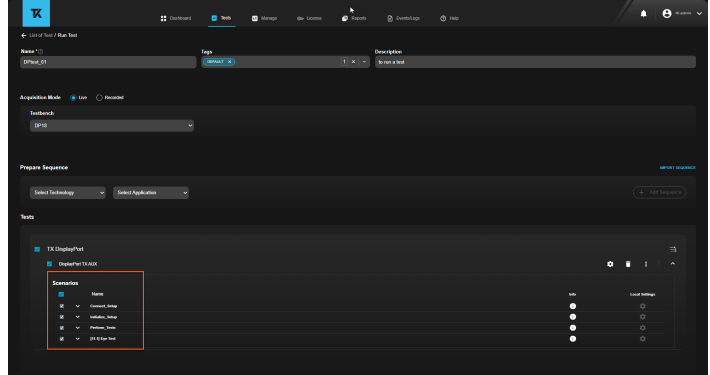
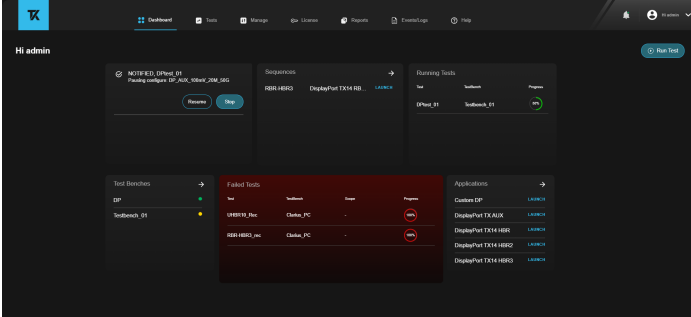


# Clarius Compliance DisplayPort 1.4 Transmitter Test Solution Datasheet



Tektronix provides the most comprehensive solutions to meet the needs of engineers designing DisplayPort silicon for computer systems and embedded systems, as well as those validating the physical layer compliance of DisplayPort devices to the DisplayPort 1.4 Compliance Test Specification. The Clarius Compliance DisplayPort application is compatible with Tektronix DPO/MSO 70000 DX/SX series oscilloscopes that are designed to meet the challenges of the next generation of display standards.

The Clarius compliance platform is a new generation compliance test automation software platform. The platform offers a range of features and benefits

- Higher asset utilization and faster test times: disaggregated architecture to offload analysis from the oscilloscope
- Easy workflow integration: leverage REST APIs and SDK for faster automation
- Integrated data management for results, reports, and waveforms in the UI, along with a dashboard view

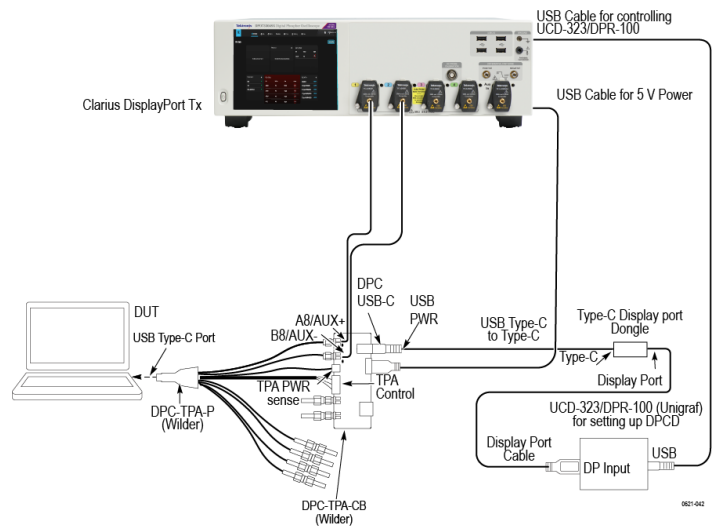
## Key features

- Complete compliance testing of data rates RBR, HBR, HBR2, and HBR3 for DisplayPort 1.4
- Supports DP, mDP, and USB-C connectors
- Automated CTLE optimization
- Intelligent pattern recognition before test execution
- Fixture de-embed feature: Use the default filter file for de-embedding fixture effect or create a custom filter file using SDLA software to leverage the channel modeling and receiver equalization functionality.
- Easy option to support repeatability of measurements
- Complete DUT automation for hands free testing
- Reports available in .pdf, and .csv formats for advanced data analysis
- Supports DPR100 and UCD323 DUT control

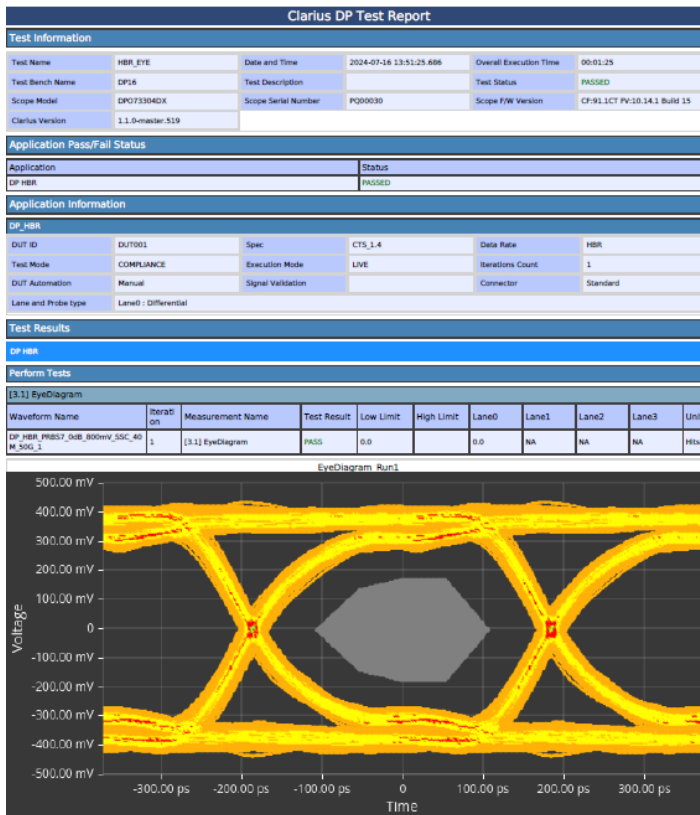
## DisplayPort compliance testing

DisplayPort sources (transmitters) have state control requirements in order to transmit the data patterns and signal properties required to demonstrate conformance as per the compliance test specification. The following properties and patterns need to be transmitted for full measurement coverage:

- Bit rates: RBR, HBR, HBR2, and HBR3
- Data patterns: D10.2, PRBS7, COMPEYE, PLTPAT, and TPS4
- FFE (pre-emphasis): 0 dB, 3.5 dB, 6 dB, and 9.5 dB
- Output levels: 400 mV, 600 mV, 800 mV, and 1200 mV
- SSC (spread spectrum): On/Off



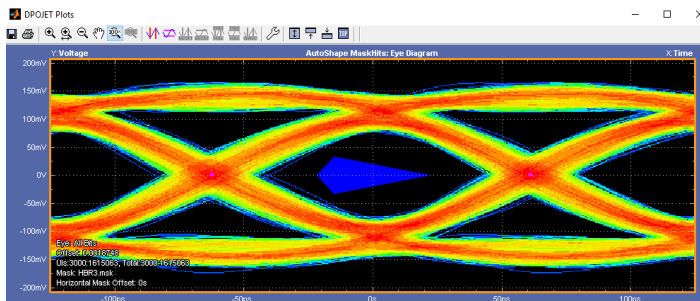
DisplayPort Type-C setup with dongle



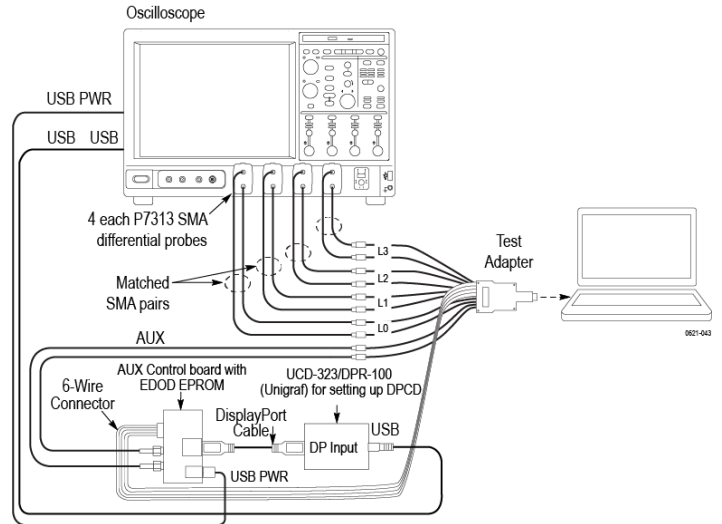
Display Port 1.4 Test report

### Compliance to characterization support

Tektronix offers DisplayPort DPOJET plugin that can be used to characterize a DUT and analyze its finer behavior. It serves as an analysis tool when the DUT fails any portion of the compliance tests or you want to take a deeper look into the failures. All the compliance tests which are supported in the application and requires a single acquisition are supported in this package. You can build automation scripts around these measurements to setup a custom test environment.



DPOJET eye diagram



DisplayPort 1.4 four lanes testing using differential probes

### SDLA features

SDLA enables you to probe and visualize data at the required location (de-embed/embed) using virtual the probing through test points. It can remove (de-embed) the effects of the cables, probes, and fixtures to get more accurate measurement results. It can embed user defined channel models to simulate the signal at the end of the link. It can also be used to open a closed eye using receiver equalization, Continuous Time Linear Equalizer (CTLE), Decision Feedback (DFE), or Feed Forward Equalization (FFE). SDLA also has advanced analysis and modeling capabilities. One can view and measure multiple test points using DPOJET Jitter and Eye analysis comprehensive frequency and time domain plots, enable quick verification of S-parameters and test point transfer functions.

## Specifications

### Proposed measurements

List of supported measurements as per DisplayPort 1.4a Standard/Type-C CTS

Measurements	RBR	HBR	HBR2	HBR3
[3.1] EyeDiagram	✓	✓		
[3.1] EyeHeight	✓	✓		
[3.1] EyeWidth	✓	✓		
[3.1] EyeDiagramZeroCable_TP3EQ			✓	
[3.1] EyeDiagramWorstCable_TP3EQ			✓	
[3.1] EyeDiagramZeroCable_TP3CTLE				✓
[3.1] EyeDiagramWorstCable_TP3CTLE				✓
[3.2] NonPELevelVerification	✓	✓		
[3.3] PELevelVerificationAndMaxDiffP2P	✓	✓		
[3.4] PELevelAndEquilizationVerification			✓	✓
[3.5] VTXDiffP2PMax			✓	✓
[3.7] IntraPairSkew	✓	✓	✓	✓
[3.8] ACCommonMode	✓	✓	✓	✓
[3.9] NonISIJitter	✓	✓		✓
[3.9] NonISIJitter_TP3CTLE				✓
[3.11] TotalJitter	✓	✓		
[3.11] DJZeroCable_TP3EQ			✓	
[3.11] TJZeroCable_TP3EQ			✓	
[3.11] TJWorstCable_TP3EQ			✓	
[3.11] TJZeroCable_TP3CTLE				
[3.11] TJWorstCable_TP3CTLE				✓
[3.11.3] DJZeroCableD10.2_TP3EQ			✓	✓
[3.11.3] DJWorstCableD10.2_TP3EQ			✓	
[3.11.3] TJZeroCableD10.2_TP3EQ			✓	
[3.11.3] TJWorstCableD10.2_TP3EQ			✓	
[3.11.3] RJZeroCableD10.2_TP3EQ			✓	
[3.11.3] RJWorstCableD10.2_TP3EQ			✓	
[3.12] MainLinkFrequency	✓	✓	✓	✓
[3.13] SSCModRate	✓	✓	✓	✓
[3.14] SSCFrequencyDeviation	✓	✓	✓	✓

### Measurements list for DisplayPort Tx AUX

The list of measurements for the DisplayPort Tx AUX technology are:

- [11.1] EyeTest
- [11.5] SlewRate
- PeakToPeak
- UnitInterval

## Ordering information

### Hardware requirements

Item		Vendor	Quantity
Tektronix Digital Phosphor Oscilloscope (DPO) or Mixed Signal Oscilloscope (MSO) – 12 GHz and above)	DPO/MSO70000 SX/DX	Tektronix	1
HDMI & DisplayPort 4K Video Generator & Analyzer	UCD323	Unigraf	1
Standard DP connector plug fixture	TF-DP-TPA-P	Wilder	1
Mini-DP plug test fixture	mDP-TPA-PR	Wilder	1
DP Aux control adapter	DP-TPA-A	Wilder	1
DP type C plug adapter & control board	DPC-TPA-RRCB	Wilder	1
Cable pair; 2.92 mm to 2.92 mm, Straight, 1.5 ps phase-matched, 1-meter	PMCABLE1M	Tektronix	1 to 4
16 GHz active probe, 2.92 mm input adapters	P7716 + P77C292MM	Tektronix	1 to 4
DP Aux controller	DPR-100	Unigraf	1
Alt mode controller, type C plug	GRL-USB-PD-C2	GRL	1

### Host system pre requisite

Item	Description	Vendor	Quantity
Host PC/Laptop	Refer to the <a href="#">system requirements</a> details	Multiple	1

### System requirements

Prerequisites	Recommended requirements
Operating system	Windows 10 Enterprise and Pro (version 21H1 and above) or Windows 11 Enterprise and Pro (version 21H2 and above) <b>Language:</b> English (United States) only
CPU cores	16
RAM	64 GB
Disk space	300 GB HDD/SSD of free disk space
Network speed	1 Gbps
Browser	Google chrome or Microsoft edge
Additional software	<ul style="list-style-type: none"> <li>Python 3.12.x<sup>1</sup></li> <li>MATLAB compiler runtime 9.11</li> <li>Unigraf DPR-100 for DisplayPort 1.4 datarate testing.</li> </ul>

## Software requirements

### Compliance

Item	Description	Vendor	Quantity
Clarius DisplayPort 1.4 Tx Compliance Test Application	Refer to the <a href="#">license options</a>	Tektronix	1

<sup>1</sup> Python installation is required for Clarius SDK and DUT control automator.

**Debug**

Item	Description	Vendor	Quantity
Jitter & Eye Diagram software	DJA <sup>2</sup>	Tektronix	1
Serial data link analysis software	SDLA64	Tektronix	1

**License options**

License terms	License option	License type
Subscription options	AT-DP14-TX-NS1	1 Year, Node-Locked
	AT-DP14-TX-NS3	3 Year, Node-Locked
	AT-DP14-TX-FS1	1 Year, Floating
	AT-DP14-TX-FS3	3 Year, Floating



**Note:** License can be used for the duration of subscription term.

**License types:**

- Node-Locked: Tied to a specific computer.
- Floating: License can be moved from one computer to another to share between labs/geography.

<sup>2</sup> Contact Tektronix for DJA DisplayPort Debug plugin



Tektronix is ISO 14001:2015 and ISO 9001:2015 certified by DEKRA.

ASEAN / Australasia (65) 6356 3900  
Belgium 00800 2255 4835\*  
Central East Europe and the Baltics +41 52 675 3777  
Finland +41 52 675 3777  
Hong Kong 400 820 5835  
Japan 81 (120) 441 046  
Middle East, Asia, and North Africa +41 52 675 3777  
People's Republic of China 400 820 5835  
Republic of Korea +82 2 565 1455  
Spain 00800 2255 4835\*  
Taiwan 886 (2) 2656 6688

Austria 00800 2255 4835\*  
Brazil +55 (11) 3759 7627  
Central Europe & Greece +41 52 675 3777  
France 00800 2255 4835\*  
India 000 800 650 1835  
Luxembourg +41 52 675 3777  
The Netherlands 00800 2255 4835\*  
Poland +41 52 675 3777  
Russia & CIS +7 (495) 6647564  
Sweden 00800 2255 4835\*  
United Kingdom & Ireland 00800 2255 4835\*

Balkans, Israel, South Africa and other ISE Countries +41 52 675 3777  
Canada 1 800 833 9200  
Denmark +45 80 88 1401  
Germany 00800 2255 4835\*  
Italy 00800 2255 4835\*  
Mexico, Central/South America & Caribbean 52 (55) 56 04 50 90  
Norway 800 16098  
Portugal 80 08 12370  
South Africa +41 52 675 3777  
Switzerland 00800 2255 4835\*  
USA 1 800 833 9200

\* European toll-free number. If not accessible, call: +41 52 675 3777

**For Further Information.** Tektronix maintains a comprehensive, constantly expanding collection of application notes, technical briefs and other resources to help engineers working on the cutting edge of technology. Please visit [www.tek.com](http://www.tek.com).

Copyright © Tektronix, Inc. All rights reserved. Tektronix products are covered by U.S. and foreign patents, issued and pending. Information in this publication supersedes that in all previously published material. Specification and price change privileges reserved. TEKTRONIX and TEK are registered trademarks of Tektronix, Inc. All other trade names referenced are the service marks, trademarks, or registered trademarks of their respective companies.