Link Parameters

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200 Gb/s per Wavelength MMF PHYs Study Group

Link Parameters

Important parameters in the 200G multimode link are highlighted, and limits (or range) are proposed

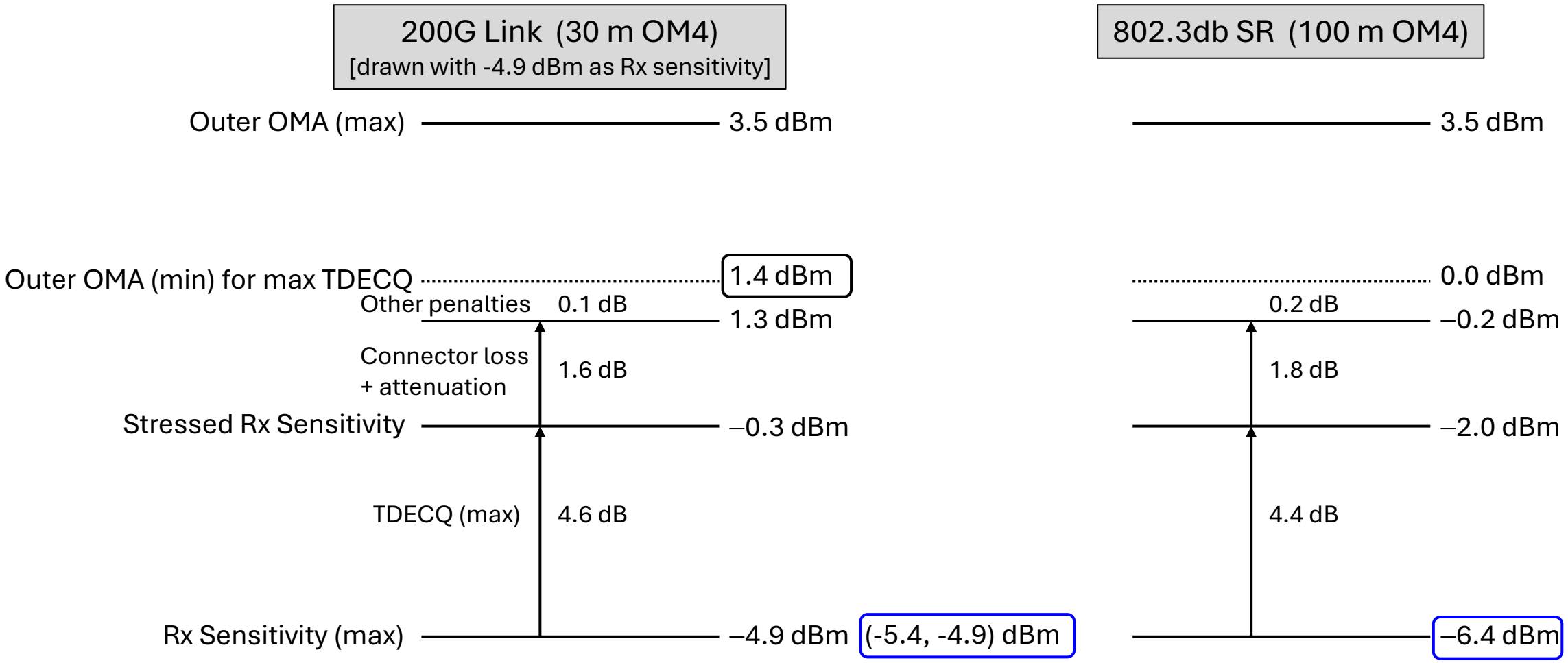
Bandwidth of the directly-modulated laser is a limitation for the multimode link. Margins for Tx and Rx must be set accordingly.

Ongoing work toward the baseline

Bernier *et al*. bernier_200gmmf_01a_2511

Link Power (OMA) Budget

Average launch power (max) 4.0 dBm



200G Link

- Rx sensitivity higher by 1.0 – 1.5 dB (there is margin against -6.4 dBm in the 100G link)
- Max average launch power has to be increased to accommodate the high launch OMA

Key Optical Specifications

Description	Value / Range	Unit	Remarks
Average launch power, each lane (max)	(4.5, 5)	dBm	
Transmitter overshoot and undershoot, each lane (max)	29	%	at 3E-3 HR; same as 802.3db (and P802.3dj D2.2 which uses 1E-2 HR)
Rx sensitivity OMA_{outer} (max)	(-5.4, -4.9)	dBm	
TDECQ-related parameters			
Transmitter and dispersion eye closure for PAM4 (TDECQ), each lane (max)	4.6	dB	
TDECQ histogram spacing	(0.06 UI, 0.08 UI)	—	
Reference equalizer	15-tap FFE + 1-tap DFE	—	from P802.3dj D2.2

Average Power

Higher launch OMA needed for the 200G link along with typical extinction ratio in the range of 2 – 3 dB requires a higher average launch power

The max average launch power was +4 dBm in the previous three multimode projects, 802.3cd, 802.3cm, and 802.3db

Considerations in setting max average launch power (4.5, 5 dBm)

- Have margin against eye safety limit
- Operate in the linear range of the photodiode

Jonathan King, king_051017_3cd_adhoc_01

Based on the max average power per lane of +4 dBm and MPO geometries for multi-lane implementations, 50GBASE-SR, 100GBASE-SR2 and 200GBASE-SR4 PMDs can be consistent with a Hazard level 1M classification for IEC 60825-2, Edition 3.2 (December 2010).

Jose Castro, castro_3cm_02a_0518

Wavelength and fibre type	1	1M
633 nm (MM)	1,23 mW (+0,9 dBm)	3,77 mW (+5,8 dBm)
780 nm (MM)	1,78 mW (+2,5 dBm)	5,45 mW (+7,4 dBm)
850 nm (MM)	2,46 mW (+3,9 dBm)	7,52 mW (+8,8 dBm)
980 nm (MM)	4,47 mW (+6,5 dBm)	13,7 mW (+11,4 dBm)

TDECQ Histogram Spacing

Histogram spacing of 0.1 UI defined in Clause 121 has been used in optical PAM4 links

Pros/Cons of a smaller histogram spacing (0.06, 0.08 UI) for 200G per lane multimode link

- The lateral extent of eye opening is small due to limited bandwidth of the directly-modulated laser.
  Link penalty calculated with a smaller histogram spacing will be more robust.
- Histogram spacing of 0.1 UI overestimates the link penalty – reducing the spacing improves correlation with link penalty
  murty_200gmmf_01a_2511
- A smaller histogram spacing will reduce sensitivity to jitter

From 802.3-2022, Clause 121

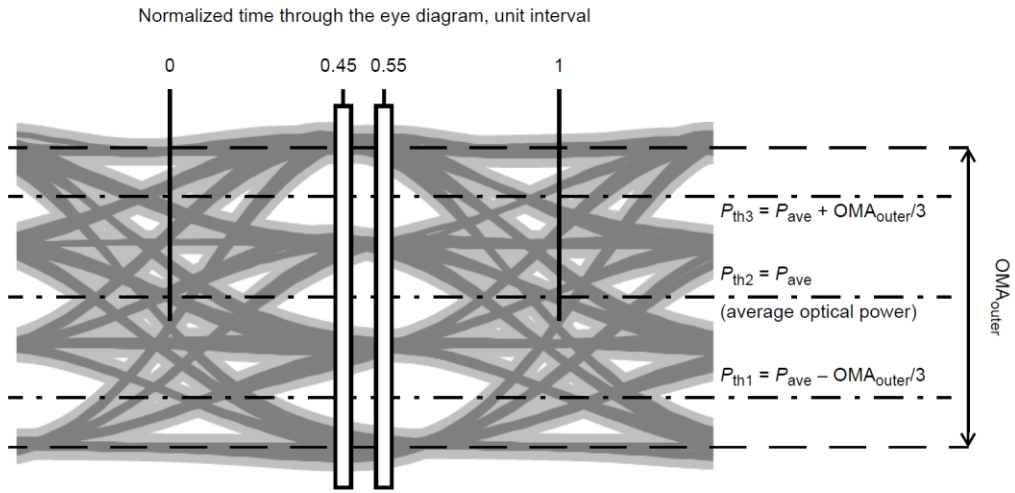


Figure 121–5—Illustration of the TDECQ measurement

Summary

Key parameters for the 200G multimode link have been highlighted and values (or range) proposed

Presentations to support / refine the proposed limits will help set up the baseline