Outer Optical Modulation Amplitude and Average Launch Power (In support of comments #13,#14, and #15)

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Suporters

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Comments against P802.3ds draft D1.0

Category	Page	Sub-clause	Line #	Comment	Proposed Change
Technical	52	300.7.1		for Outer Optical Modulation Amplitude (OMAouter), each lane (max), the current spec is 3.5dBm，for Average launch power, each lane (max)，the current spec is 5dBm, according to the calculation based on ER 3.5 dB, when AOP is 5dBm, the corresponding OMAmax is close to 4 dBm, which has already exceeded the current specification of 3.5 dBm.	recommend that the OMAmax specification in the Tx Baseline be updated to 4 dBm
Technical	54	300.7.2		for Receive power (OMAouter), each lane (max), the current spec is 3.5dBm, which has the same issue as OMAouter, each lane (max)	recommend that the Receive OMAouter, each lane (max) specification be updated to 4 dBm
Technical	53	300.7.1		Average launch power of OFF transmitter,each lane (max), the current specis -15dBm, which is referred to 802.3dj DR, dj DR is for SMF, not MMF, for the Average launch power of OFF transmitter spec, it is better to refer to df	we recommend the spec to be updated to -30dBm according to df

Tx OMA specification of ds draft1.0

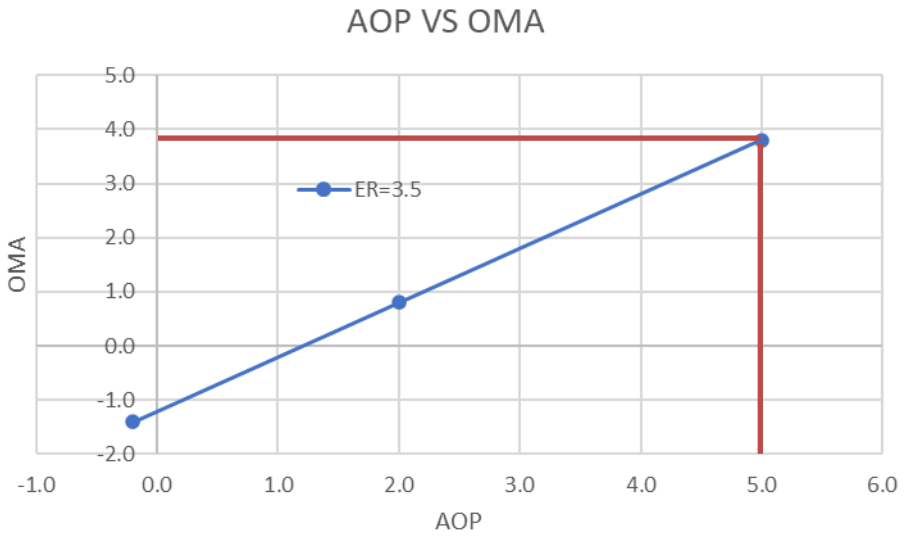
Table 300–7—Transmit characteristics

Description	Reference	200GBASE-SR1-30 400GBASE-SR2-30 800GBASE-SR4-30 1.6TBASE-SR8-30	200GBASE-SR1-50 400GBASE-SR2-50 800GBASE-SR4-50 1.6TBASE-SR8-50	Unit
Signaling rate, each lane (range)	—	106.25 ± 50 ppm		GBd
Modulation format	—	PAM4		—
Center wavelength (range)	300.9.4	844 – 868	852 – 868	nm
RMS spectral width[a] (max)	300.9.4	0.55	0.45	nm
Average launch power, each lane[b] (max)	300.9.5	5		dBm
Average launch power, each lane (min)	300.9.5	–3.4		dBm
Outer Optical Modulation Amplitude (OMA_{outer}), each lane (max)	300.9.6	3.5		dBm
Outer Optical Modulation Amplitude (OMA_{outer}), each lane (min) for max (TECQ, TDECQ) ≤ 1.8 dB for 1.8 < max (TECQ, TDECQ) ≤ TBD	300.9.6	–1.4 –3.2 + max (TECQ, TDECQ)		dBm dBm

- For ds baseline draft1.0, AOP max 5dBm and OMA max 3.5dBm were adopted.

Consideration on OMA_{max}

- Compared with 802.3df, 802.3ds Baseline AOPmax is increased by 1 dB, but OMAmax remains unchanged.
- Calculated based on AOP and OMA conversion formula, OMA is 3.8dBm corresponding to AOP 5dBm, which is exceed the OMA max spec 3.5dBm
  - Propose setting Tx OMA_{max} specification as 3.8dBm



$$OMA_{dB} = 10log10(P) + 10log10\left(2 * \frac{10^{\frac{ER_{dB}}{10}} - 1}{10^{\frac{ER_{dB}}{10}} + 1}\right)$$

Rx OMA specification of ds draft1.0

Table 300–8—Receive characersitics

Description	Reference	200GBASE-SR1-30 400GBASE-SR2-30 800GBASE-SR4-30 1.6TBASE-SR8-30	200GBASE-SR1-50 400GBASE-SR2-50 800GBASE-SR4-50 1.6TBASE-SR8-50	Unit
Average receive power, each lane (max)	—	5		dBm
Average receive power, each lane[b] (min)	—	−5	−5.1	dBm
Receive power (OMA_{outer}), each lane (max)	—	3.5		dBm
Receiver reflectance (max)	—	*TBD*		dB
Receiver sensitivity (OMA_{outer}), each lane[c] (max) for TECQ ≤ TBD for TBD < TECQ ≤ TBD	300.9.14	−3.1 −4.9 + TECQ	−3.3 −5.1 + TECQ	dBm dBm
Stressed receiver sensitivity (OMA_{outer}), each lane[c] (max)	300.9.15	*TBD*	*TBD*	dBm
Conditions of stressed receiver sensitivity test:[d]				
Stressed eye closure for PAM4 (SECQ), lane under test	—	*TBD*		dB
OMA_{outer} of each aggressor lane[e]	—	3.5		dBm

- Rx OMA max 3.5dBm and OMA of each aggressor lane were adopted in D1.0, which is corresponding to Tx OMA max
  - Propose setting Rx OMAmax and OMA of each aggressor lane specification as 3.8dBm

Average launch power of OFF transmitter

802.3ds

Table 300–7—Transmit characteristics

Description	Reference	200GBASE-SR1-30 400GBASE-SR2-30 800GBASE-SR4-30 1.6TBASE-SR8-30	200GBASE-SR1-50 400GBASE-SR2-50 800GBASE-SR4-50 1.6TBASE-SR8-50	Unit
Transmitter and dispersion eye closure for PAM4 (TDECQ), each lane (max)	300.9.7	*TBD*	*TBD*	dB
Transmitter eye closure for PAM4 (TECQ), each lane (max)	300.9.8	*TBD*		dB
Transmitter overshoot and undershoot, each lane (max)	300.9.9	*TBD*		%
Transmitter power excursion, each lane (max)	300.9.10	2.3		dBm
Extinction ratio, each lane (min)	300.9.11	2		dB
Transmitter transition time, each lane (max)	300.9.12	9		ps
Average launch power of OFF transmitter, each lane (max)	—	−15		dBm

802.3df

Table 167–7—Transmit characteristics

Description	100GBASE-VR1 200GBASE-VR2 400GBASE-VR4 800GBASE-VR8	100GBASE-SR1 200GBASE-SR2 400GBASE-SR4 800GBASE-SR8	Unit
Signaling rate, each lane (range) Other PMDs 800GBASE-VR8, 800GBASE-SR8 PMDs	53.125 ± 100 ppm 53.125 ± 50 ppm		GBd GBd
Outer Optical Modulation Amplitude (OMA_{outer}), each lane (max)	3.5		dBm
Outer Optical Modulation Amplitude (OMA_{outer}), each lane (min) For max (TECQ, TDECQ) ≤ 1.8 dB For 1.8 < max (TECQ, TDECQ) ≤ 4.4 dB	 −2.6 −4.4 + max (TECQ, TDECQ)		 dBm dBm
Transmitter and dispersion eye closure for PAM4 (TDECQ), each lane (max)	4.4	4.4	dB
Transmitter eye closure for PAM4 (TECQ), each lane (max)	4.4		dB
Overshoot/undershoot (max)	29		%
Transmitter power excursion, each lane (max)	2.3		dBm
Extinction ratio, each lane (min)	2.5		dB
Transmitter transition time, each lane (max)	17		ps
Average launch power of OFF transmitter, each lane (max)	−30		dBm

- For ds baseline D1.0, Average launch power of OFF transmitter -15dBm, but for df, the corresponding spec is -30dBm
  - Propose setting average launch power spec -15dBm for the following reason.

−15 dBm is already approximately 10 dB below the expected 200G MM receiver sensitivity of around −5 dBm, making it well outside the useful operating range. Extending RSSI detection down to −30 dBm would add unnecessary circuit complexity and calibration burden without providing meaningful operational value. Therefore, −15 dBm is a more practical and technically justified lower RSSI detection limit.

Summary

- Update Tx OMA max spec to 3.8dBm
- Update Rx OMA max spec to 3.8dBm
- Update Rx OMA of each aggressor lane spec to 3.8dBm
- Keep the baseline average launch power of OFF TX to -15dBm