



## SMPTE ST2110 Video Transmission over DWDM Networks using Bifrost Communications Quasi Coherent (QC) Pluggable Optics

The demand for IP based Media Transmission solutions has surged across various industries, including live broadcast production, OB trucks (Outside Broadcast), IPTV and contribution networks, Studio Interconnects, Remote and AI Cloud production workflows.

Transporting these high-bandwidth 12G/48G ST2110, latency-sensitive signals over long distances presents a significant challenge. Bifrost Communications' QC long reach DWDM SFP pluggables provide a high-performance solution that integrates seamlessly into existing Ethernet network equipment, simplifying deployment and management.

**Bifrost Communications' pluggable optics** are designed to deliver exceptional reach and optical transmission performance, making them ideal for challenging long-distance video transport requirements. Key features include:

- **Long-Reach Capability:** Supports transmission distances in the DWDM C-Band that far exceed typical SFP pluggable based optical solutions, enabling ST2110 video transport across local/metropolitan or regional/longhaul networks.
- **DWDM Compatibility:** Operates on the ITU-T DWDM grid, allowing multiple video channels (wavelengths) to be aggregated onto a single fiber pair
- **Small Form-Factor Pluggable (SFP):** Allows for direct insertion into standard router and switch ports, eliminating the need for bulky and expensive dedicated transponder equipment.
- **Quasi Coherent Detection:** Provides improved OSNR (Optical Signal-to-Noise Ratio) tolerance and dispersion compensation capabilities.
- **Near Zero Latency and Jitter** unlike DSP-based coherent solutions, ensuring high-fidelity video transmission and improved support for IEEE 1588 PTP.
- **Lower cost and power** through DSP free design, important in energy constrained applications.

## Public Optical Spectrum Access (OSA) Service Infrastructure

Many service providers offer OSA, leasing out access to DWDM spectrum segments to customers. This model allows media companies to benefit from the service provider's established, long-distance DWDM infrastructure without having to invest heavily in their own wide area network-level equipment (like amplifiers and dispersion compensators).

- In order to support live broadcast mission critical ST2110 services, a main and standby solution architecture is required, generally often resulting in two diverse routes of unequal length. In this application Bifrost pluggables are able to support both the short and the long route due to the extended reach and advanced dispersion compensation built into the core Quasi Coherent Technology.
- The typical capacity requirement for an ST2110 4K UHD video stream is 12G and at 8K UHD 48G. These channel capacity rates fit well with Bifrost 25G and 50G QC pluggables, enabling a PAYG matching of Capex and Opex to application demand.
- The DWDM solution supports multiple UHD streams simultaneously over the same fiber (channel stacking), conserving fiber resources and reducing fiber and amplifier costs.

Feature	Benefit for ST2110 OSA Application
Direct Pluggability	Simplifies deployment and reduces CapEx at customer sites, simply plugs directly into Ethernet Switch/Router.
Quasi Coherent Technology	Supports long reach up to 40Km C-Band transmission, enabling main and standby routes and ring based protected services. Provides near-zero latency and jitter transmission over the service provider's long-haul network to support IEEE 1588 PTP.
Channel Stacking	Maximizes leased spectrum capacity, allowing multiple UHD feeds.

## Conclusion

Bifrost Communications Quasi Coherent long reach DWDM SFP pluggable optics are an excellent choice for media companies requiring reliable, high-capacity, and long-distance transport for SMPTE ST2110 Media over IP. Whether leveraging the flexibility of a Public OSA service or maximizing the utility of a dedicated Private DWDM network, these pluggables provide a future-proof, easy-to-deploy, and cost-effective solution for the most demanding Multi-Media and Broadcast Quality Video over IP applications.