100G-EPON Power Budget Suggestions

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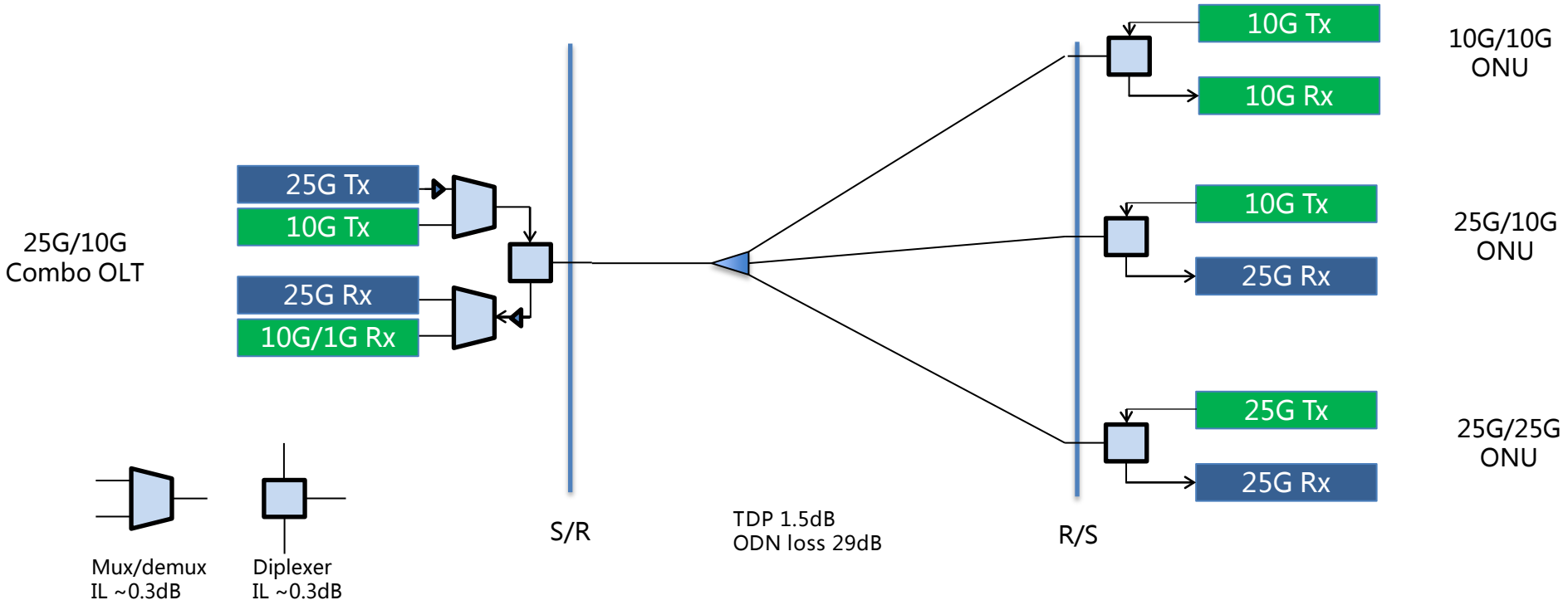
Introduction

This contribution provides some suggestions on 100G-EPON power budget.

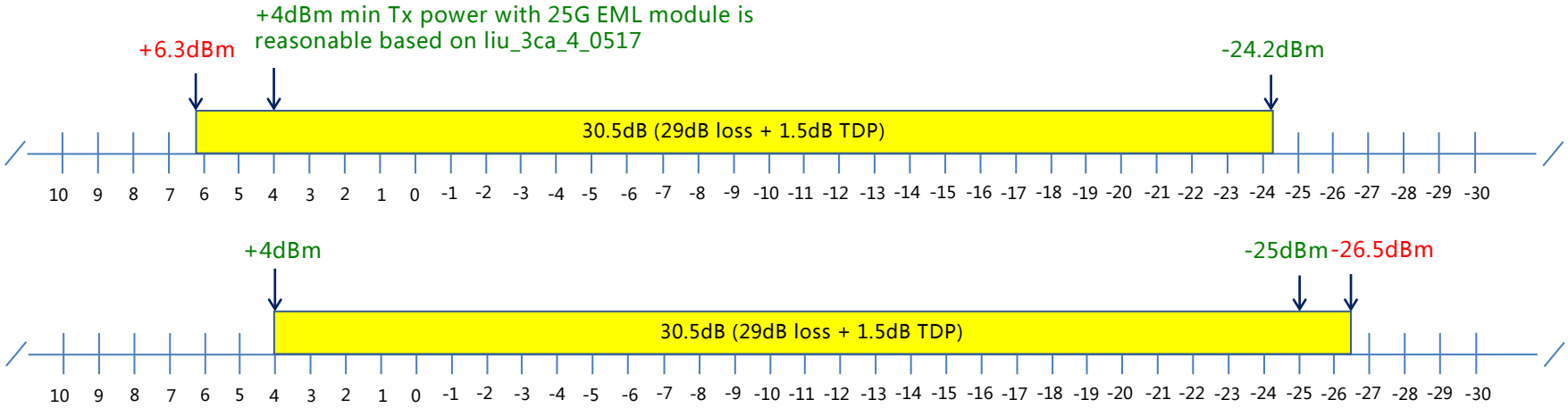
Basic conditions

- Common reference point across 25G, 50G and 100G to simplify ODN design and trouble shooting, wavelength mux and demux are considered as part of OLT/ONU module
- Power budget numbers are based on WDM/TDM hybrid wavelength plan, penalty for 25G in multi-rate receiver is small and negligible.
- 25G-EPON ONU receiver sensitivity assumed -24.2 dBm at BER = 1E-3 and ER = 8 dB as a starting point. (Motion #3 in Huntington Beach)

25G-EPON architecture and reference points

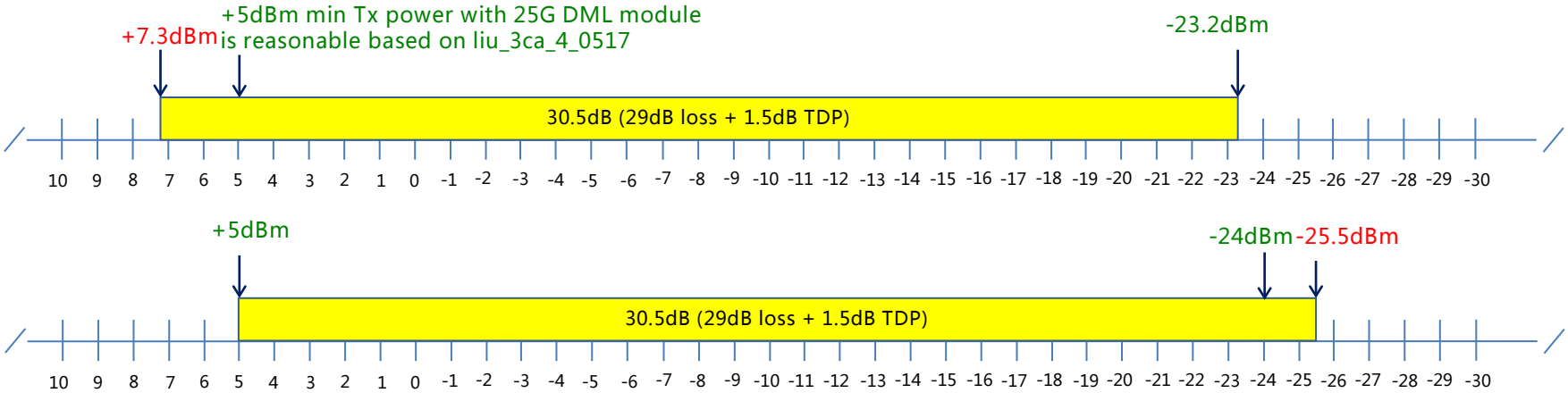


25G-EPON power budget analysis (PR30 downstream)



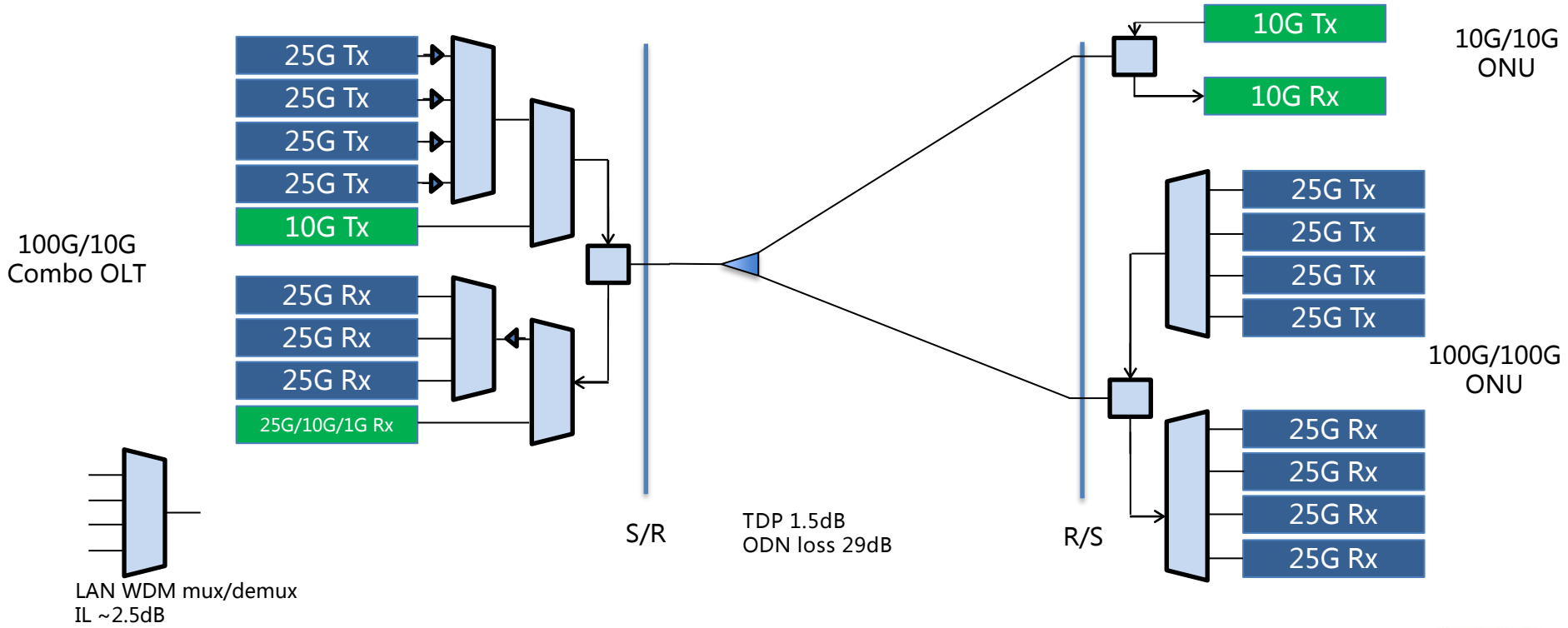
- Based on vendors' feedback, +4dBm min Tx power for 25G EML module is reasonable
- +6.3dBm is 2dB higher than vendors' feedback
- In order to fill 2.3dB gap without using amplifiers
  - Improve sensitivity of 25G APD by 0.8dB to -25dBm
  - And apply enhanced FEC for additional 1.5dB gain

25G-EPON power budget analysis (PR30 upstream)

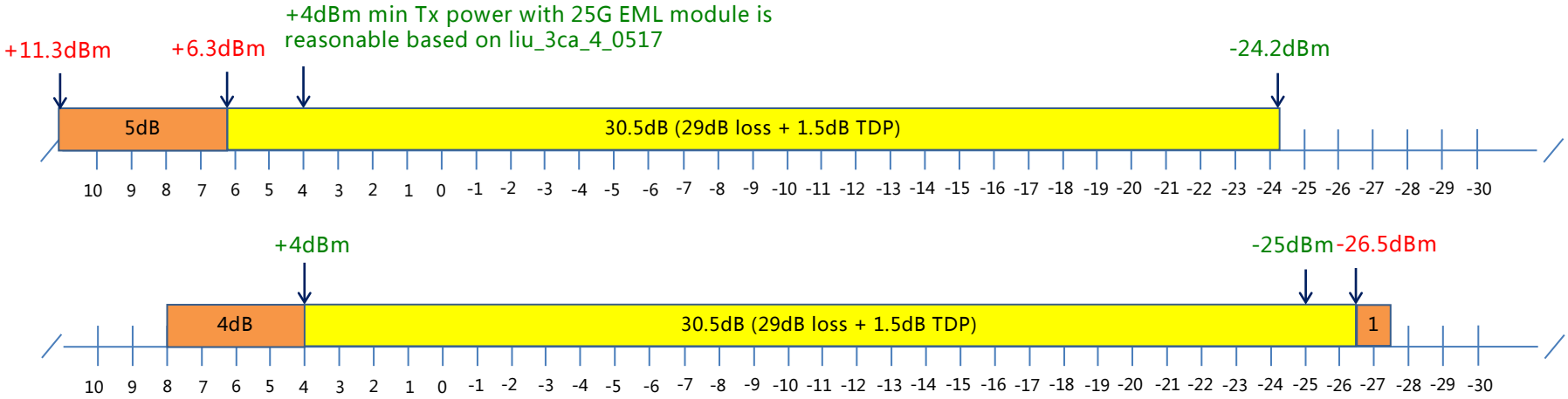


- 1dB burst penalty is assumed for 25G APD, then +7.3dBm Tx power is required for 25G DML
- Based on vendors' feedback, +5dBm min Tx power for 25G DML is reasonable
- In order to fill 2.3dB gap without using amplifier
  - Improve burst mode 25G APD sensitivity by 0.8dB to -24dBm
  - Additional 1.5dB with enhanced FEC

100G-EPON architecture and reference points

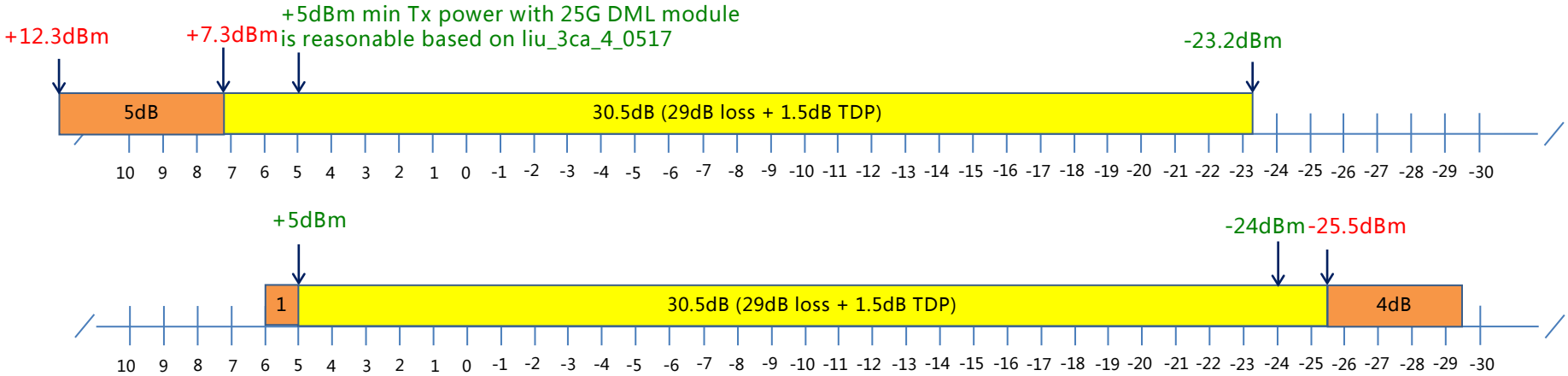


100G-EPON power budget analysis (PR30 downstream)



- 5dB Mux and demux loss has to be compensated
  - At least 1dB further improvement of 25G APD sensitivity is expected in future
  - 4dB additional OLT Tx power can be achieved by using post amplifiers

100G-EPON power budget analysis (PR30 upstream)



- 5dB Mux and demux loss has to be compensated
  - At least 1dB additional 25G DML Tx power is expected in future
  - 4dB improvement of OLT burst mode sensitivity can be achieved by using pre amplifiers

Summary

This contribution provides suggestions for 100G-EPON power budget.

Given a few optimistic for Tx power in previous discussions

For 25G

- Tx power of 25G EML and DML is at least 1-2dB lower than expect
- Sensitivity of 25G APD should be improved for at least 1dB.
- At least 1.5dB coding gain of enhanced FEC is suggested.

For 100G, to compensate 5dB mux and demux loss

- Further 1dB improvement of 25G APD sensitivity and 1dB additional 25G DML Tx power
- 4dB additional Tx power and 4dB improvement of burst mode sensitivity are needed by using amplifiers

Thank you

Tomorrow never waits