Novel Power Saving Architecture for OCDMA Code Generation

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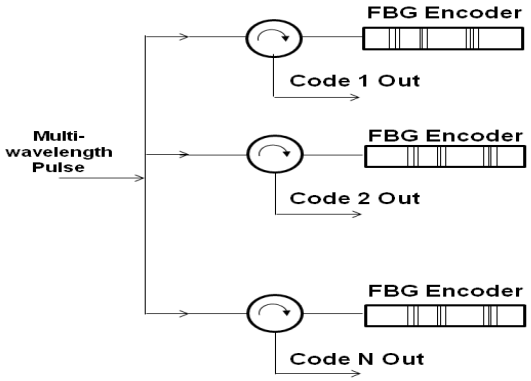
Fiber Bragg grating (FBG) optical reflectors have become quite popular for the purpose of encoding and decoding optical code division multiple assess (OCDMA) data. When the source of optical signal is a broadband supercontinuum source, the source signal is traditionally distributed equally to all users as shown in architecture in fig. 1. However, we observed that only about 20% of the power that enters into an optical en/decoder is



reflected and the remaining 80% is not used in the en/decoding process.

Fig. 1. Traditional method of generating OCDMA signals from a multiwavelength pulse

We present a novel architecture that will enable both cost and energy efficiency in the process of generating optical CDMA codes. The architecture achieves effective utilization of available optical power by using several cascaded OCDMA encoders. In this new architecture (see Fig. 2), each OCDMA encoder is supplied with multiwavelength optical source by the encoder preceding it.

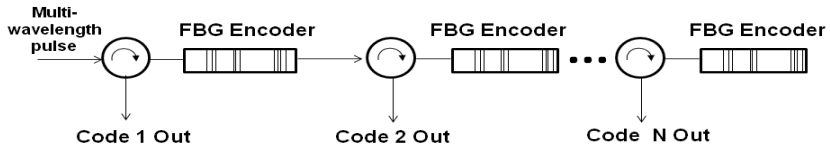


Fig. 2. Proposed cascade method that enables effective utilization of optical power

Using the architecture in fig. 2 instead of the traditional method as depicted in fig.1, we have been able to achieve power savings of up to 3dB for a 4- user OCDMA system. We were also able to eliminate the use of the initial power splitter.