Considerations on objectives for 50G/100G/200G Ethernet SMF PMDs

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Introduction

- The 50GbE/100GbE/200GbE Study Groups will need to develop smart objectives for SMF applications
- In the widest sense 4 versions can be imagined, 500m, 2km, 10km, 40km.
- In this presentation special attention is given to a 10km objective for all projects and 40km for 50GbE
- We would expect to re-use from the 400GbE BS project and possibly from other work (e.g. MSAs or ITU-T), where 25G APDs are envisioned to be used.

Channel insertion loss extrapolations from 400GBASE-FR8 and 400GBASE-LR8

***Assumptions**: 1:8 mux/demux 3 dB loss each,*
1:4 mux/demux 2 dB each, 1:2 mux/demux 1 dB each, plus using KP4 FEC

	400GBASE-FR8	400GBASE-LR8	Unit
P802.3bs, Draft 1.1 Clause 123 8x50G PAM4 configuration	4	6.3	dB
4x50G PAM4 configuration 200GBASE-xR4 Gaining 2dB	6	8.3	dB
2x50G PAM4 configuration 100GBASE-xR2 Gaining 4dB	8	10.3	dB
1x50G PAM4 configuration 50GBASE-xR Gaining 6dB	10	12.3	dB

Needed channel insertion losses versus re-use BS

	500m	2km	10km
50GBASE-xR	3 dB	4 dB	6.3 dB Re-use FR8 Margin 3.7 dB
100GBASE-xRn **N = 1 or 2**	3 dB	4 dB	6.3 dB Re-use FR8 Margin 1.7 dB
200GBASE-xRn **n = 2 or 4**	3 dB	4 dB	6.3 dB Re-use FR8 improved by 0.3 dB

Considerations on SMF objectives 50GbE

- Achieving a 50GBASE-LR budget with 6.3 dB is relatively easy re-using technology from 400GBASE-FR8 with single lane 50G PAM4
- It is difficult to imagine that a 50GBASE-FR implementation will have any significant cost advantage compared to an LR implementation
- It is also difficult to imagine that a 50GBASE-DR implementation will have any significant cost advantage compared to an LR implementation
- Probably a single objective can address 500m – 10km SMF duplex applications.
- Maybe even a 40km SMF duplex objective is feasible. This will require further analysis looking at the feasibilities when using 25G APD technology

Considerations on SMF objectives 100GbE

- Achieving a 100GBASE-LR2 budget with 6.3 dB is relatively easy re-using technology from 400GBASE-FR8 with dual lane 50G PAM4, at least if KP4 FEC is chosen
- It is therefore relatively easy to add an objective for 100GbE 10km duplex SMF

Considerations on SMF objectives 200GbE

- Achieving a 200GBASE-LR4 budget with 6.3 dB is relatively easy achievable re-using technology from 400GBASE-FR8 & 400GBASE-LR8 technology
- It is therefore relatively easy to add an objective for 200GbE 10km duplex SMF

Q & A

Thank you