The 40 km optical access objective

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Optical access fiber plant is special

- Access networks are built in a particular way
  - Constructed with high fiber count cables (many lateral splices)
  - Built over time, with significant rate of damage and repair
  - Intended to last a long time (30+ years)
  - Potentially several fiber management points (patch panels)
  - Never use engineered link methods – straight worst case designed loss
- Loss components
  - Connectors: 0.35dB each x 6 per link
  - Splices: 0.1dB each x 1/km
  - Fibre: 0.47 dB/km x 40 km
  - Repair/ageing margin: 1dB
  - Total loss ~25dB

PMDs so far

- Previously, the group has decided to specify BLR and BER PMD types
  - LR supports up to 10 km and up to 6.3 dB
  - ER supports up to 30 km (40 km with engineering), and 18 dB loss
- We need another PMD type that does more: type BZR (how bizarre!)
  - This would support up to 40 km and up to 25 dB loss

- How to derive the ZR PMD specifications?
  - As a first baseline: keep Rx the same as in ER, and increase Tx by 7 dB
  - Refine through comment process

Discussion

- Other thoughts?

Loss budgets for existing LR, ER PHYs

Budget parameters	10 Gb/s	25 Gb/s	50 Gb/s
LR Tx Average power (min)	-8.2	-7	-4.5
LR Rx Average power (min)	-14.4 (BER 1E-12)	-13.3 (BER 5E-5)	-10.8 (BER 5E-5)
Budget	6.2	6.3	6.3
ER Tx Average power (min)	-4.7	-3	0.4
ER Rx Average power (min)	-15.8 (BER 1E-12)	-21 (BER 5E-5)	-17.6 (BER 5E5)
Budget	10.9	18	18
PR Tx Ave. power (min)	2 / 5	0.6 / 2.9	
PR Rx Ave. power (min)	-19 / -27 / -28 (BER 1E-3)	-23.4 / -26.2 (BER 1E-2)	
Budget	20 / 24 / 29 / 33	24 / 29	