ciena : the network specialist

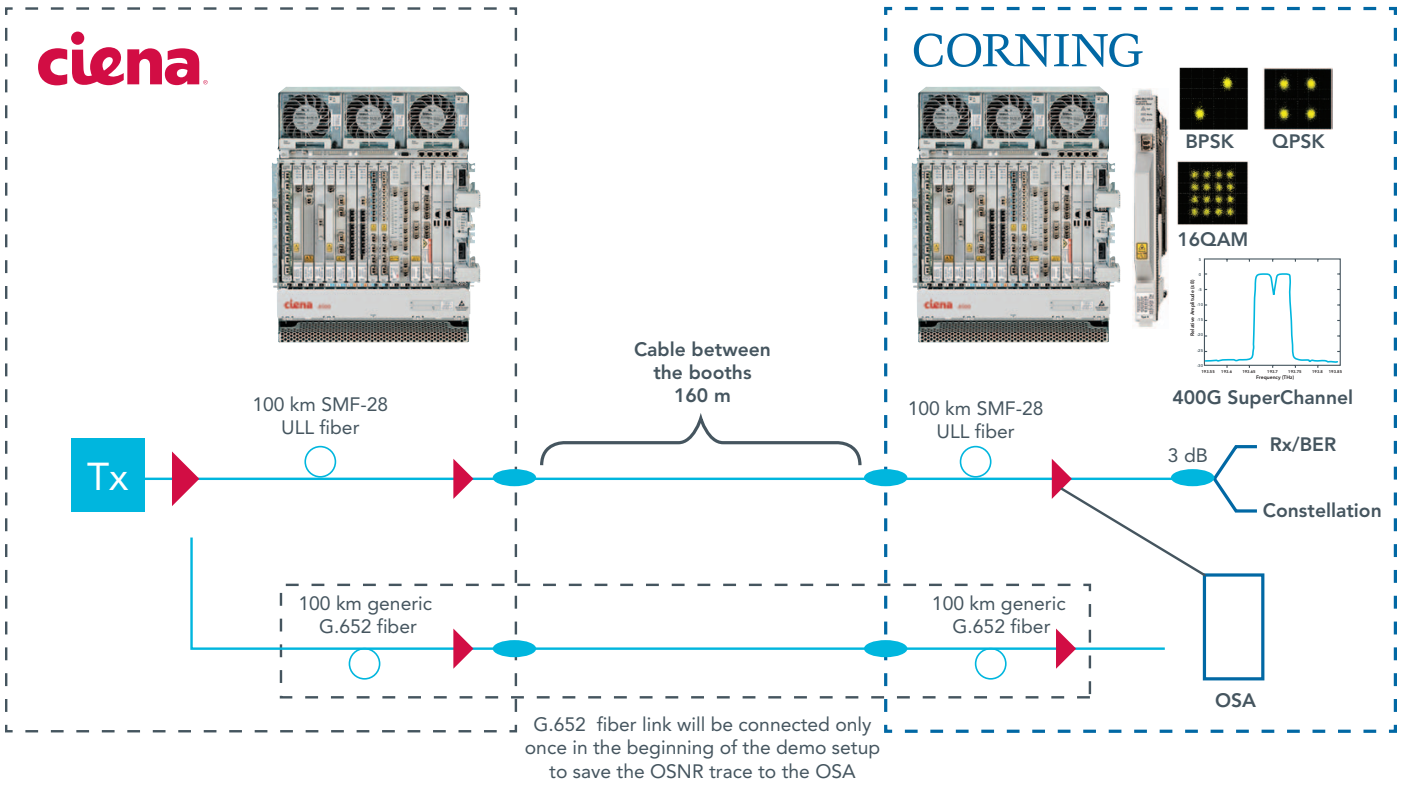
CORNING

100G-400G FOR MULTI-TERABIT NETWORK SCALE

OFC/NFOEC 2013

In today's environment of harsh competition among carriers to provide advanced high-data-rate services to users, reducing the transport cost per bit in a carrier's network is more important than ever. Historically, such reduction was achieved through both increase in bit-rate and spectral efficiency, and via further optimization of network infrastructure and functionalities. In designing the next generation of high-capacity transport systems, changes in connectivity patterns due to centralization and transition to cloud-based services must also be considered. Unpredictable service demands greatly expand the requirements and deployment scope for next-generation systems. These also imply the need to more intelligently apply bandwidth as needed while keeping operations as simple as possible for service and network providers.

At OFC/NFOEC 2013, Corning and Ciena will jointly demonstrate the broad spectrum of capabilities and applications of Ciena's WaveLogic 3—the industry's first software-programmable coherent optical processing technology that scales from 100 Gb/s to 400 Gb/s, over Corning® SMF-28® ULL optical fiber, which is the lowest-loss G.652 fiber available on the market today. We show that WaveLogic 3 technology can be remotely configured to switch between BPSK, QPSK, and 16-QAM modulation formats, demonstrating its ability to address different reach, capacity, and latency networking requirements. Spectrum of a 400G SuperChannel will also be shown, highlighting the benefits of WaveLogic 3's spectral shaping achieved via Transmitter DSP in minimizing spectral occupancy and ensuring 400G operation over today's fixed-grid environments, while increasing traffic-carrying capacity by in tomorrow's flexible grid networks. The use of an ultra-low-loss Corning SMF-28 ULL fiber increases the OSNR by approximately 3 dB, compared to a generic G.652 fiber. We estimate that this would increase the maximum reach by 30-35%, and extend the use of 400 Gb/s 16-QAM systems from metro/regional to long-haul applications.



WaveLogic 3 networking benefits

Beyond scaling bandwidth and lowering costs, WaveLogic 3-powered networks can be programmed to quickly respond and adapt to changing requirements for capacity, reach, and latency. The flexibility is particularly important with the unpredictable bandwidth routing demands experienced with cloud connectivity.

For long-haul and ultra-long-haul applications: WaveLogic 3 provides 100G transport over ultra-long-haul distances (>5000 km) without costly regeneration or Raman amplification.

Metro and regional applications: Lowering transport costs in metro, transponders can be configured remotely to transport two 100G payloads over a single 50GHz channel—double the capacity of what is possible today and significantly reducing the cost per bit. In addition, spectral shaping in the transmitter doubles the tolerance for cascaded OADMs prevalent in metro environments, enabling maximum system capacity and flexibility.

Future-proof investment: Using spectral shaping, WaveLogic 3 delivers additional capacity improvements in future flexible grid environments.

Corning SMF-28 ULL fiber networking benefits

Corning SMF-28 ULL is the lowest-loss (0.168 dB/km average attenuation) G.652 fiber available on the market to date. It has been commercially available since 2007 and deployed in many countries around the world. The ultra-low loss of Corning SMF-28 ULL fiber results in 30-35% increase in the maximum reach, compared to a generic G.652 fiber. The technical advantages of this fiber can be monetized in the following ways:

- Corning SMF-28 ULL fiber reduces the total number of electrical regenerators used in the network, providing significant net savings (especially for networks with large traffic demand).
- Such savings will also be distinct at 400 Gb/s—the use of Corning SMF-28 ULL fiber will eliminate the need of an electrical regenerator for the large portion of connections in a typical long-haul network.
- Corning SMF-28 ULL fiber reduces the number of amplifier huts in challenging and remote terrains, where the cost of bringing electricity to power those huts may be prohibitively expensive.

1201 Winterson Road
Linthicum, MD 21090
1.800.207.3714 (US and Canada)
1.410.865.8671 (outside US and Canada)
+44.20.7012.5555 (international)
www.ciena.com