New VESA Features and Application

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Connected World
More connected, Smarter

Infrastructure
Switch, Gateway, Broadband

Personal
PC, BT, Wi-Fi

Smart City
IoT Solution

Connected Home
TV, Monitor, OTT, IoT, Surveillance, Voice Assist

Connected Car
Automotive Ethernet

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Realtek Solutions

**Computer Peripheral ICs**
- PC High Definition Audio Codecs
- Consumer Audio Codecs
- Card Reader Controllers
- Webcam Controllers
- USB Type-C Controllers

**Multimedia ICs**
- LCD Monitor Controllers
- LCD TV Controllers
- Translators

**Communications Network ICs**
- Ethernet NIC / PHY
- Automotive Ethernet Solutions
- Switch Controllers/Gateway Controllers
- Broadband: ADSL2+ /VDSL/G.fast, xPON
- Wireless: Wi-Fi/ BT, GPS, IoT
- Digital Home Center: STB/OTT

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Efforts in Display Technology

Better Quality

Better Pixel

High Dynamic Range

Wide Color Gamut

Higher Resolution

Higher Refresh Rate

More Color Depth
What VESA Has Done

Display Stream Compression
- VDC-M
  - 4:1 Compression
  - Visually Lossless
  - Small Display
  - MIPI DSI Display

Display Performance Metrics
- DisplayHDR
  - 3 Performance Levels
  - 400: Entry
  - 600: Enthusiast
  - 1000: Professional

Display Port
- DP 1.4a
  - Improve Robustness
  - High Speed Cable
- DP Next Gen
  - 2X+ Current Speed
  - Less Overhead
DisplayHDR

- Why a new standard
  - Many HDR displays but no guaranteed quality
  - UHD Premium only for high-end market

- Difference from other standard
  - Multi-tier performance level for different market
  - Open standard which everyone can download from website
    - [https://displayhdr.org/](https://displayhdr.org/)
  - Focus on PC Display
    - Promoted by major players in PC industry
  - Self-testable toolkit
    - Test tool can be downloaded from Microsoft store
    - Simplified test setup
    - Let public reviewers examine the quality of products
## DisplayHDR Tiers

<table>
<thead>
<tr>
<th>Tiers</th>
<th>Brightness</th>
<th>Darkness</th>
<th>Colorfulness</th>
<th>Bit Depth</th>
<th>Response</th>
</tr>
</thead>
<tbody>
<tr>
<td>SDR</td>
<td>250 - 300</td>
<td>0.5</td>
<td>95% sRGB</td>
<td>8-bit processing</td>
<td>N/A</td>
</tr>
<tr>
<td>DisplayHDR 400</td>
<td>400</td>
<td>0.1 min</td>
<td>95% BT.709</td>
<td></td>
<td>8 Frames Black to white</td>
</tr>
<tr>
<td>DisplayHDR 600</td>
<td>600</td>
<td>0.1</td>
<td>99% BT.709 90% DCI-P3</td>
<td>10-bit processing</td>
<td></td>
</tr>
<tr>
<td>DisplayHDR 1000</td>
<td>1000</td>
<td>0.05 min</td>
<td>99% BT.709 90% DCI-P3</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

- ☆ Significant improvement from typical SDR displays
- ☆ Cover different needs. From basic to content creation.
HDR Ecosystem

- HDR OS
- HDR Gaming
- HDR Streaming
- HDR Video

HDR Contents → HDR Source → HDR Dongle → HDR Display

- RTD2171U
- RTD2172U (C to HDMI2.0b)

HDR Video

HDR Streaming

HDR Gaming

HDR OS
Realtek Position

- One of the promoters to develop DisplayHDR spec
- Worldwide 1\textsuperscript{st} DP to HDMI 2.0 HDR adapter
- Worldwide 1\textsuperscript{st} HDR Scaler
- Worldwide 1\textsuperscript{st} C to HDMI single chip adapter with HDR
Translator Product Line

**DP Converter**
- ✅ DP to HDMI

**USB-C Single Chip**
- ✅ USB-C to HDMI 4K@30p
- ✅ USB-C to HDMI 4K@60p

**DP Multimedia HUB**
- ✅ 1 to 3 SST HUB
- ✅ 1 to 4 MST HUB

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QFN | QFN | BGA
Scaler Product Line

- All Realtek HDR solutions support **HDR on both HDMI and DP**.
- All Realtek HDR solutions support **HDCP 2.2 on both HDMI and DP**.
- Several solutions already **DisplayHDR Certified**.

**RTD2795UT**
- DP1.4 HBR2
- HDMI 2.0b
- Emb. DRAM
- LQFP216

**RTD2797UPM**
- DP1.4 HBR2
- HDMI 2.0b
- CEA HDR
- BT2020
- Uniformity
- DP MST
- PIP/PBP/4P
- BGA

**RTD2797KP**
- 8 Regions
- DP1.4 HBR2
- HDMI 2.0b
- CEA HDR
- BT2020
- Uniformity
- PIP/PBP/4P
- BGA

**4K**

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