EVALUATION OF OPTICAL FILTERS FOR DWDM-DIRECT IN NEXT GENERATION OPTICAL ACCESS

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In past few years, the number of users to the Fibre-To-The-Home (FTTH) technology increased fast because of the great potentialities of broadband access. Due to this trend Gigabit Passive Optical Network (G-PON) and Gigabit-Ethernet-PON (GE-PON) has been commercialized [1]. Besides wavelength-division-multiplexing (WDM)-PON has acquired accumulative attention as different technology for the next-generation networks. Still the developments on WDM-PON are in research stage, and the standards for WDM-PON have not been established yet [1, 2]. On the other hand, the amount of traffic is still increasing, and we can estimate that global IP traffic will quadruple from 2009 to 2014 [3].Telecom operators are forced, as a consequence, to adapt in the near future their deployed optical fibre access systems so as to cope with these challenging advances [4].Therefore it is important to evaluate different wavelength filters in dense WDM (DWDM)-direct systems for broadband access to achieve greater spectral efficiency value and total information transmission capacity. Moreover it is important to evaluate minimal channel interval for currently available optical filter technologies: fibre Bragg grating (FBG) and thin film filter (TFF) with 100 GHz full width half maximum (FWHM) bandwidth in DWDM-direct systems for broadband access.

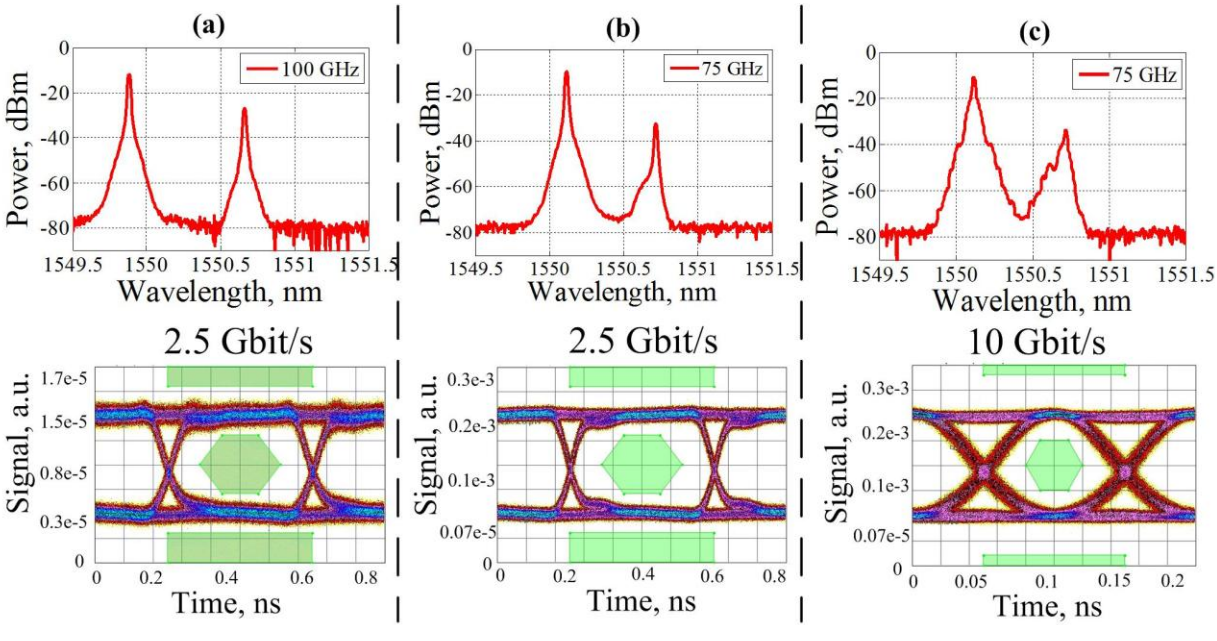

Fig.1 Measured power spectrum and eye diagrams (a) of 2.5 Gbps optical signal after FBG with 100 GHz FWHM bandwidth, (b) of 2.5 Gbps optical signal after TFF with 100 GHz FWHM bandwidth, (c) of 10 Gbps optical signal after TFF with 100 GHz FWHM bandwidth with channel interval shown in inset, after 20 km of standard single mode fibre at the worst channel.

The main results of our experimental investigation are shown in Fig.1. We have evaluated the minimal channel interval for DWDM-direct concrete realization for broadband access. Fig.1.a. shows measured power spectrum and eye diagrams of experimental 2.5 Gbps DWDM-direct system after 100 GHz FBG and Fig.1.b. - after 100 GHz TFF. Fig.1.c. shows measured diagrams of experimental 10 Gbps DWDM-direct system after 100 GHz TFF. As we can see from the results, that better performance is provided from 100 GHz TFF because of possible realization of 10 Gbps data transmission with 75 GHz channel interval for 20 km of standard single mode fibre which is typical distance for access systems.

References

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