experiment. The data rate for the superchannel is 12.25x9 = 110.25 Gb/s. The configuration of the receiver end is the same as previous two experiments.

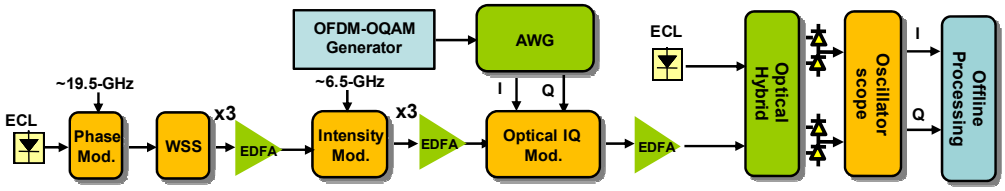

Fig. 8. The experimental setup for 110Gb/s OFDM/OQAM superchannel transmission .

Figure 9 shows the averaged BER performance of the 9 sub-bands as a function of OSNR at back-to-back. The guard band frequency is set as 39 MHz, which equals to only one subcarrier spacing. The required OSNR is 15 dB for the BER of $1x10^{-3}$. Compared to the single-band performance, the implementation error is only ~0.15 dB. Thus, it proves that our OFDM/OQAM modulation can be used in unsynchronized superchannel without any penalties.

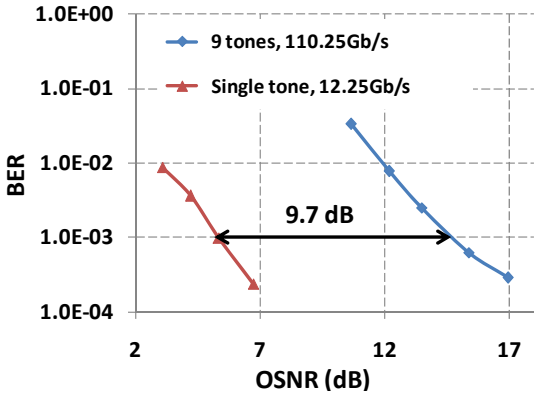

Fig. 9. BER versus OSNR for 110.25 Gb/s OFDM/OQAM superchannel at back-to-back.

Conclusion

In this paper, we experimentally demonstrated the first coherent optical OFDM/OQAM superchannel system. By using OFDM/OQAM, the signal with distinguished rectangular spectral shape (side lobe suppression ratio > 35 dB) could be efficiently generated, which is 20 dB lower than conventional OFDM. When applying such technique in unsynchronized band multiplexed superchannel system, very trivial guard band spacing (<20MHz) was required without any performance degradations. A 9-band 110-Gb/s superchannel OFDM/OQAM system was shown with comparable performance as the conventional OFDM, but with much reduced implementation complexities. Our demonstrations showed that OFDM/OQAM would be a promising alternative to OFDM to be used in high capacity transmission, re-configurable optical access and networks.

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