

# BR20 power budget

Frank Effenberger

Futurewei Technologies

Jan 2024

# Introduction

- Power budget for BR10 is baselined
- Power budget for BR40 has been presented in December, and expect a revised proposal in this meeting
- This leaves BR20 to be determined

# BR20 loss budget

- In 802.3cp, BR20 had a loss budget of 0 to 15 dB of total loss
  - The origin of this number was mainly to promote similarity to the ITU-T G.9806 Class S optics
  - The value of 15 dB can be roughly understood to come from 20 km @ 0.5 dB/km, plus 5 dB of excess connector loss
  - This is a very conservative budget, assuming super pessimistic loss
- What has changed since then?
  - G.9806 efforts have determined that existing class S is infeasible, and it has been divided into class  $S_{\text{lower}}$  (0 to 10 dB) and  $S_{\text{upper}}$  (5 to 15 dB)
  - This gives us more options to find a similar PMD

# 802.3dk loss budget framework

- The primitive elements of loss can be assumed to be
  - Fiber loss: 0.4 dB/km
  - Connector losses: 2 dB (typical of 4 mated connector pairs with the installation crew eating peanut butter sandwiches during construction)
- These then produce the PMD link losses
  - BR10: 6 dB (“rounded up” to 6.3 to match prior budget)
  - BR20: 10 dB <<< This matches  $S_{\text{lower}}$ !
  - BR40: 18 dB <<< This matches BR40 from 802.3cp
- This framework works in our setting

# Which budget should be the starting point?

- It would be useful if the  $S_{\text{lower}}$  and  $S_{\text{upper}}$  budgets could be achieved with the same receiver, as it enables a module that supports both (Tx power would have two modes)
- BR10 has a sensitivity that assumes a PIN detector (-6.1 dBm OMA)
  - Using this,  $S_{\text{lower}}$  Tx OMA > 4.4 dBm, and  $S_{\text{upper}}$  OMA > 9.4 dBm (difficult)
- BR40 has a sensitivity that assumes an APD (-12.8 dBm OMA)
  - Using this,  $S_{\text{lower}}$  Tx OMA > -2.3 dBm, and  $S_{\text{upper}}$  OMA > 2.7 dBm
- For this reason, using the BR40 Rx table as a basis is preferred

# Proposed BR20 power budget values

Description	100GBASE-BR20	Unit
Average launch power MAX	-0.2	dBm
Average launch power MIN	-5.3	dBm
OMA MAX	0.0	dBm
OMA MIN (TDEC≤1.4 dB)	-2.3	dBm
Average receive power MAX	-0.2	dBm
Average receive power MIN	-15.3	dBm
Receiver OMA MIN	-12.8	dBm
Receive OMA MAX	0.0	dBm
Receiver damage threshold	1.0	dBm

Thank you

Any questions?