

DisplayPort 2.1 UHBR Hardware Buyer & Engineering Guide

Demystifying UHBR10, UHBR13.5, and UHBR20 Transmission Tiers and DSC Compression

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1. The DisplayPort 2.1 Specification Fracturing

The VESA DisplayPort 2.1 standard introduced Ultra-High Bit Rate (UHBR) transmission backed by 128b/132b channel encoding. However, VESA permits manufacturers to market products as 'DisplayPort 2.1' regardless of which transmission tier is supported.

The standard is split into three drastically different bandwidth grades: UHBR10 (40 Gbps raw), UHBR13.5 (54 Gbps raw), and UHBR20 (80 Gbps raw). Only UHBR20 provides full uncompressed bandwidth for 4K 240Hz 10-bit HDR gaming.

2. The GPU and Monitor Compatibility Trap

Many \$1,000+ gaming monitors only support UHBR10, delivering virtually identical bandwidth to older DisplayPort 1.4 connections while forcing monitors to rely on Display Stream Compression (DSC).

Furthermore, Nvidia GeForce RTX 40-series GPUs do not support DisplayPort 2.1 at all, capping outputs at DisplayPort 1.4a (32.4 Gbps). Buyers investing in DP 2.1 monitors receive zero bandwidth advantage unless paired with compatible workstation GPUs.

Empirical Laboratory & Architectural Telemetry

Port 2.1 Tier	Raw Bandwidth	Effective Payload	Max Uncompressed Resolution
UHBR10	40.00 Gbps	38.69 Gbps	4K @ 144Hz 8-bit
UHBR13.5	54.00 Gbps	52.22 Gbps	4K @ 144Hz 10-bit HDR
UHBR20	80.00 Gbps	77.37 Gbps	4K @ 240Hz / 8K @ 60Hz 10-bit
DP 1.4a	32.40 Gbps	25.92 Gbps	4K @ 60Hz (DSC required for 10-bit)