

NEW GENERATION ACCESS SYSTEM BASED ON DWDM-DIRECT WITH 55 GHZ FIBER BRAGG GRATING

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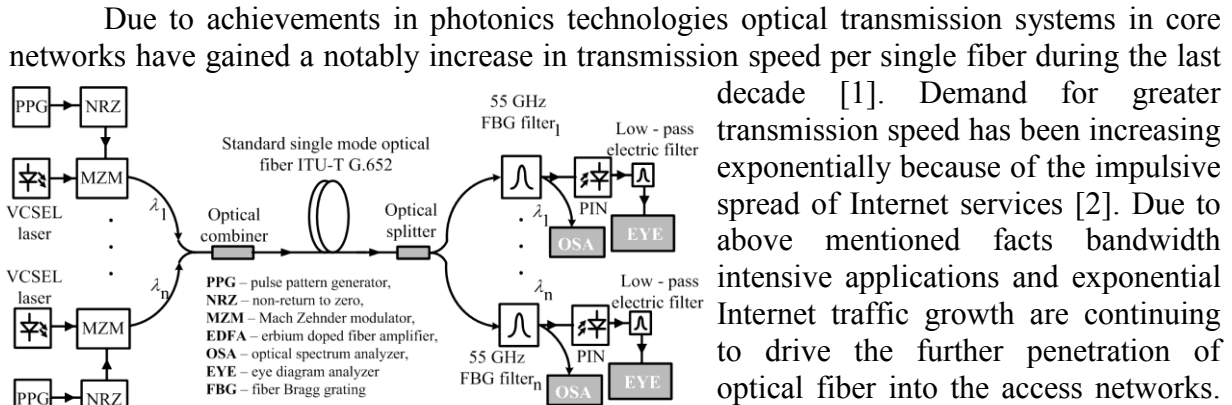


Fig.1. DWDM– direct system for broadband access

networks is further defensible in terms of video services support. The main reasons behind the implementation of new generation systems are to meet demand of capacity and user density requirements, while ensuring that the cost per unit bandwidth is lowest possible [3]. The novel concept is dense WDM (DWDM) – direct in which multiple wavelengths are directly connected to each optical access network unit (ONU) [4]. Proposed approach for increasing the transmission capacity is to reduce the channel spacing of a DWDM – direct system to the minimum while keeping the employed optical band-pass filter technologies.

We have realized a DWDM – direct system for broadband access that includes FBG filter with 55 GHz FWHM bandwidth (see Fig.1.). From the numerical results we found the minimal channel interval for the 55 GHz FBG to ensure reliable data transmission at two, four and eighth channels, and therefore were able to increase the spectral efficiency of the whole DWDM-direct system for broadband access. In 10 Gbit/s DWDM-direct systems with 55 GHz

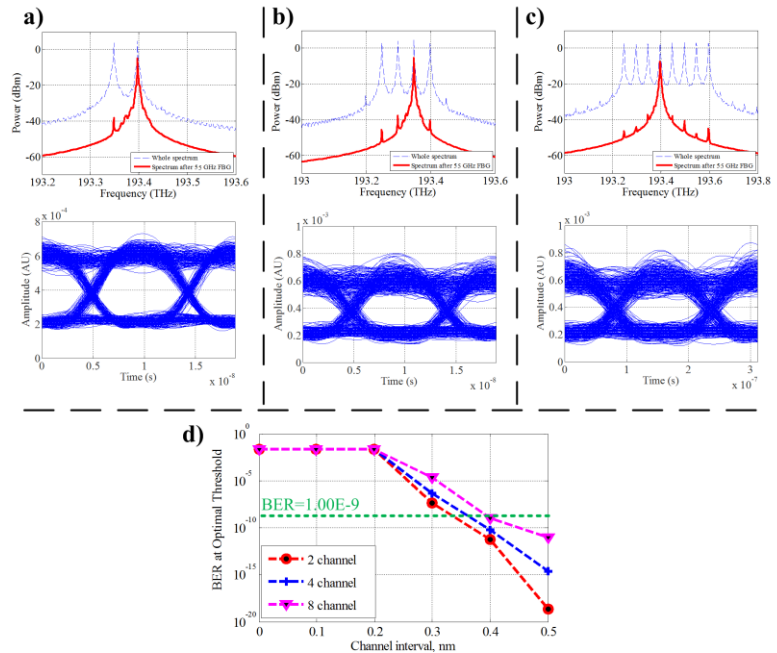


Fig.2. Power spectral densities and eye diagrams of 10 Gbit/s DWDM direct a) two channels, b) four channels, c) eight channels system after 10 km of SSMF and d) BER vs. Channel interval with 55 GHz FBG optical filter. Results obtained at the worst channel.

FBG channel spacing was 50 GHz (see Fig.2.) to ensure appropriate signal quality. As a result the spectral efficiency of the 10 Gbit/s DWDM system with 55 GHz FBG was raised from 0.18 bit/s/Hz to 0.2 bit/s/Hz.

References

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