*Cl* **163A** *SC* **163A.3.1.1** *P* **287** *L* **21** # 1

Mellitz, Richard Samtec

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

Equation 163A-3 seems incorrect for a pulse response, h(t). V_ref is intended to be a scalar not a vector function of t. I believe the idea is to be just add up Nv UI(T_b) shifted pulse responses.

*SuggestedRemedy*

In Equation 163A-3:
Replace V_f^(ref) with V_f_Nv(t).
V_f^(ref) is the last value of v(t).
Or
V_f^(ref) = V_f_Nv(T_s+nV*T_b)
This would require defining T_s in the prior paragraph as the time where h(t) reaches the peak value.

*Proposed Response* *Response Status* **O**

*Cl* **163A** *SC* **163A.3.1** *P* **286** *L* **16** # 2

Mellitz, Richard Samtec

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

Figure 163A-3 is confusing and not entirely correct for ERL. The filter used for ERL is F_r not F_BT. The ifft is for a reflection and hard to show in the diagram.

*SuggestedRemedy*

Omit reference to ERL in the first sentence of 163A.3.1 and figure 163A-2.

Add a line at end of 163-A-3.1.

The differential return loss at TP0v is used to compute ERL. The channel used to compute ERL is the reference channel S^(0) cascaded with the parallel circuit for Rd.

*Proposed Response* *Response Status* **O**

*Cl* **163A** *SC* **163A.4.1** *P* **289** *L* **1** # 3

Mellitz, Richard Samtec

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

Figure 164A-3 is confusing and not entirely correct for ERL. The filter used for ERL is F_r not F_BT. The ifft is for a reflection and hard to show in the diagram.

*SuggestedRemedy*

Omit reference to ERL in the first sentence of 164A.3.1 and figure 164A-2.

Add a line at end of 164-A-3.1.

The differential return loss at TP5v is used to compute ERL. The channel used to compute ERL is the reference channel S^(0) cascaded with the parallel circuit for Rd.

*Proposed Response* *Response Status* **O**

*Cl* **120G** *SC* **120G.5.2** *P* **246** *L* **23** # 4

Mellitz, Richard Samtec

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

Step h and j in 120G.5.2 Eye opening measurement method indicate "over the time interval ts s ± 0.05 UI and not “within 0.025 UI of time TCmid”
Comment 41 was resolved with “Alt. 2” with TBD = 50 mUI from healey_3ck_02_1020 indicating 1 window around Ts for histogram measurements.

*SuggestedRemedy*

remove "and not within 0.025 UI of time Tcmid from steps h and j in 120G.5.2

*Proposed Response* *Response Status* **O**

*Cl* **120G** *SC* **120G.3.1** *P* **231** *L* **17** # 5

Mellitz, Richard Samtec

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

EH and VEC need be to computed for the histogram window.

*SuggestedRemedy*

Change Eye height, differential (min) to 10 mV
Change Vertical eye closure (max) to 13 dB
Presentation available

*Proposed Response* *Response Status* **O**

*Cl* **162B** *SC* **162B.1** *P* **259** *L* **17** # 6

Dudek, Mike Marvell

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

The measurements at TP1 or TP4 etc. are made with the Cable Assembly Test fixture (162B.1.2) not the mated test fixture (162B.1.3)

*SuggestedRemedy*

On line 18 change 162B.1.3 to 162B.1.2

*Proposed Response* *Response Status* **O**

*Cl* **162B** *SC* **162B.1.3.2** *P* **262** *L* **41** # 7

Dudek, Mike Marvell

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

Table 162B-2 is related to crosstalk parameters not ERL

*SuggestedRemedy*

Change 162B-2 to 162B-1 (two places0

*Proposed Response* *Response Status* **O**

*Cl* **162B** *SC* **162B.1.3.2** *P* **262** *L* **43** # 8

Dudek, Mike Marvell

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

The ERL of the mated test fixture should be significantly better than the specification for the ERL of the device under test. The ERL of the QSFP-DD improved connector used for channel modeling in e.g Didel_3ck_01_0320. has an ERL of 15.7dB.

*SuggestedRemedy*

Change TBD to 14dB. Also put this in TF2 of the PICS.

*Proposed Response* *Response Status* **O**

*Cl* **162D** *SC* **162D.1.1** *P* **283** *L* **31** # 9

Dudek, Mike Marvell

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

The 100GBASE-CR2 in the Title of Table 162D-3 should be 200GBASE-CR2.

*SuggestedRemedy*

Change it

*Proposed Response* *Response Status* **O**

*Cl* **162D** *SC* **162D.1.1** *P* **283** *L* **50** # 10

Dudek, Mike Marvell

*Comment Type* **E** *Comment Status* **X**

There is an unfortunate page break in the middle of Table 162D-3

*SuggestedRemedy*

Adjust formatting so that this table is all on one page

*Proposed Response* *Response Status* **O**

*Cl* **163A** *SC* **163A.4.1.2** *P* **289** *L* **46** # 11

Dudek, Mike Marvell

*Comment Type* **E** *Comment Status* **X**

missing space between "in" and "93A.5"

*SuggestedRemedy*

fix it

*Proposed Response* *Response Status* **O**

*Cl* **163B** *SC* **163B.2** *P* **291** *L* **9** # 12

Dudek, Mike Marvell

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

With this example test fixture moved to an Annex it is necessary to refer to the relevant clause that provides the package parameters etc.

*SuggestedRemedy*

Change "For this test fixture, the reference values determined according to the methodology in 163A.3 are listed in Table 163B–1" to "For this test fixture, the reference values determined according to the methodology in 163A.3 using the parameters supplied in Clause 163 are listed in Table 163B–1"

*Proposed Response* *Response Status* **O**

*Cl* **120G** *SC* **120G.3.2** *P* **234** *L* **10** # 13

Dudek, Mike Marvell

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

The references for both near and far eye measurements in table 120G-3 are to the host output. They should be to the module output

*SuggestedRemedy*

Change the reference from 120G.3.1.5 to 120G.3.2.2

*Proposed Response* *Response Status* **O**

*Cl* **120G** *SC* **120G.3.1.5** *P* **233** *L* **17** # 14

Dudek, Mike Marvell

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

The host output signal should be measured with a crosstalk signal equivalent to the largest and fastest signal that a module is allowed to create and the crosstalk signal risetime should be measured from 20% to 80%.

*SuggestedRemedy*

Change to a target differential peak-to-peak amplitude of 900mV and the slew time to be 7.5ps measured between -270mV and +270mV

*Proposed Response* *Response Status* **O**

*Cl* **120G** *SC* **120G.1** *P* **229** *L* **3** # 15

Dudek, Mike Marvell

*Comment Type* **E** *Comment Status* **X**

Clause 116.1.4 is included in the draft and should be a hot link

*SuggestedRemedy*

Make this a hot link.

*Proposed Response* *Response Status* **O**

*Cl* **120G** *SC* **120G.1** *P* **229** *L* **2** # 16

Dudek, Mike Marvell

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

135.1.5 does not appear to exist and if it did it is unlikely to include these AUI's

*SuggestedRemedy*

Change the reference from 135.1.5 to 135.1.4 and make it a hot link and either remove the reference to a tabke or create a table that summarizes the use of the 100GAUI whithin 135.1.4

*Proposed Response* *Response Status* **O**

*Cl* **120G** *SC* **120G.3.2.2** *P* **235** *L* **34** # 17

Dudek, Mike Marvell

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

The module near-end output signal should be measured with a crosstalk signal equivalent to the largest and fastest signal that the host can supply. The risetime for the far -end signal can be slower.

*SuggestedRemedy*

Change "The crosstalk generator is calibrated at TP1a (without the use of a reference receiver) with target differential peak-to-peak amplitude of TBD mV and target transition time of TBD ps." to "The crosstalk generator is calibrated at TP1a (without the use of a reference receiver) with target differential peak-to-peak amplitude of 870 mV and target transition time of 7.5 ps for the near end measurement and target transition time of 15 ps for the far-end measurment."

*Proposed Response* *Response Status* **O**

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

Dudek, Mike Marvell

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

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* **O**

*Cl* **120G** *SC* **120G.3.3.2.1** *P* **238** *L* **54** # 19

Dudek, Mike Marvell

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

The crosstalk used in the calibration of the host stressed signal should match thecrosstalk used for the test for the module output

*SuggestedRemedy*

Change "The counter propagating crosstalk signals during calibration of the stressed signal are asynchronous with target amplitude of TBD mV peak-to-peak differential and 20% to 80% target transition time of TBD ps." to "The counter propagating crosstalk signals during calibration of the stressed signal are asynchronous with target differential peak-to-peak amplitude of 870 mV and target transition time of 7.5 ps for the near end calibration and target transition time of 15 ps for the far-end calibration"

*Proposed Response* *Response Status* **O**

*Cl* **120G** *SC* **120G.3.4.1.1** *P* **242** *L* **2** # 20

Dudek, Mike Marvell

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

The crosstalk used in the calibration of the module stressed signal should match the crosstalk used for the test for the host output

*SuggestedRemedy*

Change to "a target amplitude of 900mV differential peak-to-peak and target slew time between -270mV and +270mV of 7.5ps"

*Proposed Response* *Response Status* **O**

*Cl* **120G** *SC* **120G.1** *P* **229** *L* **5** # 21

Dudek, Mike Marvell

*Comment Type* **E** *Comment Status* **X**

Annex 135A and 120A are part of this draft.

*SuggestedRemedy*

Make these references hot links.

*Proposed Response* *Response Status* **O**

*Cl* **162B** *SC* **162B.1** *P* **259** *L* **17** # 22

Dudek, Mike Marvell

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

The measurements at TP2 or TP3 etc. are made with the Test fixture (162B.1.1) not the mated test fixture (162B.1.3)

*SuggestedRemedy*

On line 17 change 162B.1.3 to 162B.1.1

*Proposed Response* *Response Status* **O**

*Cl* **162** *SC* **162.9.3** *P* **152** *L* **30** # 23

Brown, Matt Huawei

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

In Table 162-10, the specified value for transmitter common-mode to differential mode return loss is TBD.

*SuggestedRemedy*

Provide a value or equation and update PICS.

*Proposed Response* *Response Status* **O**

*Cl* **162** *SC* **162.9.4** *P* **158** *L* **16** # 24

Brown, Matt Huawei

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

In Table 162-13, the specified value for receiver differential to common-mode return loss is TBD

*SuggestedRemedy*

Provide a value or equation and update PICS.

*Proposed Response* *Response Status* **O**

*Cl* **162** *SC* **162.11** *P* **163** *L* **17** # 25

Brown, Matt Huawei

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

In Table 162-16, the specified value for cable assemby ERL is TBD

*SuggestedRemedy*

Provide a value or equation and update PICS.

*Proposed Response* *Response Status* **O**

*Cl* **163** *SC* **163.9.3** *P* **187** *L* **41** # 26

Brown, Matt Huawei

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

In Table 163-8, the specified value for receiver differential to common-mode return loss is TBD

*SuggestedRemedy*

Provide a value or equation and update PICS.

*Proposed Response* *Response Status* **O**

*Cl* **163** *SC* **163.10.4** *P* **192** *L* **44** # 27

Brown, Matt Huawei

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

The specified value for channel differential to common-mode conversion loss is TBD.

*SuggestedRemedy*

Provide a value or equation and update PICS.

*Proposed Response* *Response Status* **O**

*Cl* **120F** *SC* **120F.3.1.2** *P* **214** *L* **35** # 28

Brown, Matt Huawei

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

The editor's note written in D1.0 indicates that the transmitter c(-3) tap should be removed if it is shown to have no value. There have been no proposals accepted to remove the tap.

*SuggestedRemedy*

Remove the editor's note.

*Proposed Response* *Response Status* **O**

*Cl* **120F** *SC* **120F.3.2.3** *P* **218** *L* **44** # 29

Brown, Matt Huawei

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

The editor's note written in D1.0 indicates that the IL for stressed input test 2 (high loss) requires no confirmation. No proposals to change the specified values have been submitted.

*SuggestedRemedy*

Remove the editor's note.

*Proposed Response* *Response Status* **O**

*Cl* **120F** *SC* **120F.4.2** *P* **222** *L* **4** # 30

Brown, Matt Huawei

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

The editor's note written in D1.0 indicates that the channel maximum insertion loss requires further investigation. No proposals to change the specification have been submitted.

*SuggestedRemedy*

Remove the editor's note.

*Proposed Response* *Response Status* **O**

*Cl* **120F** *SC* **120F.4.3** *P* **223** *L* **5** # 31

Brown, Matt Huawei

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

The specified value for channel ERL is TBD.

*SuggestedRemedy*

Provide a value and update PICS.

*Proposed Response* *Response Status* **O**

*Cl* **120G** *SC* **120G.3.1** *P* **231** *L* **33** # 32

Brown, Matt Huawei

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

The editor's note written in D1.0 indicates that the specified values for host output AC CM noise, PP output voltage, and RLCC require confirmation. No proposals to change the specified values have been submitted.

*SuggestedRemedy*

Remove the editor's note.

*Proposed Response* *Response Status* **O**

*Cl* **120G** *SC* **120G.3.1.5** *P* **233** *L* **17** # 33

Brown, Matt Huawei

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

The specified values for the host output EH/VEC crosstalk parameters (4x) are TBD.

*SuggestedRemedy*

Provide values.

*Proposed Response* *Response Status* **O**

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

Brown, Matt Huawei

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

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* **O**

*Cl* **120G** *SC* **120G.3.2** *P* **234** *L* **32** # 35

Brown, Matt Huawei

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

The editor's note indicates that the value specified for the module output AC CM noise requires confirmation. No proposals to change the specified values have been accepted. However, it should be noted that there is ongoing discussion on this topic.

*SuggestedRemedy*

Remove the editor's note.

*Proposed Response* *Response Status* **O**

*Cl* **120G** *SC* **120G.3.2.2** *P* **235** *L* **33** # 36

Brown, Matt Huawei

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

The specified values for the module output EH/VEC crosstalk parameters (2x) are TBD.

*SuggestedRemedy*

Provide values.

*Proposed Response* *Response Status* **O**

*Cl* **120G** *SC* **120G.3.3.2.1** *P* **238** *L* **54** # 37

Brown, Matt Huawei

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

The specified values for the host stressed input crosstalk parameters (2x) are TBD.

*SuggestedRemedy*

Provide values.

*Proposed Response* *Response Status* **O**

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

Brown, Matt Huawei

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

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

*SuggestedRemedy*

Provide a value.

*Proposed Response* *Response Status* **O**

*Cl* **120G** *SC* **120G.3.4.1.1** *P* **242** *L* **2** # 39

Brown, Matt Huawei

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

The specified values for the module stressed input crosstalk parameters (4x) are TBD.

*SuggestedRemedy*

Provide values.

*Proposed Response* *Response Status* **O**

*Cl* **120G** *SC* **120G.5.2** *P* **246** *L* **38** # 40

Brown, Matt Huawei

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

The editor's note indicates that the specified values for EH/VEC value may need to be updated due to measurement method being updated in D1.4.

*SuggestedRemedy*

Provide updated values for host output, module output, host input, and module input if necessary and remove editor's note.

*Proposed Response* *Response Status* **O**

*Cl* **162B** *SC* **162B.1.3.1** *P* **262** *L* **36** # 41

Brown, Matt Huawei

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

The specified value for MTF FOM_ILD upper limit is TBD.

*SuggestedRemedy*

Provide a value.

*Proposed Response* *Response Status* **O**

*Cl* **162B** *SC* **162B.1.3.2** *P* **262** *L* **43** # 42

Brown, Matt Huawei

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

The specified value for MTF ERL is TBD.

*SuggestedRemedy*

Provide a value and update PICS.

*Proposed Response* *Response Status* **O**

*Cl* **162C** *SC* **162C.2.2** *P* **275** *L* **12** # 43

Brown, Matt Huawei

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

The graphics in Figure 162C-3 and Figure 162C-44 are missing.

*SuggestedRemedy*

Provide graphics.

*Proposed Response* *Response Status* **O**

*Cl* **163B** *SC* **163B.2** *P* **291** *L* **18** # 44

Brown, Matt Huawei

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

For the example test fixture, the reference value in Table 163B-1 for transmitter steady-state voltage is TBD.

*SuggestedRemedy*

Provide a value.

*Proposed Response* *Response Status* **O**

*Cl* **163B** *SC* **163B.2** *P* **291** *L* **20** # 45

Brown, Matt Huawei

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

For the example test fixture, the reference value for transmitter linear fit pulse peak voltage is TBD.

*SuggestedRemedy*

Provide a value.

*Proposed Response* *Response Status* **O**

*Cl* **162** *SC* **162.9.4.1** *P* **158** *L* **23** # 46

Brown, Matt Huawei

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

The list of related subclauses should include 162.9.4.2.

*SuggestedRemedy*

Change "162.9.4.3 and 162.9.4.4" to "162.9.4.2, 162.9.4.3, and 162.9.4.4".

*Proposed Response* *Response Status* **O**

*Cl* **120F** *SC* **120F.3.1** *P* **212** *L* **50** # 47

Brown, Matt Huawei

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

The following sentence is repeated in both 120F.3.1 and 120F.3.1.2. "The state of the transmitter equalizer may be configured via the transmitter control interface described in 120F.3.1.4."

*SuggestedRemedy*

Delete the sentence in 120G.3.1.

*Proposed Response* *Response Status* **O**

*Cl* **136** *SC* **136.8.11.7.1** *P* **114** *L* **37** # 48

Lusted, Kent Intel Corporation

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

Based on the link training change proposed in https://www.ieee802.org/3/ck/public/20_10/lusted_3ck_02_1020.pdf, a new variable "use_quiet_in_training" was defined in Clause 136.8.11.7.1. This variable has an explicit setting of FALSE for 50 Gb/s per lane PHYs. However, no specific mention of the variable value is made for 100 Gb/s per lane PHYs. This could lead to confusion in the industry as some vendors may interpret the "use_quiet_in_training" capability as optional to implement, while it was intended to be mandatory for 100 Gb/s per lane PHYs.

*SuggestedRemedy*

In Cl 162.8.11, add a new entry to the list as follows:
h) the variable "use_quiet_in_training" (see 136.8.11.7.1) is always set to TRUE for 100 Gb/s per lane PHYs."

*Proposed Response* *Response Status* **O**

*Cl* **162** *SC* **162.8.11** *P* **150** *L* **34** # 49

Lusted, Kent — Intel Corporation

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

The requirement to "assert local_tf_lock … provided that there is a compliant signal containing training frames at the PMD input" is insufficiently detailed. It is unclear if a receiver should react to a signal that is compliant with respect to amplitude, jitter, etc but does not have a valid training frame format. It is possible that a few of the first training frames during startup are malformed logically yet meet the electrical compliance requirements.

*SuggestedRemedy*

Change item g) to be "… provided that there is a compliant signal containing valid training frames at the PMD input."

*Proposed Response* *Response Status* **O**

*Cl* **1** *SC* **1.3** *P* **32** *L* **14** # 50

Lusted, Kent — Intel Corporation

*Comment Type* **E** *Comment Status* **X**

The publication date for the SFP-DD MSA v4.2 was August 17, 2020, not August 10, 2020 as shown in the draft. See http://sfp-dd.com/wp-content/uploads/2020/08/SFP-DDrev4.2.pdf

*SuggestedRemedy*

Change the date to August 17, 2020

*Proposed Response* *Response Status* **O**

*Cl* **162** *SC* **162.9.3.1** *P* **154** *L* **6** # 51

Mellitz, Richard — Samtec

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

Samples per UI, M, may not be as straight forward for measurement equipment because architectures may vary amongst instruments. All things being ideal, as in simulation, specification of M would seem straight forward. However, what seems most important is the confidence of the results especially when we are evaluating sigma_e, sigma_n, and values extracted from histograms. For the example of histogram measurement, and good argument could be made for M to be at least 100. Setting M to at least 32 might be sufficient for V_f r c(i) measurements.

*SuggestedRemedy*

Add a line to line 7. Interpolations and raw measurement adjustments shall be sufficient to support a least a 95% confidence of all derived values for voltage and noise specifications.

*Proposed Response* *Response Status* **O**

*Cl* **136** *SC* **136.8.11.7.1** *P* **114** *L* **39** # 52

Slavick, Jeff — Broadcom

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

The use_quiet_in_training variable controls access to certain states. When TRUE it indicates access to the state is allowed. So the "and is set to FALSE otherwise" is just confusing since a boolean is either TRUE or FALSE and the first sentence is defining what happens when it's TRUE not what makes it TRUE

*SuggestedRemedy*

Remove "and is set to FALSE otherwise" from the first sentence in the definition of use_quiet_in_training

*Proposed Response* *Response Status* **O**

*Cl* **136** *SC* **136.8.11.7.1** *P* **114** *L* **39** # 53

Slavick, Jeff — Broadcom

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

The intent of the new QUIET state is to make it so all newly developed PHYs will use this features to avoid the deadlock situation. So the QUIET state should mandatory except for 50G PHY types.

*SuggestedRemedy*

Change the last sentence of the use_quiet_in_training definition to read as "This variable is always set to FALSE for 50 Gb/s per lane PHYs, otherwise it's set to TRUE..

*Proposed Response* *Response Status* **O**

*Cl* **120** *SC* **120.5.7.2** *P* **102** *L* **45** # 54

Slavick, Jeff Broadcom

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

The cross out of the text "The variables" and "by the PMD control function" in the second sentence of the paragraph seems to be too much since the sentence would read "precoder_tx_out_enable_i and precoder_rx_in_enable_i shall be set as determined in the LINK_READY state of the PMD control state diagram on lane i (see 136.8.11.7.5)"

*SuggestedRemedy*

Update the second senetence to be ""precoder_tx_out_enable_i and precoder_rx_in_enable_i shall be set as determined by the PMD control function in the LINK_READY state on lane i (see Fig 136-7)"

*Proposed Response* *Response Status* **O**

*Cl* **120** *SC* **120.5.7.2** *P* **102** *L* **30** # 55

Slavick, Jeff Broadcom

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

In the change to the first paragph it has removed the requirement of this paragraph for 50G copper PMDs.

*SuggestedRemedy*

Add 200GBASE-KR4/CR4 to the list in both the first and second sentences.

*Proposed Response* *Response Status* **O**

*Cl* **120** *SC* **120.5.7.2** *P* **103** *L* **44** # 56

Slavick, Jeff Broadcom

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

In the change to the fourth paragph it has removed the requirement of this paragraph for 50G copper PMDs.

*SuggestedRemedy*

Add 200GBASE-KR4/CR4 to the list in the first sentence.

*Proposed Response* *Response Status* **O**

*Cl* **162A** *SC* **162A.2** *P* **253** *L* **24** # 57

Wu, Mau-Lin MediaTek

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

TP0a had been replaced by TP0v in Clause 163.9.2.

*SuggestedRemedy*

Change "The recommended transmitter characteristics at TP0 as measured at TP0a are described in 163.9.2." shall be changed to "The recommended transmitter characteristics at TP0 as measured at TP0v are described in 163.9.2."

*Proposed Response* *Response Status* **O**

*Cl* **162A** *SC* **162A.3** *P* **253** *L* **29** # 58

Wu, Mau-Lin MediaTek

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

TP5a had been replaced by TP5v in Clause 163.9.3.

*SuggestedRemedy*

Change "The recommended receiver characteristics at TP5 as measured at TP5a are described in 163.9.3." shall be changed to "The recommended receiver characteristics at TP5 as measured at TP5v are described in 163.9.3."

*Proposed Response* *Response Status* **O**

*Cl* **162** *SC* **162.9.3.1.4** *P* **155** *L* **46** # 59

Wu, Mau-Lin MediaTek

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

The step size of TX EQ coefficient had been changed from 2% to 2.5%. The "coefficient step size" shall be modified from 0.02 to 0.025.

*SuggestedRemedy*

Change <… to a request to "increment" shall be between 0.005 and 0.02, …> to <… to a request to "increment" shall be between 0.005 and 0.025, …>.

*Proposed Response* *Response Status* **O**

*Cl* **162** *SC* **162.9.3.1.4** *P* **155** *L* **47** # 60

Wu, Mau-Lin MediaTek

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

The step size of TX EQ coefficient had been changed from 2% to 2.5%. The "coefficient step size" shall be modified from -0.02 to -0.025.

*SuggestedRemedy*

Change <… to a request to "decrement" shall be between -0.02 and -0.005.> to <… to a request to "decrement" shall be between -0.025 and -0.005.>.

*Proposed Response* *Response Status* **O**

*Cl* **120G** *SC* **120G.3.1** *P* **231** *L* **17** # 61

Wu, Mau-Lin MediaTek

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

Due to we adopted the new EH & VEC test methods in D1p4, the specifications of EH & VEC for "Table 120G-1 - Host output characteristics at TP1a" and "Table 120G-10 - Module stressed input parameters" shall be updated to reflect the impact by new method.

*SuggestedRemedy*

Propose to change EH from 15 mV to 8 mV in Table 120G-1 & 120G-10.
Propose to change VEC from 9.0 dB to 12.0 dB in Table 120G-1.
Propose to change VEC (max) from 9.5 dB to 12.5 dB in Table 120G-10.
Propose to change VEC (min) from 9.0 dB to 12.0 dB in Table 120G-10.
Detailed analysis is included in wu_3ck_01_0121.pdf

*Proposed Response* *Response Status* **O**

*Cl* **120G** *SC* **120G.3.1.5** *P* **233** *L* **17** # 62

Wu, Mau-Lin MediaTek

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

There are some TBDs for crosstalk calibration specs for Host Output test.
According to the analysis explored in wu_3ck_adhoc_02_010621.pdf, the target swing at TP4 shall be aligned with that of Module output spec, which is 900 mV. Similarly, the output voltage swing at TP1a, which is 870 mV now, shall be aligned among Host output, Module output, Host input, & Module input specs.

*SuggestedRemedy*

Propose the following paragraph to replace the original one
Host output: 120G.3.1.4 (Page 233, L17)
"… with target differential peak-to-peak amplitude of 900 mV and slew time of 12 ps between -2.7 V and +2.7 V."

*Proposed Response* *Response Status* **O**

*Cl* **120G** *SC* **120G.3.2.2** *P* **235** *L* **33** # 63

Wu, Mau-Lin MediaTek

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

There are some TBDs for crosstalk calibration specs for Host Output test.
According to the analysis explored in wu_3ck_adhoc_02_010621.pdf, the target swing at TP4 shall be aligned with that of Module output spec, which is 900 mV. Similarly, the output voltage swing at TP1a, which is 870 mV now, shall be aligned among Host output, Module output, Host input, & Module input specs.

*SuggestedRemedy*

Propose the following paragraph to replace the original one
Module output: 120G.3.2.2 (Page 235, L33)
"… with target differential peak-to-peak amplitude of 870 mV and target transition time of 19 ps."

*Proposed Response* *Response Status* **O**

*Cl* **120G** *SC* **120G.3.3.2.1** *P* **238** *L* **54** # 64

Wu, Mau-Lin MediaTek

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

There are some TBDs for crosstalk calibration specs for Host Output test.
According to the analysis explored in wu_3ck_adhoc_02_010621.pdf, the target swing at TP4 shall be aligned with that of Module output spec, which is 900 mV. Similarly, the output voltage swing at TP1a, which is 870 mV now, shall be aligned among Host output, Module output, Host input, & Module input specs.

*SuggestedRemedy*

Propose the following paragraph to replace the original one
Host input: 120G.3.3.2.1 (Page 238, L54))
"... with target amplitude of 870 mV peak-to-peak differential and 20% to 80% target transition time of 19 ps as measured at TP1a ..."

*Proposed Response* *Response Status* **O**

*Cl* **120G** *SC* **120G.3.4.1.1** *P* **242** *L* **2** # 65

Wu, Mau-Lin MediaTek

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

There are some TBDs for crosstalk calibration specs for Host Output test.
According to the analysis explored in wu_3ck_adhoc_02_010621.pdf, the target swing at TP4 shall be aligned with that of Module output spec, which is 900 mV. Similarly, the output voltage swing at TP1a, which is 870 mV now, shall be aligned among Host output, Module output, Host input, & Module input specs.

*SuggestedRemedy*

Propose the following paragraph to replace the original one
Module input: 120G.3.4.1.1 (Page 242, L2)
"... with target amplitude of 900 mV peak-to-peak differential and target slew time between -2.7 V and +2.7 V of 12 ps as measured at TP4 ..."

*Proposed Response* *Response Status* **O**

*Cl* **163** *SC* **163.9.2.3** *P* **187** *L* **16** # 66

Healey, Adam Broadcom Inc.

*Comment Type* **E** *Comment Status* **X**

Subclause title is incorrect.

*SuggestedRemedy*

Change subclause title to "Difference steady-state voltage".

*Proposed Response* *Response Status* **O**

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

Healey, Adam Broadcom Inc.

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

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* **O**

*Cl* **120G** *SC* **120G.3.1.5** *P* **233** *L* **17** # 68

Healey, Adam Broadcom Inc.

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

The target differential peak-to-peak amplitude and slew time of the crosstalk generator, as observed at TP4, are TBD.

*SuggestedRemedy*

Since the crosstalk generator is used to represent near-end aggression from the the module transmitter outputs, the largest amplitude and smallest transition time allowed for a module output (as observed at TP4) should be used to represent worst-case aggression.
Change:
"The crosstalk generator is calibrated at TP4 (without the use of a reference receiver) with target differential peak-to-peak amplitude of TBD mV and slew time of TBD ps between -TBD V and +TBD V."
To:
"The crosstalk generator is calibrated so that the differential peak-to-peak output voltage and transition time, as measured at TP4, are as close to the limits in Table 120G-3 as practical."

*Proposed Response* *Response Status* **O**

*Cl* **120G** *SC* **120G.3.2.2** *P* **235** *L* **33** # 69

Healey, Adam Broadcom Inc.

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

The target differential peak-to-peak amplitude and transition time, as observed at TP1a, are TBD.

*SuggestedRemedy*

Since the crosstalk generator is used to represent near-end aggression from the the host transmitter outputs, the largest amplitude and smallest transition time allowed for a host output (as observed at TP1a) should be used to represent worst-case aggression.
Change:
"The crosstalk generator is calibrated at TP1a (without the use of a reference receiver) with target differential peak-to-peak amplitude of TBD mV and target transition time of TBD ps."
To:
"The crosstalk generator is calibrated so that the differential peak-to-peak output voltage and transition time, as measured at TP1a, are a close to the limits in Table 120G-1 as practical."

*Proposed Response* *Response Status* **O**

*Cl* **120G** *SC* **120G.3.3.2.1** *P* **238** *L* **54** # 70

Healey, Adam Broadcom Inc.

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

The target differential peak-to-peak amplitude and transition time, as observed at TP1a, are TBD.

*SuggestedRemedy*

Since the crosstalk generator is used as a proxy for the host transmitter(s) during stressed input signal calibration, the amplitude and transition times should be set to agree with the values measured at the output of the host under test (TP1a).
Change:
"The counter propagating crosstalk signals during calibration of the stressed signal are asynchronous with target amplitude of TBD mV peak-to-peak differential and 20% to 80% target transition time of TBD ps as measured at TP1a (without the use of a reference receiver)."
To:
"The counter propagating crosstalk signals are asynchronous during calibration of the stressed signal. The crosstalk generator is calibrated so that the differential peak-to-peak output voltage and transition time, as measured at TP1a, are as close as practical to the values measured at the output of the host under test (at TP1a) without the use of a reference receiver."

*Proposed Response* *Response Status* **O**

*Cl* **120G** *SC* **120G.3.4.1.1** *P* **242** *L* **2** # 71

Healey, Adam Broadcom Inc.

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

The target differential peak-to-peak amplitude and slew time of the crosstalk generator, as observed at TP4, are TBD.

*SuggestedRemedy*

Since the crosstalk generator is used as a proxy for the module transmitter(s) during stressed input signal calibration, the amplitude and transition times should be set to agree with the values measured at the output of the module under test (TP4).
Change:
"The counter propagating crosstalk signals during calibration of the stressed signal are asynchronous with target amplitude of TBD mV peak-to-peak differential and target slew time between -TBD mV and TBD mV of TBD ps as measured at TP4 (without the use of a reference equalizer)."
To:
"The counter propagating crosstalk signals are asynchronous during calibration of the stressed signal. The crosstalk generator is calibrated so that the differential peak-to-peak output voltage and transition time, as measured at TP4, are as close as practical to the values measured at the output of the module under test (at TP4) without the use of a reference receiver."

*Proposed Response* *Response Status* **O**

*Cl* **120G** *SC* **120G.3.1** *P* **231** *L* **18** # 72

Healey, Adam Broadcom Inc.

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

The eye height and vertical eye closure limits were based on (simulated) measurements of a vertical slice of the eye at the nominal sampling time. The measurement method for eye height and vertical eye closure in 120G.5.2 has been modified to use a vertical slice of the eye spanning -50 to +50 mUI around the nominal sampling time. Comparison of measurement results implies that the change in the measurement method results in up to a 3 dB increase in vertical eye closure and a similar decrease in eye height.

*SuggestedRemedy*

In Table 120G-1, change "Eye height, differential (min)" to 10 mV and "Vertical eye closure (max)" to 12 dB.
In Table 120G-3, change "Near-end eye height, differential (min)" and "Far-end eye height, differential (min)" to 17 mV and "Near-end vertical eye closure (max)" and "Far-end vertical eye closure (max)" to 10.5 dB.
In Table 120G-7, change "Near-end eye height" and "Far-end eye height" to 17 mV and "Near-end vertical eye closure" and "Far-end vertical eye closure" to 10.5 dB.
In Table 120G-10, change "Eye height" to 10 mV, "VEC (max)" to 12.5 dB, and "VEC (min)" to 12 dB.

*Proposed Response* *Response Status* **O**

*Cl* **120G** *SC* **120G.5.2** *P* **245** *L* **18** # 73

Ghiasi, Ali Ghiasi Quantum/Inphi

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

In table 120G-11 we refer to TP4 near end and TP4 far end, but table 120G-4 we refer to AUI-S and AUI-L short and long. It would be helpful to be consistent with the terminology.

*SuggestedRemedy*

I suggest replacing TP4 near end with TP4-S or short and TP4 far end with TP4-L or long to align with AUI-S/L..
The AUI short covers from TP4 near end up to 10.975 dB, and AUI long covers from >10.975 dB to 16 dB channels.

*Proposed Response* *Response Status* **O**

*Cl* **120G** *SC* **120G.3.2.1** *P* **235** *L* **10** # 74

Ghiasi, Ali — Ghiasi Quantum/Inphi

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

In table 120G-4 AUI-short and long are introduced but there is no description what AUI-S and AUI-L are!

*SuggestedRemedy*

We need to define channel loss range for AUI-S and AUI-L.
ghiasi_3ck_01_0121 investigates possible channel loss ranges for AUI S/L, the result indicate 10 dB is about optimum but given how close 10 dB is to CR host loss of 10.975 dB the proposal is to use 10.975 dB as the demarcation point for AUI-S/L.

*Proposed Response* *Response Status* **O**

*Cl* **120G** *SC* **120G.3.2** *P* **234** *L* **11** # 75

Ghiasi, Ali — Ghiasi Quantum/Inphi

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

Given that now we have AUI-S/L near end eye would be AUI-S min eye opening

*SuggestedRemedy*

The eye opening with 50 mUI rectangular window for AUI-S is VEO=20 mV, see ghiasi_3ck_01_0121

*Proposed Response* *Response Status* **O**

*Cl* **120G** *SC* **120G.3.2** *P* **234** *L* **13** # 76

Ghiasi, Ali — Ghiasi Quantum/Inphi

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

Given that now we have AUI-S/L far end eye would be AUI-S min eye opening

*SuggestedRemedy*

The eye opening with 50 mUI rectangular window for AUI-L is VEO=11 mV, see ghiasi_3ck_01_0121

*Proposed Response* *Response Status* **O**

*Cl* **120G** *SC* **120G.3.2** *P* **234** *L* **11** # 77

Ghiasi, Ali — Ghiasi Quantum/Inphi

*Comment Type* **ER** *Comment Status* **X**

Given that now we have AUI-S/L near end VEC need to be defined

*SuggestedRemedy*

The eye opening with 50 mUI rectangular window for AUI-S is VEC=12.5 dB, see ghiasi_3ck_01_0121

*Proposed Response* *Response Status* **O**

*Cl* **120G** *SC* **120G.3.2** *P* **234** *L* **14** # 78

Ghiasi, Ali — Ghiasi Quantum/Inphi

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

Given that now we have AUI-S/L far end VEC need to be defined

*SuggestedRemedy*

The eye opening with 50 mUI rectangular window for AUI-L is VEC=14.5 dB, see ghiasi_3ck_01_0121

*Proposed Response* *Response Status* **O**

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

Ghiasi, Ali — Ghiasi Quantum/Inphi

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

ERL is TBD

*SuggestedRemedy*

Replace TBD with 8.5 dB and see ghiasi_3ck_01_0121

*Proposed Response* *Response Status* **O**

*Cl* **120G** *SC* **120G.3.1** *P* **231** *L* **17** # 80

Ghiasi, Ali — Ghiasi Quantum/Inphi

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

Eye height need to be adjusted to account for the 50 mUI rectangular window

*SuggestedRemedy*

See ghiasi_3ck_01_0121 and reduce eye height window from 15 mV to 9.5 mV

*Proposed Response* *Response Status* **O**

*Cl* **120G** *SC* **120G.3.1** *P* **231** *L* **19** # 81

Ghiasi, Ali — Ghiasi Quantum/Inphi

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

VEC need to be adjusted to account for the 50 mUI rectangular window

*SuggestedRemedy*

See ghiasi_3ck_01_0121 and reduce eye height window from 7.5 dB to 14 dB

*Proposed Response* *Response Status* **O**

*Cl* **163B** *SC* **163B.2** *P* **290** *L* **23** # 82

Ghiasi, Ali — Ghiasi Quantum/Inphi

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

Example TP0V should be better defined

*SuggestedRemedy*

See ghiasi_3ck_02_0121
The DUT trace is constructed from 2 mm section of PCB trace with 102 Ohms (via model), followed by 66.8 mm 92.5 Ohms strip line, followed by 2 mm section of PCB trace with 102 ohms (via model) the total loss of this model at 26.55 GHz is 2.8 dB. The PCB model is per table 93-12. The equation for the loss =0.006+0.25*SQRT(f)+0.057*f, where f is in GHz.

*Proposed Response* *Response Status* **O**

*Cl* **120G** *SC* **120G.3.1** *P* **231** *L* **25** # 83

Ghiasi, Ali — Ghiasi Quantum/Inphi

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

At TP1a it is no possible to get 7.5 ps, please put something reasonable

*SuggestedRemedy*

A fast ASIC with 7.6 ps output rise time when passes through a mated board with just 5 dB loss produces 12 ps 20-80% rise time. I suggest 12 ps but no less than 10 ps.

*Proposed Response* *Response Status* **O**

*Cl* **120G** *SC* **120G.3.1.5** *P* **233** *L* **17** # 84

Ghiasi, Ali — Ghiasi Quantum/Inphi

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

Addressing the TBD in the paragraph

*SuggestedRemedy*

A fast ASIC with 7.6 ps output rise time when passes through a mated board with just 5 dB loss produces 12 ps 20-80% rise time. I suggest 24 ps for the slew from -400 mV to + 400 mV and with amplitude of 800 mV, the reason amplitude is reduced is due assumption that signal will have pre-emphasis on for this measurement otherwise one could go with 900 mV amplitude I don't believe that is reasonable.

*Proposed Response* *Response Status* **O**

*Cl* **120G** *SC* **120G.3.1** *P* **231** *L* **25** # 85

Ghiasi, Ali — Ghiasi Quantum/Inphi

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

At TP4 it is no possible to get 7.5 ps, please put something reasonable

*SuggestedRemedy*

A fast ASIC with 7.6 ps output rise time when passes through a mated board with just 5 dB loss produces 12 ps 20-80% rise time, given that real module may have less than min HCB loss then 10 ps would be reasonable rise time.

*Proposed Response* *Response Status* **O**

*Cl* **120G** *SC* **120G.3.2.2** *P* **235** *L* **34** # 86

Ghiasi, Ali — Ghiasi Quantum/Inphi

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

Addressing the TBD in the paragraph

*SuggestedRemedy*

A fast ASIC with 7.6 ps output rise time when passes through a mated board with just 5 dB loss produces 12 ps 20-80% rise time, the full swing is about 2x. But given that module PCB may have lower than HCB loss, then I suggest 20 ps for the slew from -350 mV to + 350 mV and with amplitude of 700 mV, the reason amplitude is reduced is due assumption that signal will have pre-emphasis on for this measurement otherwise one could go with 900 mV amplitude I don't believe that is reasonable.

*Proposed Response* *Response Status* **O**

*Cl* **120G** *SC* **120G.3.3.2.1** *P* **238** *L* **54** # 87

Ghiasi, Ali — Ghiasi Quantum/Inphi

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

Addressing the TBD in the paragraph

*SuggestedRemedy*

A fast ASIC with 7.6 ps output rise time when passes through a mated board with just 5 dB loss produces 12 ps 20-80% rise time. I suggest 12 ps rise time and possibly as fast as 10 ps but would be difficult to generate such fast rise time through mated board. Given that the signal will have pre-emphasis enabled getting more than 800 mV could be difficult. I suggest to go with 800 mV

*Proposed Response* *Response Status* **O**

*Cl* **120G** *SC* **120G.3.4.1** *P* **240** *L* **46** # 88

Ghiasi, Ali — Ghiasi Quantum/Inphi

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

Table 120G-10 needs to be updated now that measurements are with 50 mUI window

*SuggestedRemedy*

See ghiasi_3ck_01_0121 and reduce eye height window from 15 mV to 9.5 mV
See ghiasi_3ck_01_0121 and reduce eye height window from 7.5 dB to 14+/- 0.5 dB

*Proposed Response* *Response Status* **O**

*Cl* **120G** *SC* **120G.3.4.1.1** *P* **242** *L* **3** # 89

Ghiasi, Ali — Ghiasi Quantum/Inphi

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

Addressing the TBD in the paragraph

*SuggestedRemedy*

A fast ASIC with 7.6 ps output rise time when passes through a mated board with just 5 dB loss produces 12 ps 20-80% rise time, the full swing is about 2x. But given that module PCB may have lower than HCB loss, then I suggest 20 ps for the slew from -350 mV to + 350 mV and with amplitude of 700 mV, the reason amplitude is reduced is due assumption that signal will have pre-emphasis on for this measurement otherwise one could go with 900 mV amplitude I don't believe that is reasonable.

*Proposed Response* *Response Status* **O**

*Cl* **120G** *SC* **120G.5.2** *P* **245** *L* **18** # 90

Ghiasi, Ali — Ghiasi Quantum/Inphi

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

gDC near end of -2 dB result in some cases VEC to increase by more than 10 dB when TX FIR is optimized about in the middle and when that module is plugged into low loss host then you end up with excessive peaking!

*SuggestedRemedy*

Please reduce gDC for TP4 near end from -2 dB to -1 dB

*Proposed Response* *Response Status* **O**

*Cl* **162** *SC* **162.11** *P* **162** *L* **36** # 91

Haser, Alex — Molex

*Comment Type* **E** *Comment Status* **X**

"Cable assembly supports… achievable cable length of at least 2 m"; spec is written around a 1.75 m cable

*SuggestedRemedy*

Change text to "…achievable cable length of at least 1.75 m"

*Proposed Response* *Response Status* **O**

*Cl* **162** *SC* **162.11** *P* **162** *L* **38** # 92

Haser, Alex Molex

*Comment Type* **E** *Comment Status* **X**

"Cable assembly supports… achievable cable length of at least 2 m"; spec is written around a 1.75 m cable

*SuggestedRemedy*

Change text to "…achievable cable length of at least 1.75 m"

*Proposed Response* *Response Status* **O**

*Cl* **162** *SC* **162.11** *P* **162** *L* **40** # 93

Haser, Alex Molex

*Comment Type* **E** *Comment Status* **X**

"Cable assembly supports… achievable cable length of at least 2 m"; spec is written around a 1.75 m cable

*SuggestedRemedy*

Change text to "…achievable cable length of at least 1.75 m"

*Proposed Response* *Response Status* **O**

*Cl* **162** *SC* **162.11** *P* **163** *L* **18** # 94

Haser, Alex Molex

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

Fill in TBD for CA ERL limit

*SuggestedRemedy*

Replace TBD with 7.4 dB based on champion_3ck_02_1020.pdf slide 6

*Proposed Response* *Response Status* **O**

*Cl* **162** *SC* **162.11.7.2** *P* **171** *L* **1** # 95

Haser, Alex Molex

*Comment Type* **E** *Comment Status* **X**

"The crosstalk paths for each MDI type are given in Table…"; the table specifies the number of crosstalk paths, not the paths themselves

*SuggestedRemedy*

Change text to "The number of crosstalk paths of each MDI…"

*Proposed Response* *Response Status* **O**

*Cl* **162B** *SC* **162B.1** *P* **259** *L* **20** # 96

Haser, Alex Molex

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

The reference MTF IL at 26.56 GHz is 6.66 dB

*SuggestedRemedy*

Change text from 6.6 dB to 6.7 dB to capture rounding correctly

*Proposed Response* *Response Status* **O**

*Cl* **162B** *SC* **162B.1.3.1** *P* **262** *L* **36** # 97

Haser, Alex Molex

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

Fill in TBD for MTF FOM_ILD limit

*SuggestedRemedy*

Fill in a value of 0.18 dBrms based on haser_3ck_adhoc_01c_062420.pdf slide 7

*Proposed Response* *Response Status* **O**

*Cl* **162B** *SC* **162B.1.3.2** *P* **262** *L* **43** # 98

Haser, Alex Molex

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

Fill in TBD for MTF ERL limi

*SuggestedRemedy*

Replace TBD with 9 dB based on diminico_3ck_03a_1020.pdf slide 7

*Proposed Response* *Response Status* **O**

*Cl* **162B** *SC* **162B.1.3.2** *P* **263** *L* **16** # 99

Haser, Alex Molex

*Comment Type* **ER** *Comment Status* **X**

The other ERL parameter tables throughout the specification include a note explaining the value for T_fx; we should add one here too, especially since it's different than the other T_fx values used in ERL calculations

*SuggestedRemedy*

Add a note to Table 162B-1 containing the following text: "The specified T_fx value represents a propagation delay of zero which captures to electrical characteristics of the entire test fixture, including the test connector and test fixture transmission line in its entirety."

*Proposed Response* *Response Status* **O**

*Cl* **162B** *SC* **162B.1.3.6** *P* **265** *L* **36** # 100

Haser, Alex Molex

*Comment Type* **ER** *Comment Status* **X**

CMDRL(f) is defined as common-mode return loss; this is incorrect

*SuggestedRemedy*

Define CMDRL(f) as common-mode to differential mode return loss

*Proposed Response* *Response Status* **O**

*Cl* **162** *SC* **162.11.4** *P* **165** *L* **8** # 101

Champion, Bruce TE Connectivity

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

Cable Assembly Diff-to-Common Mode Return loss is too tight for high volume production testing at the higher frequencies. Failures are occuring because of testing artifacts and not because of poor cable assemblies. A slight relaxation of the limit is requested to account for this.

*SuggestedRemedy*

It is recommended to use the following equation for this limit:

Return Loss(f) ≥ 22-10(f/26.56) for 0.05 ≤ f < 26.56
Return Loss(f) ≥ 19 - 7(f/26.56) for 26.56≤ f ≤ 40 GHz
See presentation

*Proposed Response* *Response Status* **O**

*Cl* **162** *SC* **162.11.6** *P* **166** *L* **37** # 102

Champion, Bruce TE Connectivity

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

There is a disrepancy between what is specifed for the MTF CM-to-CM RL and the cable assembly CM-to-CM RL.

The MTF CM-to-CM RL limit is set to -3 dB. When MTFs designed close to this limit are used in cable assembly Tp1-Tp4 channels, the Tp1-Tp4 CM-to-CM RL will fail the -2 dB limit.

*SuggestedRemedy*

It is recommended to use the following equation to take into account the worst case MTF design.

Return Loss(f) ≥ 1.8 for 0.05 ≤ f ≤ 40

*Proposed Response* *Response Status* **O**

*Cl* **162** *SC* **162.11** *P* **163** *L* **18** # 103

Champion, Bruce TE Connectivity

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

Cable Assembly ERL listed as TBD in Table 162-16

*SuggestedRemedy*

TBD to be changed to 7.4 dB. See champion_3ck_02_1020.pdf

*Proposed Response* *Response Status* **O**

*Cl* **162B** *SC* **162B.1.3.1** *P* **262** *L* **36** # 104

Champion, Bruce TE Connectivity

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

FOM_ILD is listed at TBD.

*SuggestedRemedy*

TBD to be changed to 0.18 dB

*Proposed Response* *Response Status* **O**

*Cl* **162B** *SC* **162B.1.3.2** *P* **262** *L* **43** # 105

Champion, Bruce TE Connectivity

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

MTF ERL is listed at TBD in draft

*SuggestedRemedy*

TBD to be chaned to 9 dB. See diminico_3ck_03a_1020.pdf

*Proposed Response* *Response Status* **O**

*Cl* **162B** *SC* **162B.1.3.2** *P* **262** *L* **43** # 106

DiMinico, Christopher MC Communications

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

Provide value for mated test fixture ERL TBD.

*SuggestedRemedy*

The mated test fixture ERL shall be greater than or equal to 9 dB.
Update PICS.

See diminico_3ck_adhoc_01a_121620 slide 6.

*Proposed Response* *Response Status* **O**

*Cl* **162B** *SC* **162B.1.3.1** *P* **262** *L* **36** # 107

DiMinico, Christopher MC Communications

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

Provide value for mated test fixture FOMILD TBD.

*SuggestedRemedy*

See diminico_3ck_adhoc_01a_121620
Update PICS

*Proposed Response* *Response Status* **O**

*Cl* **120F** *SC* **120F.3.1.2** *P* **214** *L* **34** # 108

Hidaka, Yasuo Credo Semiconductor, Inc.

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

C(-3) has been discussed and the editor's note should have been removed long time ago.

*SuggestedRemedy*

Remove editor's note on the pre-cursor tap c(-3).

*Proposed Response* *Response Status* **O**

*Cl* **162** *SC* **162.9.3.4** *P* **156** *L* **46** # 109

Hidaka, Yasuo — Credo Semiconductor, Inc.

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

A detail definition of PRBS9Q with the entire sequence is recommended to avoid implementation errors.

*SuggestedRemedy*

Define PRBS9Q as a new clause in clause 120.5.11.2 using clause 120.5.11.2.1 as a template.

Modify the second paragraph of 120.5.11.2.1 as follows:

When the PRBS9Q test pattern enabled, it replaces the signal on the output lane(s) for which it is enabled. The PRBS9Q test pattern is a repeating 511-symbol sequence formed by Gray coding pairs of bits from two repetitions of the PRBS9 pattern into PAM4 symbols as described in 120.5.7. The PRBS pattern generator produces the same result as the implementation shown in Figure XX–X, which implements the generator polynomial shown in Equation (YY–Y). Since the PRBS9 pattern is an odd number of bits in length, bits which are mapped as the first bit of a PAM4 symbol during one repetition of the PRBS9 sequence are mapped as the second bit of a PAM4 symbol during the next repetition of the PRBS9 sequence, and bits which are mapped as the second bit of a PAM4 symbol are mapped as the first bit of the following symbol in the next repetition of the PRBS9 sequence. For example, if the PRBS9 generator used to create the PRBS9Q sequence is initialized to a seed value of 111111111 (with the leftmost bit in S0 and the rightmost in S8), the PRBS9Q sequence is the following Gray coded PAM4 symbols, transmitted left to right:
0012322303231310010331213302202231320111030230213332303130303000
1003020031203332002123313231011003321022213103113222031333131300
0201311013311222101130233203202201221210013321323200113322333330
0110332203232300120233102211211010301312003221320210023220022223
0022122011202030031102321012312202130333101201321112010201010000
3010130102311113013221021203033011133122320310321223102110202000
1302033021032223303201211311312302232330021132121300321122111100
0331112311212000231210312332333031002023011232131330121230122222.

Draw Figure XX-X "PRBS9 pattern generator" similar to Figure 94-6 but according to polynomial 1 + x^5 + x^9.

Define Equation (YY-Y) as G(x) = 1 + x^5 + x^9 or make a reference to the polynomial in Table 68-6.

Make a reference to the new clause from 162.9.3.4.

*Proposed Response* *Response Status* **O**

*Cl* **162** *SC* **162.9.3.4** *P* **156** *L* **46** # 110

Hidaka, Yasuo — Credo Semiconductor, Inc.

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

A detail definition of twelve edges in PRBS9Q is recommended to improve reproducibility of even-odd jitter measurement.

*SuggestedRemedy*

Add a new table "PRBS9Q pattern symbols used for even-odd jitter measurements" similar to Table 120D-4, but replacing the values as follows:

Label: Description : Gray coded PAM4 symbol : first : TR begins : TR ends : last
REF : Reference : 33333 : 1 : - : - : 5
R03 : 0 to 3 rise : 1000 331 : 260 : 263 : 264 : 266
F30 : 3 to 0 fall : 233333 001 : 511 : 5 : 6 : 8
R12 : 1 to 2 rise : 3111 23 : 265 : 268 : 269 : 270
F21 : 2 to 1 fall : 1222 10 : 466 : 469 : 470 : 471
R01 : 0 to 1 rise : 2000 13 : 195 : 198 : 199 : 200
F10 : 1 t0 0 fall : 21111 0003 : 256 : 260 : 261 : 264
R23 : 2 to 3 rise : 3222 330 : 210 : 213 : 214 : 216
F32 : 3 to 2 fall : 0333 20 : 401 : 404 : 405 : 406
R02 : 0 to 2 rise : 2000 23 : 275 : 278 : 279 : 280
F20 : 2 to 0 fall : 12222 001 : 321 : 325 : 326 : 328
R13 : 1 to 3 rise : 0111 331 : 166 : 169 : 170 : 172
F31 : 3 to 1 fall : 0333 10 : 107 : 110 : 111 : 112

Add an exception to use the new table instead of Table 120D-4, when PRBS9Q is used as the test pattern for even-odd jitter measurement.

*Proposed Response* *Response Status* **O**

*Cl* **162B** *SC* **162B.1.3** *P* **262** *L* **36** # 111

Kocsis, Sam — Amphenol

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

MTF FOM_ILD requirement is TBD

*SuggestedRemedy*

Replace TBD with 0.18dB

*Proposed Response* *Response Status* **O**

*Cl* **162B** *SC* **162B.1.3.2** *P* **262** *L* **43** # 112

Kocsis, Sam Amphenol

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

MTF ERL requirement is TBD (also in PICS TF2)

*SuggestedRemedy*

Replace TBD with 10dB

*Proposed Response* *Response Status* **O**

*Cl* **162** *SC* **162.11** *P* **163** *L* **17** # 113

Kocsis, Sam Amphenol

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

CA ERL requirement is TBD

*SuggestedRemedy*

Replace TBD with 9dB

*Proposed Response* *Response Status* **O**

*Cl* **162B** *SC* **162B.1.3.3** *P* **263** *L* **34** # 114

Kocsis, Sam Amphenol

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

Recommended MTF RL mask does not provide useful information to the reader

*SuggestedRemedy*

Remove the mask from the spec

*Proposed Response* *Response Status* **O**

*Cl* **162** *SC* **162.11.7** *P* **167** *L* **21** # 115

Li, Mike Intel

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

Cp of 8.7x1e-5 nF could be improved to provide the needed channel/link solution margin and it is suppoted by the latest package technology/product (see oif2020.224.01). Moreover, such an improvement would be aligned with the latest CEI-112G-LR-PAM4 spec, and benifiting the ecosystem at large.

*SuggestedRemedy*

change Cp to 6.0x1e-5 nF

*Proposed Response* *Response Status* **O**

*Cl* **163** *SC* **163.10.1** *P* **190** *L* **46** # 116

Li, Mike Intel

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

Cp of 8.7x1e-5 nF could be improved to provide the needed channel/link solution margin and it is suppoted by the latest package technology/product (see oif2020.224.01). Moreover, such an improvement would be aligned with the latest CEI-112G-LR-PAM4 spec, and benifiting the ecosystem at large.

*SuggestedRemedy*

change Cp to 6.0x1e-5 nF

*Proposed Response* *Response Status* **O**

*Cl* **120F** *SC* **120F.4.1** *P* **220** *L* **29** # 117

Li, Mike Intel

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

Cp of 8.7x1e-5 nF could be improved to provide the needed channel/link solution margin and it is suppoted by the latest package technology/product (see oif2020.224.01). Moreover, such an improvement would be aligned with the latest CEI-112G-MR-PAM4 spec, and benifiting the ecosystem at large.

*SuggestedRemedy*

change Cp to 6.0x1e-5 nF

*Proposed Response* *Response Status* **O**

*Cl* **162** *SC* **162.9.3** *P* **152** *L* **30** # 118

Ran, Adee Intel

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

(addressing TBD)
Tx CM to differential return loss refers to 92.8.3.3 with equation TBD.

In clause 92 the RLCD of Tx and Rx have the same specifications - eq (92–2) in 92.8.3.3 and eq (92–21) in 92.8.4.3, respectively, which are identical; and there is no RLCD for cable assembly.

The conversion loss specifications may need more work, but for the purpose of technical completeness, it is suggested to use the same equation used for the cable assembly, since in both cases the measurement involves mated connectors and results should be comparable.

*SuggestedRemedy*

Add a subclause for Tx differential to common mode return loss, with equation identical to equation (162–9), or point to (162–9).

*Proposed Response* *Response Status* **O**

*Cl* **162** *SC* **162.9.4** *P* **158** *L* **16** # 119

Ran, Adee Intel

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

(addressing TBD)
Rx differential to common-mode (conversion) input return loss refers to 92.8.4.3 with value TBD.

In clause 92 the RLCD of Tx and Rx have the same specifications - eq (92–2) in 92.8.3.3 and eq (92–21) in 92.8.4.3, respectively, which are identical; and there is no RLCD for cable assembly.

The conversion loss specifications may need more work, but for the purpose of technical completeness, it is suggested to use the same equation used for the cable assembly, since in both cases the measurement involves mated connectors and results should be comparable.

As an alternative consider removing this specification (the Rx owns its performance).

*SuggestedRemedy*

Add a subclause for Rx differential to common mode return loss, with equation identical to equation (162–9), or point to (162–9).

*Proposed Response* *Response Status* **O**

*Cl* **162** *SC* **162.11** *P* **163** *L* **17** # 120

Ran, Adee Intel

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

(addressing TBD)
Minimum cable assembly ERL is TBD.

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 cable assembly cannot exceed 10.3 dB.

It can be assumed that the cable has more uniform impedance than the host board, so its ERL will be closer to that of a MTF.

The suggested value allows 1.3 dB difference for cable assembly implementation.

*SuggestedRemedy*

Change TBD to 9 dB.

*Proposed Response* *Response Status* **O**

*Cl* **163** *SC* **163.9.3** *P* **187** *L* **41** # 121

Ran, Adee Intel

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

(addressing TBD)
Rx Differential to common-mode (conversion) input return loss refers to 93.8.1.4 with value TBD. This subclause uses equation (93-5) to define the limit.

The conversion loss specifications may need more work, but for the purpose of technical completeness, it is suggested to use a piecewise-linear equation similar to (93-5). Boundary lines are suggested to match the ones used in OIF CEI-112G-LR for the 53.125 GHz signaling frequency.

As an alternative consider removing this specification (the Rx owns its performance).

*SuggestedRemedy*

Add a new subclause for Rx differential to common mode return loss with the equation:

RLdc(f) ≥ 25-20*(f/fb) for 0.05 ≤ f ≤ fb/2
RLdc(f) ≥ 15 for fb/2 < f ≤ 40
where f is the frequency in GHz and fb=53.125.

*Proposed Response* *Response Status* **O**

*Cl* **163** *SC* **163.10.4** *P* **192** *L* **44** # 122

Ran, Adee Intel

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

(addressing TBD)
For the KR PHY, the channel "differential to common-mode conversion loss of TP0 and TP5" is TBD.

For the CR PHY this parameter is specified in 162.11.5 as "The difference between the cable assembly differential to common-mode conversion loss and the cable assembly insertion loss" with equation (162-10).

For the purpose of technical completeness, a similar equation can be used for KR.

*SuggestedRemedy*

Rewrite this subclause based on 162.11.5, substituting "TP0 to TP5 channel" for "cable assembly" with editorial license.

*Proposed Response* *Response Status* **O**

*Cl* **120F** *SC* **120F.4.3** *P* **223** *L* **5** # 123

Ran, Adee Intel

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

(addressing TBD)
Channel ERL minimum is TBD.

The ERL parameters specific to C2C take into account the difference in reference receiver. With the respective parameters, ERL (which is the relative effect of reflections vs. signal) should have the same limit.

*SuggestedRemedy*

Set channel ERL minimum identical to 163.10.3 where the minimum is 9.7 dB.

*Proposed Response* *Response Status* **O**

*Cl* **120G** *SC* **120G.3.1.5** *P* **233** *L* **17** # 124

Ran, Adee Intel

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

"The crosstalk generator is calibrated at TP4 (without the use of a reference receiver) with target differential peak-to-peak amplitude of TBD mV and slew time of TBD ps between –TBD V and +TBD V"

This is the host output test; the crosstalk generator represents the module output. We specify the PtP amplitude and transition time for modules at TP4 in Table 120G–3. The calibration should use the maximum amplitude and minimum transition time values from that table.

*SuggestedRemedy*

Change the quoted sentence to:

"The crosstalk generator is calibrated at TP4 (without the use of a reference receiver) with targets equal to the Differential peak-to-peak output voltage (max) and Transition time (min, 20% to 80%) in Table 120G-3".

*Proposed Response* *Response Status* **O**

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

Ran, Adee Intel

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

(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* **O**

*Cl* **120G** *SC* **120G.3.2** *P* **234** *L* **30** # 126

Ran, Adee Intel

*Comment Type* **ER** *Comment Status* **X**

(Addressing editor's note requiring confirmation)
Editor's note indicates that AC common-mode specification needs confirmation. It has not been confirmed that the existing limit of 17.5 mV RMS is obtainable, but there is no consensus on another value.

Work is planned to refine the measurement method to allow separation of different sources of common mode signal and fine-tuned specification, but it will likely continue into later phases of P802.3ck.

This should not preclude progressing to WGB with the current method and limit.

*SuggestedRemedy*

Delete the editor's note.

*Proposed Response* *Response Status* **O**

*Cl* **120G** *SC* **120G.3.2.2** *P* **235** *L* **34** # 127

Ran, Adee Intel

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

(addressing TBD)
"The crosstalk generator is calibrated at TP1a (without the use of a reference receiver) with target differential peak-to-peak amplitude of TBD mV and target transition time of TBD ps"

This is the module output test; the crosstalk generator represents the host output. We specify the PtP amplitude and transition time for hosts at TP1a in Table 120G–1. The calibration should use the maximum amplitude and minimum transition time values from that table.

*SuggestedRemedy*

Change the quoted sentence to:

"The crosstalk generator is calibrated at TP1a (without the use of a reference receiver) with targets equal to the Differential peak-to-peak output voltage (max) and Transition time (min, 20% to 80%) in Table 120G-1".

*Proposed Response* *Response Status* **O**

*Cl* **120G** *SC* **120G.3.3.2.1** *P* **238** *L* **54** # 128

Ran, Adee Intel

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

(addressing TBD)
"The counter propagating crosstalk signals during calibration of the stressed signal are asynchronous with target amplitude of TBD mV peak-to-peak differential and 20% to 80% target transition time of TBD ps"

This is the host stressed input test; the actual counter-propagating signals are from the host's own transmitter. For calibration purposes we can assume that the host uses the maximum amplitude and minimum transition time. If the host does not reach the limits, then it may benefit from less crosstalk during the actual test - but as long as it meets the host output specifications, it is acceptable.

We specify the PtP amplitude and transition time for hosts at TP1a in Table 120G–1. The calibration should use the maximum amplitude and minimum transition time values from that table.

*SuggestedRemedy*

Change the quoted sentence to:

"The counter-propagating crosstalk signals are asynchronous with respect to the input signal and are calibrated at TP1a (without the use of a reference receiver) with targets equal to the Differential peak-to-peak output voltage (max) and Transition time (min, 20% to 80%) in Table 120G-1".

*Proposed Response* *Response Status* **O**

*Cl* **120G** *SC* **120G.3.4.1.1** *P* **242** *L* **2** # 129

Ran, Adee Intel

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

(addressing TBD)
"The counter propagating crosstalk signals during calibration of the stressed signal are asynchronous with target amplitude of TBD mV peak-to-peak differential and target slew time between –TBD mV and TBD mV of TBD ps as measured at TP4"

This is the module stressed input test; the actual counter-propagating signals are from the module's own transmitter. For calibration purposes we can assume that the module uses the maximum amplitude and minimum transition time. If the module does not reach the limits, then it may benefit from less crosstalk during the actual test - but as long as it meets the module output specifications, it is acceptable.

We specify the PtP amplitude and transition time for modules at TP4 in Table 120G–3. The calibration should use the maximum amplitude and minimum transition time values from that table.

*SuggestedRemedy*

Change the quoted sentence to:

"The counter-propagating crosstalk signals are asynchronous with respect to the input signal and are calibrated at TP4 (without the use of a reference receiver) with targets equal to the Differential peak-to-peak output voltage (max) and Transition time (min, 20% to 80%) in Table 120G-3".

*Proposed Response* *Response Status* **O**

*Cl* **162B** *SC* **162B.1.3.1** *P* **262** *L* **36** # 130

Ran, Adee Intel

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

(addressing TBD)
"FOMILD shall be less than (TBD) dB"

The importance of this parameter for quality of test fixtures in the context of this project has not been presented. ERL likely covers what FOMILD originally intended to cover.

The specification should be deleted without loss of technical completeness.

*SuggestedRemedy*

Delete the quoted sentence.

*Proposed Response* *Response Status* **O**

*Cl* **162B** *SC* **162B.1.3.2** *P* **262** *L* **43** # 131

Ran, Adee Intel

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

(addressing TBD)
"The mated test fixture ERL shall be greater than or equal to TBD dB"

We have adopted a minimum of 7.3 dB for a host ERL in Table 162–10 (with parameters in 162.9.3.5). The parameters for MTF are the same, except that "Time-gated propagation delay" is 0 instead of 0.2 ns.

The value 0 was accepted explicitly (comment #122 against D1.3) but the differnece does not seem to be justified, since the MTF includes the test fixture used for host ERL measurement (where the connector is time gated). Different time gating creates difference in the meaning of ERL.

The ERL from a high-quality MTF is the upper bound for any measurement of a DUT which uses any one of the test fixtures. Therefore, it should be significantly higher than 7.3 dB.

It is suggested to divide the budget evenly to allow about the same reflection power from the DUT's internal circuitry as from the mated connectors; if each one is 10.3 dB then their combination (RSS, since reflections are independently distributed) would be 7.3 dB.

*SuggestedRemedy*

Change minimum ERL from TBD to 10.3 dB.

In Table 162B–1, change T_fx from 0 to 0.2 ns.

*Proposed Response* *Response Status* **O**

*Cl* **163B** *SC* **163B.2** *P* **290** *L* **16** # 132

Ran, Adee Intel

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

(addressing TBD)
The example test fixture is defined only by the magnitude of its insertion loss. Therefore it is impossible for a reader to calculate reference values at TP0a, and this example does not help.

The lack of full channel information also prevents calculation of consensus values to replace the TBDs in Table 163B–1.

It is suggested to replace the definition to a full s-parameters model based on the equations in 162.11.7.1.1 with the same z_p, creating an IL of 4.33 dB at 26.56 GHz. This will enable calculation of the reference values.

Alternatively, use a smaller value for z_p to create an IL of 2.8 dB.

*SuggestedRemedy*

Replace the text of this paragraph with text referring to 162.11.7.1.1 and equation 162-12 and update the reference values (currently TBD) accordingly.

A presentation with a more detailed proposal is planned.

*Proposed Response* *Response Status* **O**

*Cl* **163** *SC* **163.9.2** *P* **185** *L* **28** # 133

Ran, Adee Intel

*Comment Type* **E** *Comment Status* **X**

The editor's note states that "In Table 163–5, common-mode to common-mode return loss reference is not appropriate". But it is appropriate; comment #228 against D1.3 was referring to the frequency range of the test fixture's specification and did not request any change to this reference (the problem is in the response).

*SuggestedRemedy*

Delete the editor's note, without any change to the table.

*Proposed Response* *Response Status* **O**

*Cl* **120F** *SC* **120F.3.1.2** *P* **214** *L* **34** # 134

Ran, Adee Intel

*Comment Type* **ER** *Comment Status* **X**

The editor's note states that pre-cursor tap
c(–3) will be removed from this specification if it is shown to “have no value”.

This has not been shown in four comment cycles since the addition of this note, so there is no need to keep it.

*SuggestedRemedy*

Delete the editor's note.

*Proposed Response* *Response Status* **O**

*Cl* **120F** *SC* **120F.3.2.3** *P* **218** *L* **43** # 135

Ran, Adee Intel

*Comment Type* **ER** *Comment Status* **X**

(Addressing editor's note requiring confirmation)
The editor's note states that the values specified for “Insertion loss at 26.5625 GHz” for test 2 require confirmation. (These values are for the high-loss test).

No proposal has been made to change the values in this table in four comment cycles since the addition of this note, so there is no need to keep it.

Note that the baseline proposal https://www.ieee802.org/3/ck/public/19_09/li_3ck_01d_0919.pdf has a comment in slide 16 that "Max informative recommended loss value is place holder and require further investigation". But the value in this table is not the informative recommended loss - it is the normative loss of the interference tolerance test. The annex does not include a "max informative recommended loss value", so there is nothing to confirm/investigate.

The IL in the high-loss test suggests the maximum loss for a channel, but the project's objective are met regardless of the value.

*SuggestedRemedy*

Delete the editor's note.

*Proposed Response* *Response Status* **O**

*Cl* **120F** *SC* **120F.3.2.3** *P* **218** *L* **16** # 136

Ran, Adee Intel

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

"Bessel-Thomson low pass response with 53 GHz 3 dB bandwidth" - we have 40 GHz in all other corresponding places in this draft.

This is for calibrating the pattern generator in the C2C Rx test setup. There is no reason for higher bandwidth in this specific subclause. All precedent cases use the same bandwidth for Rx
and for the Tx test (e.g. 33 GHz in 120D.3.2.1).

*SuggestedRemedy*

Change "53" to "40".

*Proposed Response* *Response Status* **O**

*Cl* **163** *SC* **163.10.1** *P* **190** *L* **26** # 137

Ran, Adee Intel

*Comment Type* **E** *Comment Status* **X**

This subclause is titled "Channel Operating margin" so it should only discuss COM, not recommended IL limits and ERL requirements.

There are additional requirements not listed here (e.g. mode conversion loss, 163.10.4)

*SuggestedRemedy*

Move the second paragraph (which points to 163.10.2 and 163.10.3) to the parent subclause 163.10.

Consider adding a summary table in 163.10 as in the Tx and Rx characteristics.

*Proposed Response* *Response Status* **O**

*Cl* **120G** *SC* **120G.3.3** *P* **237** *L* **37** # 138

Ran, Adee Intel

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

For module output (120G.3.2, table 120G-3), host input (120G.3.3, table 120G-6), and module input (120G.3.4, table 120G-9), the reference subclause for "Common-mode to differential return loss (min)" is incorrect - 120G.3.1.2 discusses ERL.

There is one subclause that discusses RLCD, 120G.3.1.1, but it is currently specific to host output.

*SuggestedRemedy*

Change reference from 120G.3.1.2 to 120G.3.1.1 in the 3 tables.

Rephrase the text in 120G.3.1.1 to refer to both host and module, output and input.

*Proposed Response* *Response Status* **O**

*Cl* **163** *SC* **163.10** *P* **190** *L* **28** # 139

Ran, Adee Intel

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

There is no specification for RLDC for the KR channel.

Without such specification, a channel can cause a strong common mode reflection signal that will be fed into the Tx - and since Tx RLCD/RLCC are not defined either, a differential or common mode signal can be reflected back without control.

The conversion loss specifications may need more work, but for the purpose of technical completeness, the channel RLDC from 162.11.4 can be used.

Also in missing 120F.

*SuggestedRemedy*

Add a new subclause for channel differential to common mode return loss, based on 162.11.4 with the same limits, with editorial license.

Apply similarly in 120F.

*Proposed Response* *Response Status* **O**

*Cl* **162** *SC* **162.9.3** *P* **152** *L* **35** # 140

Dawe, Piers Nvidia

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

The recommended maximum insertion loss allocation for the host traces plus BGA footprint and host connector footprint, of 6.875 dB, compares very poorly with C2M's host insertion loss up to 11.9 dB, making passive copper expensive and unattractive for a switch, while 6.875 dB is overkill for a NIC. Server-switch links will get made with an asymmetric loss budget, so it would be better for the standard to regularise what will happen anyway. By the way, many server-switch cables will be asymmetric too (different form factors at server and switch ends), and that's already allowed in this draft.

*SuggestedRemedy*

As we have done for C2M, create two kinds of CR ports. Host loss allocations of 3.75 dB and 10 dB. Short can connect to short or long; long to long is not supported. Add entries in Clause 73 Auto-Negotiation to advertise short and long to the other end.
In Table 162-10, provide separate limits for Linear fit pulse peak (min).
In Table 162-14, provide separate rows for Test channel insertion loss: for testing the short host input the values for Test 2 are 10-6.875 = 3.125 dB higher (26.75 dB and 27.75 dB), while for the long host input the values for Test 2 are 6.875-3.75 = 3.125 dB lower (20.5 dB and 21.5 dB). No change needed for Test 1.
In 162A.4, provide two equations for IL_PCBmax and for ILHostMax and show them in Fig 162A-1 and 2. Provide two Value columns in Table 162A-1. Adjust figures 162-3 and 4.

In 162.11.7.1.1, zp, representing the extra loss a host has above an MCB, could be made asymmetric but I believe that would not bring an improvement in accuracy.
There could be a third kind of CR port with 6.875 dB but this would be useful for only a subset of switch-switch links, for which passive copper is a subset anyway, so it doesn't seem worthwhile.

*Proposed Response* *Response Status* **O**

*Cl* **162** *SC* **162.9.3** *P* **152** *L* **35** # 141

Dawe, Piers Nvidia

*Comment Type* **E** *Comment Status* **X**

Clumsy "x vf" way of defining linear fit pulse peak (min)

*SuggestedRemedy*

Use "Linear fit pulse peak ratio" as in 163 and 163A.3.2.1. Note the unit in the table changes to V/V.

*Proposed Response* *Response Status* **O**

*Cl* **162** *SC* **162.9.3.3** *P* **156** *L* **31** # 142

Dawe, Piers Nvidia

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

The transmitter SNDR measurement uses the method described in

*SuggestedRemedy*

Transmitter SNDR is defined by the [measurement] method {of | described in}

*Proposed Response* *Response Status* **O**

*Cl* **162** *SC* **162.9.3.6** *P* **157** *L* **30** # 143

Dawe, Piers Nvidia

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

1. This paragraph claims that the minimum common-mode to common-mode return loss is specified to reduce reflections of signals that were generated originally as differential and end up as differential. This is not the case: it is included to contain a gross build-up of CM voltage on the line that is otherwise unbounded. If it were intended to address mixed-mode issues it would be a tighter spec, but that's not viable for front-panel connectors. Other specs such as Rx Differential to common-mode return loss and Tx Common-mode to differential mode return loss address the problem stated.
2. This is a standard, not an attempt at a textbook. We don't give any justifications for most other specs; there is no reason that this one should be different.

*SuggestedRemedy*

Delete the paragraph

*Proposed Response* *Response Status* **O**

*Cl* **163** *SC* **163.10.2** *P* **192** *L* **28** # 144

Dawe, Piers Nvidia

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

The limit at 40 GHz (not 45 as in the figure) excludes some acceptable channels.

*SuggestedRemedy*

Replace the straight part of the limit with one that curves down. (with an f^2 term). Correct the fmax in Figure 163-5.

*Proposed Response* *Response Status* **O**

*Cl* **120G** *SC* **120G.3.2** *P* **234** *L* **10** # 145

Dawe, Piers Nvidia

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

For a reasonably clean module (or test equipment in a host stressed eye test), the driver swing has to be aggressively reduced to deliver only 24 mV at near end, short setting. 120E has 70 mV.

*SuggestedRemedy*

Eye height limits should be set sensibly for short and long modes, near and far - not all the same.
Change the NEEH from 24 mV to 40 mV.

*Proposed Response* *Response Status* **O**

*Cl* **120G** *SC* **120G.3.2** *P* **234** *L* **26** # 146

Dawe, Piers Nvidia

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

As already discussed, the 2-settings method with only two compliance losses doesn't work. If the module is set to the short setting, and the host receiver isn't that near, the eye it is offered is smaller than 24 mV because of loss, and out of tune as well. If the module is set to the long setting and the host isn't that long, the eye is also out of tune. There's no guarantee that either setting is usable.

*SuggestedRemedy*

There should be 4 EH-VEC limit pairs: short near and far, and long near and far, in Table 120G. In 120G.3.2.2.1, give the four zp values: for short, 0 (as at present) and 184, for long, 61 and 244.7 (as at present).

*Proposed Response* *Response Status* **O**

*Cl* **120G** *SC* **120G.3.2.1** *P* **234** *L* **38** # 147

Dawe, Piers Nvidia

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

The module output doesn't have to "support" two things (e.g. receive, co-operate, enable, or similar), it has to actually do them.

*SuggestedRemedy*

Change "The module output shall support two..." to "The module output shall operate in two..."

*Proposed Response* *Response Status* **O**

*Cl* **120G** *SC* **120G.3.2.1** *P* **234** *L* **38** # 148

Dawe, Piers Nvidia

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

What the module output is being asked to do is not equalization, but the opposite (emphasis), and it may have to adjust its swing also. The two modes aren't states and there is no state machine.

*SuggestedRemedy*

Change "two equalization states: short and long." to "two output modes, called short and long." Change subclause title from "Module output transmit equalizer control" to "Module output mode control". Change table title from "Module state mapping" to "Module output modes".

*Proposed Response* *Response Status* **O**

*Cl* **120G** *SC* **120G.3.2.1** *P* **234** *L* **41** # 149

Dawe, Piers Nvidia

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

The module output is not tx_anything, it's part of the receive path.

*SuggestedRemedy*

Change "tx_eq_state" to "module output mode".

*Proposed Response* *Response Status* **O**

*Cl* **120G** *SC* **120G.3.2.1** *P* **234** *L* **41** # 150

Dawe, Piers Nvidia

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

I wonder what "control variable" means, as I don't believe it is used anywhere else in this document and in this subclause it's "implementation dependent". Also I wonder whether providing this mapping from S and L to 0 and 1 is helpful - maybe it should be left to CMIS and the SFF committee.

*SuggestedRemedy*

Consider telling the story without "control variable", 0 and 1, and change the middle column of Table 120G-4 from 0 and 1 to S and L.

*Proposed Response* *Response Status* **O**

*Cl* **120G** *SC* **120G.3.2.1** *P* **235** *L* **2** # 151

Dawe, Piers Nvidia

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

The list of module "Host Electrical Interface Codes" is kept in SFF-8024, Rev 4.8, Table 4-5 Host Electrical Interface Codes, and the column is headed "specification". "Application" is something else (a pair of host electrical interface and media interface specifications) as defined in CMIS.

*SuggestedRemedy*

Change "application name" to "host electrical interface" or "module electrical interface".

*Proposed Response* *Response Status* **O**

*Cl* **120G** *SC* **120G.3.2.1** *P* **235** *L* **8** # 152

Dawe, Piers Nvidia

*Comment Type* **E** *Comment Status* **X**

"IEEE Interface Type" is too grand: IEEE is much wider than 802.3, and the Capitals Are Unwarranted.

*SuggestedRemedy*

Change to "IEEE 802.3 interface type"

*Proposed Response* *Response Status* **O**

*Cl* **120G** *SC* **120G.5.2** *P* **245** *L* **9** # 153

Dawe, Piers Nvidia

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

By allowing stronger gDC with stronger gDC2, we can have up to 12 dB of peaking for gCD2 = -1 but up to 16 dB for gDC2 = -3 - yet we don't expect the maximum channel loss to vary like that.

*SuggestedRemedy*

For TP1a, change the second -12 to -11, and -13 to -10 (so the strongest "CTLE peaking" is 13).

*Proposed Response* *Response Status* **O**

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

Dawe, Piers Nvidia

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

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* **O**