Updated Analysis of OM3, OM4 and OM5 Reaches at 200G for 850 nm Wavelength Window

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Introduction

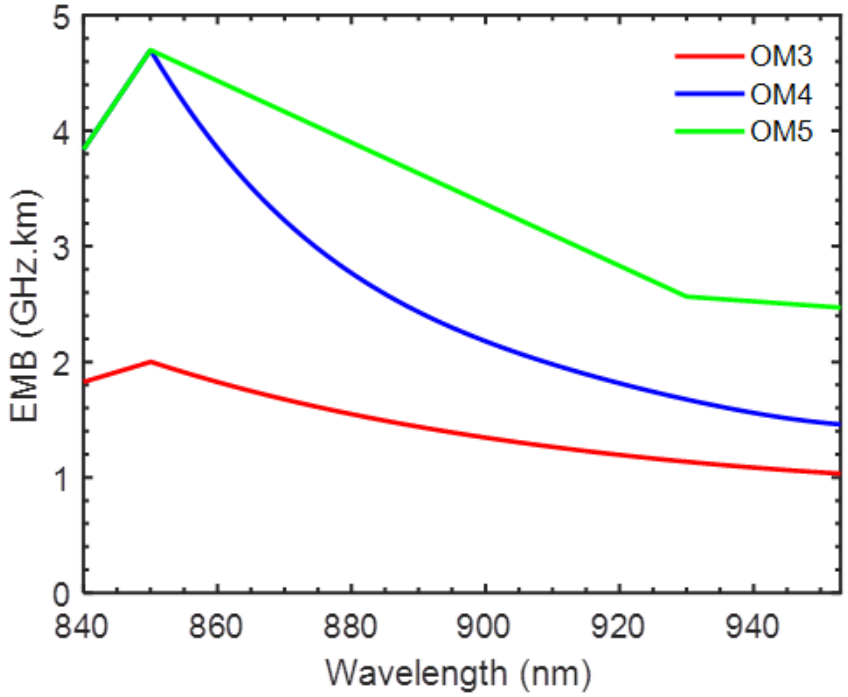
- We presented reach analysis for OM3 and OM4 on April 26, 2026 based on using 50m spec for 200G around 860nm.
  - Analysis of OM3 and OM4 Reaches at 200G for 850 nm Wavelength Window
- We learned D1.0 draft spec is adopting two specifications, one for 30m and one for 50 m.
  - Baseline Proposal for 200G per Lane Optical PMDs Supporting 30 m and 50 m MMF – Updated
  - For 200G, 802.3ds D1.0 specifies:
    - 30 m reach: OM4, 844 - 868 nm, 0.55 nm max
    - 50 m reach: EMB>= 5200 MHz.km, 852 - 868 nm, 0.45 nm max
- We provide updated reach calculations to include OM5 and more accurately align with the D1.0 spec.

Assumptions from “Baseline Proposal for 200G per Lane” and OM3/4/5 EMB Wavelength Dependence

Transmit Characteristics

Description	200GBASE-xR1 400GBASE-xR2 800GBASE-xR4 1.6TBASE-xR8	200GBASE-yR1 400GBASE-yR2 800GBASE-yR4 1.6TBASE-yR8	Unit	Remarks
Signaling rate, each lane (range)	106.25 ± 50 ppm		GBd	
Modulation format	PAM4			
Center wavelength (range)	844 – 868	852 – 868	nm	
RMS spectral width[a] (max)	0.55	0.45	nm	
Average launch power, each lane (max) *(add note)*	5		dBm	+1 dB over 802.3db
Average launch power, each lane (min)	-3.4			
Outer optical modulation amplitude (OMA_{outer}), each lane (max)	3.5		dBm	4 dBm?
Outer optical modulation amplitude (OMA_{outer}), each lane (min) for max(TECQ, TDECQ) ≤ 1.8 dB for 1.8 < max(TECQ, TDECQ) ≤ ~~4.6~~ *TBD* dB	-1.4 -3.2 + max(TECQ, TDECQ)		dBm dBm	
Transmitter and dispersion eye closure for PAM4 (TDECQ), each lane	~~4.6~~ *TBD*	~~4.6~~ *TBD*	dB	
Transmitter eye closure for PAM4 (TECQ), each lane	~~4.6~~ *TBD*		dB	
Transmitter overshoot and undershoot, each lane (max)	~~29~~ *TBD*		%	@ 3E-3 HR
Transmitter power excursion, each lane (max)	2.3		dBm	

[a] RMS spectral width is the standard deviation of the spectrum.



IEC 60793-2-10:2019

Spec. 1: 30 m reach: OM4, 844 - 868 nm, 0.55 nm max

- For Spec 1 (30m OM4 over 844–868 nm, uw = 0.55 nm).

Wavelength (nm)	844nm	852nm	860nm	868nm
Link Bandwidth (GHz)	63.76	67.08	64.09	60.59

- The lowest link bandwidth is 60.59 GHz. The calculated reaches are:

WL (nm)	844nm	852nm	860nm	868nm
OM3 Reach (m)	19.89	20.62	19.63	18.69
OM5 Reach (m)	31.57	33.58	33.73	33.73

- Therefore, taking the lowest reach among the four wavelengths, OM3, OM4, and OM5 can transmit 18.7 m, 30 m (specified), and 31.6 m, respectively.
- For Spec 1 (xR) OM3/4/5 could be specified at 15m/30m/30m if it is decided to round to nearest convenient numbers.

Spec 2: 50 m reach: EMB>= 5200 MHz.km, 852 - 868 nm, 0.45 nm max

- **For Spec 2** (50m multimode fiber with EMB ≥ 5200 MHz·km over 852–868 nm, uw = 0.45 nm). The link bandwidth used is 50.14 GHz. The calculated reaches are:

WL (nm)	852nm	860nm	868nm
OM3 Reach (m)	26	24.6	23.2
OM4 Reach (m)	45.1	42.2	39.2
OM5 Reach (m)	45.7	45.5	45.2

- Therefore, taking the lowest reach among the three wavelengths, OM3, OM4, and OM5 can transmit 23.2 m, 39.2 m, and 45.2 m, respectively.

- For Spec. 2 (yR) OM3/4/5 could be specified at 20m/40m/45m if we decide to round to nearest convenient numbers.

Questions