Sensitivity of 25G APD receiver for 25G-EPON ONU transceiver

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Motivation

- For 25G-EPON, 25G APD receiver was considered for ONU transceiver to archive PR 30 class (29 dB) without using a booster amplifier at OLT.
- In Huntington Beach meeting, the motion #3 related the 25G-EPON ONU receiver sensitivity at BER=10^{-3} was passed.

Motion #3

The 25G-EPON ONU receiver sensitivity specification proposed in harstead_3ca_4_0117.pdf page 14, -24.2 dBm at BER = 10E-3 and ER = 8 dB, shall be adopted as a starting point. The final specification would be adjusted, if required, for these two possible deltas with respect to 10G-EPON: 1) improved FEC, 2) higher diplexer loss due to smaller DS/US gap.

Moved: Ed Harstead Second: Frank Effenberger

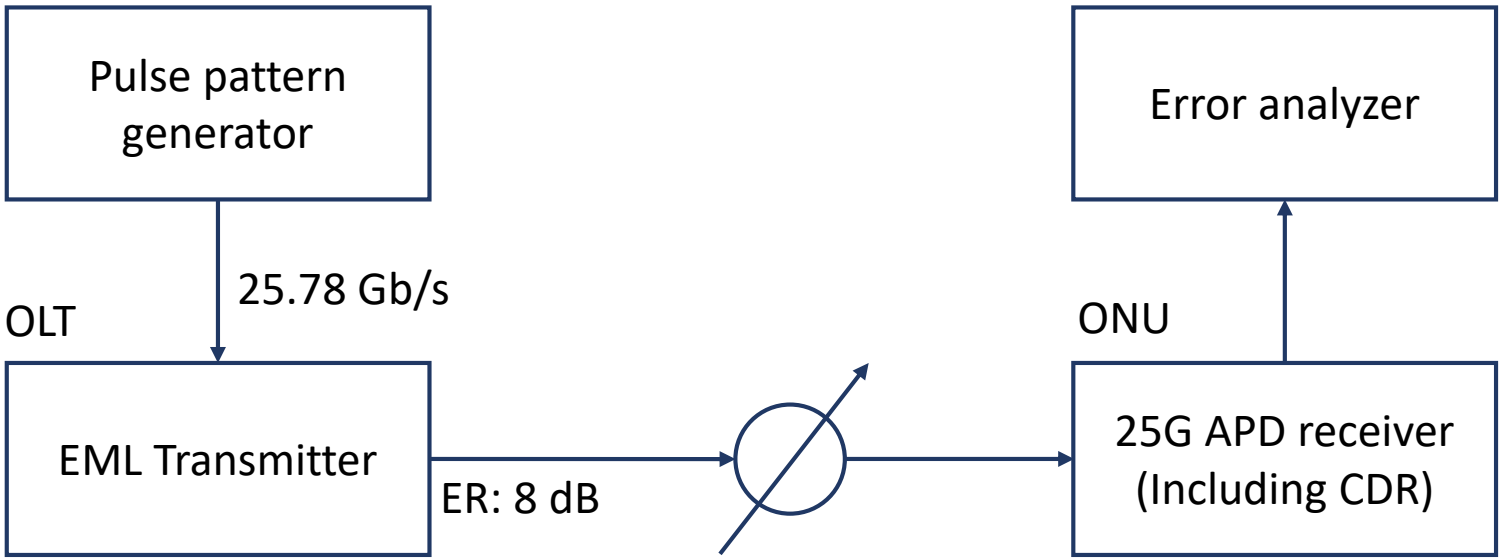
For: 26 Against: 0 Abstain: 3
Technical (≥ 75%)
Motion Passed

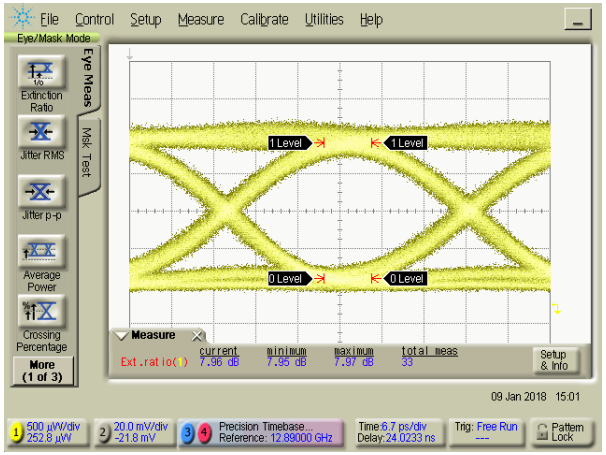
- Recently, 802.3 ca TF selected FEC code considering BER=10^{-2} of downstream signal. Therefore, the 25G-EPON ONU receiver sensitivity should be adjusted.
- In this contribution, we provide 25G APD receiver sensitivity at BER=10^{-2} and propose an adjusted receiver sensitivity specification.

Sensitivity measurement conditions

Parameter	Values
ER	8 dB
Bit rate	25.78 Gb/s
Wavelength	1309 nm
Modulation format	NRZ (PRBS 2^{31}-1)
BER	10^{-4} ~ 10^{-2}
Ambient Temperature	Room Temp.

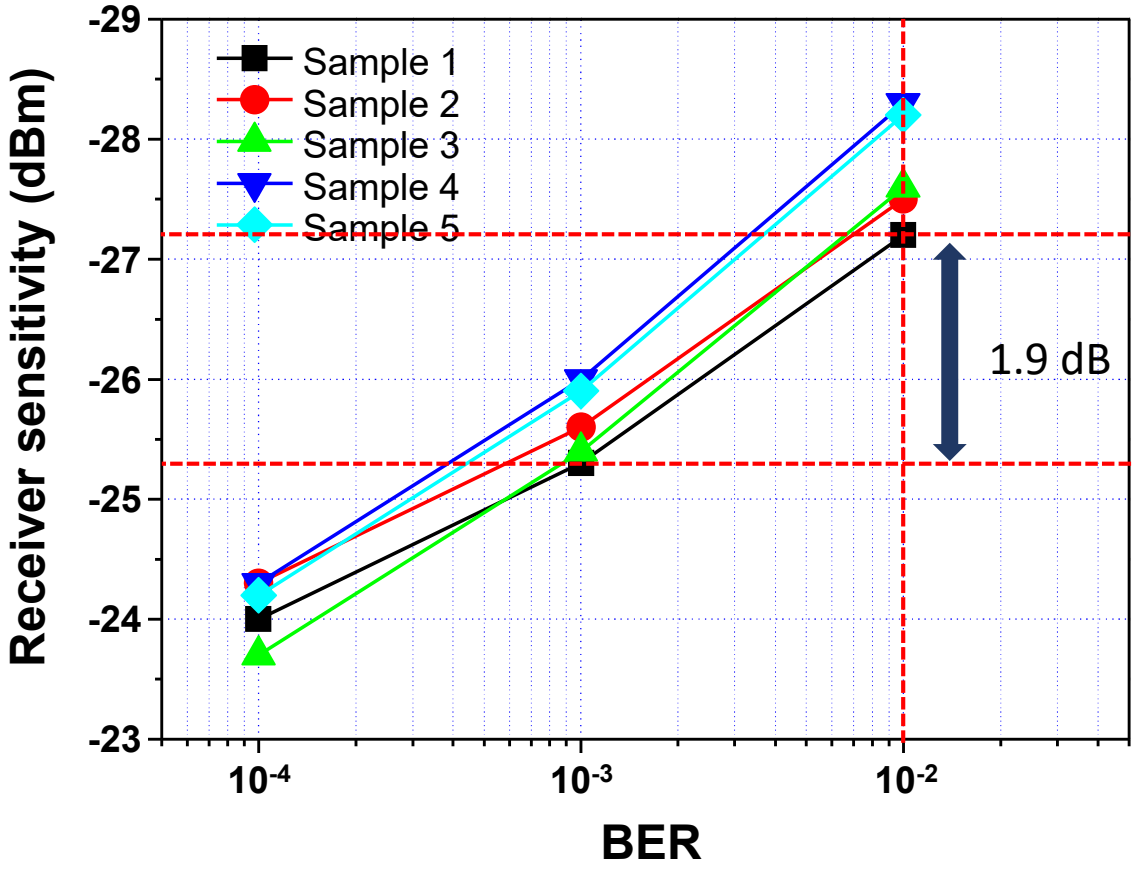
Measurement setup





Eye diagram of downstream

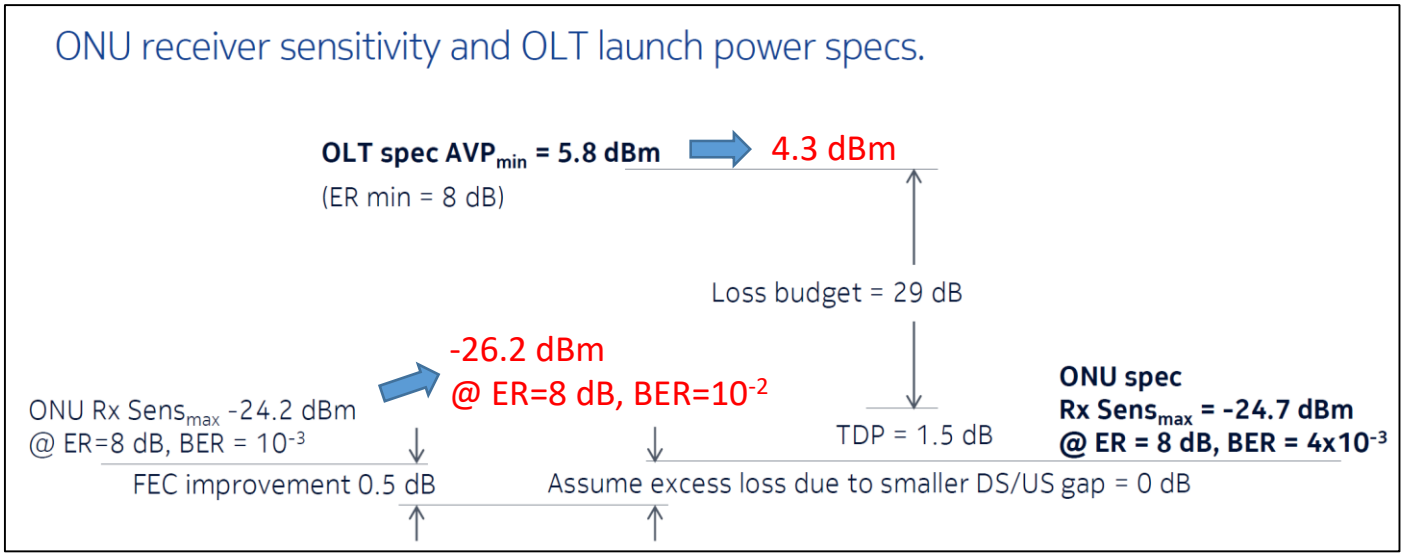
BER performance of 25G APD receiver



- Measured receiver sensitivity is over -27.2 dBm at BER=10^{-2}.
- Additional 1.9 dB of optical gain will be archived if the target BER is changed from 10^{-3} to 10^{-2}.

Conclusions

- 25G APD receiver shows minimum -27.2 dBm of sensitivity at BER=10^{-2}.
- Considering 1 dB of diplexer insertion loss due to BOSA configuration, 25G E-PON ONU receiver sensitivity should be -26.2 dBm.
- If you refer to the previous contribution (slide 5, harstead_3ca_5a_0117), OLT spec AVP_{min} will be adjusted to be 4.3 dBm which is lower than 4.5 Bm of the vender input results (slide 8, harstead_3ca_1a_0716).



Page 5, harstead_3ca_5a_0117