

RSoft Application: Nyquist-WDM Superchannels for Terabit Transmission

Overview

A researcher at a major European carrier wanted to explore terabit transmission over thousands of kilometers without in-line dispersion compensation.

The Challenge

- ▶ Counting bit error rate (BER) is computationally intensive
- ▶ Periodicity assumptions in conventional simulation tools may not be accurate for phase-modulated coherent systems
- ▶ Advanced digital signal processing (DSP) algorithms are required for detection of data.

The Solution

RSoft™ OptSim™ provides time-domain split-step (TDSS) engine with no assumption of periodicity. TDSS is ideal for long bit sequence transmission making BER counting feasible. In addition, OptSim provides a library of advanced DSP algorithms for coherent systems.

The Result¹

For a given transmitted per-channel power, BPSK and QPSK support longer distances compared to 8- and 16-QAM. PM-8QAM is an interesting trade-off between supported distance and spectral efficiency. PM-16QAM is spectrally the most efficient compared to the other three formats considered in this case study, but supports shorter distances.

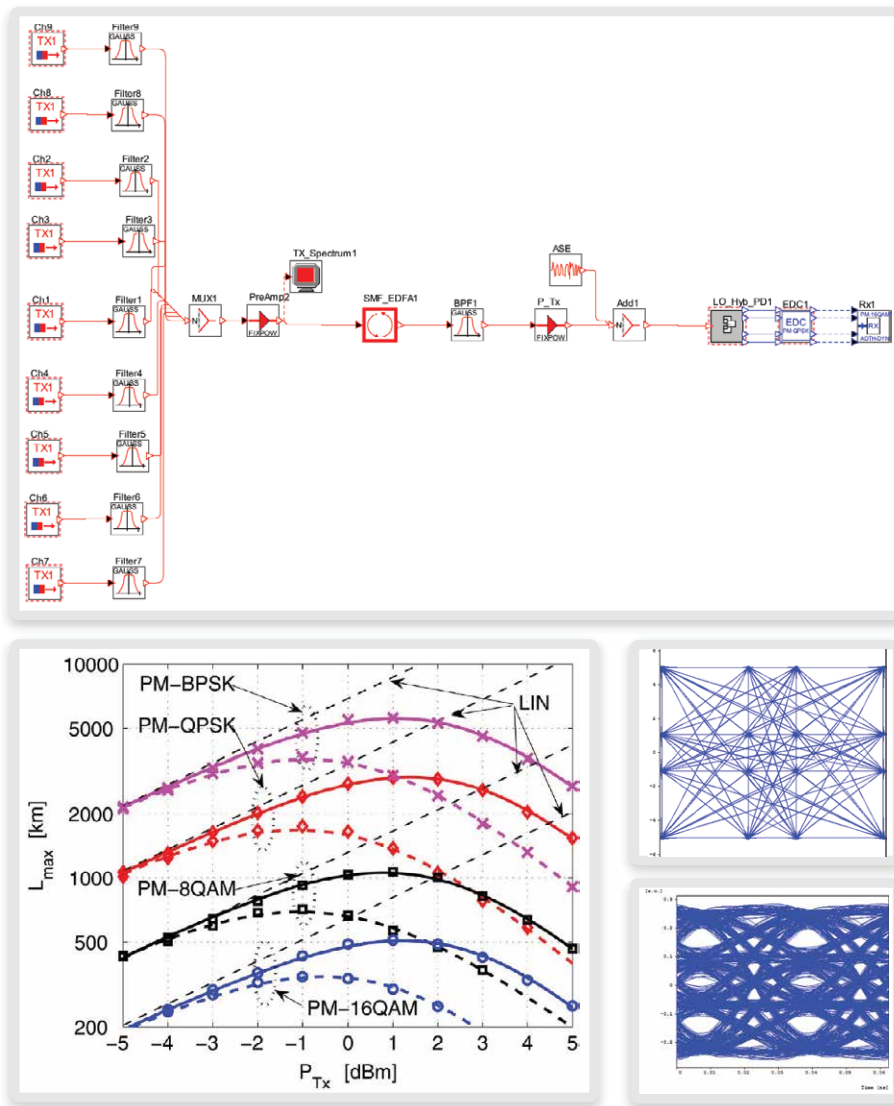


Figure 1. OptSim Layout of a Nyquist-WDM System (top), performance comparison for advanced modulation formats (lower left) and constellation and eye diagrams (lower right)

¹G. Bosco, V. Curri, A. Carena, P. Poggiolini, F. Forghieri, "On the Performance of Nyquist-WDM Terabit Superchannels Based on PM-BPSK, PM-QPSK, PM-8QAM or PM-16QAM Subcarriers", Journal of Lightwave Technology, Vol. 29, No. 1, Jan. 2011 604-605, 2002.

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