Improved optical power specs for 200GBASE-DR4 and 400GBASE-DR4

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Introduction

- dawe_3bs_05_0717 showed that there is margin to spare in the spec for 200GBASE-DR4
- To a lesser extent for 400GBASE-DR4 also
- This wastes transmitter power and supply voltage, transistor breakdown, receiver supply voltage, overload and dynamic range
- The following slides document the changes for removing:
  - 1 dB of margin from 200GBASE-DR4
  - 0.5 dB of margin from 400GBASE-DR4

- Relates to comments 28, 37

Table 121–4—SIGNAL_DETECT value definition

Receive conditions	**SIGNAL_DETECT value**
For any lane; Average optical power at TP3 <= **–16** dBm	FAIL
...	

This follows the OFF power for 50GBASE-LR

No change proposed here

Table 121–6—200GBASE-DR4 transmit characteristics

Description	Value	Unit
...		
Average launch power, each lane (max)	3 2	dBm
Average launch power, each lane[a] (min)	–4.6 –5.6	dBm
Outer Optical Modulation Amplitude (OMAouter), each lane (max)	2.8 1.8	dBm
Outer Optical Modulation Amplitude (OMAouter), each lane (min)[b]	–2.5 –3.5	dBm
Launch power in OMAouter minus TDECQ, each lane (min)	–4.4 –5.4	dBm
...		
Average launch power of OFF transmitter, each lane (max)	–16	dBm
...		
b Even if the TDECQ < 1.9 dB, the OMAouter (min) must exceed this value.		

OFF power kept aligned to 50GBASE-LR

Table 121–7—200GBASE-DR4 receive characteristics

This is the proposed max for 400GBASE-DR4. 50GBASE-FR max is +3

Description	Value	Unit
...		
Damage threshold[a], each lane	4 3.5	dBm
Average receive power, each lane (max)	3 2	dBm
Average receive power, each laneb (min)	–7.6 –8.6	dBm
Receive power (OMAouter), each lane (max)	2.8 1.8	dBm
...		
Receiver sensitivity (OMAouter), each lane[c] (max)	–6.6 –7.6	dBm
Stressed receiver sensitivity (OMAouter), each lane[d] (max)	–4.1 –5.1	dBm
...		
OMAouter of each aggressor lane	2.8 1.8	dBm

a The receiver shall be able to tolerate, without damage, continuous exposure to an optical input signal having this average power level. The receiver does not have to operate correctly at this input power.

Table 124–4—SIGNAL_DETECT value definition

Receive conditions	**SIGNAL_DETECT value**
For any lane; Average optical power at TP3 <= –15 –15.5 dBm	FAIL
...	

Table 124–6—400GBASE-DR4 transmit characteristics

Description	Value	Unit
...		
Average launch power, each lane (max)	4 3.5	dBm
Average launch power, each lane[a] (min)	–2.4 –2.9	dBm
Outer Optical Modulation Amplitude (OMAouter), each lane (max)	4.2 3.7	dBm
Outer Optical Modulation Amplitude (OMAouter), each lane (min)[b]	–0.3 –0.8	dBm
Launch power in OMAouter minus TDECQ, each lane (min)	–2.2 –2.7	dBm
...		
Average launch power of OFF transmitter, each lane (max)	–15 –15.5	dBm
...		
b Even if the TDECQ < 1.9 dB, the OMAouter (min) must exceed this value.		

Table 124–7—400GBASE-DR4 receive characteristics

Description	Value	Unit
...		
Damage threshold[a], each lane	5 4.5	dBm
Average receive power, each lane (max)	4 3	dBm
Average receive power, each laneb (min)	–5.4 –5.9	dBm
Receive power (OMAouter), each lane (max)	4.2 3.7	dBm
...		
Receiver sensitivity (OMAouter), each lane[c] (max)	–4.4 –4.9	dBm
Stressed receiver sensitivity (OMAouter), each lane[d] (max)	–1.9 –2.4	dBm
...		
OMAouter of each aggressor lane	4.2 3.7	dBm

a The receiver shall be able to tolerate, without damage, continuous exposure to an optical input signal having this average power level. The receiver does not have to operate correctly at this input power.

Thanks!