Laser-sharing in PON

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Absorption Modulator (REAM), used to reflect and modulate the US λ under test, selected by means of a standard 100 GHz grid optical filter. US signal is detected at the OLT by means of a self-coherent receiver, that uses the same CW sent to the ONU for being modulated as local oscillators, thanks to optical splitters.

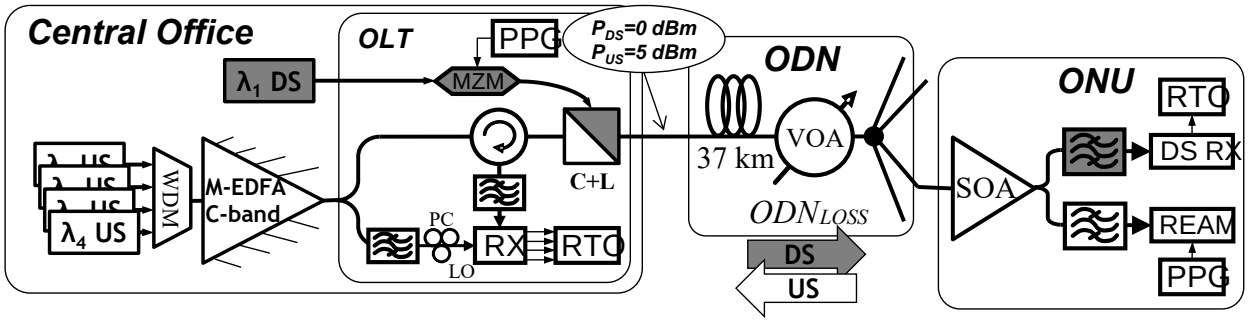

Fig. 2 Laboratory measurement setup using a real fiber infrastructure.

The system performance was first measured with the US WDM signals only, as reported in Fig. 3, in terms of BER of the channel under test as a function of the ODN loss. The SOA bias current has been optimized for each ODN loss value in order to avoid US signal saturation. Fig. 3 shows that the proposed setup supports the WDM feature up to 31 dB of ODN loss before reaching a pre-FEC BER=10-3, satisfying ITU-T ODN class N2 ([2]). We then switched on the DS l, reporting both US and DS performances in Fig. 4. The DS signal is recovered up to 35 dB of ODN loss, and the DS presence does not affect the US performance, as expected.

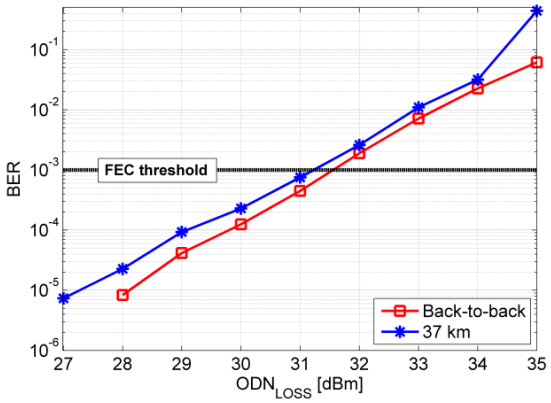

Fig. 3: Performance of the US channel under test in terms of BER vs ODN loss.

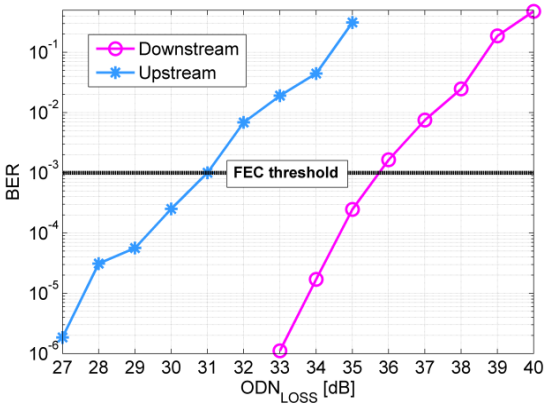

Fig. 4: Performance of the upstream and downstream transmission in terms of BER vs ODN loss.

3. Conclusions

We propose a possible approach for laser sharing between OLTs at the CO, and speculated on its economic viability when coupled to a reflective-PON architecture. In these conditions, we also experimentally demonstrate with commercial components the compatibility with the ODN specifications set by ITU-T for NG-PON2.

4. Acknowledgments

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5. References

[1] S. Straullu *et al*, "Optimization of self-coherent reflective PON to achieve a new record 42 dB ODN power budget after 100 km at 1.25 Gbps", OPEX **20**, 28, 29590-29598 (2012).

[2] *40-Gigabit-capable passive optical networks (NG-PON2)*, ITU-T Recommendation G.989.1, Mar. 2013.