P802.3ck D1.4
120G C2M Miscellaneous discussion

Matt Brown, Huawei, 802.3ck Editor-in-Chief

Introduction

- Slides to help address comments related to the 120G C2M miscellaneous comments.

Comments 154
Annex 120G EO Method

Cl 120G SC 120G.5.2 P 246 L 23 # 154

Dawe, Piers Nvidia

Comment Type **TR** *Comment Status* **D** *EO method*

Of all the options in dawe_3ck_01a_1020, this draft has the most primitive (rectangular eye mask) although it is described as a histogram. It's an inefficient/inaccurate way of measuring a signal and provides weak and uncertain protection against too much jitter. This will get worse if we relax the VEC limits, and is a particular concern for very short host channels (see Mike Dudek's work).

SuggestedRemedy

Change from a 4-cornered mask with corners at t = ts+/-0.05, V = +/-Hmin/2 to a 10-cornered mask with corners at t = ts+/-0.05, ts+/-0.07, ts+/-0.1, V = +/-Hmin/2, +/-Hmin*0.4, +/-0.
(In case it's not clear, Hmin, already specified, is the greater of EH and Eye Amplitude - VEC. There will be discussion about changing those limits from other comments, but this is a simple scalable method that can remain as the EH and VEC limits are revised.)

Proposed Response *Response Status* **W**

PROPOSED REJECT.
This comment proposes a technical change to the draft that does not address technical completeness.
The comment does not provide sufficient evidence to support the proposed changes.

Draft 1.4 fully specifies the eye height and vertical eye closure. Supporting presentations for the current methodology show that necessary eye width is enforced by these specifications.
https://www.ieee802.org/3/ck/public/20_10/healey_3ck_01a_1020.pdf
https://www.ieee802.org/3/ck/public/20_10/healey_3ck_02_1020.pdf

Broad support for this methodology was demonstrated by D1.3 Straw Polls #9 and #12.
https://www.ieee802.org/3/ck/public/20_10/minutes_3ck_1020_final_unapproved.pdf

Straw Poll #9:
I support the EW/ESMW direction of (Chicago rules):
A: Keep ESMW and eye width
B: Replace EH, ESMW, and eye width with an eye mask as proposed in dawe_3ck_01_1020
C: Remove ESMW and eye width and redefine EH and VEC as proposed in healey_3ck_01a_1020
D: Remove ESMW and eye width and leave EH and VEC as is
Results: A: 9, B: 10, C: 24, D: 6

Straw Poll #12:
I would support replacing ESMW and EW with the following option from healey_3ck_02_1020
A. “Alt. 2” with TBD = 50 mUI
B. “Alt. 1” with TBD1 = 25 mUI and TBD2 = 25 mUI
C. “Alt. 1” with TBD1 = 50 mUI and TBD2 = 20 mUI
D. “Alt. 2” with TBD = 70 mUI
A: 18, B: 8, C: 4, D: 9

Comment 18
Annex 120G TP4a stressed input test

Cl 120G SC 120G.3.3.2 P 238 L 6 # 18

Dudek, Mike Marvell

Comment Type T *Comment Status* D *TP4a SIT*

The host only needs to meet either the near-end or far-end parameters. This should be clear in this "shall" statement.

SuggestedRemedy

Change " The input shall satisfy the input tolerance with the parameters in Table 120G–7" to The input shall satisfy the input tolerance with either the near-end or the far-end parameters in Table 120G–7"

Proposed Response *Response Status* W

PROPOSED ACCEPT IN PRINCIPLE.

This comment proposes a technical change to the draft that does not address technical completeness.

A statement later in the subclause indicates that the host input need only meet one of the two stressors. See page 239 line 38.

However, it would be helpful to point out the same in this normative statement as well to avoid confusion.

Implement the suggested remedy.

120G.3.3.2 Host stressed input test

The host stressed input tolerance is measured using the procedure defined in 120G.3.3.2.1. The input shall satisfy the input tolerance with the parameters in Table 120G–7.

Table 120G–7—Host stressed input parameters

Parameter	Value
Applied peak-to-peak sinusoidal jitter	Table 120G–8
Near-end eye height	24 mV
Near-end vertical eye closure	7.5 dB
Far-end eye height	24 mV
Far-end vertical eye closure	7.5 dB

Page 239, line 38

The stressed input is calibrated using either the near-end or the far-end method (see 120G.3.2.2.1), based on the value of tx_eq_state as requested by the host (see 120G.3.2.2). The eye height and vertical eye closure are set to the target values in Table 120G–7 when measured according to the method in 120G.5.2. Meeting the BER requirement using only one value of tx_eq_state, as requested by the host, is sufficient.

Comment 67
Annex 120G TP4a stressed input test

Cl 120G SC 120G.3.3.2.1 P 239 L 40 # 67

Healey, Adam Broadcom Inc.

Comment Type T *Comment Status* D *TP4a SIT levels*

The stressed input signal calibration procedure states that "random jitter and the pattern generator output levels are adjusted (without exceeding the differential peak-to-peak input voltage tolerance specification as shown in Table 120G–6) to result in the eye height for all three eyes given in Table 120G–7 with the setting of the CTLE that minimizes the vertical eye closure." The term "output levels" is ambiguous. It could be interpreted to be "pattern generator output amplitude" or "individual PAM-4 signal levels". It seems that the latter is intended but the individual PAM-4 signal levels should not be allowed to be adjusted so far that the level separation mismatch ratio ("RLM") is too low.

SuggestedRemedy

Replace the sentence with the following text:
"The pattern generator output is adjusted so that the height of the smallest eye matches the value in Table 120G-7, and the height of all three eyes agree to the largest extent possible, for the CTLE setting that minimizes vertical eye closure. The differential peak-to-peak input voltage tolerance given in Table 120G-6 is not exceeded. Individual PAM-4 signal levels may be adjusted to improve the agreement of the three eye heights but the level separation mismatch ratio (RLM) is at least 0.95. RLM is defined in 120D.3.1.2 and is calculated using VM0, VM1, VM2, and VM3 as defined in 120G.5.2 in place of V0, V1, V2, and V3 respectively. Random jitter amplitude may also be adjusted to acheive the eye height targets.

A similar change is suggested for 120G.3.4.1.1 (page 242, line 17).

Proposed Response *Response Status* W

PROPOSED ACCEPT IN PRINCIPLE.
Implement the suggested remedy in 120G.3.3.2.1 and a similar change in 12G.3.4.1.1 with editorial license.

120G.3.3.2.1, Page 239, line 40

Random jitter and the pattern generator output levels are adjusted (without exceeding the differential peak-to-peak input voltage tolerance specification as shown in Table 120G–6) to result in the eye height for all three eyes given in Table 120G–7 with the setting of the CTLE that minimizes the vertical eye closure. Pre-emphasis capability is likely to be required in the pattern generator to meet this requirement.

120G.3.4.1.1, Page 242, line 17

For the high-loss case, frequency-dependent attenuation is added such that the loss at 26.56 GHz from the output of the pattern generator to TP1a is 18.2 dB. The 18.2 dB loss represents 16 dB channel loss with an additional allowance for host transmitter package loss. Eye height and VEC are then measured at TP1a as described in 120G.5.2. Random jitter and the pattern generator output levels are adjusted (without exceeding the differential peak-to-peak input voltage tolerance specification as shown in Figure 120G–9) to result in the eye height for all three eyes given in Table 120G–10 using the reference receiver with the setting that minimizes the vertical eye closure. The CTLE setting, $g_{DC}+g_{DC2}$, has to be less than or equal to –13 dB.

Comments 125, 38, 34, 79
Annex 120G TP1/TP4 ERL

Cl 120G SC 120G.3.4 P 240 L 17 # 38

Brown, Matt Huawei

Comment Type T *Comment Status* D *TP1 ERL*

In table 120G-9, the specified value for module input ERL (min) is TBD.

SuggestedRemedy

Provide a value.

Proposed Response *Response Status* W

PROPOSED ACCEPT IN PRINCIPLE.
Resolve using the response to comment #125.

Cl 120G SC 120G.3.2 P 234 L 17 # 34

Brown, Matt Huawei

Comment Type T *Comment Status* D *TP4 ERL*

In Table 120G-3, the specified value for ERL at module output (TP4) is TBD.

SuggestedRemedy

Provide a value and update PICS.

Proposed Response *Response Status* W

PROPOSED ACCEPT IN PRINCIPLE.
Resolve using the response to comment #125.

Note: Should take into consideration the closed responses to comments for MTF and CA ERL.
Proposals
Module output ERL: 9 dB (125), 8.5 dB (79)
Module input ERL: 8.5 dB (125)
Need to pick a value for module input and module output.

Cl 120G SC 120G.3.2 P 234 L 17 # 125

Ran, Adee Intel

Comment Type TR *Comment Status* D *TP4 ERL*

(addressing TBD)
Module output ERL (min) is TBD

Since it is measured at TP4 the module ERL will be no better than that of a mated test fixture. In another comment I am suggesting setting the minimum ERL of a MTF to 10.3 dB to enable measurement of the internal host circuitry. Based on this proposal, the ERL of a module cannot exceed 10.3 dB.

The proposed value allows 1.3 dB difference for Tx and 1.8 dB for RX for module implementation.

Similarly in 120G.3.4 for module input ERL at TP1.

SuggestedRemedy

Change TBD to 9 dB for Tx ERL and 8.5 dB for Rx ERL.

Proposed Response *Response Status* W

PROPOSED ACCEPT IN PRINCIPLE.
Two comments propose values for module output ERL (min) as follows:
#79: 8.5 dB
#125: 9 dB
Select a value and use this for both module output (120G.3.2) and module input (120G.3.4).
For task force discussion.

Cl 120G SC 120G.3.2 P 234 L 17 # 79

Ghiasi, Ali Ghiasi Quantum/Inphi

Comment Type TR *Comment Status* D *TP4 ERL*

ERL is TBD

SuggestedRemedy

Replace TBD with 8.5 dB and see ghiasi_3ck_01_0121

Proposed Response *Response Status* W

PROPOSED ACCEPT IN PRINCIPLE.
Resolve using the response to comment #125.