C2M comment discussion

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April 8, 2020

Agenda

Provide background to help resolve comments.

Comments 96, 11, 154
VEC and EH values

Cl 120G SC 120G.3.1 P 221 L 21 # 96

Ghiasi, Ali — Ghiasi Quantum/Inphi

Comment Type TR *Comment Status* X

Vertical eye closure is TBD

SuggestedRemedy

Replace TBD with 10 and see ghiasi_3ck_01_0320

Proposed Response *Response Status* O

Cl 120G SC 120G.3.1 P 221 L 20 # 11

Hidaka, Yasuo — Credo Semiconductor

Comment Type TR *Comment Status* X

As we discussed in ad hoc in hidaka_3ck_adhoc_01_021920, I recommend max 9dB VEC at TP1a with Rx noise of eta_0 = 4.1E-8V^2/GHz.
In the same presentation, EH (min) and bmax(n) were also provided.

SuggestedRemedy

Change Table 120G-1 as follows:
Change the value of vertical eye closure (max) from TBD dB to 9 dB.
Change the value of eye height, differential (min) from 15 mV to 14mV.

Change Table 120G-9 as follows:
Change the value of eta_0 from TBD V^2/GHz to 4.1E-8V^2/GHz.
Change the value of b_max(1) from TBD to 0.5.
Change the value of b_max(2) from TBD to 0.15.
Change the value of b_max(3) from TBD to 0.1.
Change the value of b_max(4) from TBD to 0.05.

Alternatively, if a lower value of b_max(1) is preferred, the following is also OK.
Change Table 120G-1 as follows:
Change the value of vertical eye closure (max) from TBD dB to 9 dB.
Change the value of eye height, differential (min) from 15 mV to 13.5mV.

Change Table 120G-9 as follows:
Change the value of eta_0 from TBD V^2/GHz to 4.1E-8V^2/GHz.
Change the value of b_max(1) from TBD to 0.3.
Change the value of b_max(2) from TBD to 0.2.
Change the value of b_max(3) from TBD to 0.1.
Change the value of b_max(4) from TBD to 0.05.

Proposed Response *Response Status* O

Cl 120G SC 120G P 221 L 20 # 154

Dudek, Mike — Marvell

Comment Type T *Comment Status* X

The Vertical Eye Closure has a TBD value, and the appropriate value depends on the parameters in the test methodology table 120G.4.2. I will have a presentation to justify the choices in the proposed change.

SuggestedRemedy

Change the values in table 120G-9 from TBD to
One sided spectral noise 5e-8
b1max = 0.4
b2-bn max=0.15
Change the VEC in table 120G-1 to 7.5dB.

Proposed Response *Response Status* O

Three values for VEC (max.) are proposed to replace TBD:
#96: 10 dB
#11: 9 dB
#154: 7.5 dB

Is there a compromise value?

#11 also proposes to reduce EH to 14 mV
D1.1 specifies EH (max.) as 15 mV.

Comments 10165, 10166
Test method

Dp and Np values

Cl 120G SC 120G.4.2 P 232 L 45 # 10165

Li, Mike Intel

Comment Type TR *Comment Status* D

[Comment resubmitted from Draft 1.0. Subcl. 120G.4.2 - Pg 226 - ln 24]

"Dp equal to 3" is not right as there are 3 pre-taps for the host

SuggestedRemedy

change "Dp equal to 3" to ""Dp equal to 4".

Proposed Response *Response Status* O

Cl 120G SC 120G.4.2 P 232 L 45 # 10166

Li, Mike Intel

Comment Type TR *Comment Status* D

[Comment resubmitted from Draft 1.0. Subcl. 120G.4.2 - Pg 226 - ln 24]

"Np equal to 200" is not appripriate as UI becomes half in second.

SuggestedRemedy

"Np equal to 200" to "Np equal to 400"

Proposed Response *Response Status* O

Perform the following step once:

a) Capture the signal according the method defined in 162.9.3.1.1, with the exception that the test system has a low-pass response equivalent to the specified receiver noise filter with associated parameters in Table 120G–9 in place of the low-pass response specified in 162.9.3, to give $y_1(k)$.

Perform the following five steps for each valid combination of g_{DC} and g_{DC2} as specified in Table 120G–9:

b) Compute the response $y_2(k)$ by applying the effect of the continuous time filter to $y_1(k)$ using the associated parameters in Table 120G–9.

c) Compute the linear fit pulse response $p_2(k)$ using the method defined in 162.9.3.1.1 with parameter M the same as for step a), D_p equal to 3, and N_p equal to 200.

In D1.1, Dp = 3 and Np = 200

Comments propose changing to:
Dp = 4 and Np = 400

Discussion at ad hoc had opposing opinions.

View #1 The fitted pulse response is used only for determine the DFE sampling phase and tap weights. Therefore smaller values would suffice.

View #2 The fitted pulse might be used to analyze the pulse response for assessing the quality of the signal above and beyond providing EH and VEC.

There was no consensus on which direction to take.

Comments 10157, 114
CTF gain, part 1

CTF gain range

Cl **120G** *SC* **120G.4.2** *P* **232** *L* **19** # 10157

Dawe, Piers — Mellanox

Comment Type **TR** *Comment Status* **D**

[Comment resubmitted from Draft 1.0. Subcl. 120G.4.2 - Pg 225 - ln 44]

This allows combinations such as gDC=-3, gDC2=-3 that should not happen, receivers don't need to design for, and waste time in the "for each valid combination of gDC and gDC2" measurement procedure.

SuggestedRemedy

Limit the combinations:

gDC2	gDC
0 or 1	3 to 14
2	6 to 14
3	9 to 14

Cl **120G** *SC* **120G.4.2** *P* **232** *L* **15** # 114

Ghiasi, Ali — Ghiasi Quantum/Inphi

Comment Type **TR** *Comment Status* **X**

Is not necessary to allow all combination of gDC and gDC2

SuggestedRemedy

Move gDC and gDC2 into a new table with 3 columns for TP1a, TP4, and TP5 per ghiasi_3ck_01_0320

CTF gain step size

Cl **120G** *SC* **120G.4.2** *P* **232** *L* **19** # 10143

Dawe, Piers — Mellanox

Comment Type **T** *Comment Status* **D**

[Comment resubmitted from Draft 1.0. Subcl. 120G.4.2 - Pg 225 - ln 46]

Are 1 dB steps for gDC2 fine enough?

SuggestedRemedy

Change to 1/2 dB?

120G.4.2 Eye opening measurement method

The eye opening parameters eye height, eye width, and vertical eye closure are measured with the effect of a reference receiver which includes receiver input referred noise, a continuous-time filter as defined in 93A.1.4.3, a receiver noise filter as defined in 93A.1.4.1, and a decision-feedback equalizer as defined in 93A.1.6, using the parameters specified in Table 120G–9.

Table 120G–9—Eye opening reference receiver parameter values

Parameter	Symbol	Value	Units
Receiver 3 dB bandwidth	f_r	$0.75 \times f_b$	GHz
Continuous time filter, DC gain Minimum value Maximum value Step size	g_{DC}	 −14 −3 1	 dB dB dB
Continuous time filter, DC gain 2 Minimum value Maximum value Step size	g_{DC2}	 −3 0 1	 dB dB dB
Continuous time filter, zero frequency for $g_{DC} = 0$	f_z	12.58	GHz
Continuous time filter, pole frequencies	f_{p1} f_{p2}	20 28	GHz GHz
Continuous time filter, low-frequency pole/zero	f_{LF}	f_b / 40	GHz
Decision feedback equalizer (DFE) length	N_b	4	UI
Normalized DFE coefficient magnitude limit $n = 1$ $n = 2$ to N_b	$b_{max}(n)$	 TBD TBD	—
One-sided noise spectral density	η_0	TBD	V²/GHz

f) Compute the variance of the noise at the output of the receive equalizer σ_N^2 based on the one-sided spectral density η_0, provided in Table 120G–9, referred to the receiver noise filter input per Equation (93A–35).

g) Compute an eye diagram from $y_{rx}(k)$, including the effect of Gaussian noise with variance calculated in the previous step.

h) From the eye diagram, compute the eye height, eye width, and vertical eye closure from the eye diagram using the methodologies in 120E.4.2 and 120E.4.3.

Within the set of combinations of g_{DC} and g_{DC2} with eye height meeting the target requirement, for the combination resulting in the smallest vertical eye closure, the eye height, eye width, and vertical eye closure are used as the measured values.

Comments 10157, 10143, 114
CTF gain, part 2

	gDC					
gDC2	D1.1	dawe comment #10157	ghiasi presentation	OIF	discussion compromise	Other
0	-3 to -14	-3 to -14	-2 to -4	-3 to -12	-2 to -6	?
-1	-3 to -14	-3 to -14	-2 to -7	-3 to -12	-2 to -9	?
-2	-3 to -14	-6 to -14	-4 to -11	-6 to -12	-4 to -11	?
-3	-3 to -14	-9 to -14	-8 to -13	-9 to -11	-8 to -13	?
# of combos 1 dB step	12x4 = 48	12*2+9+6 = 39	3+6+8+6 = 23	10*2+7+3 = 30	5+8+8+6 = 27	x+x+x+x = y
# of combos 0.5 dB step	96	78	46	60	54	2*y