

50 GbE 40 km Objective

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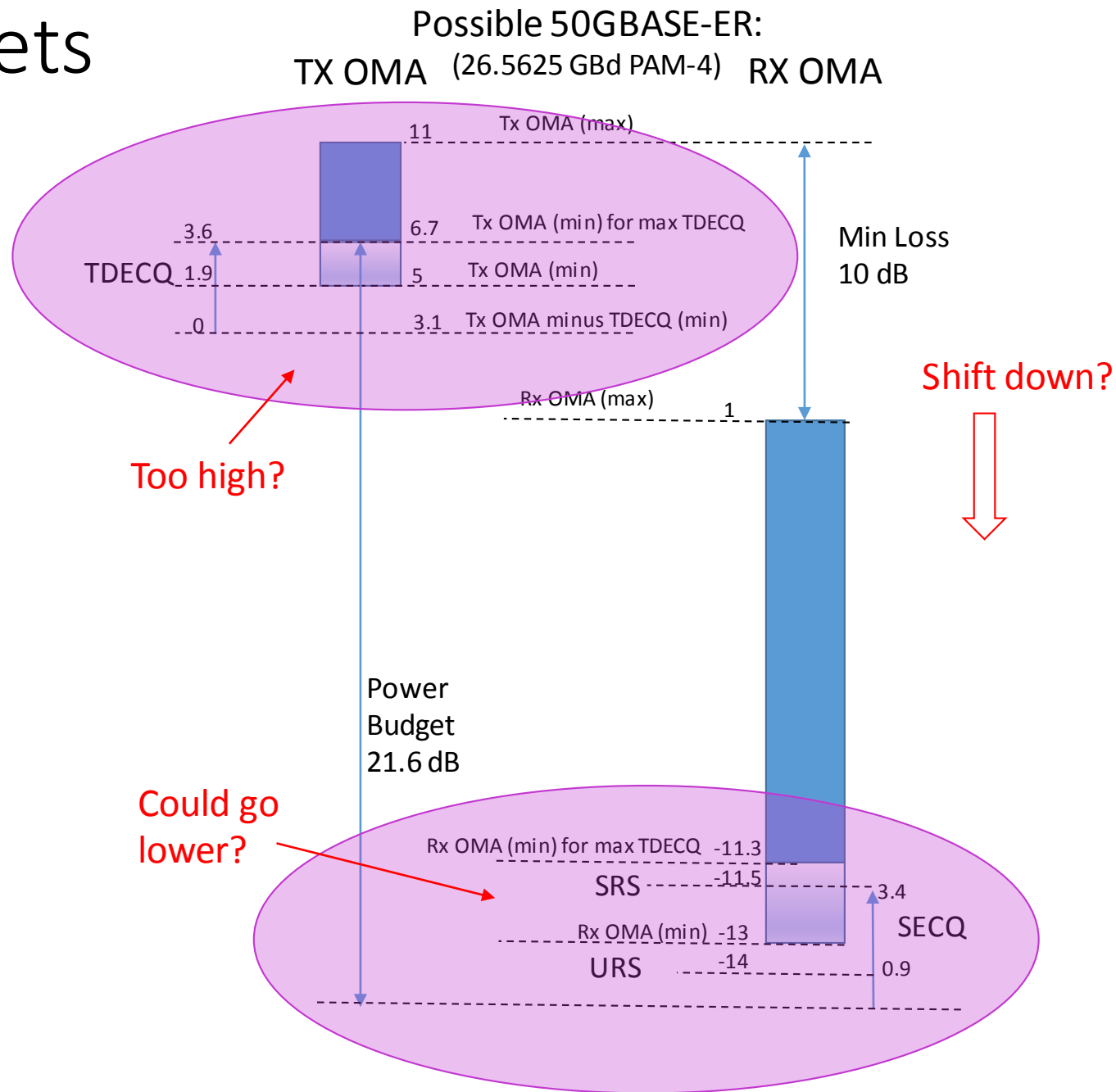
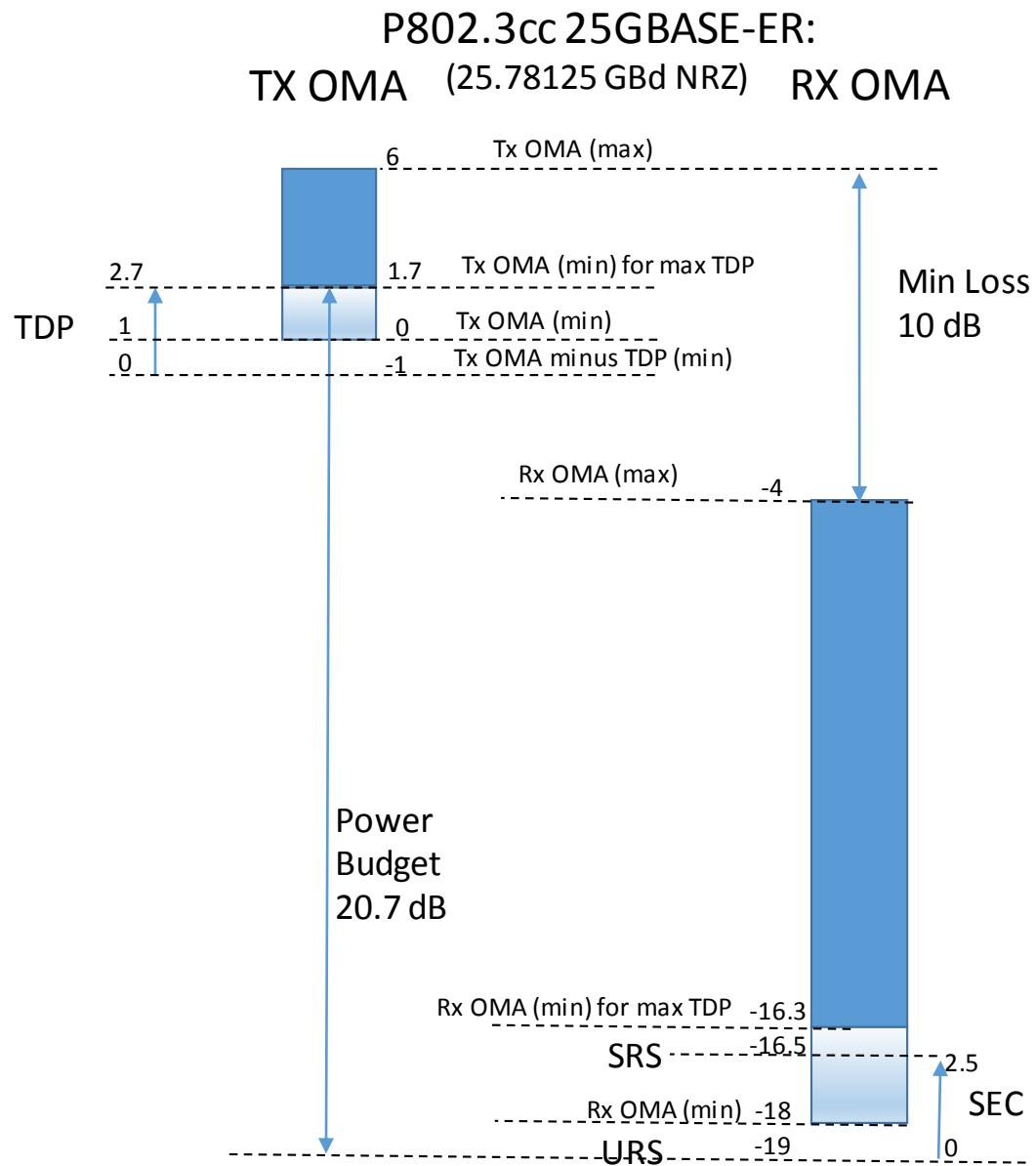
Background

- 50GBASE-LR included as part of P802.3cd project
 - PAM-4 modulation
 - 10.3 dB power budget (6.3 dB channel insertion loss + 4 dB allocation for penalties)
- The P802.3cc project (25GbE over SMF) included –LR and –ER variants for NRZ modulation
 - -ER (40 km) PMD based on APD receiver
 - 20.7 dB power budget (18 dB channel insertion loss + 2.7 dB allocation for penalties)

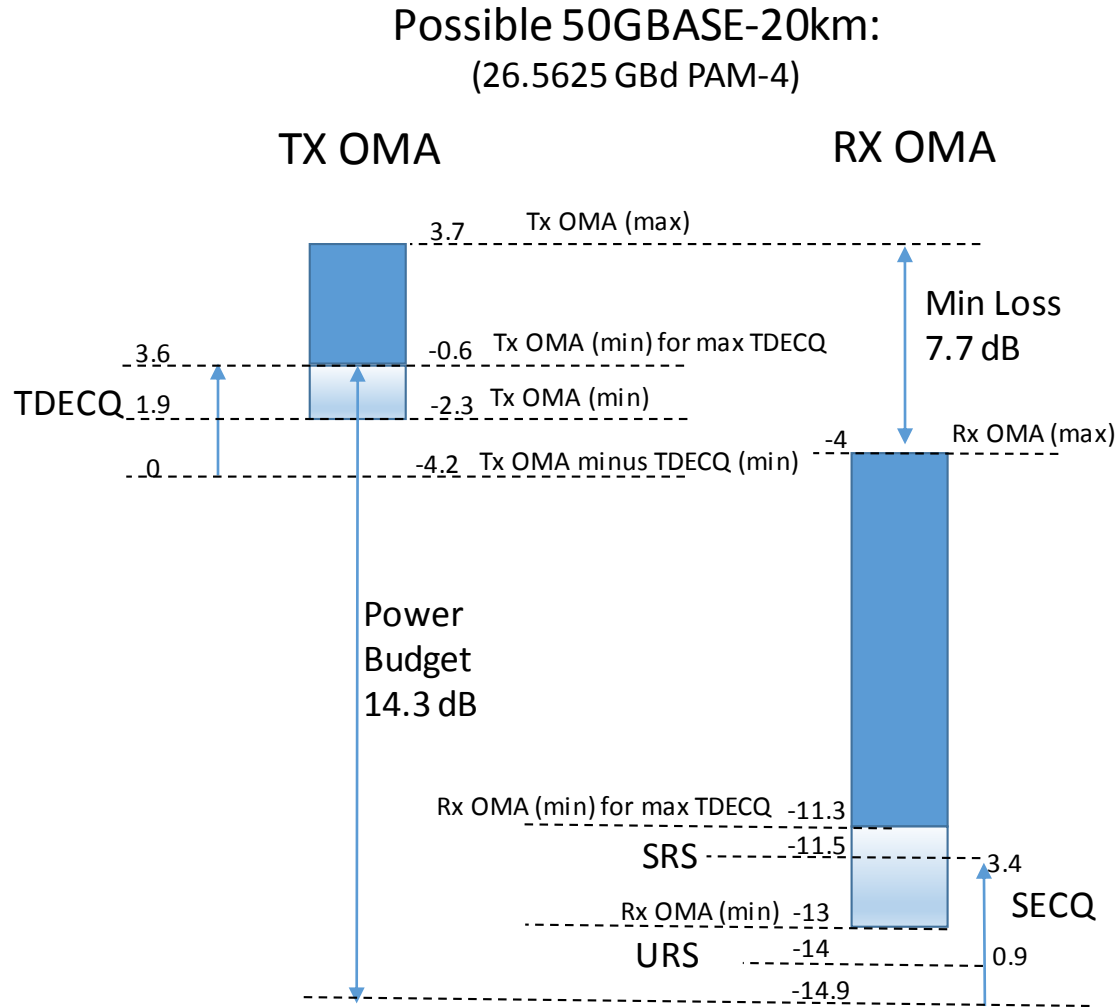
Challenges

- PAM-4 has a 4.8 dB modulation penalty
 - The nominal link budget shifts up by ~ 5 dB compared to NRZ at the same baud rate
 - The next page shows an example of shifting an NRZ budget higher by + 5 dB
- Tradeoff between minimum channel loss and APD overload level
- Tradeoff between Tx OMA range and Rx sensitivity / SRS

Example 40km link budgets



Strawman 20km link budget



- Channel insertion loss (max) of 10.7 dB
- Reduce Tx power by 7.3 dB compared to 40 km reach
- This is not a standard reach but could potentially be considered – particularly for multi-lane (200 Gb/s) versions

Proposed Objective

- Define a single-lane 50 Gb/s PHY for operation over
 - SMF with lengths up to at least 40 km