

Invited paper

**Multi-Rate (111-Gb/s, 2x43-Gb/s, and 8x10.7-Gb/s) Transmission at 50-GHz
Channel Spacing over 1040-km Field-Deployed Fiber**

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Abstract

111-Gb/s transmission combined with 2x43-Gb/s and 8x10.7-Gb/s on a 50-GHz grid over 1,040-km field fiber and two ROADMs is demonstrated, showing the feasibility of 100G overlaying existing 10G/40G commercial systems.

Extended Abstract

In this field trial, we characterize the optical transmission performance of a 111 Gb/s coherently demodulated polarization multiplexed (CP) RZ-QPSK channel on a 50GHz grid with two adjacent 43 Gb/s and eight 10.7 Gb/s channels over 1,040 Km of standard fiber and two ROADMs in the optical path. The WDM system used for this trial was a Nokia Siemens Networks' hiT 7500 ultra long haul (ULH) platform with standard EDFA amplifiers spaced every 80 Km on Verizon's fiber network in Richardson Texas. The interplay between the channels with different data rates was analyzed to show how the 111 Gb/s is optimized by carefully choosing the power levels of the neighboring 10.7 Gb/s and 43 Gb/s channels. We also performed PMD tolerance tests by adding lumped multi-order PMD in the beginning and end of the transmission line to show that the 111-Gb/s channel is able to sustain at least 23-ps mean DGD for error-free operation, owing to strong digital processing in the coherent receiver. The results of this trial confirm the suitability of 111-Gb/s CP-QPSK for multi-rate operation in existing systems on presently deployed fiber infrastructures.



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Glenn Wellbrock is the Director of Backbone Network Design at Verizon, where he is responsible for the development of new optical and data technologies for the converged Verizon backbone infrastructure. Previous positions include running the advanced technology lab, establishing evaluation criteria, and setting engineering guidelines for all backbone transport equipment as well as various positions within network operations. In addition to his 20+ years at Verizon (1984-2001 & 2004-present), Glenn was responsible for Product Architecture within the optical networks group at Marconi and Product Planning at Qplus Networks with a specific focus on developing alternative modulation techniques.