

SMF comments

Pete Anslow, Ciena

IEEE P802.3bs Task Force, SMF Ad Hoc, 21 June 2016

Introduction

This contribution discusses some of the SMF related comments against P802.3bs D1.4 as found in: [P802d3bs_D1p4_comments_rec_C1.pdf](#)

Comment #1

Comment #1 proposes to make the changes to the power budget of 200GBASE-FR4/LR4 and 400GBASE-FR8/LR8 proposed in [cole_01a_0616_smf](#) as discussed in the SMF Ad Hoc on 14 June.

As per [anslow_01_0616_smf](#) the following two slides capture the proposals and fill in the additional changes needed to make the power budget consistent (cells shaded **yellow**).

Power budget proposals 200GBASE-FR4/LR4

Parameter	D1.4		Proposal		Unit
	FR4	LR4	FR4	LR4	
Table 122-9					
Total average launch power (max)	11.2	11.7	10.7	11.3	dBm
Average launch power, each lane (max)	5.2	5.7	4.7	5.3	dBm
Outer Optical Modulation Amplitude (OMA _{outer}), each lane (max)	5	5.5	4.5	5.1	dBm
Difference in launch power between any two lanes (OMA _{outer}) (max)	4.4	4.4	4	4	dB
Table 122-11					
Damage threshold, each lane	6.2	6.7	5.7	6.3	dBm
Average receive power, each lane (max)	5.2	5.7	4.7	5.3	dBm
Receive power, each lane (OMA _{outer}) (max)	5	5.5	4.5	5.1	dBm
Difference in receive power between any two lanes (OMA _{outer}) (max)	4.5	4.6	4.1	4.2	dB
OMA _{outer} of each aggressor lane	0.9	-0.6	0.5	-1	dBm

Power budget proposals 400GBASE-FR8/LR8

Parameter	D1.4		Proposal		Unit
	FR8	LR8	FR8	LR8	
Table 122-10					
Difference in launch power between any two lanes (OMA_{outer}) (max)	4.4	4.4	4	4	dB
Table 122-12					
Difference in receive power between any two lanes (OMA_{outer}) (max)	4.5	4.9	4.1	4.5	dB
OMA_{outer} of each aggressor lane	1.4	0.2	1	-0.2	dBm

Comment #6

Comment #6 is:

“The receiver sensitivity specs for 400GBASE-DR4 are marginal to what is technically feasible. An increase in Tx_OMA-TDECQ spec is desired to reduce the burden on the Rx.”

The proposed change to the power budget is captured on the next slide.

The cells shaded **yellow** indicate where the Average power (min) values for the two tables were swapped over in the comment and also that the damage threshold is usually dependent on the average receive power (max).

Power budget proposals 400GBASE-DR4

Parameter	D1.4	Proposal	Unit
Table 124-6			
Average launch power, each lane (max)	4	5.3	dBm
Average launch power, each lane (min)	-2.4	-1.1	dBm
Outer Optical Modulation Amplitude (OMA _{outer}), each lane (max)	4.2	5.5	dBm
Outer Optical Modulation Amplitude (OMA _{outer}), each lane (min)	-0.3	1	dBm
Launch power in OMA _{outer} minus TDECQ, each lane (min)	-1.3	0	dBm
Table 124-7			
Damage threshold, each lane	6.5	??	dBm
Average receive power, each lane (max)	4	5.3	dBm
Average receive power, each lane (min)	-5.4	-4.1	dBm
Receive power, each lane (OMA _{outer}) (max)	4.2	5.5	dBm
Receiver sensitivity (OMA _{inner}), each lane (max)	-9.2	-7.9	dBm
Stressed receiver sensitivity (OMA _{outer}), each lane (max)	-1.9	-0.6	dBm
OMA _{outer} of each aggressor lane	4.2	5.5	dBm

Comment #13

Comment #13 is:

CI 124 SC 124.8.5 P 294 L 44 # 13

Implementing TDECQ conformance test set-up with real-time scope can limit the bandwidth because an external O/E is needed. Simulation of optimized solutions show a 3dB bandwidth lower than current 38.68GHz. For this, the value of combination of the O/E converter and the oscilloscope filter response bandwidth should be reduced to take into account real-time implementation.

From first analysis and available hardware, seems a reasonable minimum value closer to 33GHz rather than 38.68GHz.

Suggested Remedy

From “The combination of the O/E converter and the oscilloscope has a fourth-order Bessel-Thomson filter response with a bandwidth of 38.68 GHz” to “The combination of the O/E converter and the oscilloscope has a fourth-order Bessel-Thomson filter response with a [minimum](#) bandwidth of [33](#) GHz”.

Comment #14

Comment #14 is:

CI 124 SC 124.8.5 P 294 L # 14

TDECQ reference equalizer for 400GBASE-DR4 is not defined. All other PMDs have a defined 5 taps T/2 spaced FFE.

SuggestedRemedy

Add a dedicated paragraph "TDECQ reference equalizer".

Because the reduced bandwidth of the TDECQ tester for 400GBASE-DR4, a realistic reference equalizer for 400GBASE-DR4 should be a 7 tap, T spaced, feed-forward equalizer (FFE).

Proposed response

The reference equalizer for 400GBASE-DR4 is defined in 124.8.5 with the text: "using a reference equalizer as described in 121.8.5.4".

The commenter is invited to provide evidence that the 5 tap, T/2 spaced, feed-forward equalizer is inadequate and that the 7 tap, T spaced, feed-forward equalizer is the appropriate substitute.

Thanks!