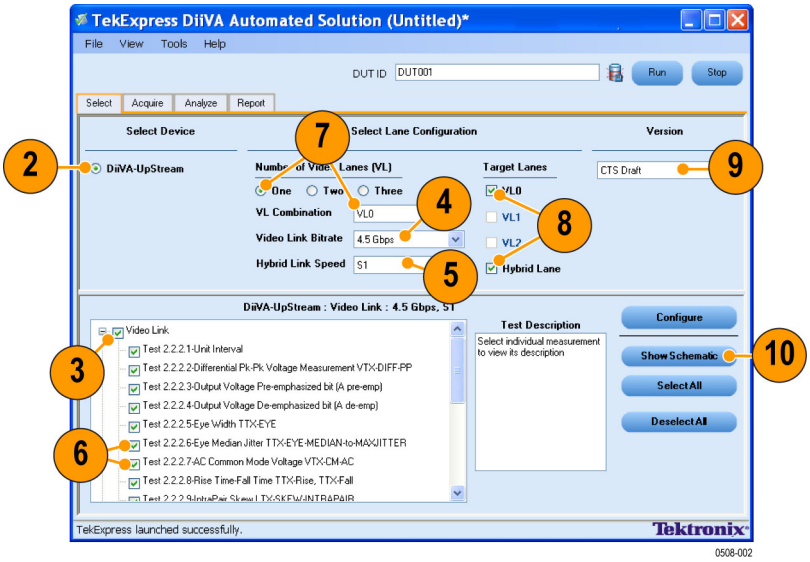
You can click **Show Schematic** to display a diagram of the test setup for each of the test suites.

Select a Device, Lane Configuration, and Test

1. Click the **Select** tab.



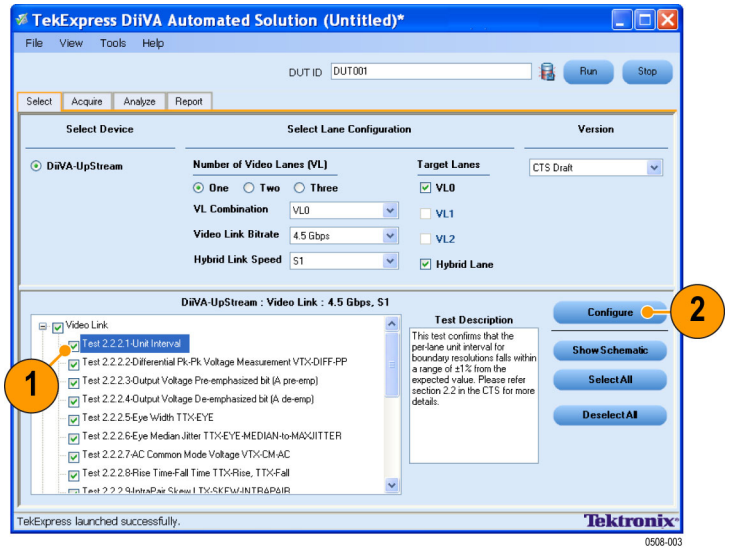
2. Select a Device.
3. Select Video Link or Hybrid Link, or both.
4. Select the Video Link Bitrate.
5. Select the Hybrid Link Speed.
6. Select the test to run. You can select multiple tests from the list.



7. Define the Lane Configuration.
   - Select the number of video lanes.
   - Select the video lane combination.
8. Select the target lanes for Video Link measurements and the **Hybrid Lane** for Hybrid Link measurements.
9. Choose the version of the selected test suite from the **Version** drop-down list.
10. Click **Show Schematic** to see the schematic diagram of the test setup.

Configure the Test Parameters

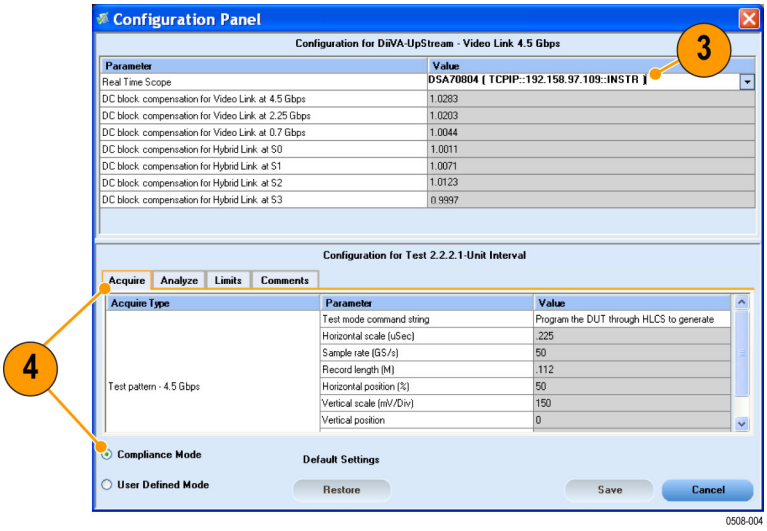
1. Click the test name to configure.
2. Click **Configure**.



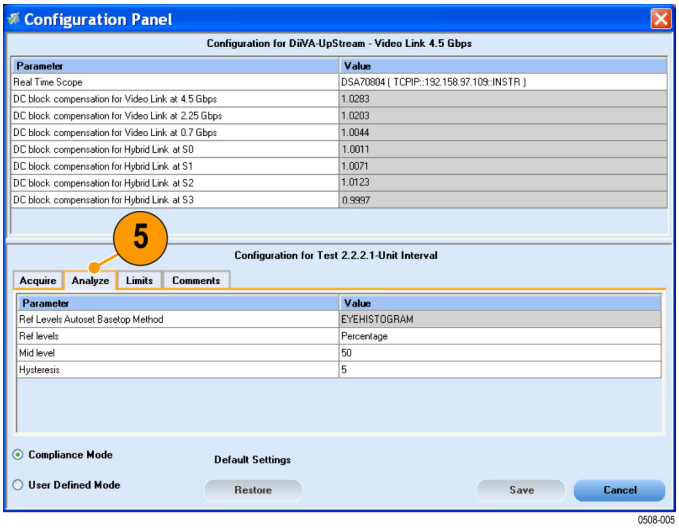
3. If multiple instruments are connected, choose the correct instrument from the parameter-value list.

4. The Compliance Mode is selected by default. You can use the default settings in Compliance Mode. Click the **Acquire** tab to view parameters related to acquisition.

NOTE. *Use the User Defined Mode to change the parameter values as required. If you do so, you will not be testing the device against the values specified for compliance.*

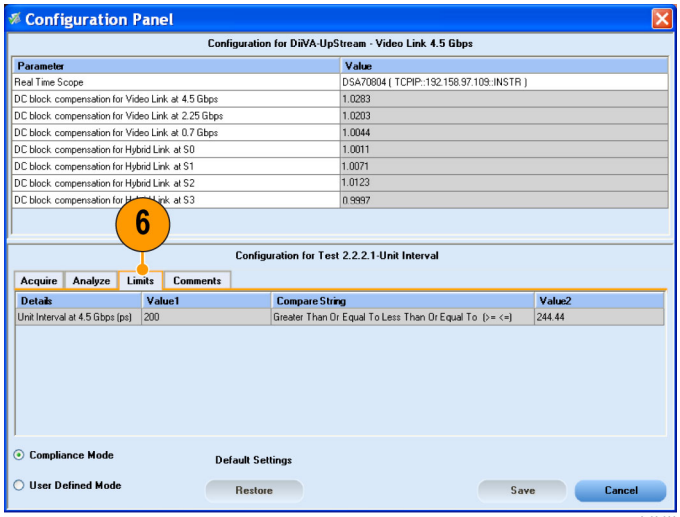


5. Click the **Analyze** tab to view analysis parameters.



6. Click the **Limits** tab to view the measurement limits.

   See the online help for various test limit comparisons.

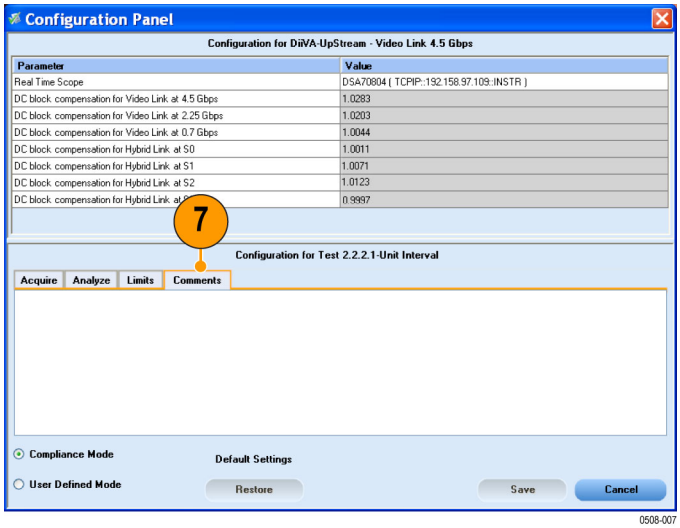


0508-006

7. Click the **Comments** tab to enter test-specific comments.

8. Click **Cancel**.

NOTE. *Use the File menu to save the session.*

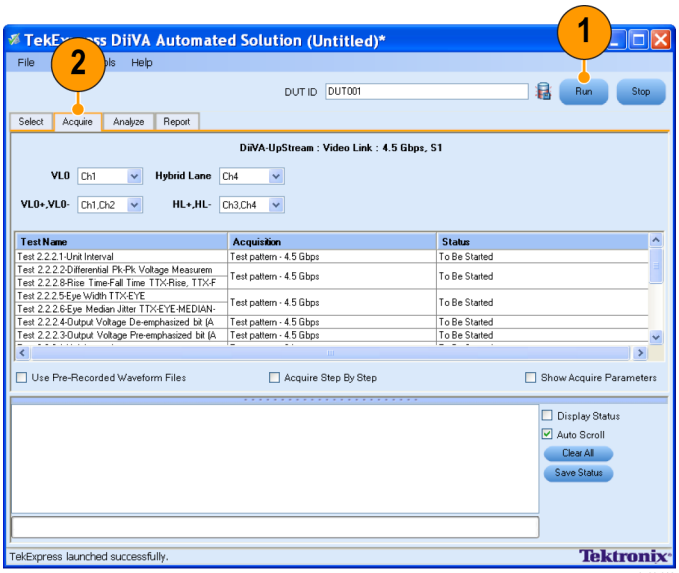


0508-007

Run the Test

1. Click **Run** to run the test.

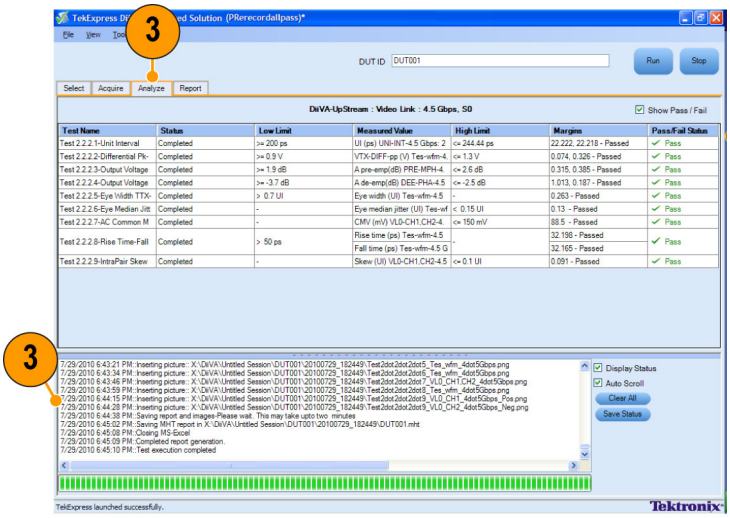
2. Click **Acquire** to view the waveform acquisition details for the tests in the sselected test suite.



0508-009

3. Click **Analyze** while the tests are running to view the status and progress of the tests. The application checks to see if the device has passed the test.

   The application displays run-time messages with time-stamp data.



0508-010

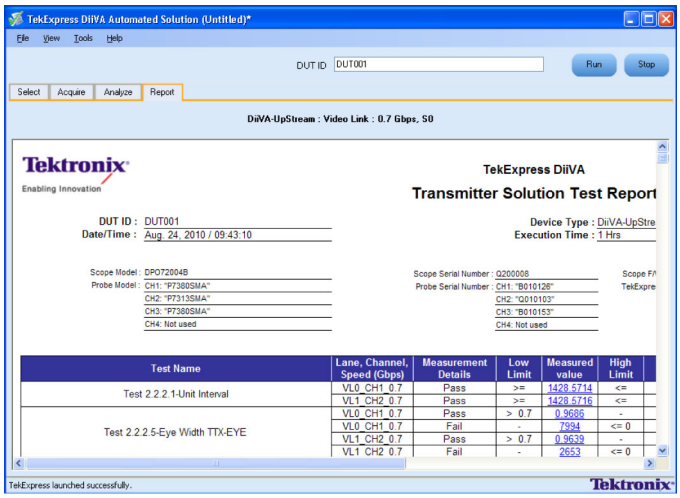
Interpret the Test Result

The report summary appears when the test complete. Check the report to see if the device passed the test.

1. The report displays the DUT ID, the date and time the test was run, and execution time.

2. Test information like the Device Type, Version, Execution Time, Compliance Mode (Yes or No), and Overall Test Result (Pass or Fail), are shown.

3. The test results include iInstrument information such as the models, serial numbers, and firmware/software versions are shown.



0508-031

4. A table displays the Test Name, Lane, Channel and Speed, Measurement Details, Low and High Limits, Margin, Test Result, Compliance Mode, Analysis Time, and Comments.

Generate, Save, and Print a Report

A report summary is generated in MHT format after you have successfully run one or more test(s).

To save the report summary, select **File > Save Report As**.

To preview the report before printing, select **File > Print Preview Report**.

To print the report, select **File > Print Report**.

Application Examples

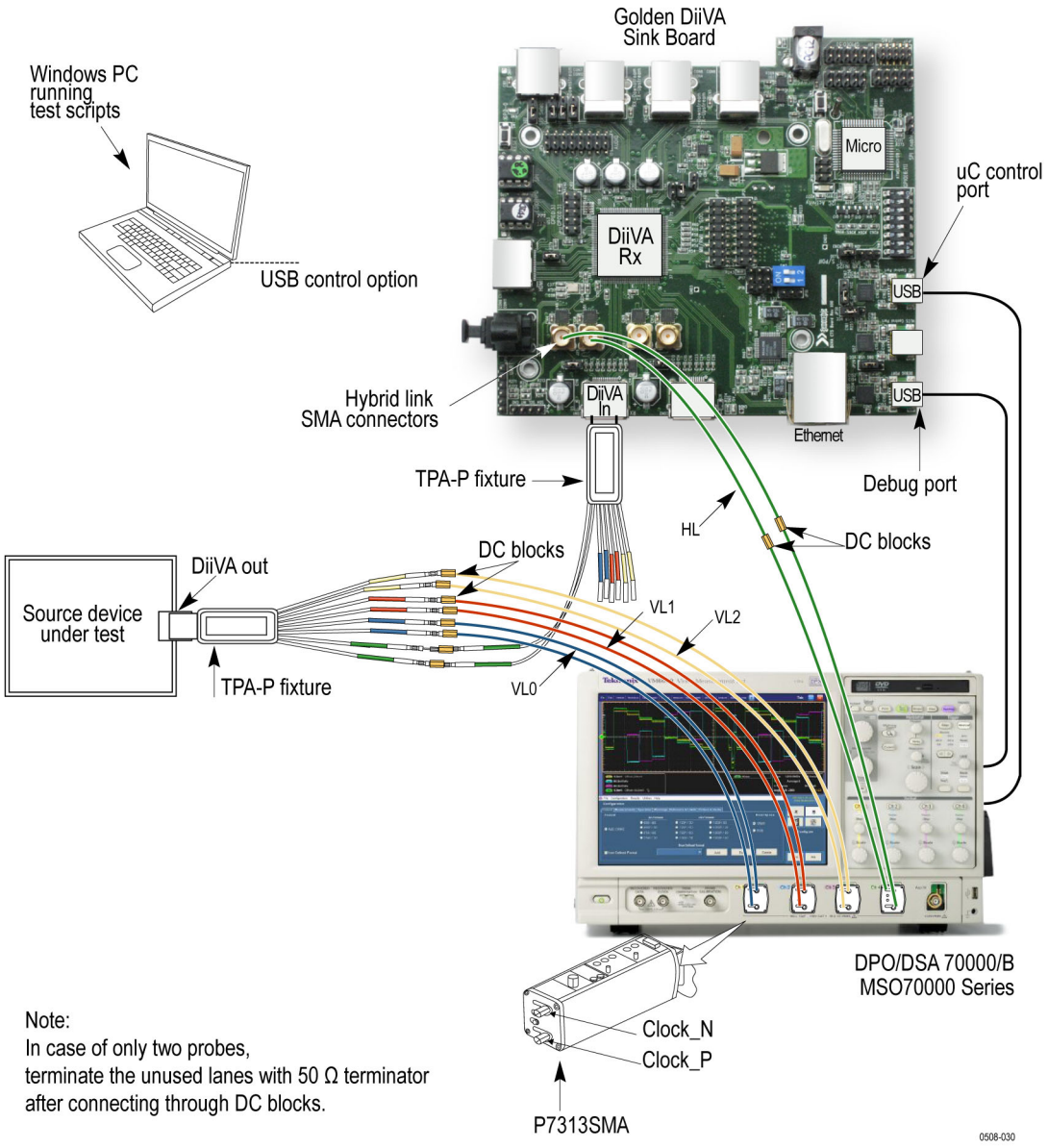
The measurements are classified based on the test pattern. The following examples show a test individually for both video link and hybrid link. For details on other tests, see the TekExpress DiiVA Automated Solution online help.

Upstream Video Link Test: Differential Pk-Pk Voltage

This test checks the DUT for compliance with upstream video link tests.

Required equipment	Description or quantity
Oscilloscope with DiiVA test automation software installed	Tektronix DPO/DSA71254, Tektronix DPO/DSA71254, Tektronix DPO/DSA71604, Tektronix DPO/DSA72004, Tektronix MSO71254, Tektronix MSO71604, or TektronixMSO72004 oscilloscope
Differential Probes with matched pair cables	Two Tektronix P7313 probes
Golden DiiVA Sink board used as HLCS Test Controller and TPA	One
TF-DiiVA-TPA-P test fixtures	Two
SMA cables	Six Tektronix part number 174-1428-00 (1.5 meter) Tektronix part number 174-1341-00 (1 meter)
DC blocks	Six
50 Ω terminators	Six

1. Connect the DUT to the equipment as shown.



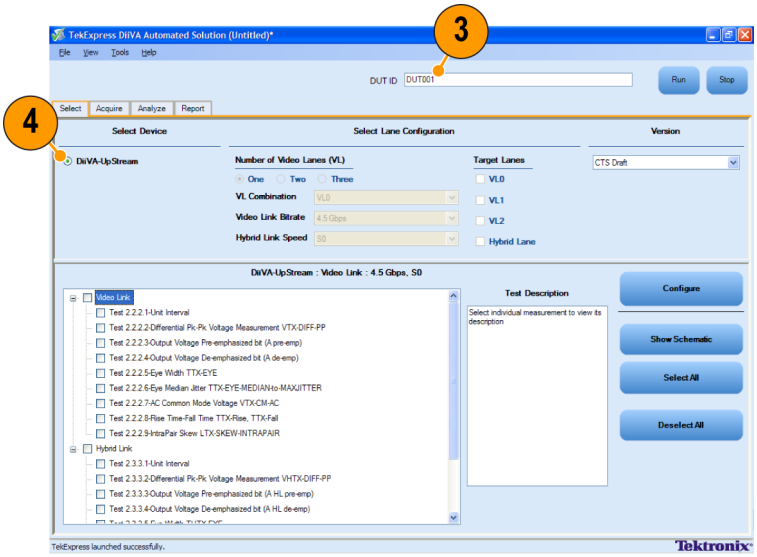
- Connect the DUT to the TF-DiiVA-TPA-P fixture.
- Connect the TF-DiiVA-TPA-P board to the oscilloscope using the probes (three pairs, one for each video lane).

NOTE. *Always attach all lanes through DC blocks, since these lines can carry 5 V power.*

- Connect the second TF-DiiVA-TPA-P board to Golden DiiVA Sink board.
- Connect the TF-DiiVA-TPA-P board to the second TF-DiiVA-TPA-P board using two SMA cables or barrel adapters.
- Terminate unused lanes with 50 Ω after connecting the DC blocks.
- Connect a USB cable from the controlling device to the HLCS/µC Control Port input of the Golden DiiVA Sink board.

2. Launch TekExpress DiiVA.

3. Enter the DUT ID.



4. Select the device as **DiiVA UpStream**.

5. Select **Test 2.2.2.2-Differential Pk-Pk Voltage Measurement VTX-DIFF-PP**.

6. Set the number of video lanes to**One**.

7. Set the VL Combination to**VL0**

8. Set the Video Link Bitrate to**4.5 Gbps**.

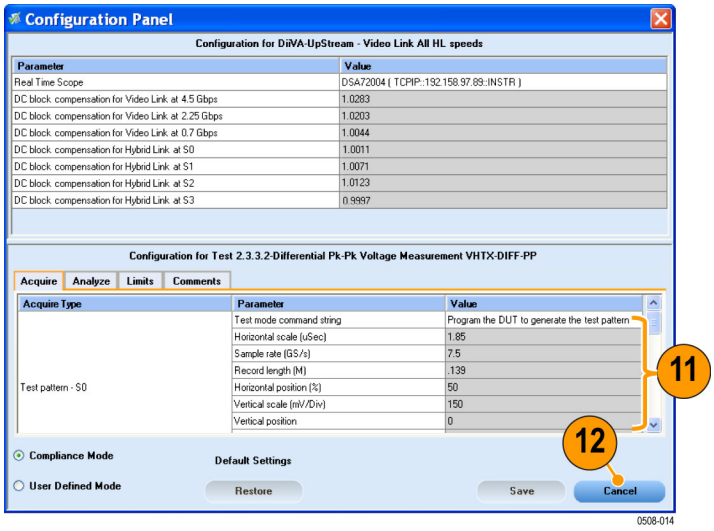
9. Select the CTS version.

10. Click **Configure** to open the configuration panel.

11. Use the default values in the Compliance Mode to run the tests for compliance with the standards.

NOTE. *To change acquisition parameter values, click User Defined Mode. A message appears prompting you that if you make changes to a test, the test may no longer be compliant. Click* ***OK*** *to proceed with the User Defined Mode.*

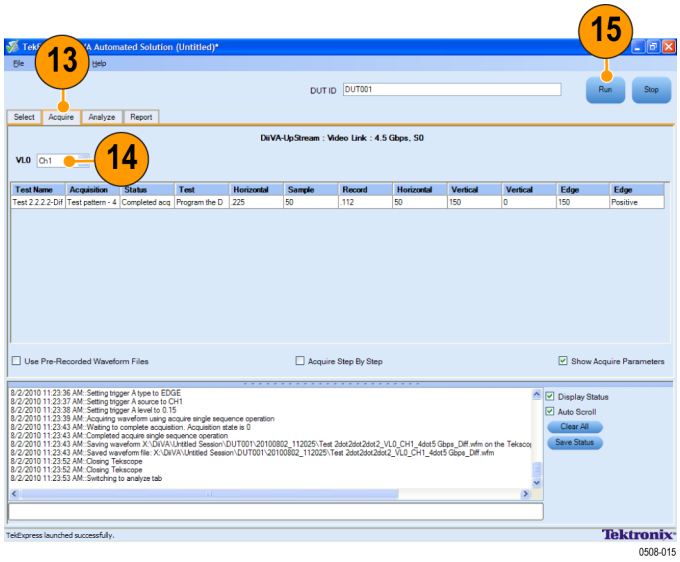
12. Click **Cancel**



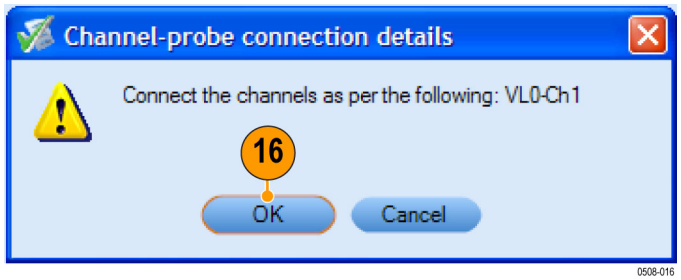
13. Click **Acquire**.

14. Set the channel for the video lane to **VL0**.

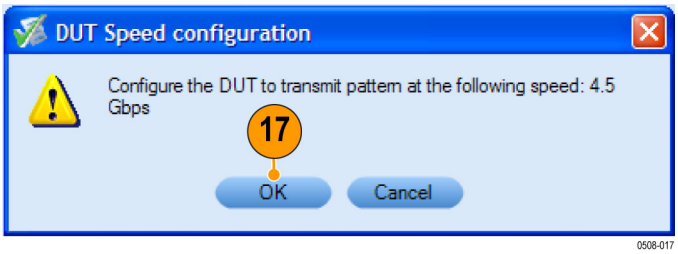
15. Click **Run**.



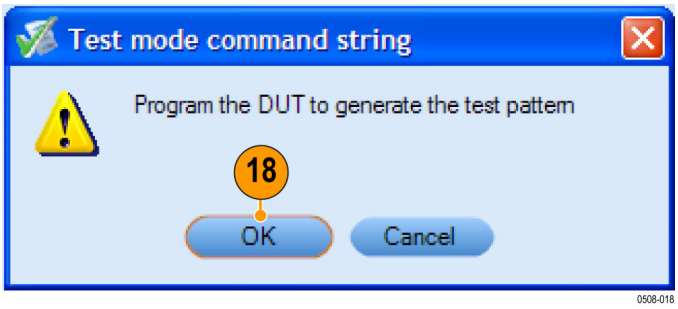
16. When prompted, check the channel and probe connections. Click **OK**.



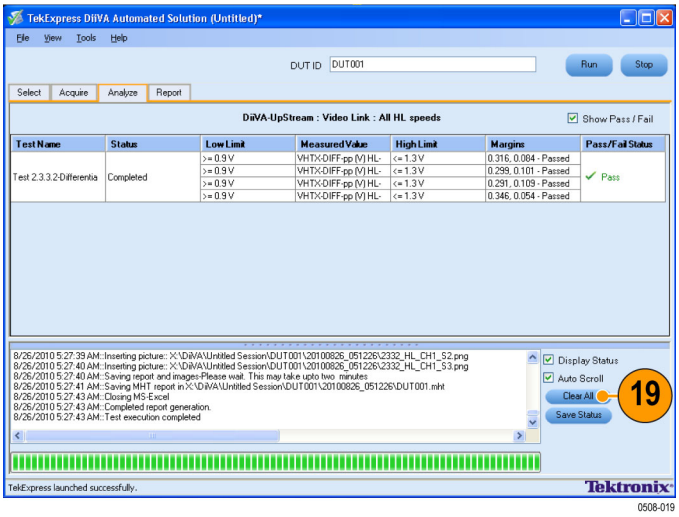
17. When prompted, configure the DUT to transmit the pattern at the selected speed. Click **OK**.



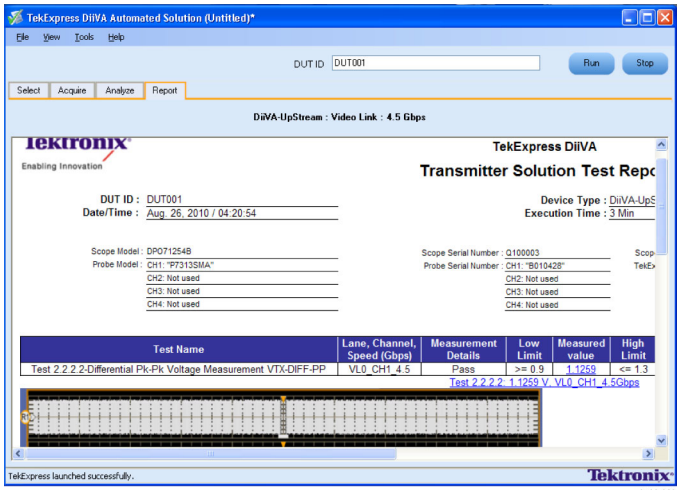
18. The application prompts you to confirm on the generation of the test pattern. Click **OK**.



19. The application automatically switches to the Analyze tab. The application displays the status of the tests in the Status Messages window. Click **Save Status** to save the status messages.



20. When the tests complete, the application shows a report in the Report tab.



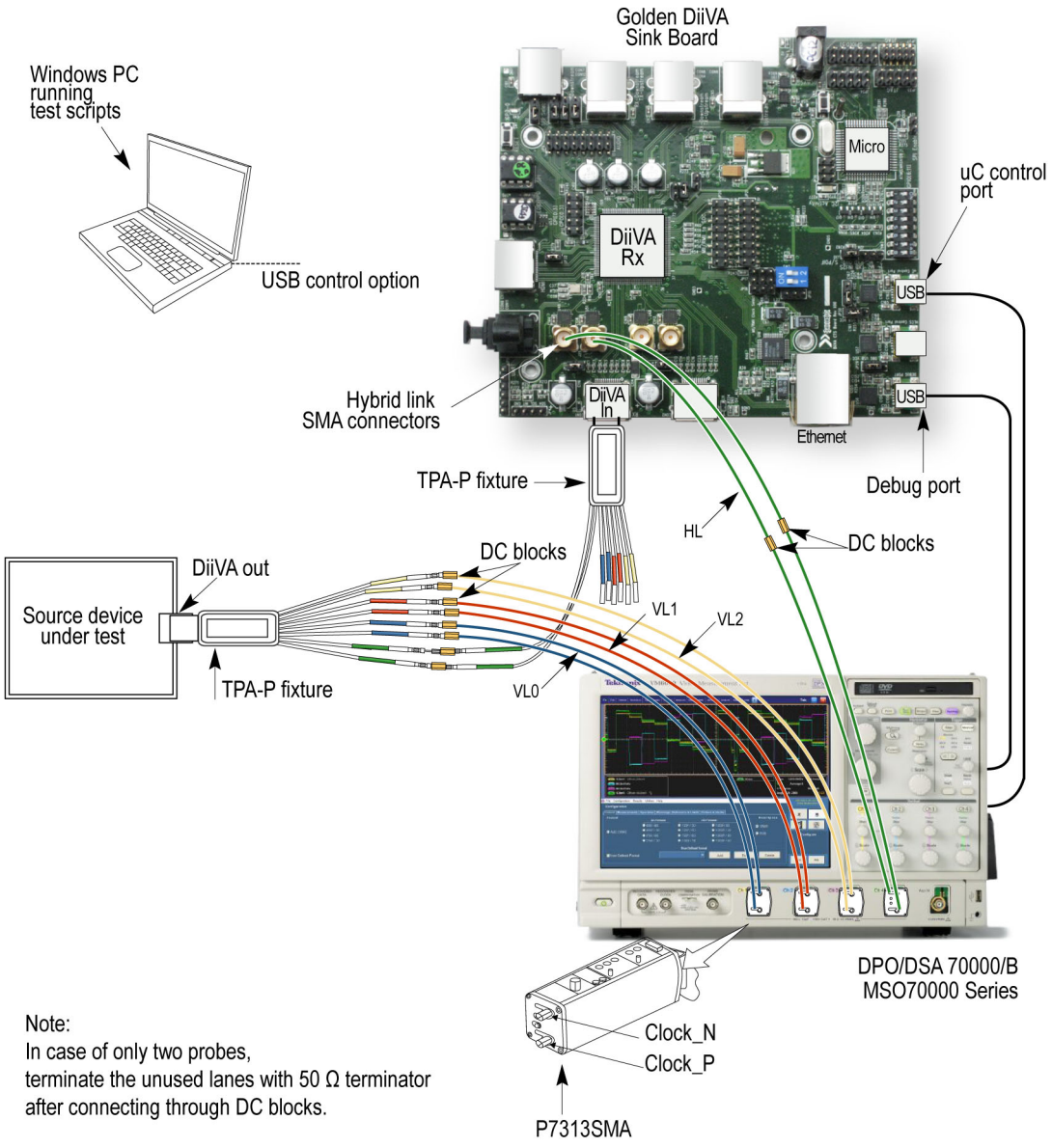
0508-029

Upstream Hybrid Link Test: Differential Pk-Pk Voltage

This test checks the DUT for compliance with upstream hybrid link tests.

Required equipment	Description or quantity
Digital Storage Oscilloscope with DiiVA test automation software installed	Tektronix DPO/DSA71254, Tektronix DPO/DSA71254, Tektronix DPO/DSA71604, Tektronix DPO/DSA72004, Tektronix MSO71254, Tektronix MSO71604, or TektronixMSO72004 oscilloscope
Differential Probe with matched pair cables	One Tektronix P7313 probe
Golden DiiVA Video Sink board used as HLCS Test Controller and TPA	One
TF-DiiVA-TPA-P test fixtures	Two
SMA cables	Two Tektronix part number 174-1428-00 (1.5 meter) Tektronix part number 174-1341-00 (1 meter)
DC blocks	Two
50 Ω terminators	Six

1. Connect the DUT to the equipment as shown.



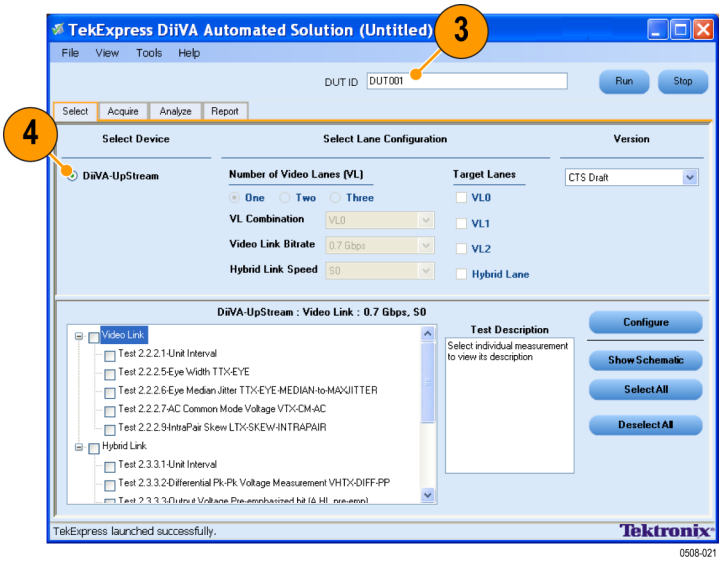
- Connect the DUT to the first TF-DiiVA-TPA-P board.
- Connect the second TF-DiiVA-TPA-P board to the Golden DiiVA Sink board.

NOTE. *Always attach all lanes through DC blocks, since these lines can carry 5 V power.*

- Connect the hybrid link of the two TF-DiiVA-TPA-P fixtures using SMA cables or barrel adapters.
- Connect the hybrid link output from the Golden DiiVA Sink board to the oscilloscope channel using the differential probes.
- Terminate the unused lanes with 50 Ω after connecting the DC blocks.
- Connect a USB cable from the controlling device to the HLCS/µC Control Port input of the Golden DiiVA Sink board. During manual operation, commands are manually sent to the Golden DiiVA Sink board.

2. Launch TekExpress DiiVA.

3. Enter the DUT ID.



4. Select the device as **DiiVA UpStream**.

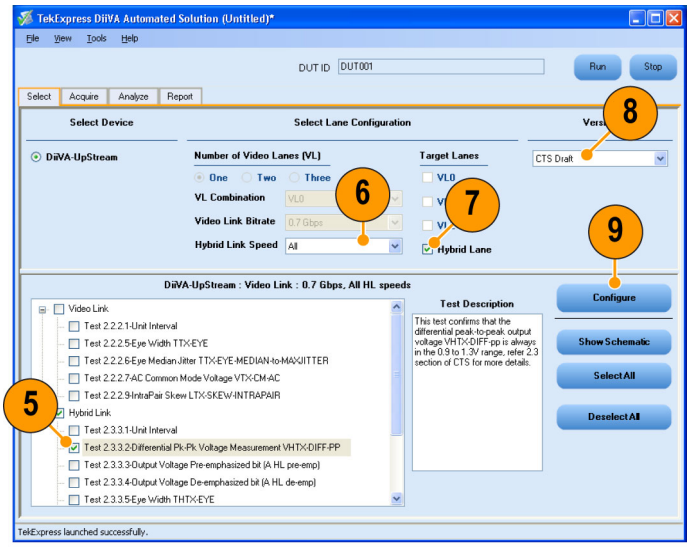
5. Select **Test 2.3.3.2-Differential Pk-Pk Voltage Measurement VHTX-DIFF-PP**.

6. Set the Hybrid Link Speed to **All**.

7. Select the Target Lane as **Hybrid Lane**.

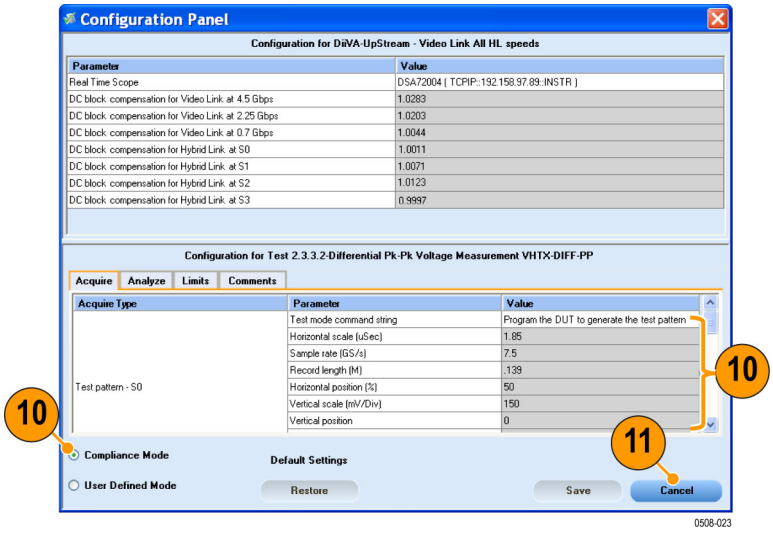
8. Select the CTS version.

9. Click **Configure** to open the configuration panel.



10. Use the default values in the Compliance Mode to run the tests for compliance with the standards.

NOTE. *To change acquisition parameter values, click User Defined Mode. A message appears prompting you that if you make changes to a test, the test may no longer be compliant. Click* ***OK*** *to proceed with the User Defined Mode.*

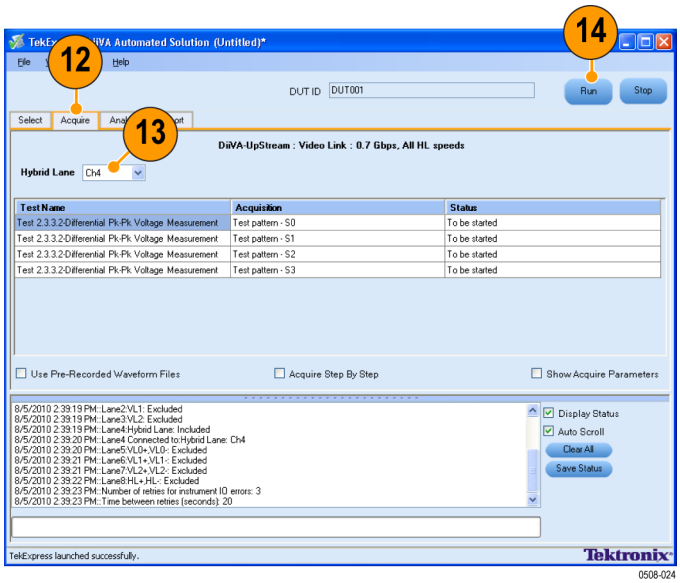


11. Click **Cancel**.

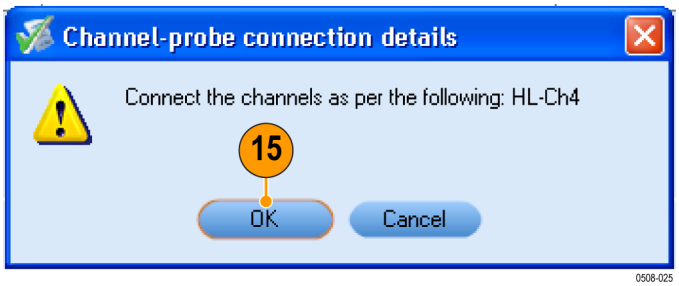
12. Click **Acquire**

13. Select the channel for the hybrid lane.

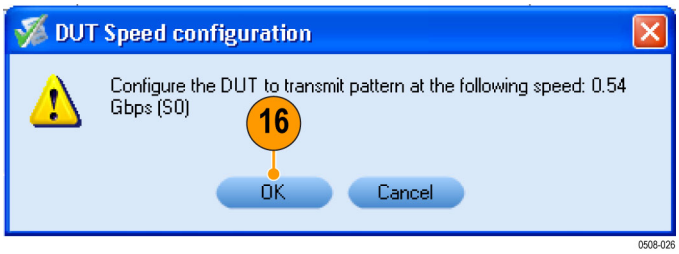
14. Click **Run**.



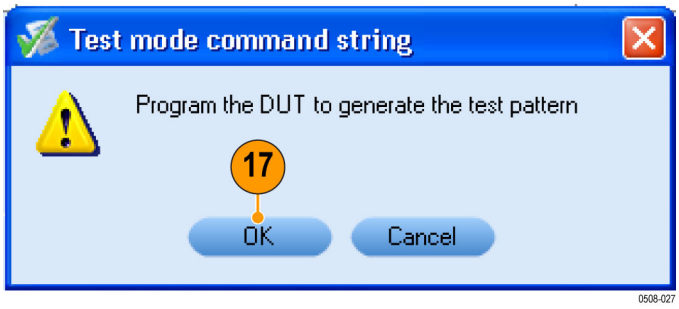
15. When prompted, check the channel connections and click **OK**.



16. When prompted, configure the DUT to transmit the pattern at the selected speed, and click **OK**.

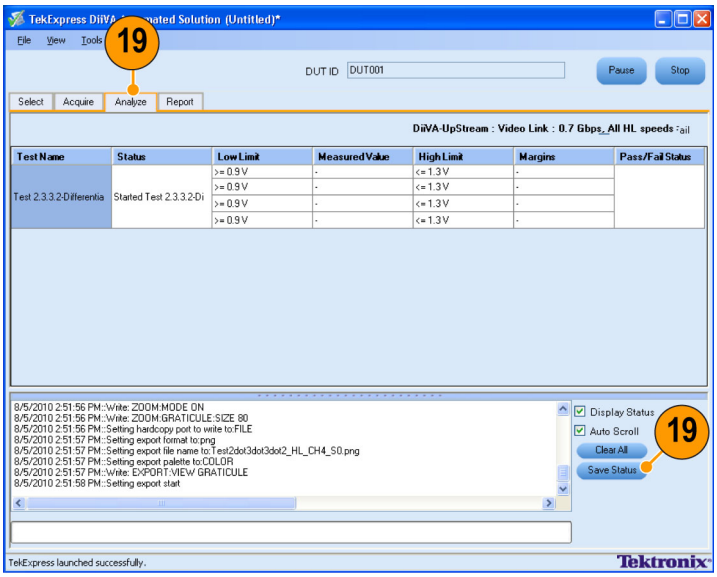


17. When prompted, program the DUT to generate the test pattern. Click **OK**.

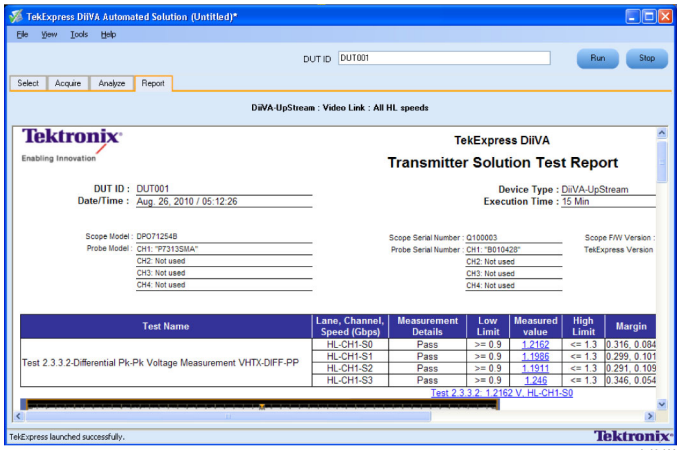


18. Repeat steps 15 through 17 for each of the speeds.

19. The application automatically switches to the Analyze tab. The application displays the status of the tests in the Status Messages window. Click **Save Status** to save the status messages.



20. When the tests complete, the application shows a report in the Report tab.



0508-032

Index

A

Acquire, 8
Analyze, 8

C

Compliance mode, 6
Configure, 5
    Acquire panel, 6
    Analyze panel, 6
    Comments panel, 7
    Limits panel, 7
Connections
    Hybrid link, 17
    Video link, 11

D

DC blocks, 10, 16
Device, 4
DiiVA UpStream, 12, 18

E

Equipment, 2

G

Golden DiiVA Sink board, 10
Golden DiiVA Video Sink board, 16

H

Hybrid lane, 18
Hybrid link
    Differential Pk-Pk Voltage Measurement, 18

I

Installation, 1

L

Lane configuration, 5

M

Multiple tests, 4

P

Prerequisites, 1
Probe, 10, 16

R

Readme, 1
Real-time oscilloscope, 10, 16
Report
    generate, 9
    MHT, 9
    previewing, 9
    print, 9
    printing, 9
    save, 9
    saving, 9
Run
    test, 8

S

Show Schematic, 2, 5
SMA cables, 10
SMA Cables, 16
Software
    closing the, 2
    process flow, 3
    starting the, 2
    upgrades, iii
Status messages, 8

T

Terminators, 10, 16
Test
    configuring, 5
    details, 9
    interpreting the result, 9
    parameters, 5
    report, 9
    running, 8
    selecting, 4
Test fixtures, 10, 16
Test suite
    version, 5

U

User defined mode, 13, 21

V

Video link
    Differential Pk-Pk Voltage Measurement, 12