Baseline proposals for 200GBASE-FR4 and 200GBASE-LR4

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Introduction

- In this presentation proposals are made for baselines for 200GBASE-FR4 and 200GBASE-LR4 optical specifications.
- The details of the proposal are intended to be consistent with 400GBASE-FR8 and 400GBASE-LR8 specifications in Draft 1.3
- In the following tables, only the parameters with values being different from 400GBASE-FR8 and 400GBASE-LR8 are shown
- A specific proposal for FR4 and LR4 wavelengths is not made. Considerations about potential choices will be shown

Baseline proposal for 200GBASE-FR4

Parameter	200G-FR4	400G-FR8	Unit
Transmitter:			
Total average launch power (max)	9.7	13.2	dBm
Average launch power, each lane (max)	3.7	4.2	dBm
Average launch power, each lane (min)	–3.5	–3	dBm
OMA_{outer}, each lane (max)	5	5.5	dBm
OMA_{outer}, each lane (min)	–0.5	0	dBm
Launch power in OMA_{outer} minus TDP, each lane (min)	–1.5	–1	dBm
TDP, each lane (max)	*2.2 or higher?*	2.2	dB
Receiver:			
Damage threshold, each lane	4.7	5.2	dBm
Average receive power, each lane (max)	3.7	4.2	dBm
Average receive power, each lane (min)	–7.5	–7	dBm
Receive power, each lane (OMA_{outer}) (max)	5.2	5.7	dBm
Receiver sensitivity (OMA_{inner}), each lane (max)	–10.6	–10.1	dBm

Baseline proposal for 200GBASE-LR4

Parameter	200G-LR4	400G-LR8	Unit
Transmitter:			
Total average launch power (max)	9.7	13.2	dBm
Average launch power, each lane (max)	3.7	4.2	dBm
Average launch power, each lane (min)	–2.8	–2.3	dBm
OMA_{outer}, each lane (max)	5.2	5.7	dBm
OMA_{outer}, each lane (min)	0.2	0.7	dBm
Launch power in OMA_{outer} minus TDP, each lane (min)	–0.8	–0.3	dBm
TDP, each lane (max)	*2.4 or higher?*	2.4	dB
Receiver:			
Damage threshold, each lane	4.7	5.2	dBm
Average receive power, each lane (max)	3.7	4.2	dBm
Average receive power, each lane (min)	–9.1	–8.6	dBm
Receive power, each lane (OMA_{outer}) (max)	5.2	5.7	dBm
Receiver sensitivity (OMA_{inner}), each lane (max)	–12.4	–11.9	dBm

Considerations on baselines for 200GbE FR4 and LR4

- In this presentation the “gain” going from 8 channels to 4 channels, being 2 dB, is mainly used to relax the transmitter power levels (1.5dB before mux).
- So with respect to FR8 and LR8 power levels, a downward shift of 0.5 dB is being proposed.

- Do we want to maintain TDP at 2.2 dB / 2.4 dB for FR4 / LR4 respectively or would it be more cost effective to increase the TDP towards 3 dB?

- 2 potential choices are considered for FR4 and LR4 wavelength specifications: LWDM as in 100GBASE-LR4 or CWDM (as in some MSAs)

Considerations wavelength choices for FR4 and LR4

Considered options:

- LWDM: 1295.5, 1300.05, 1304.58 and 1309.14 nm
  - Reuse from 100GBASE-LR4 and 400GBASE-FR8/LR8
- CWDM: 1271, 1291, 1311 and 1331 nm
  - Reuse from several 2km 100G MSAs

Further Considerations wavelength choices

LWDM:

- Mature technology
- No issues foreseen with dispersion penalty for both 2km and 10km
- Higher cost than CWDM

CWDM:

- Mature technology
- No issues foreseen with dispersion penalty at 2km
- Potential issues with dispersion at 10km which needs experimental verification
- Lower cost than LWDM

Further Considerations wavelength choices

Option 1: CWDM for FR4 and LR4

- Potentially lowest cost
- Potential issues with dispersion at 10km

Option 2: CWDM for FR4 and DWDM for LR4

- If CWDM dispersion penalty at 10km too high
- Potentially lowest cost for 2km and different solution for 10km
- If we accept different solutions for 2km and 10km

Option 3: LWDM for FR4 and LR4

- If CWDM dispersion penalty at 10km too high
- If we want SAME wavelength specification for 2km and 10km

Q & A

Thank you