NOKIA

PR20 (24 dB) loss budget

Ed Harstead, member Fixed Networks CTO

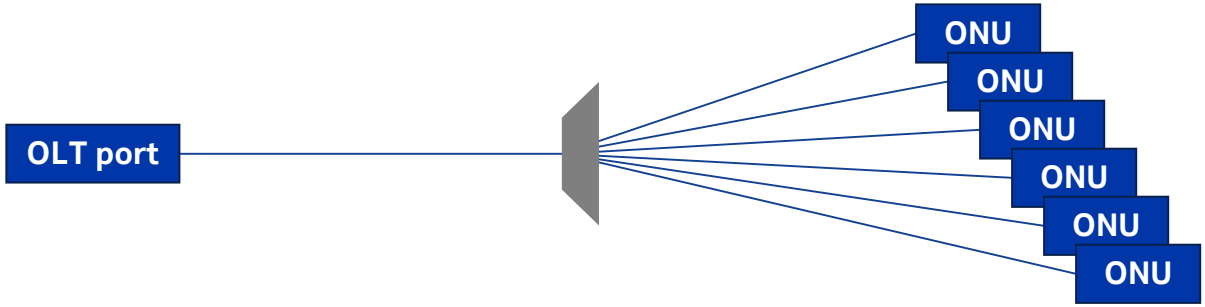
Nov. 2016

Impacts of PR20 loss budget

- Maximum ODN loss
  - PR30: 29 dB. Current focus of 802.3ca.
  - PR20: 24 dB.
- Impact of PR20: 5 dB reduction in loss budget on the optical components:
  - 25G: removes the need for high transmitter launch powers in the OLT and the ONU. Launch powers can be on the same order as 10G EPON
  - 100G: will probably remove the need for optical post- and pre-amplification in the OLT. Will greatly reduce the power, size and cost of the OLT optical module.
- Impact of PR20: 5 dB reduction in loss budget on the ODN:
  - For a given ODN, allowed splitting loss will be reduced by 5 dB
  - 5 dB corresponds to about “1.5” splitting stages: an *average* reduction of split ratio by a factor of ~3.

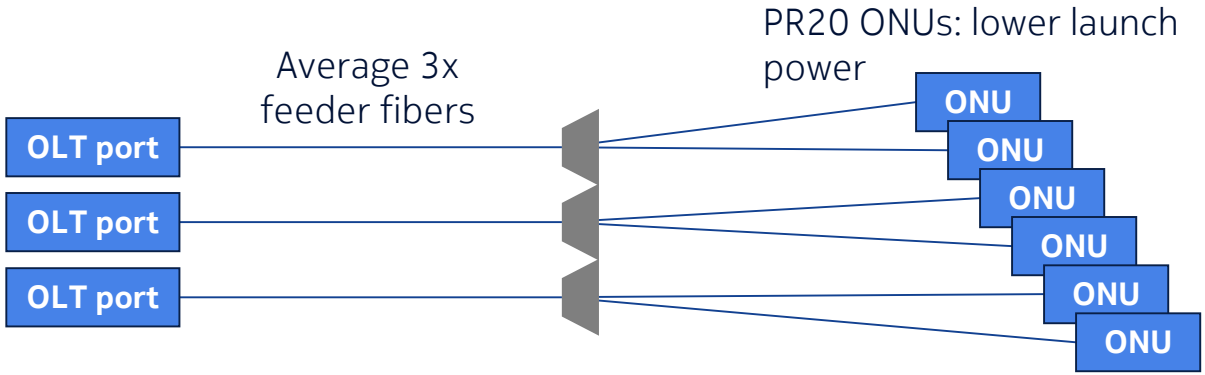
PR20 – PR30: comparison

PR30



PR20

- Average 3x OLT ports
- Mitigated by significantly lower per-port cost, size and power



NOKIA

Conclusions

- Both PR30 and PR20 will be standardized for 25/50/100G EPON.
- The market will sort out which (or both) will be commercialized
- PR30
  - The range of 29 dB loss budget is where IEEE and ITU-T markets have focused
  - PR30 will be required for existing ODNs with 29 dB loss budget (unless the operator replaces splitters)
- PR20
  - Will require on average 3x more OLT ports and feeder fibers
  - But will allow for significant improvements in OLT port cost, size, and power, and lower cost ONUs


NOKIA

Backup reference: splitter insertion loss

Split ratio	Ideal insertion loss (dB) (3.0 dB/stage)	Conservative insertion loss (dB) (3.5 dB/stage)
2	3	3.5
4	6	7
8	9	10.5
16	12	14
32	15	17.5
64	18	21
128	21	24.5
256	24	28