

INVESTIGATION OF FLAT-TOP BPF USABILITY IN AMPLIFIED FIBER OPTICAL SYSTEMS

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In this work we present realization of amplified optical communication system at different data transmission speeds and distances.

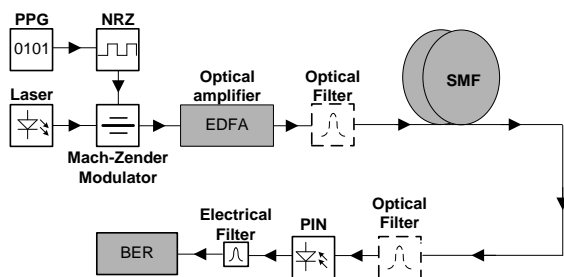


Fig.1 Measurement scheme

To suppress amplified spontaneous emission of erbium doped fiber amplifier we use tunable bandwidth flat-top band pass optical filter. Investigation of this problem is important because of great role of optical amplifiers in optical communication systems. The used simulation program realizes method of calculation that is based on solving a complex set of differential equations, taking into account optical and electrical noise, linear and non-linear effects [1]. We have numerically and practically realized 2.5 Gbit/s and 10.52 Gbit/s data transmission speed single channel optical communication systems with flat-top band pass optical filter. As we can see in fig. 1, three different system setups were made: first, without using a filter, second, using filter after optical amplifier and a third, using filter after optical fiber. The best and worst case eye diagrams are on fig. 2. The main need of optical filter is to use it for ASE noise suppression behind the optical amplifier, because without optical filter in amplified system ASE noise is greater than with filter.

Realization of low insertion loss optical filter is a core problem for realization of high speed optical communication systems [2]. In amplified optical communication systems optical filter implementation after optical amplifier arises in better system stability to optical noise.

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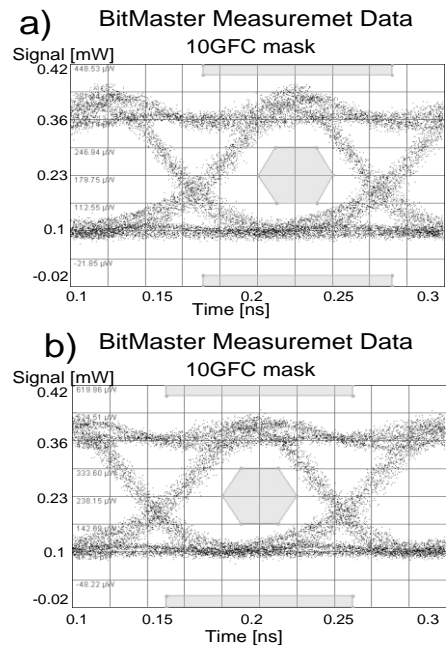


Fig.2 Eye diagram after 40 km of optical fiber a) without filter usage ,b) with optical filter after amplifier.

References

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