

# UNIGRAF

## Company Introduction

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# Unigraf Oy

- Privately owned, established 1990
- World-leader in video electronics testing
- Key contributor for DisplayPort standards
- Unique product range for DP, HDMI & USB-C
- Comprehensive distribution network
- Strategic partnerships



# Products We Are Testing



Smartphones



Laptop



Tablet



VR Glasses



PC Display Controller



AV Switch



Soundbar



High-end monitor and Digital TV



Set Top Box

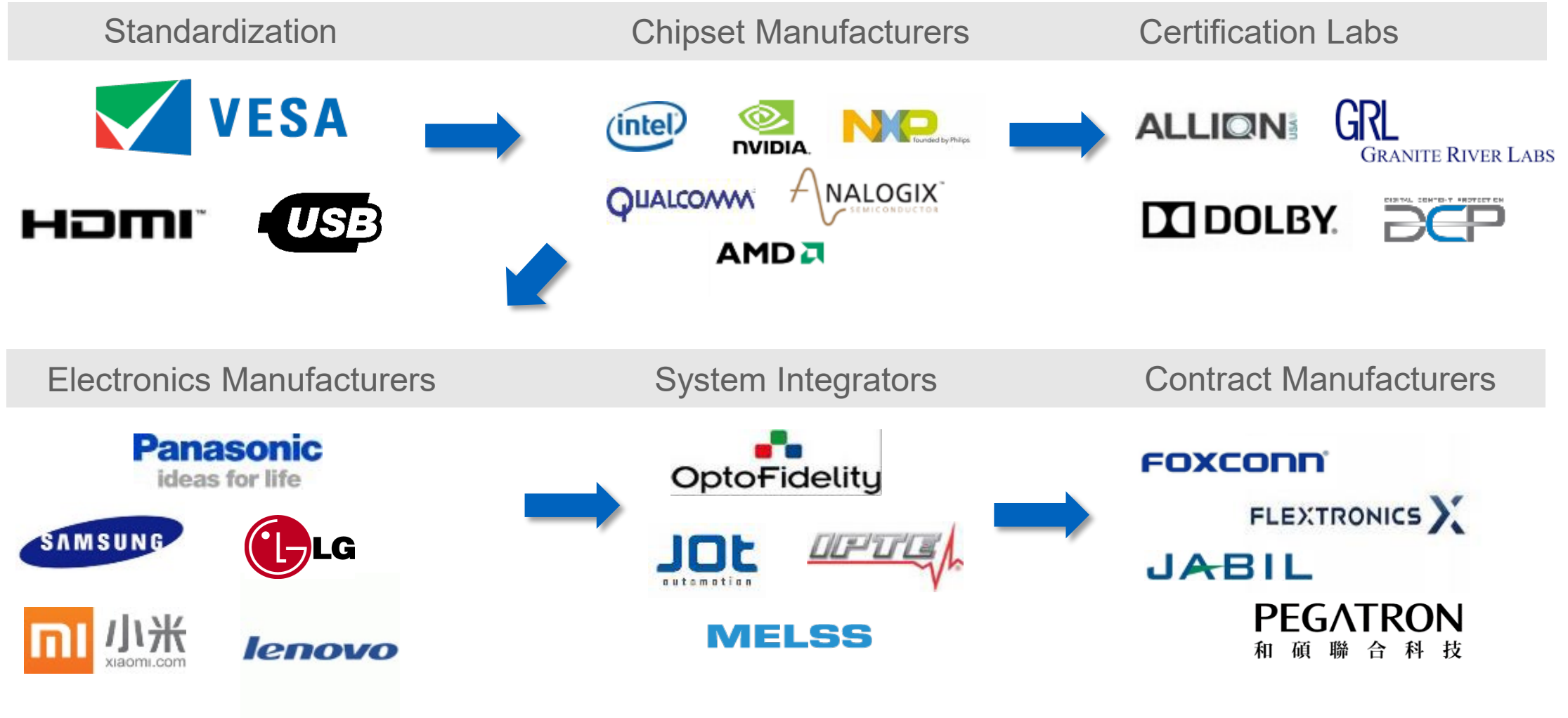


Surround Systems



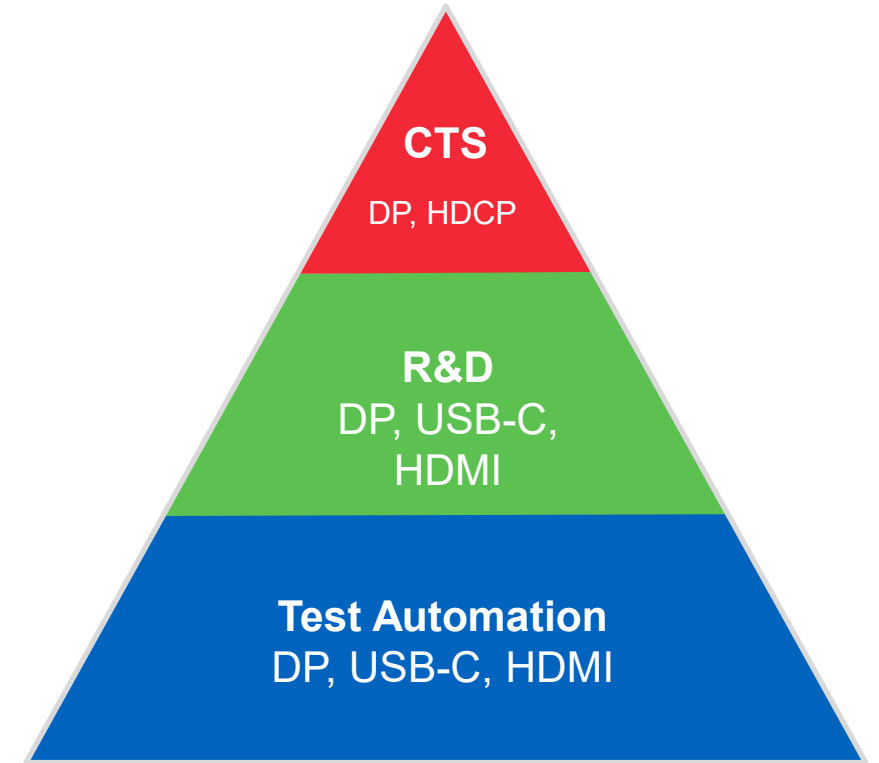
Media Players

# Our Value Chain and Business Model



# Unigraf Test Device Offering

- Unigraf offers 3 levels of testing:
  - ✓ Compliance Testing
  - ✓ R&D Tools
  - ✓ Manufacturing & Test Automation
- Unigraf offers 3 HW platforms
  - ✓ UCD-500 series • 16K
  - ✓ UCD-400 series • 8K
  - ✓ UCD-300 series • 4K
  - ✓ 4K test automation only -> UCD-200 series
- SW supports Windows, Linux, macOS

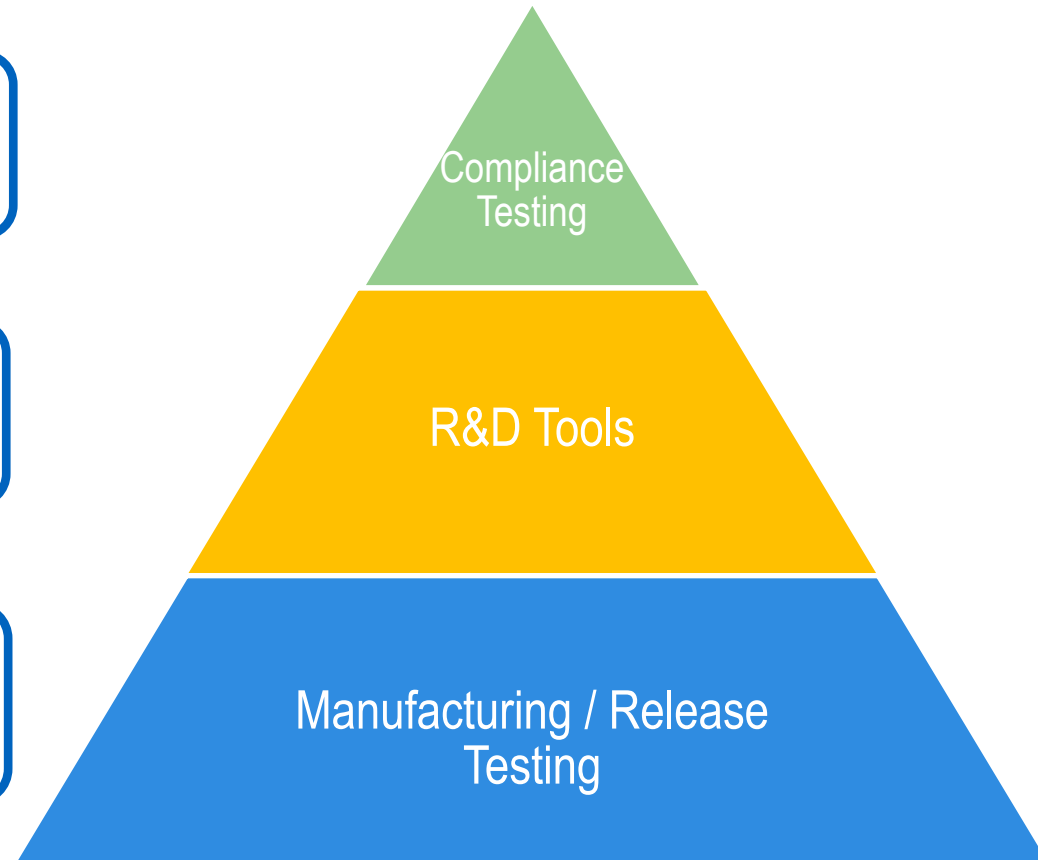


# Unigraf Target Business Segments

Compliance testing for DisplayPort and HDCP

HDMI, DisplayPort and USB-C developers

HDMI, DisplayPort and USB-C manufacturers



# Global Distribution Network



## KEY MARKETS

1. Asia
2. North America
3. Israel & India

# Unigraf Value Proposal

- Improve Consumer Product Quality
  - ✓ Compliance test tools for DP and HDCP
  - ✓ R&D tools
  - ✓ Production testing
- World Class Knowledge in Video Electronics Testing
  - ✓ Contributor to DisplayPort standardization
  - ✓ DP, HDMI and USB-C generators and analyzers
  - ✓ Dolby Vision Test partner
- Global Support Network with Fast response & in Local Language
  - ✓ Distributors in Asia, North-America and Europe





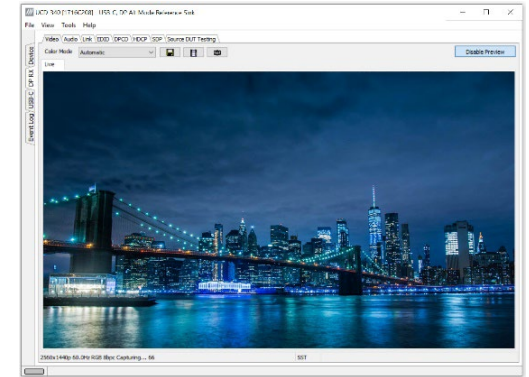
# TEST SOLUTIONS FOR DisplayPort

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# UCD-500

- DP 2.0 Reference Sink and Source up to 8K@60Hz (16K@60Hz with DSC up to UHBR 20 Bit Rate)
- DP and USB-C input and output
- Panel Replay & Adaptive Sync
- DSC, FEC and LTTTPR support
- DP 2.0 Link Layer Compliance Test Device
- HDCP 2.3 Compliance Test Device for Transmitters, Receivers and Repeaters\*



\* Under development

# UCD-400

- VESA Certified DP 1.4a Link Layer CTS Test Tool
- DCP LLC Approved HDCP 2.3 CTS Tool
- 8K and 4K Reference Sink & Source
- DP 1.4a / HBR3 input and output in one unit
- Cable adapter for USB-C devices testing
- MST support (4 streams)
- DSC, FEC and LTTTPR support
- HDCP 1.3 and HDCP 2.3 support
- High level API for easy integration



HDCP 2.3 CTS

DP 1.4 LL CTS



# DisplayPort PHY Compliance Test Automation Tools

- UCD-323 Gen2 • AUX Controller for PHY Tests
  - ✓ Companion tool for PHY test equipment to perform automated DP 2.0 PHY compliance testing for Source and Sink DUTs
- DPT-200 • DisplayPort Reference Source
  - ✓ DP AUX Controller to automate the DP PHY testing with a compliant PHY Test Equipment.
- DPR-100 • DisplayPort Reference Sink
  - ✓ Test tool for audio and HDCP compliance tests of DisplayPort Source devices.



	DP 2.0 PHY Layer CTS Test	DP 1.4 / HBR3 PHY Layer CTS	Device Role	Product Number
UCD-323 Gen 2 with Sink AUX Controller	yes	no	Testing Sink DUT	065059 + 065060
UCD-323 Gen 2 with Source AUX Controller	yes	no	Testing Source DUT	065059 + 065061
DPT-200	no	yes	Testing Sink DUT	065921 + 065048
DPR-100	no	yes	Testing Source DUT	065910 + 065053

# DPA-400

- Compatible with all DP versions up to 2.0
  - ✓ Device independent
  - ✓ Can be used between any DP Source and Sink
- Time stamped interaction log
- Detect and parse all DPCD locations
- Decode Sideband Channel Communication messages
- Flexible in MST testing
- USB controlled & powered, small and light weight



AUX Channel Monitor is mandatory tool for any engineer verifying or debugging Compliance Test or Interoperability

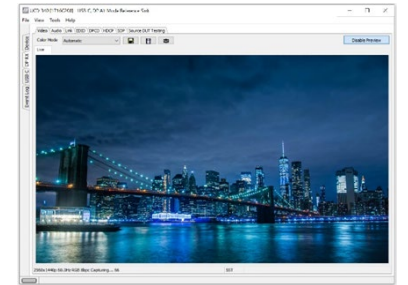


TEST SOLUTION FOR  
**USB-C**



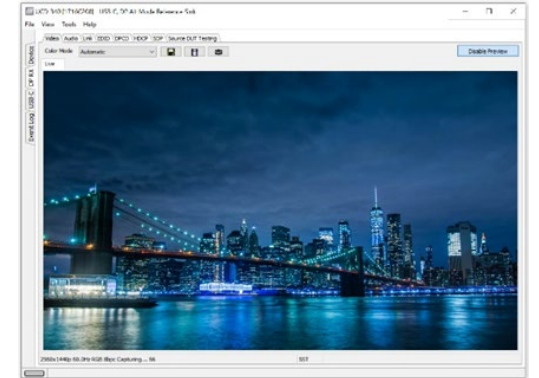
# UCD-424

- DP 1.4a Link Layer CTS support
- HDCP 2.3 CTS support
- Up to 8K support for reference sinks, sources & repeaters
- DP 1.4a / HBR3 input and output in one unit
- USB-C v1.3 input and output with Power Delivery 3.0
- Power Delivery: Capable to sink & source 9V/3A
- PD Role swaps supported
- MST support (4 streams)
- DSC, FEC and LTTTPR support
- HDCP 1.3 and HDCP 2.3 support



# UCD-340

- USB-C DP Alt Mode 4K Video Generator and Analyzer
- Test DP Alt Mode video and audio
- Test USB-C Power Delivery with DP Alt Mode
- USB-C and PD2.0 controls
- Power source and load up to 100W
- Electrical test for DUT connector pins
- Cable flip with SW
- HDCP 1.3 and HDCP 2.3 support
- USB data pass-thru





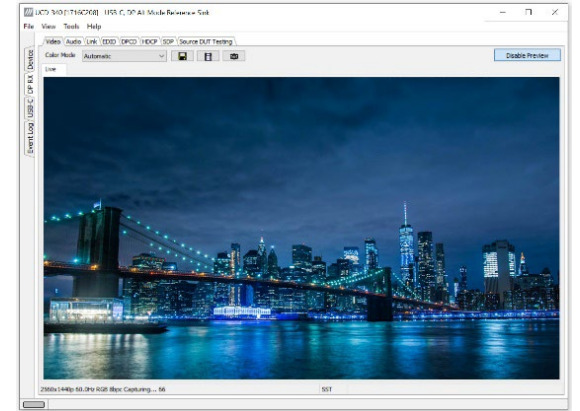


# TEST SOLUTION FOR HDMI



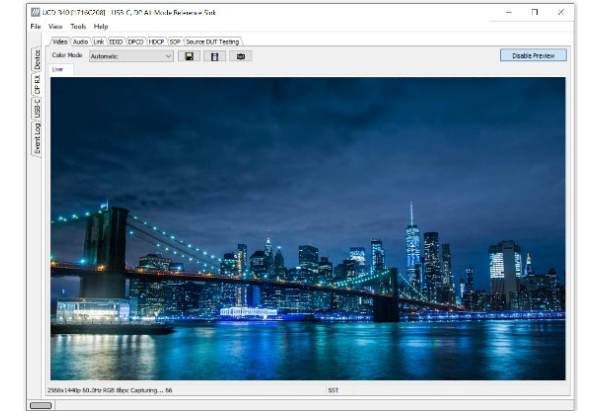
# UCD-422

- 10K Video Analyzer & Generator
- HDMI 2.1 Test Equipment (FRL)
- 10K@30Hz and 8K@60Hz support
- Enhanced Gaming Features: VRR, ALLM
- TMDS support
- HDCP 2.3 support
- No limitation to output any HDR format such as HDR 10+ and Dolby Vision
- eARC support
- DSC support



# UCD-323

- HDMI 2.0 and DP 1.2 input and output in one unit
- UHD / 4K compliant test equipment
- DCP Approved HDCP 2.3 CTS Test Tool
- HDCP 1.3 and HDCP 2.3 support
- Sink and source video, audio and configuration parameters
- Approved Dolby Vision & Dolby Digital Plus compatibility test tool
- Approved Dolby Atmos & Dolby Digital Plus compatibility test tool





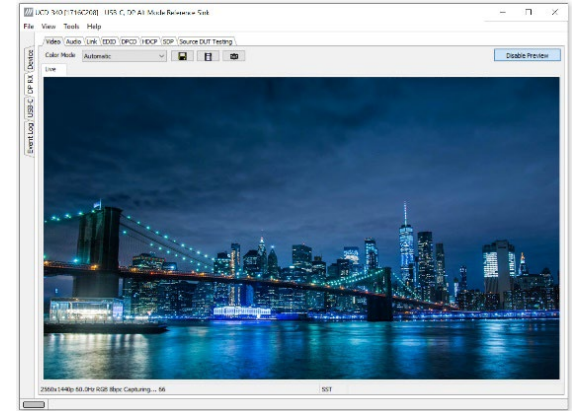
TEST SOLUTION FOR



**UNIGRAF**

# Certified HDR10+ Test Tools

- UCD-422
  - ✓ 10K Video Analyzer & Generator
  - ✓ HDMI 2.1 Test Equipment (FRL)
  - ✓ Enhanced Gaming Features: VRR, ALLM
- UCD-323
  - ✓ HDMI 2.0 and DP 1.2 input and output in one unit
  - ✓ UHD / 4K compliant test equipment
- No limitation to output any HDR format such as HDR 10+ and Dolby Vision



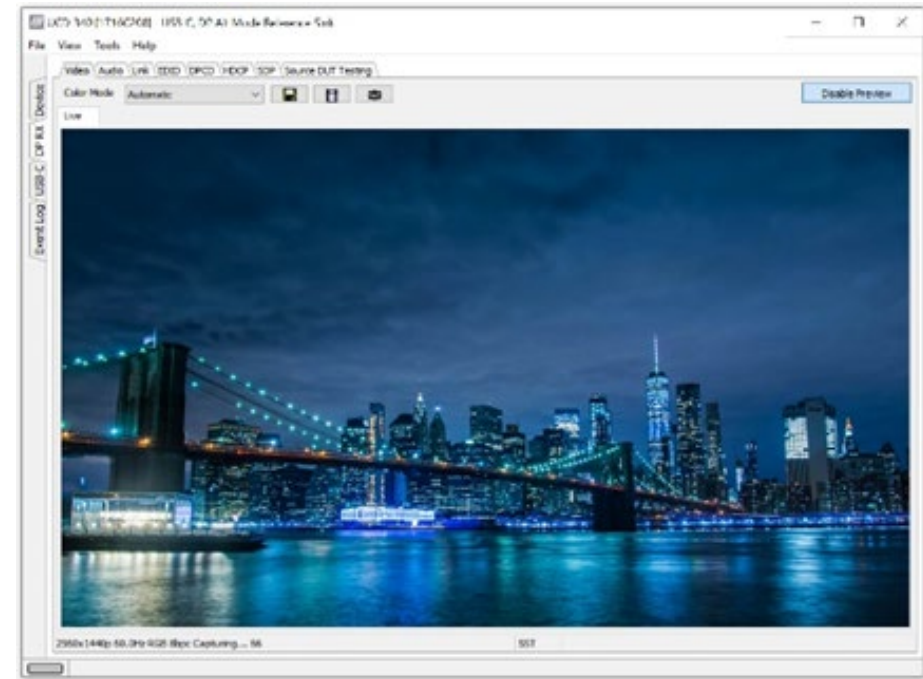
# Dolby Vision

- UCD-451
  - ✓ DisplayPort 1.4a Dolby Vision Test Tool • 8K Video Generator with Extended 32GB memory enables playing back 8K Dolby Vision™ content.
- UCD-452
  - ✓ HDMI 2.1 Dolby Vision Test Tool • 10K Video Generator with extended 32GB memory enables playing back 8K Dolby Vision™ content.
- UCD-323
  - ✓ Approved Dolby Vision/Atmos & Dolby Digital Plus compatibility test tool
  - ✓ HDMI 2.0 and DP 1.2 input and output in one unit • 4K compliant test equipment



# TESTING HDR

- UCD devices have no limitation on outputting HDR formats such as HDR 10, HDR 10+, Dolby Vision.
- Our system is flexible we can load non-standard formats, custom packets, video and audio.
- Ability to play longer scenarios with customized metadata. (e.g. VSIFs.)
- Unigraf UCD devices are approved for self certification of Dolby Vision technology.
- Our plan is to create our own content packages for HDR 10 and HDR 10+ standards.
- HDR 10 and 10+ standard is open, so we are permitted to share content packages.





Testing The Future



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CAPTURING THE WORLD