PERFORMANCE ENHANCEMENT OF A BIDIRECTIONAL DWDM SOLUTION

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DWDM technology is known as a kind of technology coupling and transmitting optical signals of different frequency (wavelength) to an optical fiber by using the tremendous bandwidth of single mode fibers (SMF) low-loss area in DWDM system, which is not only conducive to the realization of switching and recovery in optical networks but also convenient to the expansion and upgrade, and thus the further realization of transparent and high survivability optical networks [1, 2].

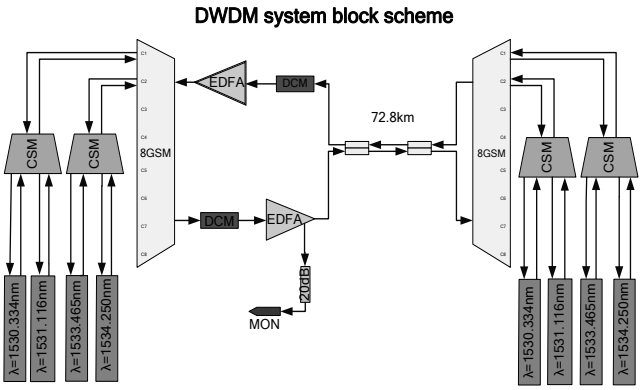

Figure 1. Block scheme of a bidirectional DWDM solution

In this report we have investigated the performance of a standard bidirectional DWDM solution with dispersion compensation and EDFA amplification where four 10 Gbit/s channels were combined and transmitted over the 72.8 km long optical fiber.

The simulation model gave us decent results. Signal spectrums of input channels were almost identical to the ones received from real system, as well as EDFA output spectrums were also very much alike. Further optimization of the system was based on increasing the number of channels transmitted and decreasing the spacing between channels. In comparison to the original system, eye opening became worse and BER increased and almost reached the critical value of 10^{-9}, but this is still acceptable for a normal operation of transmission system.

Our final conclusion would be that specific real-working DWDM solution can be successfully optimized according to proposed strategy and the system capacity may be increased for up to 110 Gbit/s.

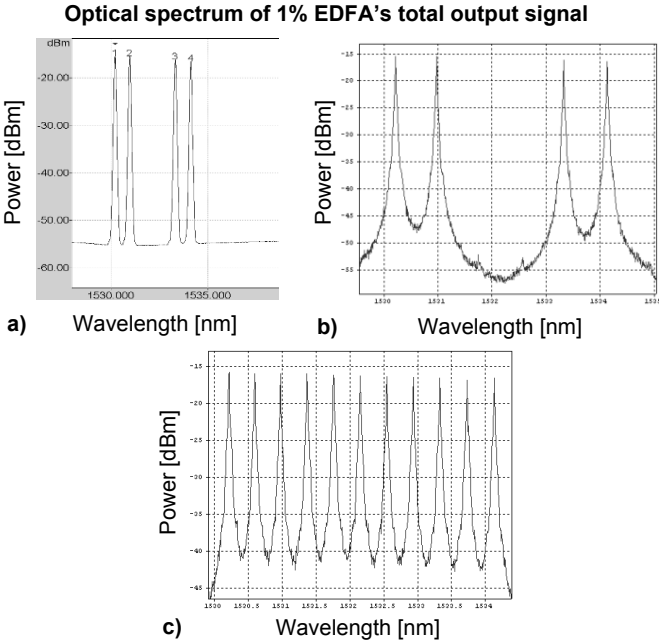

Figure 2. Signal spectrum of 1% EDFA's total output signal: a-measured with OSA; b and c-simulated in OptSim

References

1. V.Bobrovs, G.Ivanovs, *Investigation of Different Modulation Formats Simultaneous Transmission in WDM Systems*, Electronics and Electrical Engineering, 2010, No.7, 109-112.
2. D.Tianlin, *Fiber-optic communications and fiber-optic information network*, Tsinghua Univ. Press, 2011.