HDMI 2.2 Specification Overview

HDMI Licensing Administrator, Inc.
June 2025

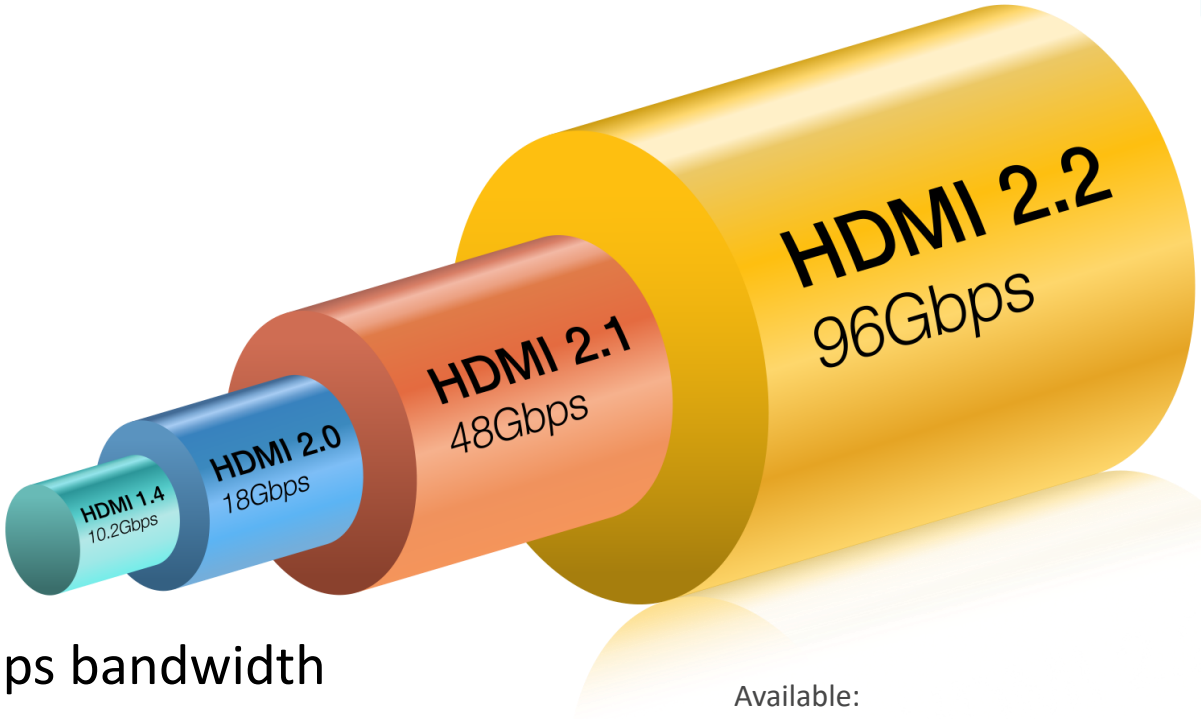
HDMI® Specification Version 2.2 Primary Features

Next-gen HDMI Fixed Rate Link (FRL) Technology enabling 96Gbps bandwidth

New Ultra96 HDMI® Cable that supports all the HDMI 2.2 Specification features

“Ultra96” feature name that manufacturers are encouraged to use to indicate a product supports a maximum of 64Gbps, 80Gbps or 96Gbps bandwidth in compliance with the HDMI 2.2 Specification

Latency Indication Protocol (LIP) for improving audio and video synchronization



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Ultra96 Feature Name for Product Bandwidth Indication

“Ultra96” is a feature name that manufacturers are encouraged to use to indicate a product supports a maximum of **64Gbps, 80Gbps or 96Gbps bandwidth** in compliance with the HDMI 2.2 Specification.

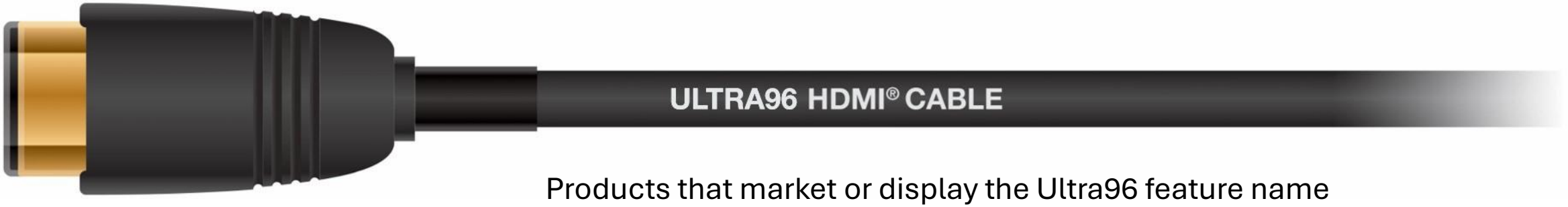
Products that market or display the Ultra96 feature name require the **Ultra96 HDMI® Cable** to ensure a product’s maximum bandwidth is properly supported.

The new **Ultra96 HDMI Cable** supports up to 96Gbps and all HDMI 2.2 applications. The current **Ultra High Speed HDMI® Cable** is applicable for system configurations supporting up to 48Gbps maximum bandwidth.

Look For The Ultra96 Feature Name

A manufacturer may use the Ultra96 feature name in several places including;

- HDMI ports
- Spec sheets
- User guides
- On-screen displays
- Marketing copy
- On packaging



Products that market or display the Ultra96 feature name require the **Ultra96 HDMI® Cable** to ensure a product's maximum bandwidth is properly supported.

Next-Gen Fixed Rate Link (FRL) – Future-Forward Benefits

Enables higher quality options now and in the future for **content producers** such as TV, movie and game studios, while enabling **multiple distribution platforms**

Faster 96Gbps bandwidth improves demanding data-intensive, immersive and virtual applications such as AR/VR/MR, spatial reality and light field displays as well as various commercial applications such as large-scale digital signage, medical imaging and machine vision

Gaming and VR/AR payload bandwidth double every 2-3 years, leveraging uncompressed 4K/240Hz at 10-bit and 12-bit, and beyond

More Options – More Formats

HDMI 2.2 Specification delivers enhanced options for the vast HDMI® ecosystem, with more advanced solutions to create, distribute and experience the best end-user outcome

Supports multiple opportunities along with options for uncompressed and compressed video and chroma sampling

HDMI®
HIGH-DEFINITION MULTIMEDIA INTERFACE

HDMI Video Table – All Formats

	8-bit	10-bit	12-bit	16-bit(*)
4K 100 | 120fps	RGB | 4:4:4 4:2:2 | 4:2:0	RGB | 4:4:4 4:2:2 | 4:2:0	RGB | 4:4:4 4:2:2 | 4:2:0	4:2:0
4K 144fps	RGB | 4:4:4 4:2:2 | 4:2:0	RGB | 4:4:4 4:2:2 | 4:2:0	RGB | 4:4:4 4:2:2 | 4:2:0	4:2:0
4K 200 | 240fps	RGB | 4:4:4 4:2:2 | 4:2:0	RGB | 4:4:4 4:2:2 | 4:2:0	RGB | 4:4:4 4:2:2 | 4:2:0	4:2:0
4K 400 | 480fps	RGB | 4:4:4 4:2:2 | 4:2:0	RGB | 4:4:4 4:2:2 | 4:2:0	RGB | 4:4:4 4:2:2 | 4:2:0	-
5K 100 | 120fps	RGB | 4:4:4 4:2:2 | 4:2:0	RGB | 4:4:4 4:2:2 | 4:2:0	RGB | 4:4:4 4:2:2 | 4:2:0	4:2:0
5K 200 | 240fps	RGB | 4:4:4 4:2:2 | 4:2:0	RGB | 4:4:4 4:2:2 | 4:2:0	RGB | 4:4:4 4:2:2 | 4:2:0	4:2:0
8K 48 | 50 | 60fps	RGB | 4:4:4 4:2:2 | 4:2:0	RGB | 4:4:4 4:2:2 | 4:2:0	RGB | 4:4:4 4:2:2 | 4:2:0	4:2:0
8K 100 | 120fps	RGB | 4:4:4 4:2:2 | 4:2:0	RGB | 4:4:4 4:2:2 | 4:2:0	RGB | 4:4:4 4:2:2 | 4:2:0	-
8K 200 | 240fps	RGB | 4:4:4 4:2:2 | 4:2:0	RGB | 4:4:4 4:2:2 | 4:2:0	RGB | 4:4:4 4:2:2 | 4:2:0	-
10K 48 | 50 | 60fps	RGB | 4:4:4 4:2:2 | 4:2:0	RGB | 4:4:4 4:2:2 | 4:2:0	RGB | 4:4:4 4:2:2 | 4:2:0	4:2:0
10K 100 | 120fps	RGB | 4:4:4 4:2:2 | 4:2:0	RGB | 4:4:4 4:2:2 | 4:2:0	RGB | 4:4:4 4:2:2 | 4:2:0	-
12K 48 | 50 | 60fps	RGB | 4:4:4 4:2:2 | 4:2:0	RGB | 4:4:4 4:2:2 | 4:2:0	RGB | 4:4:4 4:2:2 | 4:2:0	-
12K 100 | 120fps	RGB | 4:4:4 4:2:2 | 4:2:0	RGB | 4:4:4 4:2:2 | 4:2:0	RGB | 4:4:4 4:2:2 | 4:2:0	-
16K 24 | 25 | 30fps	RGB | 4:4:4 4:2:2 | 4:2:0	RGB | 4:4:4 4:2:2 | 4:2:0	RGB | 4:4:4 4:2:2 | 4:2:0	-
16K 50 | 60fps	RGB | 4:4:4 4:2:2 | 4:2:0	RGB | 4:4:4 4:2:2 | 4:2:0	RGB | 4:4:4 4:2:2 | 4:2:0	-

* DSC 1.2a is not supported for 16-bit

BLACK = Support with UHS HDMI Cables or Ultra96 HDMI Cables
RED = Support with UHS HDMI Cables+DSC or with Ultra96 HDMI Cables
GREEN = Support with UHS HDMI Cables+DSC or Ultra96 HDMI Cables+DSC
BLUE = Support with Ultra96 HDMI Cables+DSC

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HIGH-DEFINITION MULTIMEDIA INTERFACE

Multiple Resolutions and Refresh Rates

Uncompressed full chroma formats include, for example, **8K60/4:4:4 and 4K240/4:4:4 at 10-bit and 12-bit**

Compression and chroma subsampling enable higher resolutions and refresh rates including:

4K@480

5K@240

8K@240

10K@120

12k@120

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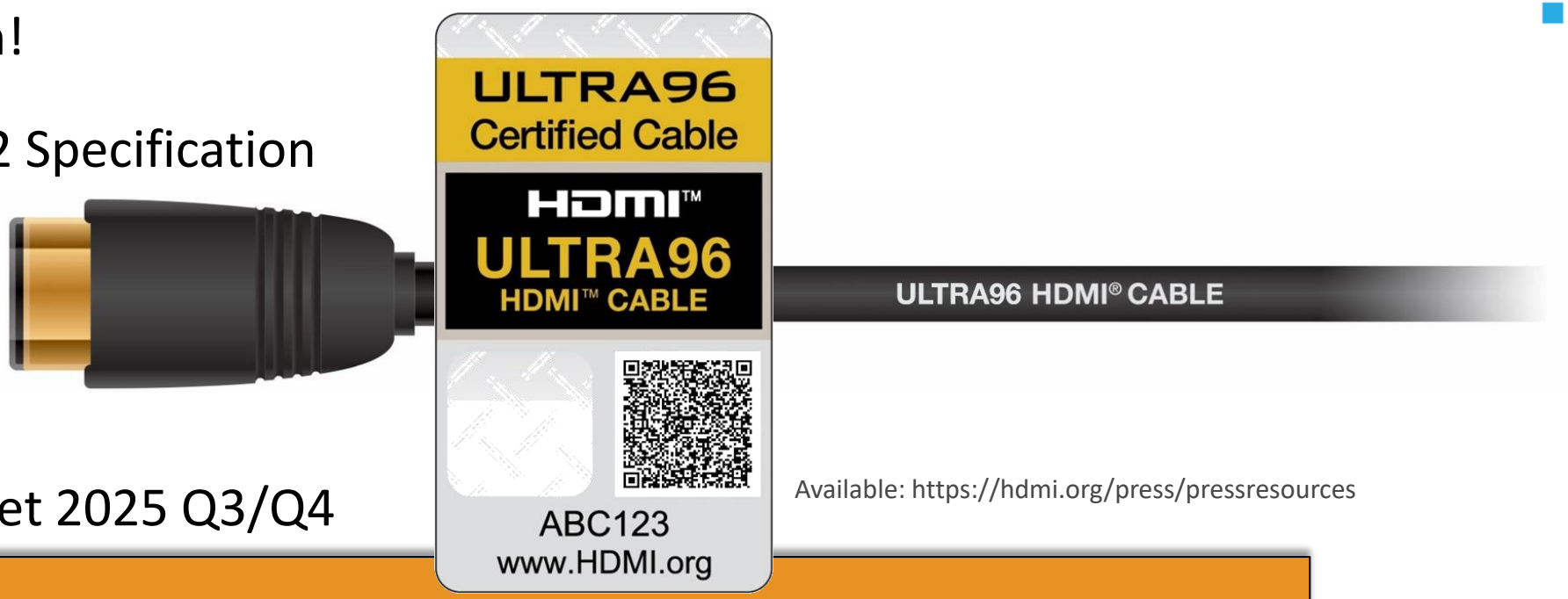
New Ultra96 HDMI® Cable

96Gbps of bandwidth!

Supports all HDMI 2.2 Specification features

Evolving beyond “High Speed” cables

Expected in the market 2025 Q3/Q4



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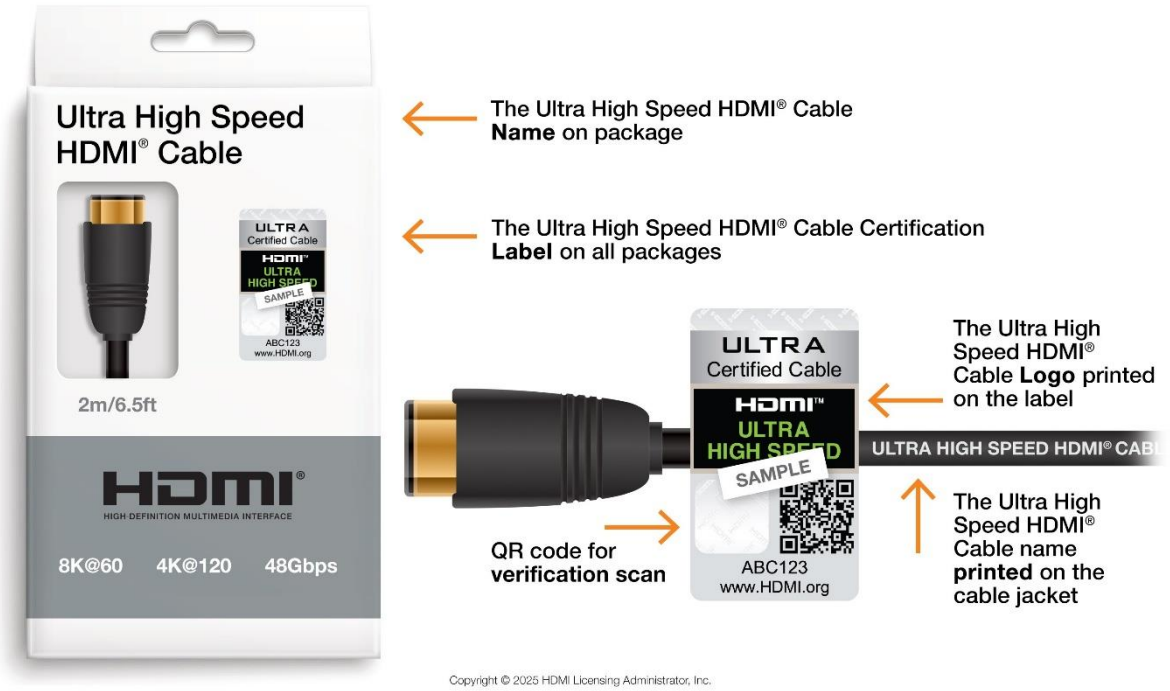
Part of the HDMI Ultra Certification program

Every model and length requiring testing and certification
On-cable identification printing
Anti-counterfeiting labels
Lifetime product compliance auditing

The Ultra HDMI Cables Identification

The Ultra96 HDMI® Cable joins the Ultra High Speed HDMI® Cable as part of the Ultra HDMI Cable Family

How to Identify an Ultra High Speed HDMI® Cable



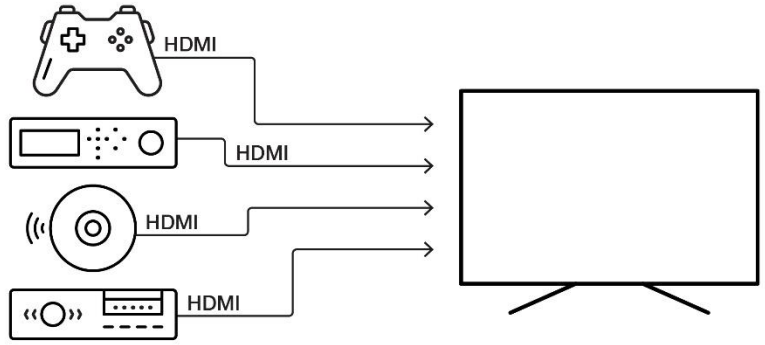
How to Identify an Ultra96 HDMI® Cable

HDMI® Latency Indication Protocol (LIP)

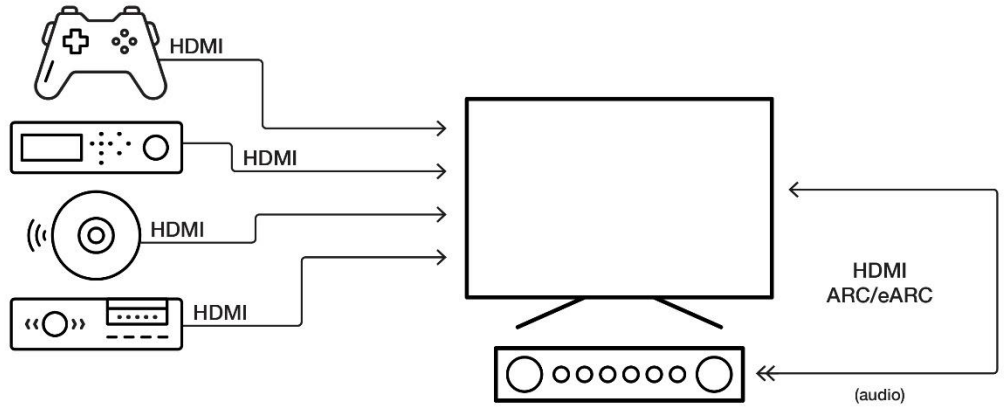
LIP improves audio and video synchronization, especially for multiple-hop system configurations such as those with an audio video receiver or soundbar

Based on demand for sync improvements as content, distribution, devices and installations have become more diverse and demanding

#1 A/V difference unlikely but LIP can still benefit mismatched content and headphone playback



#2 Corrects TV delay of video - TV can instead rely on the source devices to delay video in a more efficient way



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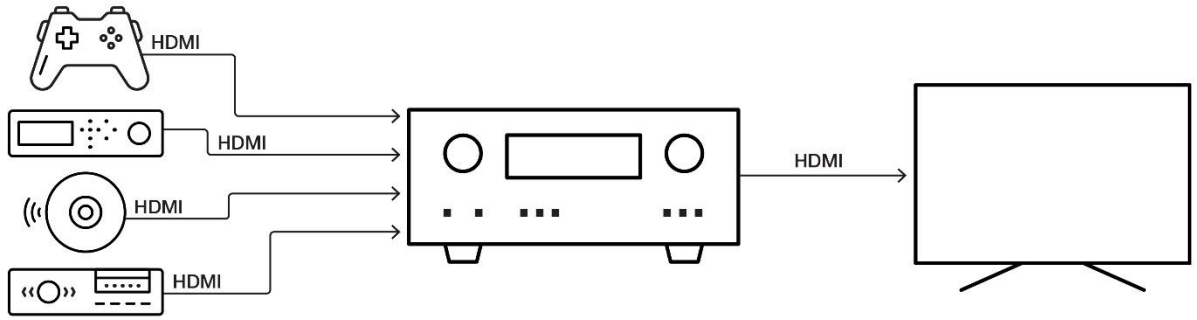
HDMI® Latency Indication Protocol (LIP)

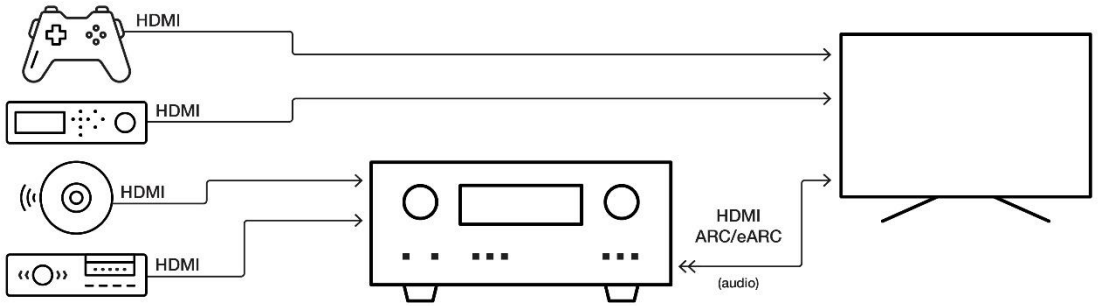
Whether it is the obvious lag between a person's lip movements and hearing the words, or fast-paced gaming interactions - the out-of-sync experience is a distraction and can make content unwatchable

This can be even worse when a system involves multiple audio and video connections

#3 Corrects AVR delay - AVR can instead rely on the source devices to delay audio in a more efficient way



#4 LIP on all involved devices can invoke any necessary delays of audio or video more efficiently at the source device



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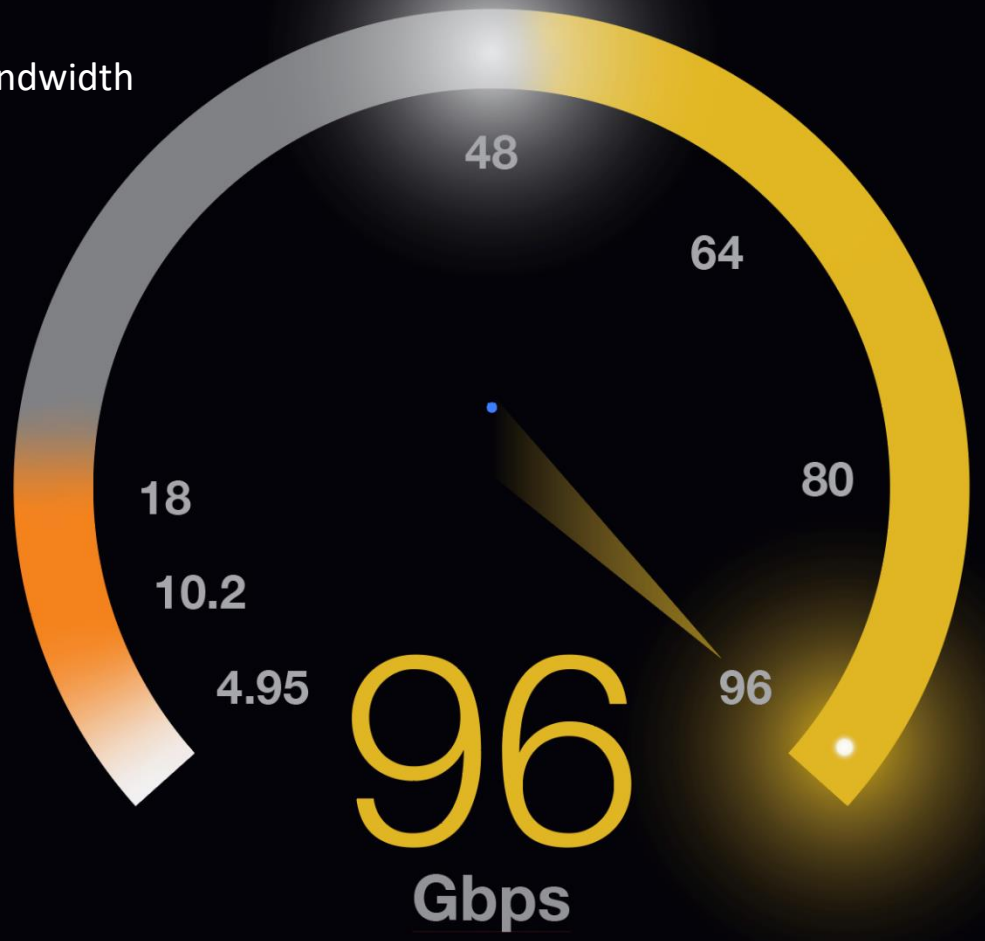
Summary of HDMI® 2.2 Specification Features

- Up to 96Gbps bandwidth and next-gen HDMI Fixed Rate Link technology
- Ultra96 HDMI® Cable supports up to 96Gbps bandwidth
- Ultra High Speed HDMI® cable supports up to 48Gbps bandwidth
- Ultra96 feature name
- Latency Indication Protocol (LIP)
- Dynamic HDR support
- Source-Based Tone Mapping (SBTM)
- Enhanced Audio Return Channel (eARC)
- **Enhanced Gaming Features including:**
  - Variable Refresh Rate (VRR)
  - Auto Low Latency Mode (ALLM)
  - Quick Frame Transport (QFT)
- Quick Media Switching (QMS)
- HDMI Cable Power



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Thank You

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