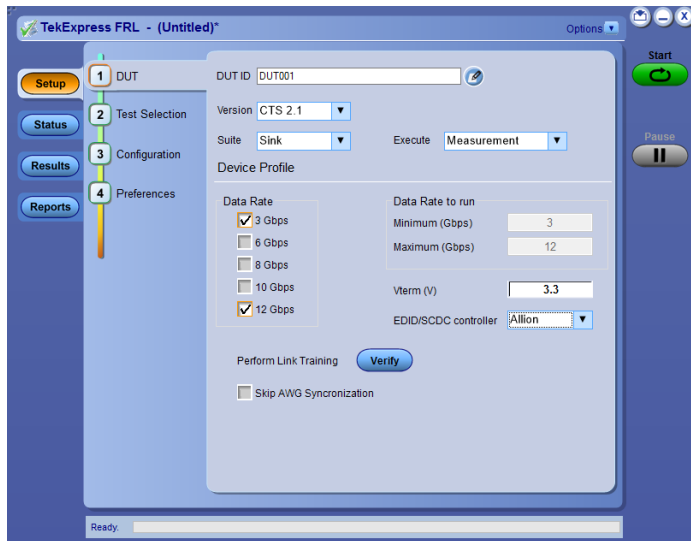


HDMI 2.1 FRL

Compliance Test Solution Datasheet



Engineers designing and validating the HDMI physical layer of their devices face constant pressure to improve efficiency. Designers need to perform a wide range of compliance tests quickly and reliably, right on their bench. The HDMI 2.1 is known for Fixed Rate Link (FRL) supports up to 4 k at 120 Hz or 8 k at 60 Hz for both compressed and uncompressed video content. The FRL supports only predefined discrete data rates - 3 Gbps, 6 Gbps, 8 Gbps, 10 Gbps, and 12 Gbps on each of its 4 lanes, which means the FRL supports a post encoded link bandwidth of up to 48 Gbps.

Key features

- Conformance to HDMI 2.1 Standards and Compliance Test Specification 2.1 (CTS)
- Simple and easy setup to perform measurements
- The TekExpress based software solution allows to completely automate the execution of all source and sink measurements.
- There is no “external plumbing” such as delay lines, amplifiers or bias tees
- Programmatically change amplitude, bias voltage, and skew with AWG-HD. No need to change the connection or manual intervention between the tests.
- Superior performance across industry. Completes all sink measurements for one data rate in less than 20 minutes.
- Fully integrated with EDID/SCDC emulators
- Statistically based Pass/Fail results, quick results with Pass/Fail notification, and limit margins. Detailed reports including BER error on each lane.

- Provides link training debug capability
- Completely automated pattern calibration software
- Multilane calibration support

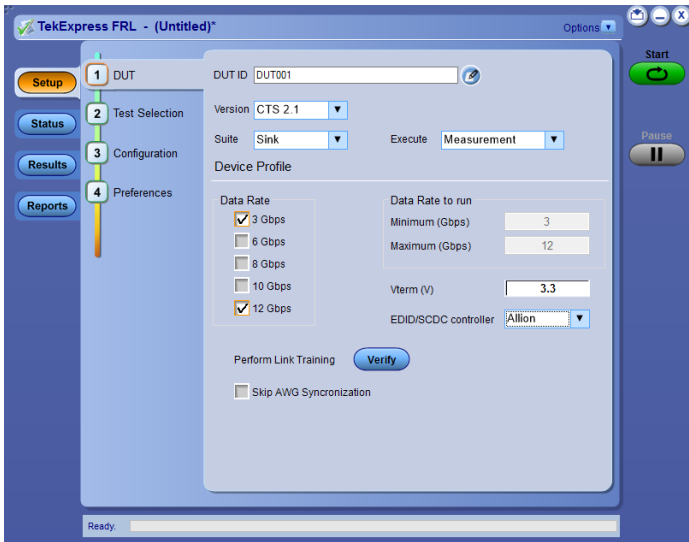
Fully automated HDMI 2.1 FRL compliance testing

The sink testing requires a source, capable of generating a wide range of test patterns and the ability to add precise amount of impairment to the output signal. The jitter, tolerance, skew, sensitivity and timing testing with repeatability are critical. For customers who want to reduce test times with the performance to meet the new standard requirements, Tektronix offers a complete test solution for HDMI 2.1 sink testing. The Tektronix sink test provides an end-to-end automated solution with significant reduction in test time. Featuring the performance for the Tektronix AWG70001B and the new AWG-HD test fixture, this solution provides complete automation without adding an external delay lines, amplifiers or bias tees. The TekExpress based software solution completely automates the execution of all sink measurements. Once the set-up is connected, no changes in connection or no manual interventions are required between the tests.

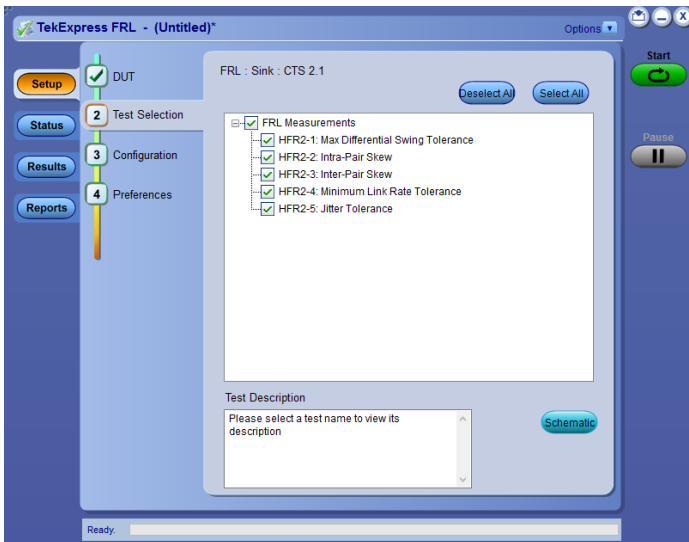
The TekExpress FRL compliance solution provides you the tools to easily run High Definition Multimedia Interface (HDMI) tests under the HDMI 2.1 compliance test specification. It provides a complete and reliable solution for quick testing.

Quick Pass/Fail tests substantiated with results make the TekExpress FRL application the preferred solution for HDMI 2.1 physical layer validation. In-depth analysis is possible with the statistical information about the performed tests.

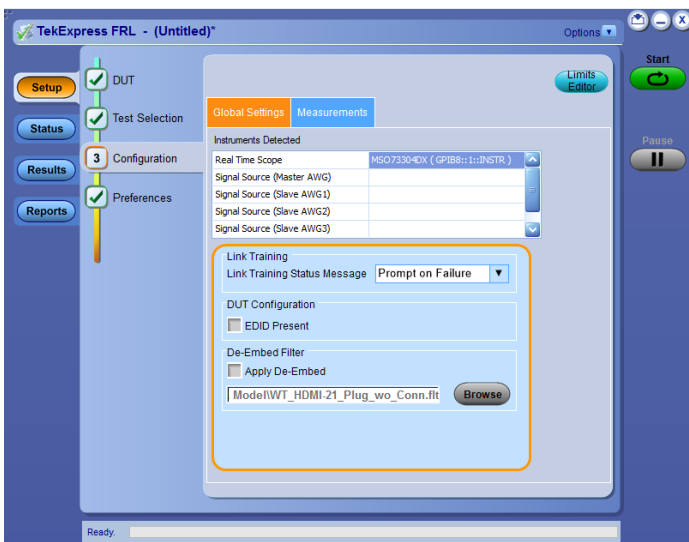
The TekExpress FRL application performs the link training prior to executing each measurement, to establish a link between the FRL-capable sink device and the Tektronix signal generator. The statistical Pass/Fail criteria are based on whether the sink device meets the Character Error Rate requirement in the specification. The TekExpress FRL application does all these with a single-click and without any manual intervention.



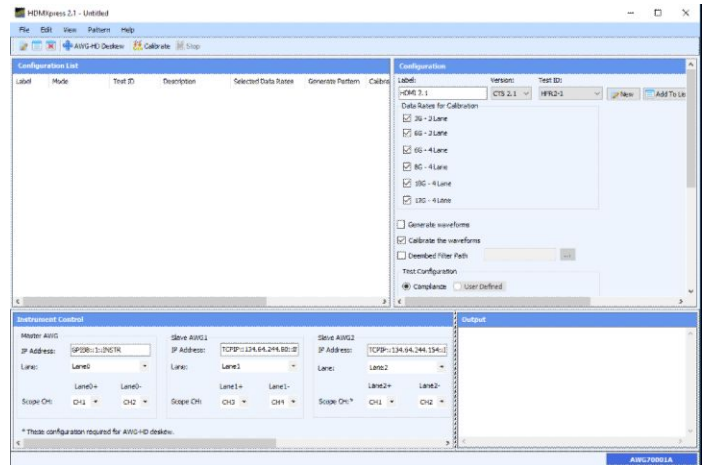
TekExpress FRL sink application



FRL sink measurements



TekExpress FRL sink measurement configuration



HDMExpress pattern calibration software)

FRL sink measurements

SI No.	Measurement ID	Measurement Name
1	HFR2-1	Max Differential Swing Tolerance
2	HFR2-2	Intra-Pair Skew
3	HFR2-3	Inter-Pair Skew
4	HFR2-4	Minimum Link Rate Tolerance
5	HFR2-5	Jitter Tolerance

Ordering information

Required software	<p>HD21 (HDMI 2.1 Advanced Analysis and Compliance Software for Tx tests)</p> <p>HD21DS (HDMI 2.1 Advanced Analysis and Compliance Software for Rx tests)</p> <p>HD21DSM (HDMI 2.1 Advanced Analysis and Characterization Software for Rx tests; HDMXpress (requires HD21, DJA, SDLA64))</p> <p>HDM-DSM (HDMI2.0 Advanced Analysis and Characterization Software for Rx tests)</p> <p>DJA (Advanced Jitter Analysis for use with TekScope Anywhere; DPO/DSA/MSO7000C/D/DX; DPO7000C or DPO/MSO5000 Oscilloscopes)</p> <p>SDLA64 (Serial Data Link Analysis for Win7 (64 bit) Oscilloscopes)</p>
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Required hardware	<p>DPO72304SX¹ Digital Phosphor Oscilloscope with bandwidth \geq to 23 GHz ; 4 Ch, 23 GHz, 50 GS/s or 2 Ch, 23 GHz, 100 GS/s</p> <p>SEQ: Adds Sequencing to the AWG70001B; requires export control license</p> <p>AWG70000-150: Adds Sequencing to the AWG70001B; requires export control license</p> <p>AWGSYNC01: Hub for synchronizing multiple AWGs</p> <p>AWG70001B: Arbitrary Waveform Generator: 1-Channel, 10-bit, up to 50 GS/s</p> <p>AWG-HD (HDMI Fixture for Sink (Rx) Solution with Programmable Delay and Amplitude)</p>
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Probes	P7625/P7633/P7720 Tri-mode probe with P76CA-292C (1 No.)
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Recommended accessories

Name	Quantity	Description
PMCABLE1M	10	Precision Phase Matched Cable Pair
131849000	4	SMA Male-to-Male connector
HDA2.1-TPA-P	1	HDMI2.1 Type A Plug Adapter
HDA2.1-TPA-R	1	HDMI2.1 Type A Receptacle Adapter
HD-EDID-TEMSS	1	HDMI EDID Controller Kit Wilder

Certifications



Tektronix is registered to ISO 9001 and ISO 14001 by SRI Quality System Registrar.



Product(s) complies with IEEE Standard 488.1-1987, RS-232-C, and with Tektronix Standard Codes and Formats.

¹ Any 4 channel 23 GHz or greater

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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.

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