SMF comments

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Introduction

Comments against P802.3bs draft 1.2 for the reflection related budgets have a good level of consensus.

The following slides try to capture the different proposals.

Note: the values in the cells with yellow background were calculated after the call by attenuating the receiver reflectance by the value of the maximum channel loss.

Reflection budget proposals 400GBASE-DR4

Parameter	D1.1	Liu	Anslow	Proposal	Unit
Table 122-6					
Average launch power, each lane (min)	-1.9	-2.4	-2.4	-2.4	dBm
Outer Optical Modulation Amplitude (OMAouter), each lane (min)	0.2	-0.3	-0.3	-0.3	dBm
Launch power in OMAouter minus TDP, each lane (min)	-0.8	-1.3	-1.3	-1.3	dBm
Optical return loss tolerance (max)	TBD		21.9	24.7	dB
Transmitter reflectance (max)	-20	-26	-26	-26	dB
Table 122-7					
Average receive power, each lane (min)	-4.9	-5.4	-5.4	-5.4	dBm
Receiver reflectance (max)	-26	-26	-26	-26	dB
Receiver sensitivity (OMAinner), each lane (max)	-9.1	-9.2	-9.2	-9.2	dBm
Table 122-8					
Power budget (for max TDP)	6	5.6	5.6	5.6	dB
Maximum discrete reflectance	-35	-45	-45	-45	dB
Allocation for penalties (for maximum TDP)	3	2.6	2.6	2.6	dB
Table 122-11					
Optical return loss	TBD		21.9	24.7	dB
Table 122-12					
[Channel] Optical return loss (min)	TBD		38.5	39	dB
122.11.2.2					
maximum discrete reflectance	-35	-45	-45	-45	dB
Max number of -45 dB reflections		4	4	4	

Reflection budget proposals 400GBASE-LR8

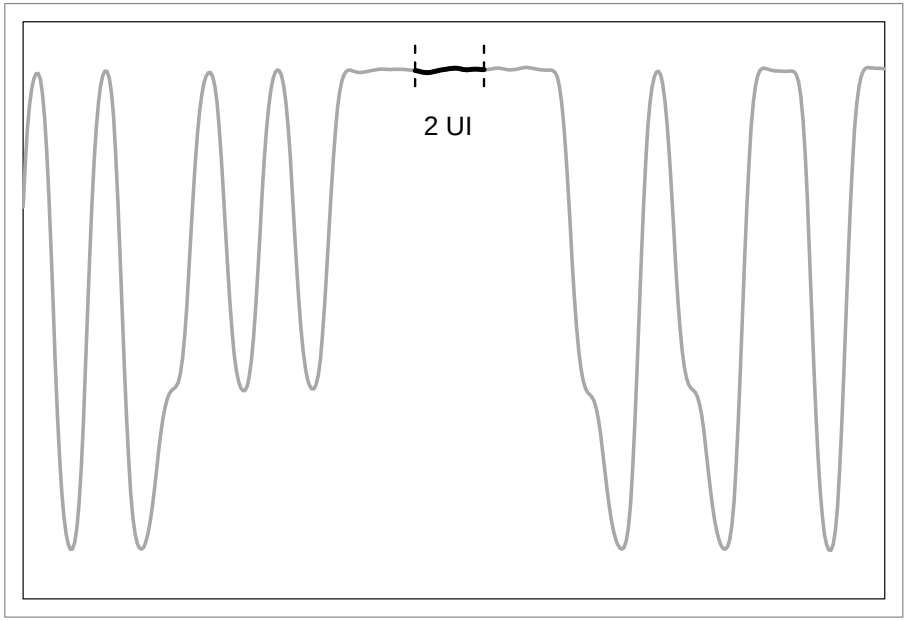
Parameter	D1.1	Liu	Anslow	Proposal	Unit
Table 123-7					
Average launch power, each lane (min)	-2.5	-2.2	-2.2	-2.3	dBm
Outer Optical Modulation Amplitude (OMAouter), each lane (min)	0.5	0.8	0.8	0.7	dBm
Launch power in OMAouter minus TDP, each lane (min)	-0.5	-0.2	-0.2	-0.3	dBm
Optical return loss tolerance (max)	TBD		15.5	17.6	dB
Transmitter reflectance (max)	TBD	-26	-26	-26	dB
Table 123-8					
Average receive power, each lane (min)	-8.8	-8.5	-8.5	-8.6	dBm
Receiver reflectance (max)	TBD	-26	-26	-26	dB
Receiver sensitivity (OMAinner), each lane (max)	-11.6	-11.8	-11.8	-11.9	dBm
Table 123-9					
Power budget (for maximum TDP)	8.7	9.2	9.2	9.2	dB
Maximum discrete reflectance	TBD	-35	-35	-35	dB
Allocation for penalties (for maximum TDP)	2.4	2.9	2.9	2.9	dB
Table 123-12					
100GBASE-FR8 Optical return loss	20		15.5	17.6	dB
Table 123-13					
[Channel] Optical return loss (min)	21		27	27	dB
123.11.2.2					
maximum discrete reflectance	26	-35	-35	-35	dB
Max number of -35 dB reflections		6	6	6	

Reflection budget proposals 400GBASE-FR8

Parameter	D1.1	Liu	Anslow	Proposal	Unit
Table 123-7					
Average launch power, each lane (min)	-3	-2.9	-2.7	-2.7	dBm
Outer Optical Modulation Amplitude (OMAouter), each lane (min)	0	0.1	0.3	0.3	dBm
Launch power in OMAouter minus TDP, each lane (min)	-1	-0.9	-0.7	-0.7	dBm
Optical return loss tolerance (max)	TBD		15.5	17.2	dB
Transmitter reflectance (max)	TBD	-26	-26	-26	dB
Table 123-8					
Average receive power, each lane (min)	-7	-6.9	-6.7	-6.7	dBm
Receiver reflectance (max)	TBD	-26	-26	-26	dB
Receiver sensitivity (OMAinner), each lane (max)	-9.8	-10	-10.1	-10.1	dBm
Table 123-9					
Power budget (for maximum TDP)	6.2	6.5	6.8	6.8	dB
Maximum discrete reflectance	TBD	-35	-35	-35	dB
Allocation for penalties (for maximum TDP)	2.2	2.5	2.8	2.8	dB
Table 123-12					
100GBASE-FR8 Optical return loss	20		15.5	17.2	dB
Table 123-13					
[Channel] Optical return loss (min)	21		27	27	dB
123.11.2.2					
maximum discrete reflectance	26	-35	-35	-35	dB
Max number of -35 dB reflections		4	6	6	

OMA and ER definitions

Comment #168 proposes that the OMA and ER definitions are based on the average values of the central 2UI of the PRBS13Q pattern run of 7 threes and run of 6 zeros:



ER definition alternatives

Cl **122** *SC* **122.7.1** *P* **178** *L* **31** # 53

Dawe, Piers Mellanox

Comment Type **T** *Comment Status* **X**

The reason for specifying extinction ratio is to ensure that the eye opening is not too small a fraction of the light level in that eye, or of the highest light level of the whole signal. As the eye opening depends strongly on how closed the eye is (e.g. how fast), the traditional SONET/IEC method is appropriate. One can apply that algorithm for NRZ to a PAM4 eye, although the reported extinction ratio is not what people are used to. One can generalise the algorithm to PAM4. For both these one needs to sync to an eye, which may be difficult if a lot of equalisation is allowed. I believe we want to measure the signal before equalisation, as effects such as MPI or modal noise occur before equalisation.

SuggestedRemedy

If a lot of equalisation is allowed, limit either:
the mean of the upper half of the signal to the lower half of the signal (unsynchronised extinction ratio), or:
the ratio of the average signal to the RMS of the signal.
If only a moderate amount of equalisation is allowed so that recovering the timing is not a problem and three eyes are visible, use the usual IEC method: the mean of the upper half of the signal over the lower half of the signal, in the central 20% of the UI. Consider if 20% should be reduced.
Observed through the usual 19.34 GHz BT4 filter.

TDEC and eye mask

palkert_3bs_01_0116 associated with comment #87 against D1.1 is a starting point for the definition of a PAM4 TDEC test.

More contributions on this topic are needed

Is a separate eye mask required?

There are no comments on this against D1.2

Stressed receiver sensitivity

How should the stressed signal be generated?

How should the amount of stress in each sub-eye be controlled?

Contributions on this topic are needed

There are no comments on this against D1.2

Thanks!