Cl **162C** *SC* **162C.1** *P* **259** *L* **11** # 1

Lusted, Kent — Intel Corporation

Comment Type **TR** *Comment Status* **A**

The MDI connector contact mapping for the OSFP connector is incorrect. Many of the contact mappings have incorrect polarity and there are several GND mappings that were missed as well

SuggestedRemedy

Update Table 162C-3 with the correct contact mapping. See presentation submitted to Task Force.

Response *Response Status* **C**

ACCEPT IN PRINCIPLE.

Implement the contact mapping per the following presentation:
http://www.ieee802.org/3/ck/public/20_07/lusted_3ck_01_0720.pdf

Cl **135** *SC* **135.1.4** *P* **109** *L* **23** # 2

Marris, Arthur — Cadence Design Systems

Comment Type **T** *Comment Status* **A** *bucket*

Change 100GMII to CGMII in Figure 135-2

SuggestedRemedy

Change to CGMII in two places

Response *Response Status* **C**

ACCEPT.

Cl **152** *SC* **152.6.2a** *P* **115** *L* **32** # 3

Marris, Arthur — Cadence Design Systems

Comment Type **T** *Comment Status* **A** *bucket8 FEC*

IFEC should be enabled by setting the variable to one (not zero)

SuggestedRemedy

Change text to "When the IFEC_Enable variable is set to one, the Inverse RS-FEC sublayer performs the transmit function as specified in 152.5.2 and the receive function as specified in 152.5.3. When the variable is set to a zero, the transmit and receive functions are disabled, and the Inverse RS-FEC sublayer is bypassed,"

Response *Response Status* **C**

ACCEPT IN PRINCIPLE.

Change text to
"When the IFEC_Enable variable is set to one, the Inverse RS-FEC sublayer performs the transmit function as specified in 152.5.2 and the receive function as specified in 152.5.3. When the variable is set to a zero, the Inverse RS-FEC transmit and receive functions are disabled, and the Inverse RS-FEC sublayer is bypassed,"

Cl **91** *SC* **91.6.2f** *P* **88** *L* **7** # 4

Marris, Arthur — Cadence Design Systems

Comment Type **T** *Comment Status* **A** *bucket8 FEC*

100G RS-FEC should be enabled by setting the variable to one (not zero)

SuggestedRemedy

Change text to: "When 100G_RS_FEC_Enable variable is set to one, the RS-FEC sublayer performs the transmit function as specified in 91.5.2 and the receive function as specified in 91.5.3. When the variable is set to zero, the transmit and receive functions are disabled,"

Response *Response Status* **C**

ACCEPT IN PRINCIPLE.

Change text to:
"When 100G_RS_FEC_Enable variable is set to one, the RS-FEC sublayer performs the transmit function as specified in 91.5.2 and the receive function as specified in 91.5.3. When the variable is set to zero, the RS-FEC transmit and receive functions are disabled,"

Cl **163** *SC* **163.9.1** *P* **177** *L* **40** # 5

Wu, Mau-Lin Mediatek

Comment Type **T** *Comment Status* **R** *bucket5 ERL*

ERL value is TBD in Table 163-5

SuggestedRemedy

Change ERL value from TBD to 13

Response *Response Status* **C**

REJECT.

There is no consensus to make the proposed change. See the response to comment #45.

Cl **163** *SC* **163.9.1.1** *P* **178** *L* **42** # 6

Wu, Mau-Lin Mediatek

Comment Type **T** *Comment Status* **A** *bucket5 ERL*

N_bx value is TBD in Table 163-6
The purpose of N_bx is to reflect the effect of DFE taps in referenced receiver. Based on that, we shall consider N_bx >= 21. Please refer to wu_3ck_02a_1119.pdf & wu_3ck_adhoc_01_010820.pdf for more details.

SuggestedRemedy

Change TBD of "N_bx" to 21.

Response *Response Status* **C**

ACCEPT IN PRINCIPLE.

Resolve using the response to comment #45.

Cl **163** *SC* **163.9.1.1** *P* **178** *L* **45** # 7

Wu, Mau-Lin Mediatek

Comment Type **T** *Comment Status* **A** *bucket*

The TX ERL (min) value is specified both in Table 163-5 as well as the following sentence here. "Transmitter ERL at TP0a shall be greater than or equal to TBD dB". The value is the duplicated information & could be removed.

Please refer to details in wu_3ck_adhoc_01_061020.pdf

SuggestedRemedy

Change the sentence to
***
Transmitter ERL at TP0a shall be greater than or equal to the value of ERL (min.) specified in Table 163-5.
***

Response *Response Status* **C**

ACCEPT IN PRINCIPLE.

The comment refers to the following presentation:
http://www.ieee802.org/3/ck/public/adhoc/jun10_20/wu_3ck_adhoc_01_061020.pdf

Change the sentence to "Transmitter ERL at TP0a shall be greater than or equal to ERL (min) specified in Table 163-5."

Cl **163** *SC* **163.9.2** *P* **180** *L* **46** # 8

Wu, Mau-Lin Mediatek

Comment Type **T** *Comment Status* **R** *bucket5 ERL*

ERL value is TBD in Table 163-7

SuggestedRemedy

Change ERL value from TBD to 13

Response *Response Status* **C**

REJECT.

There is no consensus to make the proposed change. See the response to comment #45.

Cl **163** *SC* **163.9.2.1** *P* **181** *L* **7** # 9

Wu, Mau-Lin Mediatek

Comment Type **T** *Comment Status* **A** *bucket*

The RX ERL (min) value is specified both in Table 163-7 as well as the following sentence here. "Receiver ERL at TP5a shall be greater than or equal to TBD dB". The value is the duplicated information & could be removed.

Please refer to details in wu_3ck_adhoc_01_061020.pdf

SuggestedRemedy

Change the sentence to
***
Receiver ERL at TP5a shall be greater than or equal to the value of ERL (min.) specified in Table 163-7.
***

Response *Response Status* **C**

ACCEPT IN PRINCIPLE.

The comment refers to the following presentation:
http://www.ieee802.org/3/ck/public/adhoc/jun10_20/wu_3ck_adhoc_01_061020.pdf

Change the sentence to: "Receiver ERL at TP5a shall be greater than or equal to ERL (min) specified in Table 163-7."

Cl **120F** *SC* **120F.3.1** *P* **205** *L* **14** # 10

Wu, Mau-Lin Mediatek

Comment Type **T** *Comment Status* **R** *bucket5 ERL*

ERL value is TBD in Table 120F-1

SuggestedRemedy

Change ERL value from TBD to 11

Response *Response Status* **C**

REJECT.

There is no consensus to make the proposed change. See the response to comment #45.

Cl **120F** *SC* **120F.3.1** *P* **205** *L* **20** # 11

Wu, Mau-Lin Mediatek

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

Steady state voltage v_f (min) is TBD

SuggestedRemedy

Change v_f (min) value from TBD to 0.5

Proposed Response *Response Status* **Z**

REJECT.

This comment was WITHDRAWN by the commenter.

Cl **120F** *SC* **120F.3.1** *P* **205** *L* **21** # 12

Wu, Mau-Lin Mediatek

Comment Type **T** *Comment Status* **A** *bucket2*

Linear fit pulse peak (min) is 'TBD x v_f'

SuggestedRemedy

Change Linear fit pulse peak (min) from 'TBD x v_f' to '0.55 x v_f'

Response *Response Status* **C**

ACCEPT IN PRINCIPLE.

Resolve using the response to comment #33.

Cl **120F** *SC* **120F.3.1.1** *P* **205** *L* **40** # 13

Wu, Mau-Lin Mediatek

Comment Type **T** *Comment Status* **A** *bucket*

The TX ERL (min) value of TP0a is specified both in Table 120F-1 as well as the following sentence here. "Transmitter ERL at TP0a shall be greater than or equal to TBD dB". The value is the duplicated information & could be removed.

Please refer to details in wu_3ck_adhoc_01_061020.pdf

SuggestedRemedy

Change the sentence to
***
Transmitter ERL at TP0a shall be greater than or equal to the value of ERL (min.) specified in Table 120F-1.
***

Response *Response Status* **C**

ACCEPT IN PRINCIPLE.

The comment refers to the following presentation:

http://www.ieee802.org/3/ck/public/adhoc/jun10_20/wu_3ck_adhoc_01_061020.pdf

Change the sentence to:"Transmitter ERL at TP0a shall be greater than or equal to ERL (min) specified in Table 120F-1."

Cl **120F** *SC* **120F.3.1.1** *P* **205** *L* **47** # 14

Wu, Mau-Lin Mediatek

Comment Type **T** *Comment Status* **A** *bucket5 ERL*

The value of T_r in Table 120F-2 is TBD.

SuggestedRemedy

Change TBD to 0.01

Response *Response Status* **C**

ACCEPT IN PRINCIPLE.

Resolve using the response to comment #45.

Cl **120F** *SC* **120F.3.1.1** *P* **205** *L* **53** # 15

Wu, Mau-Lin Mediatek

Comment Type **T** *Comment Status* **A** *bucket5 ERL*

The value of N_bx in Table 120F-2 is TBD.
In order to reflect the capability referenced receiver of C2C, N_bx shall align with the N_b value in Table 120F-6, which is 6.

SuggestedRemedy

Change TBD to 6

Response *Response Status* **C**

ACCEPT IN PRINCIPLE.

Resolve using the response to comment #45.

Cl **120F** *SC* **120F.3.2** *P* **207** *L* **44** # 16

Wu, Mau-Lin Mediatek

Comment Type **T** *Comment Status* **R** *bucket5 ERL*

The value of ERL is TBD in Table 120F-3

SuggestedRemedy

Change TBD to 11

Response *Response Status* **C**

REJECT.

There is no consensus to make the proposed change. See the response to comment #45.

Cl **120F** *SC* **120F.3.2.1** *P* **208** *L* **5** # 17

Wu, Mau-Lin Mediatek

Comment Type **T** *Comment Status* **A** *bucket*

The RX ERL (min) value at TP5a is specified both in Table 120F-3 as well as the following sentence here. "Receiver ERL at TP5a shall be greater than or equal to TBD dB". The value is the duplicated information & could be removed.

Please refer to details in wu_3ck_adhoc_01_061020.pdf

SuggestedRemedy

Change the sentence to
***
Receiver ERL at TP5a shall be greater than or equal to the value of ERL (min.) specified in Table 120F-3.
***

Response *Response Status* **C**

ACCEPT IN PRINCIPLE.

The comment refers to the following presentation:
http://www.ieee802.org/3/ck/public/adhoc/jun10_20/wu_3ck_adhoc_01_061020.pdf

Change the sentence to:"Receiver ERL at TP5a shall be greater than or equal to ERL (min) specified in Table 120F-3."

Cl **120G** *SC* **120G.3.1** *P* **221** *L* **23** # 18

Wu, Mau-Lin Mediatek

Comment Type **T** *Comment Status* **R** *bucket5 ERL*

The value of ERL (min) in Table 120G-1 is TBD

SuggestedRemedy

Change TBD to 9.5

Response *Response Status* **C**

REJECT.

There is no consensus to make the proposed change. See the response to comment #45.

Cl **120G** *SC* **120G.3.1.3** *P* **222** *L* **36** # 19

Wu, Mau-Lin Mediatek

Comment Type **T** *Comment Status* **A** *bucket8 ERL*

The table to be refered for calculation of host output ERL at TP1a is 'TBD' now. Propose to refer to values in Table 120G-9 as the similar method as Clauses 162, 163, & 120F.

Please refer to details in wu_3ck_adhoc_01_061020.pdf

SuggestedRemedy

Change TBD to 120G-9

Response *Response Status* **C**

ACCEPT IN PRINCIPLE.

The comment refers to the following presentation:
http://www.ieee802.org/3/ck/public/adhoc/jun10_20/wu_3ck_adhoc_01_061020.pdf

Resolve using the response to comment #51.

Cl **120G** *SC* **120G.3.1.3** *P* **222** *L* **40** # 20

Wu, Mau-Lin Mediatek

Comment Type **T** *Comment Status* **A** *bucket*

The host output ERL (min) value at TP1a is specified both in Table 120G-1 as well as the following sentence here. "Host output ERL at TP1a shall be greater than TBD". The value is the duplicated information & could be removed.

Please refer to details in wu_3ck_adhoc_01_061020.pdf

SuggestedRemedy

Change the sentence to
***
Host output ERL at TP1a shall be greater than or equal to the value of ERL (min.) specified in Table 120G-1.
***

Response *Response Status* **C**

ACCEPT IN PRINCIPLE.

The comment refers to the following presentation:
http://www.ieee802.org/3/ck/public/adhoc/jun10_20/wu_3ck_adhoc_01_061020.pdf

Change the sentence to: “Host output ERL at TP1a shall be greater than or equal to ERL (min.) specified in Table 120G-1.”

Cl **120G** *SC* **120G.3.2.2** *P* **226** *L* **31** # 21

Wu, Mau-Lin Mediatek

Comment Type **T** *Comment Status* **A** *bucket8 ERL*

The table to be refered for calculation of module output ERL at TP4 is 'TBD' now. Propose to refer to values in Table 120G-9 as the similar method as Clauses 162, 163, & 120F.

Please refer to details in wu_3ck_adhoc_01_061020.pdf

SuggestedRemedy

Change TBD to 120G-9

Response *Response Status* **C**

ACCEPT IN PRINCIPLE.

The comment refers to the following presentation:
http://www.ieee802.org/3/ck/public/adhoc/jun10_20/wu_3ck_adhoc_01_061020.pdf

Resolve using the response to comment #51.

Cl **120G** *SC* **120G.3.2.2** *P* **226** *L* **34** # 22

Wu, Mau-Lin Mediatek

Comment Type **T** *Comment Status* **A** *bucket*

The module output ERL (min) value at TP4 is specified both in Table 120G-3 as well as the following sentence here. "Module output ERL at TP4 shall be greater than TBD". The value is the duplicated information & could be removed.

Please refer to details in wu_3ck_adhoc_01_061020.pdf

SuggestedRemedy

Change the sentence to
***
Module output ERL at TP4 shall be greater than or equal to the value of ERL (min.) specified in Table 120G-3.
***

Response *Response Status* **C**

ACCEPT IN PRINCIPLE.

The comment refers to the following presentation:
http://www.ieee802.org/3/ck/public/adhoc/jun10_20/wu_3ck_adhoc_01_061020.pdf

Change the sentence to:
Module output ERL at TP4 shall be greater than or equal to ERL (min) specified in Table 120G-3.

Cl **120G** *SC* **120G.3.3** *P* **227** *L* **15** # 23

Wu, Mau-Lin Mediatek

Comment Type **T** *Comment Status* **R** *bucket5 ERL*

The value of ERL (min) in Table 120G-4 is TBD

SuggestedRemedy

Change TBD to 9.5

Response *Response Status* **C**

REJECT.

There is no consensus to make the proposed change. See the response to comment #45.

Cl **120G** *SC* **120G.3.3.1** *P* **227** *L* **30** # 24

Wu, Mau-Lin Mediatek

Comment Type **T** *Comment Status* **A** *bucket8 ERL*

The table to be refered for calculation of host input ERL at TP4a is 'TBD' now. Propose to refer to values in Table 120G-9 as the similar method as Clauses 162, 163, & 120F.

Please refer to details in wu_3ck_adhoc_01_061020.pdf

SuggestedRemedy

Change TBD to 120G-9

Response *Response Status* **C**

ACCEPT IN PRINCIPLE.

The comment refers to the following presentation:
http://www.ieee802.org/3/ck/public/adhoc/jun10_20/wu_3ck_adhoc_01_061020.pdf

Resolve using the response to comment #51.

Cl **120G** *SC* **120G.3.3.1** *P* **227** *L* **33** # 25

Wu, Mau-Lin Mediatek

Comment Type **T** *Comment Status* **A** *bucket*

The host input ERL (min) value TP4a is specified both in Table 120G-4 as well as the following sentence here. "Host input ERL at TP4a shall be greater than TBD". The value is the duplicated information & could be removed.

Please refer to details in wu_3ck_adhoc_01_061020.pdf

SuggestedRemedy

Change the sentence to
***
Host input ERL at TP4a shall be greater than or equal to the value of ERL (min.) specified in Table 120G-4.
***

Response *Response Status* **C**

ACCEPT IN PRINCIPLE.

The comment refers to the following presentation:

http://www.ieee802.org/3/ck/public/adhoc/jun10_20/wu_3ck_adhoc_01_061020.pdf

Change the sentence to:
Host input ERL at TP4a shall be greater than or equal to ERL (min) specified in Table 120G-4.

Cl **120G** *SC* **120G.3.4.2** *P* **232** *L* **46** # 26

Wu, Mau-Lin Mediatek

Comment Type **T** *Comment Status* **A** *bucket8 ERL*

The table to be refered for calculation of module input ERL is 'TBD' now. Propose to refer to values in Table 120G-9 as the similar method as Clauses 162, 163, & 120F.

Please refer to details in wu_3ck_adhoc_01_061020.pdf

SuggestedRemedy

Change TBD to 120G-9

Response *Response Status* **C**

ACCEPT IN PRINCIPLE.

The comment refers to the following presentation:
http://www.ieee802.org/3/ck/public/adhoc/jun10_20/wu_3ck_adhoc_01_061020.pdf

Resolve using the response to comment #51.

Cl **120G** *SC* **120G.3.4.2** *P* **232** *L* **49** # 27

Wu, Mau-Lin Mediatek

Comment Type **T** *Comment Status* **A** *bucket*

The module input ERL (min) value at TP1 is specified both in Table 120G-7 as well as the following sentence here. "Module input ERL at TP1 shall be greater than TBD". The value is the duplicated information & could be removed.

Please refer to details in wu_3ck_adhoc_01_061020.pdf

SuggestedRemedy

Change the sentence to
***
Module input ERL at TP1 shall be greater than or equal to the value of ERL (min.) specified in Table 120G-7.
***

Response *Response Status* **C**

ACCEPT IN PRINCIPLE.

The comment refers to the following presentation:
http://www.ieee802.org/3/ck/public/adhoc/jun10_20/wu_3ck_adhoc_01_061020.pdf

Change the sentence to:Module input ERL at TP1 shall be greater than or equal to ERL (min) specified in Table 120G-7.

Cl **163** *SC* **163.9.1** *P* **177** *L* **38** # 28

Wu, Mau-Lin Mediatek

Comment Type **T** *Comment Status* **R** *common mode noise*

The 'AC common-mode RMS voltage (max.)' is 30 mV, which is the same as that in 802.3cd. By combining this spec with P/N skew mismatch of backplane channel, it will induce crosstalk to differential signal at receiver. From 50G to 100G, it's difficult to improve the P/N skew mismatch to half. Based on that, we shall modify AC common-mode RMS voltage. We shall align this spec to that in C2M (120G).

SuggestedRemedy

Change 30 mV to 17.5 mV.

Response *Response Status* **C**

REJECT.

Note that comment #205 and #54 request the same change.

The suggested remedy does not provide sufficient evidence that the proposed threshold is feasible and necessary. Further evidence and consensus building is encouraged.

This applies to both KR and C2C.

Cl **120F** *SC* **120F.3.1** *P* **205** *L* **13** # 29

Wu, Mau-Lin Mediatek

Comment Type **T** *Comment Status* **R** *bucket3*

The 'AC common-mode RMS voltage (max.)' is 30 mV, which is the same as that in 802.3cd. By combining this spec with P/N skew mismatch of backplane channel, it will induce crosstalk to differential signal at receiver. From 50G to 100G, it's difficult to improve the P/N skew mismatch to half. Based on that, we shall modify AC common-mode RMS voltage. We shall align this spec to that in C2M (120G).

SuggestedRemedy

Change 30 mV to 17.5 mV.

Response *Response Status* **C**

REJECT.

Resolve using the response to comment #28.

Cl **163** *SC* **163.9.1** *P* **177** *L* **45** # 30

Wu, Mau-Lin Mediatek

Comment Type **T** *Comment Status* **A** *bucket2*

The "Linear fit pulse peak (min.)" in Table 163-5 is still 'TBD x v_f'.

SuggestedRemedy

Propose to change 'TBD x v_f' to '0.65 x v_f'.

Response *Response Status* **C**

ACCEPT IN PRINCIPLE.

Resolve using the response to comment #33.

Cl **163** *SC* **163.9.1.2** *P* **178** *L* **52** # 31

Wu, Mau-Lin Mediatek

Comment Type **T** *Comment Status* **R** *bucket5 TP0a*

The insertion loss of TP0a test fixture is still keep as between 1.2 dB and 1.6 dB at 26.56 GHz. It may be critial for the state-of-art PCB technology to achieve this small IL value.

SuggestedRemedy

Propose to change '1.2 dB and 1.6 dB at 26.56 GHz' to '2.4 dB and 3.2 dB at 26.56 GHz'.

Response *Response Status* **C**

REJECT.

A new methodology using TP0v as adopted in the response of comment #33 replaces TP0a as a normative test point for TX measurements. The TP0 to TP0a insertion loss remains unchanged.

See the responses to comments #33 and #153.

Cl **120G** *SC* **120G.3.1** *P* **221** *L* **17** # 32

Wu, Mau-Lin Mediatek

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

The ESMW (eye symmetry mask width) value in Table 120G-1 is still TBD

SuggestedRemedy

Change 'TBD' value to '0.1'

Proposed Response *Response Status* **Z**

REJECT.

This comment was WITHDRAWN by the commenter.

Cl **163** *SC* **163.9.1** *P* **177** *L* **26** # 33

Ben Artsi, Liav Marvell Technology

Comment Type **T** *Comment Status* **A** *TP0v*

TP0a has been shown to be extremely difficult to be used as a point to measure Specified Tx compliance parameters.

SuggestedRemedy

Measurement to be done at a newly defined TP0v which may vary according to implementation.
A presentation will be provided with details, parameters values and method.

Response *Response Status* **C**

ACCEPT IN PRINCIPLE

The following presentations were reviewed:
http://www.ieee802.org/3/ck/public/20_07/benartsi_3ck_01_0720.pdf
http://www.ieee802.org/3/ck/public/20_07/heck_3ck_01a_0720.pdf

Strawpoll #1.
I support use of the TP0v methodology as proposed in benartsi_3ck_01_0720.
A: Yes
B: No
C: Need more information
Choose one.
A: 16 B: 1 C: 21

Implement using the contents of heck_3ck_01a_0720 with editorial license, with the following exceptions:
- on slide 9, in value column change 0 to TBD (3 times)
- use different annex, e.g., 163A

Cl **163** *SC* **163.9.1.2** *P* **178** *L* **47** # 34

Ben Artsi, Liav Marvell Technology

Comment Type **T** *Comment Status* **A** *TP0v*

A reference TP0 - TP0a test fixture is specified while its loss values are not practical.

SuggestedRemedy

Specify a more feasible reference TP0 to TP0a specification alongside informative parameters for reference in TP0a. Specify an additional test fixture range of TP0 - TP0v Loss at ~26.56GHz ≤ 5dB ; ILD ≤ 0.2dB ; ERL. A presentation is to be provided with the actual suggestion

Response *Response Status* **C**

ACCEPT IN PRINCIPLE.

The following presentation was reviewed:
http://www.ieee802.org/3/ck/public/20_07/benartsi_3ck_01_0720.pdf

For the TP0 to TP0v test fixture for 163 and 120F specify the following:
IL @ 26.56 GHz <= 5 dB
ILD <= 0.2 dB

Cl **163** *SC* **163.9.2.2** *P* **179** *L* **27** # 35

Ben Artsi, Liav Marvell Technology

Comment Type **T** *Comment Status* **R** *Test Fixture*

The Rx test fixture definition is extremely hard to achieve, if even possible and anyhow embedded as part of the interconnect when used for the interference tolerance test. Thus, should allow a higher max loss for Rx test fixture.

SuggestedRemedy

Recommend increasing loss limits to a minimum of 3 and max of 4dB at 26.56GHz with ILD≤0.2dB

Response *Response Status* **C**

REJECT.

This comment was WITHDRAWN by the commenter.

Cl **120F** *SC* **120F.3.1** *P* **205** *L* **10** # 36

Ben Artsi, Liav — Marvell Technology

Comment Type **T** *Comment Status* **A** *bucket2*

TP0a has been shown to be extremely difficult to be used as a point to measure Specified Tx compliance parameters.

SuggestedRemedy

Follow the same remedy as for 163.9.1

Response *Response Status* **C**

ACCEPT IN PRINCIPLE.

Resolve using the response to comment #33.

Cl **162** *SC* **162.11.7** *P* **160** *L* **43** # 37

Ben Artsi, Liav — Marvell Technology

Comment Type **T** *Comment Status* **A** *CA COM*

Transmitter signal-to-noise ratio is TBD

SuggestedRemedy

In benartsi_3ck_01a_0919 it was shown that an optimized break-out section cross-talk degrades SNR by at least 0.5dB.
This degradation is not represented in the "include PCB" section and should be accounted for in setting a proper value of SNR_Tx in section 162. In Table 163–10 SNR_Tx is specified to be 33dB and very likely same devices will be used for both sections. For comparison, in section 163 the break-out area crosstalk is included in the interconnect supplied to COM.
According to all of the above, set 162 section's SNR_Tx COM value to be 32.5dB (to account for host board break-out section crosstalk which is not included in the "include PCB" specification). This value correlates to 163 section's SNR_Tx of 33dB and allows traces and conector crosstalk degradation of an additional 1dB up to TP2 resulting in the 31.5dB already specified in table 162–9 (SNDR = 31.5dB)

Response *Response Status* **C**

ACCEPT IN PRINCIPLE.

The referenced presentation is here:
http://www.ieee802.org/3/ck/public/19_09/benartsi_3ck_01a_0919.pdf

Comments #70, #77, #152, #11162 also address SNR_TX.

Set SNR_TX to 32.5 dB.

Cl **163** *SC* **163.9.2.3** *P* **181** *L* **53** # 38

Ben Artsi, Liav — Marvell Technology

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

Stating that the transmitter device package model S(tp) is omitted from Equation (93A–3) in the calculation of COM practically penalizes cases which use "golden device" as the transmitter for interference tolerance testing

SuggestedRemedy

Change the sentence to:
"It is the test implementor's responsibility to adjust Tx package parameters to best match the actual driver package used for testing alongside parameters which will calibrate tx waveform to match the one supplied at TP0v, orelse transmitter device package model S(tp) should be omitted from Equation (93A–3) in the calculation of COM

Proposed Response *Response Status* **Z**

PROPOSED REJECT.

This comment was WITHDRAWN by the commenter.

Cl **120G** *SC* **120G.5.2** *P* **235** *L* **5** # 39

Brown, Matt — Huawei Technologies Canada

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

The single-ended termination resistor value is not specified for the reference receiver.

SuggestedRemedy

In Table 120G-9, add parameter "Single-ended termination resistance", Rd, with value 50 Ω.

Proposed Response *Response Status* **Z**

PROPOSED REJECT.

This comment was WITHDRAWN by the commenter.

Cl **162** *SC* **162.9.3.2** *P* **152** *L* **24** # 40

Brown, Matt — Huawei Technologies Canada

Comment Type **E** *Comment Status* **A** *bucket*

This subclause specifies a recommended insertion loss for the host. It seems this would be more appropriately located in Annex 162A along with other informative specifications relating to the channel.

SuggestedRemedy

Move the specification in 162.9.3.2 to Annex 162A then add a reference in 162.9.3.2 pointing to Annex 162A.

Response *Response Status* **C**

ACCEPT IN PRINCIPLE.

Implement the suggested remedy with editorial license.

Cl **120F** *SC* **120F.3.1** *P* **205** *L* **16** # 41

Brown, Matt — Huawei Technologies Canada

Comment Type **E** *Comment Status* **A** *bucket8 RL*

Naming of return loss parameters is not consistent.

SuggestedRemedy

In Table 120F-1 (P205, L16) and in 120F.3.1.2 (206/L3) change "Common-mode output return loss" to"Common-mode return loss"
In Table 120F-3 (P207/L46) and 120F.3.2.2 (P208/L9) change "Differential to common mode input return loss" to "Differential to common-mode return loss".

Response *Response Status* **C**

ACCEPT.

Cl **120G** *SC* **120G.3.1** *P* **221** *L* **22** # 42

Brown, Matt — Huawei Technologies Canada

Comment Type **E** *Comment Status* **A** *bucket*

Naming of return loss parameters is not consistent.

SuggestedRemedy

In Table 120G-1 (P221, L22) and 120G.3.1.2 (P222, L6) change "Common to differential mode return loss" to "Common-mode to differential return loss".
In Table 120G-3 (P224, L52) and Table 120G-7 (P230, L9) change "Common-mode to differential mode return loss" to "Common-mode to differential return loss".

Response *Response Status* **C**

ACCEPT.

Cl **93A** *SC* **93A.5** *P* **195** *L* **1** # 43

Mellitz, Richard — Samtec

Comment Type **TR** *Comment Status* **A** *bucket8 ERL*

Creating a TDR (or PTDR) from return loss data may result in factious noise in the TDR response. The reason is high frequency data may not be well behaved enough to perform a reliable Inverse Fourier Transform. Instrument manufacturers may employ proprietary windowing when determining TDR from frequency domain data. A Tukey window (non-proprietary) is a cosine window which will give good consistent results between implementation of the inverse Fourier Transform. See https://en.wikipedia.org/wiki/Window_function#Tukey_window

SuggestedRemedy

Add term H_tw to 93A-58. I.e. H_ii(f)=H_t(f)* s_ii(f)*H_r(f)*H_Tw(f)

Define f_tw_period=2*(f_b- f_b*(1-f_r));
Define: H_tw
When f<- f_r, H_tw=1
When f> f_r <= f_b, H_tw=0.5*cos(2*pi*(f-f_b)/f_tw_period=-pi)+.5
When f> f_v, H_tw=0

Response *Response Status* **C**

ACCEPT IN PRINCIPLE.

Update Equation 93A-58 according to slide 2 of the following presentation:
http://www.ieee802.org/3/ck/public/20_07/heck_3ck_05_0720.pdf

Implement editorial license.

Cl **162** *SC* **162.11.3** *P* **158** *L* **48** # 44

Mellitz, Richard — Samtec

Comment Type **TR** *Comment Status* **A** *bucket5 ERL*

Align Tr with Host T_r in table 11.33

SuggestedRemedy

set T_r to 0.01 ns in table 162.15

Response *Response Status* **C**

ACCEPT IN PRINCIPLE.

Resolve using the response to comment #45.

Cl **162** *SC* **162.11.3** *P* **158** *L* **52** # 45

Mellitz, Richard Samtec

Comment Type **TR** *Comment Status* **A**

N = 7000 is requres a frequency step less than 10 Mhz. This is measurement burdon with no change over N=3500.

SuggestedRemedy

Set N=3500 as suggested in mellitz_3ck_adhoc_01_061020

Response *Response Status* **C**

ACCEPT IN PRINCIPLE.

The referenced presentation is located here:
Http://www.ieee802.org/3/ck/public/adhoc/jun10_20/mellitz_3ck_adhoc_01a_061020.pdf

Adopt the values for Tr, Bx, Px, N, and Nbx in slide 6 of the following presentation:
http://www.ieee802.org/3/ck/public/20_07/kochuparambil_3ck_01a_0720.pdf

There was no consensus to adopt values for ERL (min).

Cl **163** *SC* **163.9.1.1** *P* **178** *L* **41** # 46

Mellitz, Richard Samtec

Comment Type **TR** *Comment Status* **A** *bucket5 ERL*

Assign N_bx to recommendation in mellitz_3ck_adhoc_01_061020

SuggestedRemedy

Set N_bx to 21

Response *Response Status* **C**

ACCEPT IN PRINCIPLE.

This comment refers to the following presentation:
http://www.ieee802.org/3/ck/public/adhoc/jun10_20/mellitz_3ck_adhoc_01a_061020.pdf

Resolve using the response to comment #45.

Cl **163** *SC* **163.10.2** *P* **186** *L* **49** # 47

Mellitz, Richard Samtec

Comment Type **TR** *Comment Status* **A** *bucket5 ERL*

Assign N_bx to recommendation in mellitz_3ck_adhoc_01_061020

SuggestedRemedy

Set N_bx to 21

Response *Response Status* **C**

ACCEPT IN PRINCIPLE.

Resolve using the response to comment #45.

Cl **120F** *SC* **120F.3.1.1** *P* **205** *L* **52** # 48

Mellitz, Richard Samtec

Comment Type **TR** *Comment Status* **A** *bucket5 ERL*

Assign N_bx to recommendation in mellitz_3ck_adhoc_01_061020

SuggestedRemedy

Change TBD for N_bx to 6

Response *Response Status* **C**

ACCEPT IN PRINCIPLE.

Resolve using the response to comment #45.

Cl **120F** *SC* **120F.4.3** *P* **213** *L* **42** # 49

Mellitz, Richard Samtec

Comment Type **TR** *Comment Status* **A** *bucket5 ERL*

Assign N_bx to recommendation in mellitz_3ck_adhoc_01_061020

SuggestedRemedy

Change TBD for N_bx to 6

Response *Response Status* **C**

ACCEPT IN PRINCIPLE.

The referenced presentation is here:
http://www.ieee802.org/3/ck/public/adhoc/jun10_20/mellitz_3ck_adhoc_01a_061020.pdf

Resolve using the response to comment #45.

Cl **120G** *SC* **120G.3.2.2** *P* **226** *L* **31** # 50

Mellitz, Richard Samtec

Comment Type **TR** *Comment Status* **A** *bucket8 ERL*

There doesn't see to be a need for table TBD

SuggestedRemedy

Remove sentence: "
Parameters that do not appear in Table 120G–2 take values from Table TBD "
Add to prior sentence "except the value of N is 400"

Response *Response Status* **C**

ACCEPT IN PRINCIPLE.

Resolve using the resonse to comments #45 and #51.

Cl **120G** *SC* **120G.3.3.1** *P* **227** *L* **30** # 51

Mellitz, Richard Samtec

Comment Type **T** *Comment Status* **A** *bucket8 ERL*

There doesn't see to be a need for table TBD

SuggestedRemedy

Remove sentence: "
Parameters that do not appear in Table 120G–2 take values from Table TBD "

Response *Response Status* **C**

ACCEPT IN PRINCIPLE.

Implement suggested remedy and apply similar fix with editorial license to 120G.3.1.3 (Host output), 120G.3.2.2 (Module output), & 120G.3.4.2 (Module input).

Cl **120G** *SC* **120G.3.4.2** *P* **232** *L* **46** # 52

Mellitz, Richard Samtec

Comment Type **TR** *Comment Status* **A** *bucket8 ERL*

There doesn't see to be a need for table TBD

SuggestedRemedy

Remove sentence: "
Parameters that do not appear in Table 120G–2 take values from Table TBD "
Add to prior sentence "except the value of N is 400"

Response *Response Status* **C**

ACCEPT IN PRINCIPLE.

Resolve using the resonse to comment #45 and #51.

Cl **163** *SC* **163.10** *P* **184** *L* **4** # 53

Mellitz, Richard Samtec

Comment Type **TR** *Comment Status* **A** *package parameter*

Much work has been done on 100G package model. Parameters in table 163-10 were based on package transmission line losses different the specified in table 93A-3. The table 93A-3 values were suggested in benartsi_3ck_adhoc_01_121218 and benartsi_3ck_01_0119.

SuggestedRemedy

Add line: The package transmission line, s^(l)(f), uses table 93A-3 but replaces values for a_1 and a_2 with 0.0009909 and 0.0002772 respectively.

Response *Response Status* **C**

ACCEPT IN PRINCIPLE.

Implement suggested remedy with editorial license.

Cl **163** *SC* **163.9.1** *P* **177** *L* **38** # 54

Mellitz, Richard Samtec

Comment Type **TR** *Comment Status* **R** *bucket3*

30 mv of AC common-mode RMS voltage is too severe. Little work has been to justify this.

SuggestedRemedy

Set AC common-mode RMS voltage to TBD. Add a line to the table called AC common-mode deterministic voltage which essentially represents skew.

Response *Response Status* **C**

REJECT.

Resolve using the response to comment #28.

Cl **162** *SC* **162.9.3** *P* **148** *L* **24** # 55

Mellitz, Richard Samtec

Comment Type **TR** *Comment Status* **R**

30 mv of AC common-mode RMS voltage is too severe. Little work has been to justify this.

SuggestedRemedy

Set AC common-mode RMS voltage to TBD. Add a line to the table called AC common-mode deterministic voltage which essentially represents skew.

Response *Response Status* **C**

REJECT.

[Editor's note: Change clause/subclause from 163/163.9.3]

There is no consensus to change the TX AC CM noise values at this time.

Resolve using the response to comment #28.

Cl **163** *SC* **163.9.1** *P* **177** *L* **41** # 56

Mellitz, Richard Samtec

Comment Type **TR** *Comment Status* **D** *common mode spec*

need spec form common mode return loss.

SuggestedRemedy

Change to integrated common mode return loss so it may be used to compute the effect of common mode noise and remove reference to 93.8.1.4

Proposed Response *Response Status* **Z**

REJECT.

This comment was WITHDRAWN by the commenter.

Cl **163** *SC* **163.9.3** *P* **148** *L* **30** # 57

Mellitz, Richard Samtec

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

need spec form common mode return loss.

SuggestedRemedy

Change to integrated common mode return loss so it may be used to compute the effect of common mode noise and remove reference to 92.8.3.4

Proposed Response *Response Status* **Z**

REJECT.

This comment was WITHDRAWN by the commenter.

[Editor's note: changed subclause from 162.9.3.]

Cl **163** *SC* **163.9.1** *P* **177** *L* **42** # 58

Mellitz, Richard Samtec

Comment Type **TR** *Comment Status* **A** *bucket2*

Vf(min) should align with Av in COM table 163-10 since Nv=200

SuggestedRemedy

Replace 0.4 with 0.413

Response *Response Status* **C**

ACCEPT IN PRINCIPLE.

[Editor's note: Change page from 148.]

Resolve using the response to comment #33.

Cl **120F** *SC* **120F.3.1** *P* **205** *L* **20** # 59

Mellitz, Richard Samtec

Comment Type **TR** *Comment Status* **A** *bucket2*

Vf(min) should align with Av in COM table 120F-6 since Nv=200

SuggestedRemedy

Replace TBD for Vf(min) with V(fmin)=0.413

Response *Response Status* **C**

ACCEPT IN PRINCIPLE.

Resolve using the response to comment #33.

Cl **162** *SC* **162.8.11** *P* **147** *L* **14** # 60

Lusted, Kent — Intel Corporation

Comment Type **TR** *Comment Status* **A** *Logic*

The currently defined PMD control function does not place a limit on the amount of time that a device is allowed to transition from the Cl 73 Auto-negotiation protocol (i.e. entry into the AN_GOOD_CHECK state in Figure 73-10) to the response of new request from a partner device. This particular condition had a constraint of 50 msec in Clause 92.7.12. Because it was not bounded, it is possible for a device to consume a large amount of time transitioning between these functions.

SuggestedRemedy

Add an item to the list in the subclause that states "the handshake timing shall meet the requirements of 136.8.11.6 except during the first 50 ms following the beginning of the start-up protocol. The beginning of the start-up protocol is defined to be entry into the AN_GOOD_CHECK state in Figure 73–10.".

Response *Response Status* **C**

ACCEPT IN PRINCIPLE.

In 73.6.10, the Transmit Switch function requires signals at the MDI to conform to a PHY's specifications within 20 msec. However, in the 136.8.11 PMD control function, the delay from the start of the state machine until local_tf_lock assertion is undefined, which makes the exit from SEND_TF unpredictable.

It would be beneficial to explicitly define the allowed delay.

Add an item to the exceptions list in subclause 162.8.11 that states "A receiver is expected to assert local_tf_lock within 275 ms from entry into the AN_GOOD_CHECK state in Figure 73–11 provided that there is a compliant signal containing training frames at the PMD input."

Also, in 73.10.2, for the case of 100GBASE-KR1, 100GBASE-CR1, 200GBASE-KR2, 200GBASE-CR2, 400GBASE-KR4 or 400GBASE-CR4, change the min value of link_fail_inhibit_timer to be "12.3" and the max value of link_fail_inhibit_timer to be "12.4" to account for the extra 275 ms.

Implement with editorial license.

Cl **1** *SC* **1.4** *P* **31** *L* **28** # 61

Lusted, Kent — Intel Corporation

Comment Type **TR** *Comment Status* **A** *bucket4*

The definition for 100GAUI-n in 802.3cd-2018 clause 1.4.3.6 needs to be updated for the single lane version of this interface "100GAUI-1" enabled with the 3ck project.

SuggestedRemedy

Add reference to 100GAUI-1 and the relevant clause as appropriate.

Response *Response Status* **C**

ACCEPT IN PRINCIPLE.

The referenced subclause is 1.4.36.

Implement the suggested remedy with language consistent with the base standard.

Cl **1** *SC* **1.4** *P* **31** *L* **28** # 62

Lusted, Kent — Intel Corporation

Comment Type **TR** *Comment Status* **A** *bucket4*

The definition for 200GAUI-n in 802.3-2018 clause 1.4.87 needs to be updated for the two lane version of this interface "200GAUI-2" enabled with the 3ck project.

SuggestedRemedy

Add reference to 200GAUI-2 and the relevant clause as appropriate.

Response *Response Status* **C**

ACCEPT IN PRINCIPLE.

Implement the suggested remedy with language consistent with the base standard.

Cl **1** *SC* **1.4** *P* **31** *L* **28** # 63

Lusted, Kent — Intel Corporation

Comment Type **TR** *Comment Status* **A** *bucket4*

The definition for 400GAUI-n in 802.3-2018 clause 1.4.111 needs to be updated for the four lane version of this interface "400GAUI-4" enabled with the 3ck project.

SuggestedRemedy

Add reference to 400GAUI-4 and the relevant clause as appropriate.

Response *Response Status* **C**

ACCEPT IN PRINCIPLE.

Implement the suggested remedy with language consistent with the base standard.

Cl **1** *SC* **1.5** *P* **32** *L* **28** # 64

Lusted, Kent — Intel Corporation

Comment Type **TR** *Comment Status* **A** *bucket4*

Update the abbreviation of 100GAUI to include the n number of lanes and align consistency with the base standard 802.3-2018 for 200GAUI-n and 400GAUI-n

SuggestedRemedy

Consider changing the abbreviation to be "100GAUI-n 100 Gb/s Attachment Unit Interface over n lanes"

Response *Response Status* **C**

ACCEPT IN PRINCIPLE.

Implement the suggested remedy.

Cl **116** *SC* **116.2** *P* **95** *L* **12** # 65

Lusted, Kent — Intel Corporation

Comment Type **TR** *Comment Status* **A** *bucket*

The 200 Gb/s and 400 Gb/s subclause does not have a reference to the Clause 73 Auto-Negotiationfunction that similarly present in Clause 80 Introduction to 40 Gb/s and 100 Gb/s networks

SuggestedRemedy

Insert a new subclause before existing clause 116.2.6 "Management interface (MDIO/MDC)". Renumber existing clauses 116.2.6 and 116.2.7 as appropriate.
The new clause 116.2.6 "Auto-Negotiation" will have the following text:
"Auto-Negotiation provides a linked device with the capability to detect the abilities (modes of operation) supported by the device at the other end of the link, determine common abilities, and configure for joint
operation.
Clause 73 Auto-Negotiation is used by the 200 Gb/s and 400 Gb/s backplane PHYs (200GBASE-KR4, 200GBASE-KR2, and 400GBASE-KR4) and the 200 Gb/s and 400 Gb/s copper PHYs (200GBASE-CR4, 200GBASE-CR2 and 400GBASE-CR4)."

Response *Response Status* **C**

ACCEPT IN PRINCIPLE.

Insert a new subclause before existing clause 116.2.6 "Management interface (MDIO/MDC)".

In the new subclause clause 116.2.5a "Auto-Negotiation" include the following text:
"Auto-Negotiation provides a linked device with the capability to detect the abilities (modes of operation) supported by the device at the other end of the link, determine common abilities, and configure for joint operation.
Clause 73 Auto-Negotiation is used by the 200 Gb/s and 400 Gb/s backplane PHYs (200GBASE-KR4, 200GBASE-KR2, and 400GBASE-KR4) and the 200 Gb/s and 400 Gb/s copper PHYs (200GBASE-CR4, 200GBASE-CR2 and 400GBASE-CR4)."

Cl **162** *SC* **162.8.11** *P* **147** *L* **21** # 66

Lusted, Kent — Intel Corporation

Comment Type **TR** *Comment Status* **R** *Logic*

In the IEEE 802.3cd-2018 project, an updated PMD Control Function (i.e. link training) was defined and specified in Cl 136.8.11.
Among other things, specific changes enabled the link training protocol to support link establishment between two devices without using Cl 73 Auto-Negotiation (i.e. for the customer use case of “forced PHY speed” on the link).

The currently defined state machine in Clause 136.8.11 (Figure 136-7) does not autonomously recover from a partner breaking frame lock during link training (Note: observed when the Clause 73 Auto-Negotiation state machine is not used.) Unless a high-level management agent (i.e. SW or FW) detects the condition, the result could be either a link down (i.e. link never comes up) or a link oscillation (up/down/up/down/etc). One reason is that the signals local_tf_lock and remote_tf_lock are only checked moving from the SEND_TF state to the TRAIN_LOCAL state. Another is that there is no clear indication between the two end points that the link has been restarted (without AN73 present). There are other reasons as well, not listed here.

SuggestedRemedy

Update the PMD control state diagram to account for this situation. Some solutions include, but are not limited to:
- increase the duration of the holdoff_timer to exceed that of the max_wait_timer (>= 12 seconds)
- add monitoring of the local and received frame lock status after the initial frame lock is achieved
- implement an abort signaling mechanism

See presentation to be submitted for TF consideration.

Response *Response Status* **C**

REJECT.

The following presentation was reviewed by the task force:
https://www.ieee802.org/3/ck/public/20_07/lusted_3ck_02_0720.pdf

There is no consensus on a complete solution at this time.

Cl **80** *SC* **80.1.4** *P* **76** *L* **5** # 67

Lusted, Kent — Intel Corporation

Comment Type **T** *Comment Status* **A** *bucket*

The nomenclature for "100GBSSE-P" in the base document (IEEE Std. 802.3-2018, Section Six, page 84, line 12ish) does not list the Clause 161 RS-FEC-Int as a valid layer even though the new RS-FEC-Int was added for 100GBASE-P PHY types.

SuggestedRemedy

Change the last sentence of the sixth paragraph in IEEE Std. 802.3-2018 Clause 80.1.4 to be "Some 100GBASE-P Physical Layer devices also use the transcoding and FEC of Clause 91 and some may also use the RS-FEC-Int of Clause 161."

Response *Response Status* **C**

ACCEPT IN PRINCIPLE.

Change the last sentence of the sixth paragraph in IEEE Std. 802.3-2018 Clause 80.1.4 to be "Some 100GBASE-P Physical Layer devices also use the transcoding and FEC of Clause 91 or Clause 161."

Cl **162** *SC* **162.11.3** *P* **159** *L* **1** # 68

Champion, Bruce — TE Connectivity

Comment Type **T** *Comment Status* **R** *bucket5 ERL*

Cable Assembly ERL listed as TBD

SuggestedRemedy

TBD to be changed to 8 dB. See presentation

Response *Response Status* **C**

REJECT.

The following presentation was reviewed by the task force:
http://www.ieee802.org/3/ck/public/20_07/champion_3ck_01_0720.pdf

There is no consensus to make the proposed change. See the response to comment #45.

Cl **162** *SC* **162.11.7** *P* **161** *L* **14** # 69

Champion, Bruce — TE Connectivity

Comment Type **T** *Comment Status* **A** *CA COM*

One-sided noise spectral density set at 1.0e-8 contrary to lim_3ck_01a_1119 and mellitz_3ck_03a_1119 recommendations. This makes a large impact on cable assembly COM and the ability to achieve 2m copper reach

SuggestedRemedy

One-sided noise spectral density should be set to 9e-9 as recommended by lim_3ck_01a_1119 and mellitz_3ck_03a_1119, see presentation

Response *Response Status* **C**

ACCEPT IN PRINCIPLE.

The following presentation was reviewed by the task force:
http://www.ieee802.org/3/ck/public/20_07/champion_3ck_02_0720.pdf

The current value was adopted based on the results of Straw Polls #10 and #11 at the 01/2020 interim meeting. The comment provides evidence that some channels fail COM. However, having an interoperable link requires both passing cables and receivers, and both need to be addressed.

Based on strawpoll #12 consensus, change the value of eta0 to 9E-9.

Strawpoll #12 (decision)
I would support changing the value of eta0 to 9E-9 V^2/GHz?
Y: 25
N: 19

Cl **162** *SC* **162.11.7** *P* **160** *L* **42** # 70

Champion, Bruce TE Connectivity

Comment Type **T** *Comment Status* **A** *bucket5 CA*

SNR_Tx listed at TBD

SuggestedRemedy

Change TBD to 32.5 as described in champion_3ck_adhoc_01_031120.pdf. See presentation

Response *Response Status* **C**

ACCEPT IN PRINCIPLE.

The referenced ad hoc presentation is here:
http://www.ieee802.org/3/ck/public/adhoc/mar11_20/champion_3ck_adhoc_01_031120.pdf

The following presentation was reviewed by the task force:
http://www.ieee802.org/3/ck/public/20_07/champion_3ck_02_0720.pdf

Resolve using response to comment #37.

Cl **162** *SC* **162.11** *P* **158** *L* **15** # 71

Haser, Alex Molex

Comment Type **T** *Comment Status* **R**

Fill in TBD for differential to common-mode return loss

SuggestedRemedy

Presentation to follow

Response *Response Status* **C**

REJECT.

The following presentation was reviewed at a previous ad hoc meeting:
http://www.ieee802.org/3/ck/public/adhoc/jun17_20/haser_3ck_adhoc_02_061720.pdf

Resolve with comment 181, 147, and 74

There is no consensus to make changes to this specification at this time.

Cl **162** *SC* **162.11** *P* **158** *L* **17** # 72

Haser, Alex Molex

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

Fill in TBD for differential to common-mode conversion loss

SuggestedRemedy

Presentation to follow

Proposed Response *Response Status* **Z**

REJECT.

This comment was WITHDRAWN by the commenter.

Cl **162** *SC* **162.11** *P* **158** *L* **18** # 73

Haser, Alex Molex

Comment Type **T** *Comment Status* **A**

Fill in TBD for common-mode to common-mode return loss

SuggestedRemedy

Presentation to follow

Response *Response Status* **C**

ACCEPT IN PRINCIPLE.

The following presentation was reviewed at a previous ad hoc meeting:
http://www.ieee802.org/3/ck/public/adhoc/jun17_20/haser_3ck_adhoc_02_061720.pdf

Implement the proposal on slide 7 of diminico_3ck_02d_0720.

Cl **162** *SC* **162.11.4** *P* **159** *L* **6** # 74

Haser, Alex Molex

Comment Type **T** *Comment Status* **R** *bucket5 CA*

Fill in TBD for differential to common-mode return loss

SuggestedRemedy

Presentation to follow

Response *Response Status* **C**

REJECT.

The task force review the following presentation at a previous ad hoc meeting:
http://www.ieee802.org/3/ck/public/adhoc/jun17_20/haser_3ck_adhoc_02_061720.pdf

Resolve using the response to comment #71.

Cl **162** *SC* **162.11.5** *P* **159** *L* **10** # 75

Haser, Alex Molex

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

Fill in TBD for differential to common-mode conversion loss

SuggestedRemedy

Presentation to follow

Proposed Response *Response Status* **Z**

REJECT.

This comment was WITHDRAWN by the commenter.

Cl **162** *SC* **162.11.6** *P* **159** *L* **14** # 76

Haser, Alex Molex

Comment Type **T** *Comment Status* **A** *bucket5 CA*

Fill in TBD for common-mode to common-mode return loss

SuggestedRemedy

Presentation to follow

Response *Response Status* **C**

ACCEPT IN PRINCIPLE.

The following presentation was reviewed at a previous ad hoc meeting:
http://www.ieee802.org/3/ck/public/adhoc/jun17_20/haser_3ck_adhoc_02_061720.pdf

Resolve using the response to comment #73.

Cl **162** *SC* **162.11.7** *P* **160** *L* **42** # 77

Haser, Alex Molex

Comment Type **TR** *Comment Status* **A** *bucket5 CA*

Fill in TBD for SNR_Tx

SuggestedRemedy

Set SNR_Tx to 32.52 dB. All lanes of cables must pass COM; need a higher SNR_Tx valule to do so given shared data (see champion_3ck_adhoc_01_031120)

Response *Response Status* **C**

ACCEPT IN PRINCIPLE.

The referenced presentation is here:
http://www.ieee802.org/3/ck/public/adhoc/mar11_20/champion_3ck_adhoc_01_031120.pdf

Resolve using the response to comment #37.

Cl **162** *SC* **162.11.7** *P* **161** *L* **14** # 78

Haser, Alex Molex

Comment Type **TR** *Comment Status* **A** *bucket5 eta0*

Current eta_0 value causes contributed cable data sets to fail 3 dB COM

SuggestedRemedy

Change eta_0 back to 8.37e-9 (see champion_3ck_adhoc_01_031120)

Response *Response Status* **C**

ACCEPT IN PRINCIPLE.

The referenced presentation is here:
http://www.ieee802.org/3/ck/public/adhoc/mar11_20/champion_3ck_adhoc_01_031120.pdf

Resolve using the response to comment #69.

Cl **162B** *SC* **162B.1.1.1** *P* **247** *L* **39** # 79

Haser, Alex Molex

Comment Type **TR** *Comment Status* **R** *bucket5 range*

Frequency range is not practical for measured data

SuggestedRemedy

Change to 0.05 GHz ≤ f ≤ 40 GHz (see haser_3ck_adhoc_01b_061020) & update Figure 162B-1

Response *Response Status* **C**

REJECT.

Resolve using the response to comment #91.

Cl **162B** *SC* **162B.1.2.1** *P* **248** *L* **40** # 80

Haser, Alex Molex

Comment Type **TR** *Comment Status* **R** *bucket5 range*

Frequency range is not practical for measured data

SuggestedRemedy

Change to 0.05 GHz ≤ f ≤ 40 GHz (see haser_3ck_adhoc_01b_061020) & update Figure 162B-2

Response *Response Status* **C**

REJECT.

Resolve using the response to comment #91.

Cl **162B** *SC* **162B.1.3.1** *P* **249** *L* **37** # 81

Haser, Alex Molex

Comment Type **TR** *Comment Status* **R** *bucket5 range*

Frequency range is not practical for measured data

SuggestedRemedy

Change to 0.05 GHz ≤ f ≤ 40 GHz (see haser_3ck_adhoc_01b_061020) & update Figure 162B-3

Response *Response Status* **C**

REJECT.

Resolve using the response to comment #91.

Cl **162B** *SC* **162B.1.3.1** *P* **249** *L* **41** # 82

Haser, Alex Molex

Comment Type **TR** *Comment Status* **R** *bucket7*

Frequency range is not practical for measured data

SuggestedRemedy

Change to 0.05 GHz ≤ f ≤ 40 GHz (see haser_3ck_adhoc_01b_061020) & update Figure 162B-3

Response *Response Status* **C**

REJECT.

The following presentation was reviewed at a previous ad hoc meeting:
http://www.ieee802.org/3/ck/public/adhoc/jun10_20/haser_3ck_adhoc_01c_062420.pdf

Resolve using the response to comment #91.

Cl **162B** *SC* **162B.1.3.1** *P* **250** *L* **24** # 83

Haser, Alex Molex

Comment Type **T** *Comment Status* **A**

Fill in TBD value for T_t (6.16ps)

SuggestedRemedy

See haser_3ck_adhoc_01b_061020

Response *Response Status* **C**

ACCEPT IN PRINCIPLE.

The following presentation was reviewed at a previous ad hoc meeting:
http://www.ieee802.org/3/ck/public/adhoc/jun10_20/haser_3ck_adhoc_01c_062420.pdf

For T_t, replace TBD with 7.5 ps.

Cl **162B** *SC* **162B.1.3.1** *P* **250** *L* **25** # 84

Haser, Alex Molex

Comment Type **TR** *Comment Status* **R** *bucket5 range*

F_min is not practical for measured data

SuggestedRemedy

Change to f_min to 0.05 GHz (see haser_3ck_adhoc_01b_061020)

Response *Response Status* **C**

REJECT.

Resolve using the response to comment #91.

Cl **162B** *SC* **162B.1.3.1** *P* **250** *L* **33** # 85

Haser, Alex Molex

Comment Type **TR** *Comment Status* **R** *bucket5 range*

Frequency range is not practical for measured data

SuggestedRemedy

Change to 0.05 GHz ≤ f ≤ 40 GHz (see haser_3ck_adhoc_01b_061020)

Response *Response Status* **C**

REJECT.

Resolve using the response to comment #91.

Cl **162B** *SC* **162B.1.3.2** *P* **250** *L* **45** # 86

Haser, Alex Molex

Comment Type **T** *Comment Status* **A**

Fill in TBD for RL limit

SuggestedRemedy

See haser_3ck_adhoc_01b_061020 & update Figure 162B-4

Response *Response Status* **C**

ACCEPT IN PRINCIPLE.

The following presentation was reviewed at a previous ad hoc meeting:
http://www.ieee802.org/3/ck/public/adhoc/jun10_20/haser_3ck_adhoc_01c_062420.pdf

Differential Return Loss =
18-0.5*fGHz ; 0.01 GHz ≤ fGHz < 25 GHz
5.5 ; 25 GHz ≤ fGHz ≤ 50 GHz

Cl **162B** *SC* **162B.1.3.2** *P* **250** *L* **47** # 87

Haser, Alex Molex

Comment Type **TR** *Comment Status* **R** *bucket5 range*

Frequency range is not practical for measured data

SuggestedRemedy

Change to 0.05 GHz ≤ f ≤ 40 GHz (see haser_3ck_adhoc_01b_061020)

Response *Response Status* **C**

REJECT.

Resolve using the response to comment #91.

Cl **162B** *SC* **162B.1.3.3** *P* **251** *L* **18** # 88

Haser, Alex Molex

Comment Type **T** *Comment Status* **A**

Fill in TBD for CMCIL limit

SuggestedRemedy

See haser_3ck_adhoc_01b_061020 & update Figure 162B-5

Response *Response Status* **C**

ACCEPT IN PRINCIPLE.

The following presentation was reviewed by the task force at a previous ad hoc meeting:
http://www.ieee802.org/3/ck/public/adhoc/jun10_20/haser_3ck_adhoc_01c_062420.pdf

Set the common-mode conversion loss limits as follows:
30-(21/28)*fGHz ; 0.01 TBD GHz ≤ fGHz < 20 GHz
15 ; 20 GHz ≤ fGHz ≤ 50 GHz

Cl **162B** *SC* **162B.1.3.4** *P* **251** *L* **46** # 89

Haser, Alex Molex

Comment Type **TR** *Comment Status* **R** *bucket5 range*

Frequency range is not practical for measured data

SuggestedRemedy

See haser_3ck_adhoc_01b_061020 & update Figure 162B-6

Response *Response Status* **C**

REJECT.

Resolve using the response to comment #91.

Cl **162B** *SC* **162B.1.3.5** *P* **252** *L* **33** # 90

Haser, Alex Molex

Comment Type **TR** *Comment Status* **R** *bucket5 range*

Frequency range is not practical for measured data

SuggestedRemedy

See haser_3ck_adhoc_01b_061020 & update Figure 162B-7

Response *Response Status* **C**

REJECT.

Resolve using the response to comment #91.

Cl **162B** *SC* **162B.1.3.6** *P* **253** *L* **54** # 91

Haser, Alex Molex

Comment Type **TR** *Comment Status* **R**

The frequency range for ICN calculation is not clearly defined.

SuggestedRemedy

Add "Integrated crosstalk RMS noise voltages are measured over N uniformly-spaced frequencies f_n spanning the frequency range 50 MHz to 40 GHz with a minimum spacing of 10 MHz." to the end of this section.

Response *Response Status* **C**

REJECT.

The following presentation was reviewed at a previous ad hoc meeting:
http://www.ieee802.org/3/ck/public/adhoc/jun10_20/haser_3ck_adhoc_01b_061020.pdf

Comment is pivot for frequency range comments: 79, 80, 81, 82, 84, 85, 87, 89, 90.

There is no consensus to change the frequency range at this time.

Strawpoll #10
I would support the upper limit of the frequency range for MTF specifications other than ICN to be:
A: 40GHz
B: 50GHz (currently in 1.2)
C: A compromise; such as 50GHz with some relaxation after 40GHz
(chicago rules)
A: 9 B: 35 C: 14

Strawpoll #11
I believe that a change should be made on the frequency upper limit for MTF specifications at this time?
Y: 16
N: 28
A: 8

Cl **162B** *SC* **162B.1.3.6** *P* **254** *L* **11** # 92

Haser, Alex Molex

Comment Type **T** *Comment Status* **A**

Fill in TBD for T_nt

SuggestedRemedy

Set T_nt to 6.16 ps (see haser_3ck_adhoc_01b_061020)

Response *Response Status* **C**

ACCEPT IN PRINCIPLE.

The following presentation was reviewed at a previous ad hoc meeting:
http://www.ieee802.org/3/ck/public/adhoc/jun10_20/haser_3ck_adhoc_01c_062420.pdf

Adopt the following values:
Tnt= 7.5 ps
Tft= 7.5 ps
ICNFEXT = 4.2mV
ICNNEXT = 1.5 mV
ICNTotal = 4.4 mV

Cl **162B** *SC* **162B.1.3.6** *P* **254** *L* **13** # 93

Haser, Alex Molex

Comment Type **T** *Comment Status* **A** *bucket7 CR ICN*

Fill in TBD for T_ft

SuggestedRemedy

Set T_ft to 6.16 ps (see haser_3ck_adhoc_01b_061020)

Response *Response Status* **C**

ACCEPT IN PRINCIPLE.

The following presentation was reviewed at a previous ad hoc meeting:
http://www.ieee802.org/3/ck/public/adhoc/jun10_20/haser_3ck_adhoc_01c_062420.pdf

Resolve using the response to comment #92.

Cl **162B** *SC* **162B.1.3.6** *P* **254** *L* **20** # 94

Haser, Alex Molex

Comment Type **T** *Comment Status* **A** *bucket7 CR ICN*

Fill in TBD for MDFEXT ICN limit

SuggestedRemedy

Use same limit as 802.3cd; 4.2 mV (see haser_3ck_adhoc_01b_061020)

Response *Response Status* **C**

ACCEPT IN PRINCIPLE.

The following presentation was reviewed at a previous ad hoc meeting:
http://www.ieee802.org/3/ck/public/adhoc/jun10_20/haser_3ck_adhoc_01c_062420.pdf

Resolve using the response to comment #92.

Cl **162B** *SC* **162B.1.3.6** *P* **254** *L* **21** # 95

Haser, Alex Molex

Comment Type **T** *Comment Status* **A** *bucket7 CR ICN*

Fill in TBD for MDNEXT ICN limit

SuggestedRemedy

Use same limit as 802.3cd; 1.5 mV (see haser_3ck_adhoc_01b_061020)

Response *Response Status* **C**

ACCEPT IN PRINCIPLE.

The following presentation was reviewed at a previous ad hoc meeting:
http://www.ieee802.org/3/ck/public/adhoc/jun10_20/haser_3ck_adhoc_01c_062420.pdf

Resolve using the response to comment #92.

Cl **162B** *SC* **162B.1.3.6** *P* **254** *L* **23** # 96

Haser, Alex Molex

Comment Type **T** *Comment Status* **A** *bucket7 CR ICN*

Fill in TBD for Total ICN limit

SuggestedRemedy

Use same limit as 802.3cd; 4.4 mV (see haser_3ck_adhoc_01b_061020)

Response *Response Status* **C**

ACCEPT IN PRINCIPLE.

The following presentation was reviewed at a previous ad hoc meeting:
http://www.ieee802.org/3/ck/public/adhoc/jun10_20/haser_3ck_adhoc_01c_062420.pdf

Resolve using the response to comment #92.

Cl **152** *SC* **152.5.2a** *P* **115** *L* **31** # 97

Slavick, Jeff Broadcom

Comment Type **TR** *Comment Status* **A** *bucket*

Enable usually means it's active when set to a 1. However the IFEC_enable bit is written have the clause active when the bit is a 1.

SuggestedRemedy

Either: a) Change IFEC_enable to IFEC_bypass in Table 152-1, 156.6.2a (heading and 2 places in text), and in 45.2.1.186aa
or b) Change zero to one in 3rd sentenece of 152.6.2a and one to a zero in the 4th sentence

Response *Response Status* **C**

ACCEPT IN PRINCIPLE.

See response to comment #3.

Cl **45** *SC* **45.2.1.186aa** *P* **62** *L* **13** # 98

Slavick, Jeff Broadcom

Comment Type **E** *Comment Status* **A** *bucket*

Capitalization issue

SuggestedRemedy

Lowercase the E in Enable in the Name column

Response *Response Status* **C**

ACCEPT IN PRINCIPLE.

Implement suggested remedy.

Also make same change in Table 45-88.

Cl **161** *SC* **161.5.22** *P* **131** *L* **31** # 99

Slavick, Jeff Broadcom

Comment Type **E** *Comment Status* **A** *bucket*

FEC_cw_counter font seems off in the first sentenece

SuggestedRemedy

Check font setting

Response *Response Status* **C**

ACCEPT.

Cl **91** *SC* **91.6.2f** *P* **88** *L* **7** # 100

Slavick, Jeff Broadcom

Comment Type **TR** *Comment Status* **A** *bucket*

Enable usually means it's active when set to a 1. However the 100G_RS_FEC_enable bit is written have the clause active when the bit is a 1.

SuggestedRemedy

Either: a) Change 100G_RS_FEC_enable to 100G_RS_FEC_bypass in Table 91-2, 91.6.2f (heading and 2 places in text), 45.2.1.110 and in 45.2.110aa
or b) Change zero to one in 3rd sentenece of 91.6.2f and one to a zero in the 4th sentence

Response *Response Status* **C**

ACCEPT IN PRINCIPLE.

See response to comment #4.

Cl **161** *SC* **161.6.22** *P* **131** *L* **31** # 101

Slavick, Jeff Broadcom

Comment Type **TR** *Comment Status* **A** *FEC*

RS-FEC codewords arrive every 51.2ns for 100G operations. A 32b codeword counter will saturate in about 3.5 minutes. A 40b counter would saturate in about 15.5 hours at 100G. A 48b counter would saturate in 166 days at 100G.

SuggestedRemedy

Increase the size of the cw_counter to 48b to provide long term testing without constant polling of the system (especially if these counters were extended to be available for 400G or 800G operations)

Response *Response Status* **C**

ACCEPT

Cl **45** *SC* **45.2.1.126a** *P* **51** *L* **27** # 102

Slavick, Jeff Broadcom

Comment Type **E** *Comment Status* **A** *bucket*

First paragraph of 45.2.1.126a could use some word-smithing. All registers use same mapping (not similar) and reduce the laundry list text to just be a bunch of "see" references

SuggestedRemedy

Changed "The assignment of bits in the RS-FEC codeword error bin 1 register is shown in Table 45–100a. The assignment of bits in the other RS-FEC codeword error bin registers is done similarly. The RS FEC codeword error bin counter registers apply to the codeword-interleaved RS-FEC defined in Clause 161. See 161.6.23 for a definition of these registers. There are fifteen of these 32-bit registers, which increment depending upon the error signature of a corrected codeword. Their bits are reset to all zeros when the register is read by the management function or upon reset, and held at all ones in the case of overflow."
To "The assignment of bits in the RS-FEC codeword error bin 1 register is shown in Table 45–100a. The assignment of bits for the other RS-FEC codeword error bin registers are identical to that of bin 1. The RS-FEC codeword error bin registers increment depending upon the error signature of a corrected codeword (see 161.6.23). Their bits are reset to all zeros when the register is read by the management function or upon reset, and held at all ones in the case of overflow."

Response *Response Status* **C**

ACCEPT.

Cl **162** *SC* **162.8.11** *P* **147** *L* **27** # 103

Healey, Adam Broadcom Inc.

Comment Type **T** *Comment Status* **A** *Tx electrical*

An expand set of predefined equalizer settings would be useful. The ability to select an initial condition closer to the target settings can be expected to improve robustness and decrease training time (due to a reduction in the number of iterative updates).

SuggestedRemedy

Add bit 11 of the control field (currently reserved) to "Initial condition request" to enable the definition of up to 7 presets with encoding 000 being "Individual coefficient control". The equalizer settings corresponding to each preset will be specified in 162.9.3.1.3 as already stated.

Response *Response Status* **C**

ACCEPT IN PRINCIPLE

Implement with editorial license the updates provided on slide 5 of the following presentation.
http://www.ieee802.org/3/ck/public/20_07/heck_3ck_03_0720.pdf

Cl **162** *SC* **162.9.3.1.3** *P* **151** *L* **30** # 104

Healey, Adam Broadcom Inc.

Comment Type **T** *Comment Status* **A** *Tx electrical*

In Table 162-10, the coefficient initial conditions for presets 2 and onward are TBD.

SuggestedRemedy

Define the coefficient initial conditions (presentation with proposed values to be provided).

Response *Response Status* **C**

ACCEPT IN PRINCIPLE

The following presentations were reviewed:
http://www.ieee802.org/3/ck/public/20_07/healey_3ck_01_0720.pdf
http://www.ieee802.org/3/ck/public/20_07/heck_3ck_03_0720.pdf

Update the coefficient initial conditions according to slide 6 of heck_3ck_03_0720.

Implement with editorial license.

Cl **162** *SC* **162.9.3** *P* **148** *L* **19** # 105

Healey, Adam Broadcom Inc.

Comment Type **T** *Comment Status* **D** *Ref clk*

The signaling rate range can be reduced to +/-50 ppm with minimal impact to the overall cost of the system. A lower signaling rate range can be leveraged by implementations to improve performance margin. However, interoperability with implementations that use 50 Gb/s/lane (and lower) AUIs must be preserved. The proposed changes encourage migration to higher-precision frequency references while maintaining compability with prior implementations with up +/-100 ppm tolerance.

SuggestedRemedy

This proposed change leverages terms from Clause 45 that describe how MDIO manageable devices are organized in the Physical Layer stack. The first is the idea that sublayers may be in the same "package" or in different packages (see IEEE Std 802.3-2018 45.1.1). The definition of a "package" is vendor specific (could be a chip, module, or other entity). The second is that a PMA that is not in the same package as the PMD is designated as a "separated PMA" (see IEEE Std 802.3-2018, 45.2.1). The third concept that is important to the proposed definition is that a PMA, by itself, has no control over the signaling rate tolerance. The frequency offset at the PMA output is inherited from the PMA input. Since the PMA has no control over this, It does not make sense to impose a specification on the PMA signaling rate range except for specific circumstances. Similar arguments can be made for PMD outputs as they inherit the frequency precision from the PMA.

In Table 162-9, Table 163-5, Table 120F-1, and Table 120G-1, change the "signaling rate range" (or "signaling rate per lane (range)") to 53.125 +/- 50 ppm and add a footnote to indicate 1) that the +/-50 ppm tolerance applies to PMA (and PMD) that are is the same package as the PCS and 2) that in other cases, the signaling rate is related to the signaling rate from the higher (separated PMA) sublayer.

In Table 120G-3, change "signaling rate per lane (range)" to "signaling rate per lane" with a value of 53.125. In 120G.3.1.1 (and/or a footnote to Table 120G-3), state the signaling rate tolerance at the module output is inherited from the PMD receiver input.

Also change 120G.3.1.1 to agree with changes Table 120G-1 and Table 120G-3.

No change to the input signaling rate range requirements in Table 162-12, Table 120G-4, and Table 120G-7 is needed because they continue to represent the largest extent of the signaling rate range for all allowed configurations of the Physical Layer stack.

Recommend that the signaling rate tolerance of the output of a "legacy" PCS/PMA (interface is not 100GAUI-1, 200GAUI-2, or 400GAUI-4) be constrained to +/-50 ppm when used with a separated PMA that has a 100GAUI-1, 200GAUI-2, or 400GAUI-4 interface . Suggested locations for this recommendation are Annex 120A and Annex 135A.

Proposed Response *Response Status* **Z**

REJECT.

Cl **161** *SC* **161.6.23** *P* **131** *L* **36** # 106

Nicholl, Shawn Xilinx

Comment Type **ER** *Comment Status* **A** *bucket*

Variable "i" is not italicized in two places.

SuggestedRemedy

In the text "where i=1 to 15", propose to italicize the "i".
In the text "exactly i correctable", propose to italicize the "i".

Response *Response Status* **C**

ACCEPT.

Cl **120G** *SC* **120G.3.2** *P* **224** *L* **49** # 107

Hidaka, Yasuo Credo Semiconductor

Comment Type **TR** *Comment Status* **A** *bucket3*

Far-end eye heigh, differential (min) is TBD.
See hidaka_3ck_01_0720, slide 7.

SuggestedRemedy

Change TBD to 24.

Response *Response Status* **C**

ACCEPT IN PRINCIPLE.

Resolve using the response to comment #177.

Cl **120G** *SC* **120G.3.2** *P* **224** *L* **48** # 108

Hidaka, Yasuo Credo Semiconductor

Comment Type **TR** *Comment Status* **A** *bucket3*

Near-end VEC (max) should be specified.
See hidaka_3ck_01_0720, slide 6.

SuggestedRemedy

To table 120G-3, add a row of "Near-end vertical eye closure (max)" with a value of 7.5 dB and a reference to 120G.3.2.1.

Response *Response Status* **C**

ACCEPT IN PRINCIPLE.

Resolve using the response to comment #177.

Cl **120G** *SC* **120G.3.2** *P* **224** *L* **51** # 109

Hidaka, Yasuo Credo Semiconductor

Comment Type **TR** *Comment Status* **A** *bucket3*

Far-end VEC (max) should be specified.
See hidaka_3ck_01_0720, slide 6.

SuggestedRemedy

To table 120G-3, add a row of "Far-end vertical eye closure (max)" with a value of 7.0 dB and a reference to 120G.3.2.1.

Response *Response Status* **C**

ACCEPT IN PRINCIPLE.

Resolve using the response to comment #177.

Cl **120G** *SC* **120G.3.1.3** *P* **222** *L* **38** # 110

Hidaka, Yasuo Credo Semiconductor

Comment Type **T** *Comment Status* **A** *ERL*

"The beginning of the host connector" is not clear.

SuggestedRemedy

Change "the beginning of the host connector" to "the mating interface of the connector between HCB and host under test".

Response *Response Status* **C**

ACCEPT IN PRINCIPLE.

The following presentation was reviewed by the task force:
https://www.ieee802.org/3/ck/public/20_07/hidaka_3ck_02a_0720.pdf

For Annex 120G, implement the changes on slide 5 of the referenced presentation.

For Clause 162, implement the changes on slide 6 of the referenced presentation.

Implement with editorial license.

Cl **120G** *SC* **120G.3.2.2** *P* **226** *L* **32** # 111

Hidaka, Yasuo Credo Semiconductor

Comment Type **T** *Comment Status* **A** *ERL*

"The beginning of the MCB connector" is not clear.

SuggestedRemedy

Change "the beginning of the MCB connector" to "the mating interface of the connector between MCB and module under test".

Response *Response Status* **C**

ACCEPT IN PRINCIPLE.

Resolve using the response to comment #110.

Cl **120G** *SC* **120G.3.3.1** *P* **227** *L* **31** # 112

Hidaka, Yasuo Credo Semiconductor

Comment Type **T** *Comment Status* **A** *ERL*

"The beginning of the host connector" is not clear.

SuggestedRemedy

Change "the beginning of the host connector" to "the mating interface of the connector between HCB and host under test".

Response *Response Status* **C**

ACCEPT IN PRINCIPLE.

Resolve using the response to comment #110.

Cl **120G** *SC* **120G.3.4.2** *P* **232** *L* **47** # 113

Hidaka, Yasuo Credo Semiconductor

Comment Type **T** *Comment Status* **A** *ERL*

"The beginning of the MCB connector" is not clear.

SuggestedRemedy

Change "the beginning of the MCB connector" to "the mating interface of the connector between MCB and module under test".

Response *Response Status* **C**

ACCEPT IN PRINCIPLE.

Resolve using the response to comment #110.

Cl **120G** *SC* **120G.3.4.1** *P* **230** *L* **38** # 114

Hidaka, Yasuo Credo Semiconductor

Comment Type **TR** *Comment Status* **A**

Eye height of module stressed input test is TBD.
It should be 15mV for consistency with host output spec.

SuggestedRemedy

Change TBD mV to 15 mV.

Response *Response Status* **C**

ACCEPT IN PRINCIPLE.

Resolve using the response to #200.

Cl **120G** *SC* **120G.3.3.2** *P* **227** *L* **49** # 115

Hidaka, Yasuo Credo Semiconductor

Comment Type **TR** *Comment Status* **A**

Far end eye height of host stressed input test is TBD.
See hidaka_3ck_01_0720, slide 7.

SuggestedRemedy

Change TBD to 24mV.

Response *Response Status* **C**

ACCEPT IN PRINCIPLE.

The following presentations were reviewed by the task force.
http://www.ieee802.org/3/ck/public/20_07/ghiasi_3ck_02_0720.pdf
http://www.ieee802.org/3/ck/public/20_07/hidaka_3ck_01_0720.pdf

The value for TP4a FE EH should match the value for TP4 FE EH. The value for TP4 FE EH as adopted by comment #177 is 24 mV.

Set that TP4a FE EH target value to 24 mV.

Implement with editorial license.

Cl **120G** *SC* **120G.3.3.2** *P* **227** *L* **50** # 116

Hidaka, Yasuo — Credo Semiconductor

Comment Type **T** *Comment Status* **A** *bucket7 C2M*

VEC of host stressed input test is not specified.

SuggestedRemedy

To table 120G-5, add a row of "Far-end vertical eye closure (max)" with a value of 7.5dB and a row of "Far-end vertical eye closure (min)" with a value of 7.0dB.

Response *Response Status* **C**

ACCEPT IN PRINCIPLE.

Resolve using the response to comment #197.

Cl **120G** *SC* **120G.5.2** *P* **235** *L* **7** # 117

Hidaka, Yasuo — Credo Semiconductor

Comment Type **TR** *Comment Status* **R**

This CTLE will have positive gain if gDC = -2dB.
To avoid positive gain, upper bound of gDC for TP1a should be limited up to -3dB.

SuggestedRemedy

Change upper bound of -2 of gDC for TP1a to -3.

Response *Response Status* **C**

REJECT.

There is no consensus to make changes to g_DC and g_DC2.

Cl **120G** *SC* **120G.5.2** *P* **235** *L* **7** # 118

Hidaka, Yasuo — Credo Semiconductor

Comment Type **TR** *Comment Status* **R**

It is not good to restrict gDC range by gDC2.
My simulation showed that many cases had the best gDC at max (weakest) regardless of gDC2 value, and resulted out of the specified range in D1.2.
This is reasonable, because the best gDC2 may be low (strong) to cancel low-frequency loss due to skin effect, whereas the best gDC may be high (weak) to suppress enhancement of high-frequency noise.
Hence, we should not restrict gDC range by gDC2.

SuggestedRemedy

Make gDC range independent from gDC2.

Response *Response Status* **C**

REJECT.

Resolve using the response to comment #117.

Cl **120G** *SC* **120G.5.2** *P* **235** *L* **17** # 119

Hidaka, Yasuo — Credo Semiconductor

Comment Type **TR** *Comment Status* **A** *bucket7 C2M*

Range of gDC for TP4 near-end is TBD.
See hidaka_3ck_01_0720, slide 8.

SuggestedRemedy

Specify gDC range for TP4 near-end as min -5.0, max -3.0, step 1.0.

Response *Response Status* **C**

ACCEPT IN PRINCIPLE.

Resolve using the response to comment #201.

Cl **120G** *SC* **120G.5.2** *P* **235** *L* **21** # 120

Hidaka, Yasuo — Credo Semiconductor

Comment Type **TR** *Comment Status* **A** *bucket7 C2M*

Range of gDC2 for TP4 near-end is TBD.
See hidaka_3ck_01_0720, slide 8.

SuggestedRemedy

Specify gDC2 range for TP4 near-end as min -2.0, max 0.0, step 0.5.

Response *Response Status* **C**

ACCEPT IN PRINCIPLE.

Resolve using the response to comment #201.

Cl **120G** *SC* **120G.5.2** *P* **235** *L* **25** # 121

Hidaka, Yasuo — Credo Semiconductor

Comment Type **TR** *Comment Status* **A** *bucket7 C2M*

Range of gDC for TP4 far-end is TBD.
See hidaka_3ck_01_0720, slide 8.

SuggestedRemedy

Specify gDC range for TP4 far-end as min -9.0, max -3.0, step 1.0.

Response *Response Status* **C**

ACCEPT IN PRINCIPLE.

Resolve using the response to comment #202.

Cl **120G** *SC* **120G.5.2** *P* **235** *L* **29** # 122

Hidaka, Yasuo — Credo Semiconductor

Comment Type **TR** *Comment Status* **A** *bucket7 C2M*

Range of gDC2 for TP4 far-end is TBD.
See hidaka_3ck_01_0720, slide 8.

SuggestedRemedy

Specify gDC2 range for TP4 far-end as min -3.0, max -1.5, step 0.5.

Response *Response Status* **C**

ACCEPT IN PRINCIPLE.

Resolve using the response to comment #202.

Cl **120G** *SC* **120G.5.2** *P* **236** *L* **21** # 123

Hidaka, Yasuo — Credo Semiconductor

Comment Type **T** *Comment Status* **A**

The condition "where eye height also meets the target value" seems not necessary and confusing. It is not clear what is "the target value".

SuggestedRemedy

Remove "where eye height also meets target value".

Response *Response Status* **C**

ACCEPT IN PRINCIPLE.

The intent of the reference phrase is to eliminate combinations of gDC and gDC2 where the EH height specification fails.

Change "where eye height also meets target value" to "where eye height also complies with the specification for eye height (min) as specified for the interface".

Cl **162** *SC* **162.11.7.1.1** *P* **162** *L* **16** # 124

Hidaka, Yasuo — Credo Semiconductor

Comment Type **T** *Comment Status* **A** *bucket*

"(transmitter or receiver)" is confusing and not correct.

SuggestedRemedy

Change "host (transmitter or receiver) PCB signal path" to "host receiver PCB signal path".

Response *Response Status* **C**

ACCEPT IN PRINCIPLE.

Resolve using the response to comment #218.

Cl **162** *SC* **162.11.7.1.2** *P* **162** *L* **28** # 125

Hidaka, Yasuo — Credo Semiconductor

Comment Type **T** *Comment Status* **A** *bucket*

S^(HOSP) is not the host receiver PCB signal path in this clause.

SuggestedRemedy

Change "S^(HOSP)" to "S^(HOSPR)" in Equation (162-13) and on line 28 and line 42.

Response *Response Status* **C**

ACCEPT.

Cl **162** *SC* **162.11.7.1.2** *P* **163** *L* **1** # 126

Hidaka, Yasuo — Credo Semiconductor

Comment Type **T** *Comment Status* **A** *bucket*

S^(HOSP) is not the host receiver PCB signal path in this clause.

SuggestedRemedy

Change "S^(HOSP)" to "S^(HOSPR)" in Equation (162-14) in page 162 and on line 1 in page 163.

Response *Response Status* **C**

ACCEPT.

Cl **162** *SC* **162.11.7.1.2** *P* **162** *L* **29** # 127

Hidaka, Yasuo — Credo Semiconductor

Comment Type **T** *Comment Status* **A** *bucket6*

S^(HOSPT) is defined as the host transmitter PCB signal path in clause 162.11.7.1.1. The aggressor transmitter PCB signal path should use a different symbol. Clause 136.11.7.1 defined the agressor transmitter PCB signal path as S^(HOTxSP).

SuggestedRemedy

Change "S^(HOSPT)" to "S^(HOTxSP)" in Equation (162-13) and on line 29 and line 44.

Response *Response Status* **C**

ACCEPT.

Cl **162** *SC* **162.11.7.1.2** *P* **163** *L* **3** # 128

Hidaka, Yasuo Credo Semiconductor

Comment Type **T** *Comment Status* **A** *bucket6*

S^(HOSPT) is defined as the host transmitter PCB signal path in clause 162.11.7.1.1. The aggressor transmitter PCB signal path should use a different symbol. Clause 136.11.7.1 defined the agressor transmitter PCB signal path as S^(HOTxSP).

SuggestedRemedy

Change "S^(HOSPT)" to "S^(HOTxSP)" in Equation (162-14) in page 162 and on line 3 in page 163.

Response *Response Status* **C**

ACCEPT.

Cl **162** *SC* **162.11.7.1.1** *P* **162** *L* **14** # 129

Hidaka, Yasuo Credo Semiconductor

Comment Type **E** *Comment Status* **A** *bucket*

There is meaning less "or".

SuggestedRemedy

Change "transmitter or" to "transmitter".

Response *Response Status* **C**

ACCEPT IN PRINCIPLE.

Resolve using the response to comment #217.

Cl **120G** *SC* **120G.3.2** *P* **224** *L* **36** # 130

Hidaka, Yasuo Credo Semiconductor

Comment Type **TR** *Comment Status* **A**

The near-end eye and far-end eye of module output characteristics (at TP4) are not well defined. Table 120G-3 refers to 120E.3.3.2.1 for far-end eye height, but 120E.3.3.2.1 is host stressed input test.

SuggestedRemedy

Add a sub clause describing near-end and far-end eys in 120G.3.2.1, similar to 120E.3.2.1.1 like the following:

The near-end eye is measured using the method in 120G.5.2.

For the far-end eye, the signal measured at TP4 is first convolved with a host channel (~9.6 dB loss at Nyquist) that represents the worst case channel loss with some reflection in the host trace. The host channel is the host receiver PCB signal path S^(HOSPR) defined in 162.11.7.1.1 with an exception to use z_p = 244.7 mm. The methods in 120G.5.2 and TBD are then used to measure eye height, eye width, vertical eye closure, and far-end pre-cursor ISI ratio.

Change the references in Table 120G-3.

Response *Response Status* **C**

ACCEPT IN PRINCIPLE.

Implement the suggested remedy with the exception that C0 and C1 are not included in the host channel.

Implement with editorial license.

Cl **120G** *SC* **120G.3.2** *P* **224** *L* **36** # 131

Hidaka, Yasuo — Credo Semiconductor

Comment Type **TR** *Comment Status* **A**

Table 120G-3 specifies far-end pre-cursor ISI ratio with a reference to 120E.3.2.1.2. Some description in 120E.3.2.1.2 is not relevant for 120G.

SuggestedRemedy

Add a sub clause describing far-end pre-cursor ISI ratio in 120G.3.2.1, similar to 120E.3.2.1.2 like the following:

Capture the PRBS13Q waveform corresponding to the far-end eye (see TBD) and calculate the linear fit pulse using the procedure defined in 162.9.3.1.1. Any setting of the reference receiver at TP4 far-end in Table 120G-9 for which the far-end eye width and height satisfy the limits in Table 120G–3, may be used.
The peak amplitude of the linear fit pulse is p_max. The pre-cursor ISI p_pre is the value of the linear fit pulse 1 UI prior to the time of the pulse peak. The pre-cursor ISI ratio is p_pre / p_max.

Response *Response Status* **C**

ACCEPT IN PRINCIPLE.

To be consistent with the methodology in 120G.5.2 the setting criteria should be based on EH and VEC. 162.9.3.1.1 includes both capture and linear fit methods. Some clarification of the reference is necessary.

In 120G.3.2, add a subclause describing far-end pre-cursor ISI ratio as follows:
“Capture the PRBS13Q waveform corresponding to the far-end eye and calculate the linear fit pulse using the procedure defined in 162.9.3.1.1. Any valid setting of the reference receiver continuous-time filter (see 120G.5.2) for which the far-end eye height and vertical eye closure satisfy the limits in Table 120G–3 may be used.
The peak amplitude of the linear fit pulse is p_max. The pre-cursor ISI p_pre is the value of the linear fit pulse 1 UI prior to the time of the pulse peak. The pre-cursor ISI ratio is p_pre / p_max.”

Change the reference in Table 120G-3 to point to the new subclause.
Implement with editorial license.

Cl **93A** *SC* **93A.1.2.4** *P* **198** *L* **50** # 132

Hidaka, Yasuo — Credo Semiconductor

Comment Type **T** *Comment Status* **A** *COM*

Scattering parameter of the second transmission line segment S^(l2) is used in EQ 93A-16b without its definition by new COM parameters z_p2 and Z_c2.

SuggestedRemedy

Insert the following statement at the end of 93A.1.2.3,

For clauses that includes a second package transmission line segment by parameters z_p2 and Z_c2, the scattering parameters for the second package transmission line are defined by Equation (93A-12a), Equation (93A–13a) and Equation (93A–14a). The units of z_p2 are mm.

rho2 = (Z_c2 - 2*R_0) / (Z_c2 + 2*R_0) (93A-12a)

s^(l2)_11(f) = s^(l2)_22(f) = rho2*(1-exp(-gamma(f)*2*z_p2)) / (1 - rho2^2*exp(-gamma(f)*2*z_p2)) (93A-13a)

s^(l2)_21(f) = s^(l2)_12(f) = (1-rho2^2)*exp(-gamma(f)*z_p2) / (1 - rho2^2*exp(-gamma(f)*2*z_p2)) (93A-14a)

The second transmission line scattering parameter matrix is then denoted as S^(l2).

Response *Response Status* **C**

ACCEPT IN PRINCIPLE.

Implement the suggested remedy with editorial license.

Cl **120F** *SC* **120F.4.1** *P* **212** *L* **5** # 133

Hidaka, Yasuo — Credo Semiconductor

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

As shown in sun_3ck_adhoc_01_030420, f_LF = f_b/40 is better than f_LF = f_b/80 for C2C.

SuggestedRemedy

Change f_LF from f_b/80 to f_b/40 in table 120F-6.

Proposed Response *Response Status* **Z**

REJECT.

This comment was WITHDRAWN by the commenter.

Cl **120F** *SC* **120F.3.1** *P* **204** *L* **48** # 134

Hidaka, Yasuo — Credo Semiconductor

Comment Type **T** *Comment Status* **A** *bucket*

53GHz bandwidth is unnecessarily high and inconsistent with Annex 120G.3.1, Annex 120G.3.2, Clause 162.9.3 and Clause 163.9.1.

SuggestedRemedy

Change 53 GHz to 40 GHz.

Response *Response Status* **C**

ACCEPT IN PRINCIPLE.

Implement suggested remedy.

See comment #162.

Cl **120G** *SC* **120G.3.2** *P* **224** *L* **45** # 135

Hidaka, Yasuo — Credo Semiconductor

Comment Type **TR** *Comment Status* **A** *bucket3*

Near-end eye height, differential (min) is TBD.
See hidaka_3ck_01_0720, slide 7.

SuggestedRemedy

Change TBD to 50.

Response *Response Status* **C**

ACCEPT IN PRINCIPLE.

Resolve using the response to comment #177.

Cl **162** *SC* **162.9.3** *P* **148** *L* **4** # 136

Ran, Adee — Intel

Comment Type **T** *Comment Status* **A** *bucket*

The rule here says "all transmitter measurements are made(…) using a test system with a fourth-order Bessel-Thomson low-pass response with 40 GHz 3 dB bandwidth". Some transmitter specifications require measurement of s-parameters, which should not include this filter.

In 163.9.1 and 120F.3.1, the similar rule refers to "all transmitter signal measurements", and in 120G.3.1 it is "output signal measurements". This phrasing would be better.

SuggestedRemedy

Change the text here to align with 163.9.1 and especially refer to signal measurements.

Response *Response Status* **C**

ACCEPT.

Cl **162** *SC* **162.9.3** *P* **148** *L* **28** # 137

Ran, Adee — Intel

Comment Type **T** *Comment Status* **R** *bucket7 CR*

(cross-clause comment)
Tx common mode to differential mode return loss is currently TBD.

The current reference is to 92.8.3.3 equation 92-2, where the equation for the minimum loss creates a piecewise linear function, with 22 dB at DC, 12 dB at the Nyquist frequency (12.89 GHz), and ~10.5 dB at 19 GHz. This limits the conversion to/from common mode quite well.

There is another C-D RL specification in this draft, in 120F.3.2.2 (Rx specifications), which is based on frequency scaling of the similar specification in clause 93 (equation 93-5 - per the adopted baseline). Equation 93-5 creates a tighter spec than equation 92-2 (except in a small band around 7 GHz) even though mode conversion should be easier to control in KR/C2C channels.

Clause 163 Rx specification refers to 93.8.1.4 - which is a Tx specification and does not include C-D RL at all (obvious error).

It is not clear why C2C, CR, and KR should have different specifications for C-D RL. If there is, it should be explained (informative NOTE would probably help).

The suggested remedy based on frequency scaling of equation 92-2 (which is equivalent to equation 120G–1, but uses f_N as a parameter to simplify the text).

Alternatively, 120F.3.2.2 can be used for all three Rx specifications.

This specification should be in a new subclause that other specifications can refer to. It should also provide some justification to the specification.

SuggestedRemedy

Add a subclause 162.9.3.1.5 with content:
162.9.3.5 PMD Common-mode to differential return loss
Common-mode signal can be generated in the channel by conversion of a differential signal. Common-mode signal propagating from the channel into the transmitter or the receiver can be converted back to a differential signal and result in differential noise propagating toward the receiver. To limit this effect, a minimum common-mode to common-mode return loss is required.

The common-mode to differential mode output return loss of the transmitter shall meet Equation (162–new).

CDRL(f) ≥
22-10*f/f_N, 0.01 ≤ f ≤ f_N
15-3*f/f_N, f_N< f < 40
Where
f_N=26.5625 is the Nyquist frequency in GHz

f is the frequency in GHz
CDRL(f) is the common-mode to differential return loss in dB at frequency f

Refer to the new subclause in Rx specifications: Table 162–12, Table 163–7 , and Table 120F-3.

Response *Response Status* **C**

REJECT.

There is no consensus to change the RLCD specification at this time.

See the response to comment #138.

Cl **162** *SC* **162.9.3** *P* **148** *L* **28** # 138

Ran, Adee Intel

Comment Type **T** *Comment Status* **R** *Tx electrical*

(cross-clause)
Clause 162 has a common-mode to differential return loss specification for both Tx and Rx. Clause 163 and annex 120F have this specification only for Rx.

Is this an oversight, or maybe a Tx specification is not required in clause 162 either? (discussion may be required)

SuggestedRemedy

If a C-D RL specification is not required for the Tx, it should be removed from Table 163–5, and the specification (subject of another comment) should be a subclause of 162.9.4 instead of 162.9.3.

If it is required, references to the specification subclause (subject of another comment) should be added in Table 163–5 and in Table 120F–1.

If there is a reason to have a specification for CR but not for KR/C2C, there should be an informative NOTE in clause 162 that explains it. (I don't know of a reason at the time of writing)

Response *Response Status* **C**

REJECT.

There is no consensus to change the TX RLCD specification at this time.

Strawpoll #13 (direction)
I support resolving comment #138 as follows:
A: keep TX RLCD per Draft 1.2
B: modify TX RLCD per comment 138 suggested remedy
C: remove TX RLCD specification

Strawpoll #13
(chicago rules)
A: 12 B: 11 C: 13

Cl **162** *SC* **162.9.3** *P* **148** *L* **30** # 139

Ran, Adee Intel

Comment Type **T** *Comment Status* **A** *Tx electrical*

(cross-clause)
Common-mode to common-mode return loss specification is currently TBD.

The specification in all PMD clauses since 802.3bj is 2 dB flat between 0.2-19 GHz.

This specification has been taken from InfiniBand without further discussion in 802.3bj. It may be difficult to justify specific limits. However, it is reasonable from implementation point of view and there is no evidence that requires modifying it.

It is proposed to extend the frequency range proportionally with the increase in signaling rate, to 40 GHz. This should be done in a new subclause that other specifications can refer to. It should also provide some justification to the specification.

SuggestedRemedy

Add a new subclause 162.9.3.6 with content:

162.9.3.6 Common-mode to common-mode return loss
Common-mode signal can be generated in the channel by conversion of a differential signal. Any common-mode signal returned into the channel can be converted back to a differential signal and result in differential noise into the receiver. To limit this effect, a minimum common-mode to common-mode return loss is required.

The common-mode to common-mode return loss shall be greater than or equal to 2 dB at all frequencies between 0.2 GHz and 40 GHz.

Refer to the new subclause in the appropriate row of table 162-9. Set the value to 2 dB.

Refer to the new subclause in Table 163-5 with the same value, and change the row name from "Common-mode return loss (min.)" to "Common-mode to common-mode return loss (min.)".

Add a new row for "Common-mode to common-mode return loss (min.)" with same content in table 120F-1.

Response *Response Status* **C**

ACCEPT IN PRINCIPLE.

Implement the suggested remedy with editorial license.

Cl **162** *SC* **162.9.3** *P* **148** *L* **45** # 140

Ran, Adee
Intel

Comment Type **T** *Comment Status* **A** *Tx electrical*

(Cross-clause)
Footnote d of table 162-9 states "J3u, JRMS, and even-odd jitter measurements are made with a single transmit equalizer setting selected to compensate for the loss of the host channel".

This is a significant change compared to the method of 120D.3.1.8 (referenced for two of the jitter parameters), which states that "The J4u, JRMS, and Even-odd jitter specifications shall be met regardless of the transmit equalization setting".

Furthermore, 162.9.3.3 defines J3u jitter with a reference to 120D.3.1.8.1 (which implies being required at all equalization settings) without mention of the exception in the footnote.

Furthermore, "selected to compensate for the loss" can be interpreted in different ways.

Similar text exists in clause 136 and has caused confusion about jitter measurement requirements.

Applies also to clause 163 (which has similar footnote and J3u subclause) and to annex 120F (which simply refers to annex 120D).

SuggestedRemedy

1. Change title of 162.9.3.3 from "J3u jitter" to "Output jitter".
2. Change 162.9.3.3 to include the following:
"Output jitter is characterized by three parameters, J3u, JRMS, and Even-odd jitter. These parameters are calculated from measurements with a single transmit equalizer setting to compensate for the loss of the transmitter package and host channel. The equalizer setting is chosen to minimize any or all of the jitter parameters.

J3u and JRMS are calculated from a jitter measurement specified in 120D.3.1.8.1. J3u is defined as the time interval that includes all but 10^–3 of fJ(t), from the 0.05th to the 99.95th percentile of fJ(t) .

Even-odd jitter is calculated from a jitter measurement as specified in 120D.3.1.8.2."
3. Change the references from 120D.3.1.8 to 162.9.3.3 in the table and in the PICS (TC12).
4. Delete footnote d.

In clause 163, apply similar changes to the table, referring to 162.9.3.3.

In Annex 120F, apply similar changes including a new subclause, but change "host channel" to "test fixture", and omit the definition of J3u.

Response *Response Status* **C**

ACCEPT IN PRINCIPLE.

Implement the suggested remedy with editorial license.

Cl **162** *SC* **162.9.3.1.2** *P* **151** *L* **10** # 141

Ran, Adee
Intel

Comment Type **E** *Comment Status* **D** *Tx electrical*

"The steady-state voltage vf is defined in 136.9.3.1.2, and is determined using Nv=200"

The definition in 136.9.3.1.2 is concise, and includes yet another reference to clause 85. The value of Nv is significantly different. It would help readers if we reduce the depth of references.

SuggestedRemedy

Change this sentence to the following (in a separate paragraph):

"The steady-state voltage vf is defined to be the sum of the linear fit pulse response p(1) through p(M×Nv) divided by M
(refer to 85.8.3.3 step 3)" where Nv=200 is the length of the pulse response in UI."

Proposed Response *Response Status* **Z**

REJECT.

This comment was WITHDRAWN by the commenter.

Cl **162** *SC* **162.9.3.1.3** *P* **151** *L* **30** # 142

Ran, Adee
Intel

Comment Type **T** *Comment Status* **D** *Tx electrical*

Cross-clause

The OUT_OF_SYNC setting is the initial setting used when bringing up a link. It is likely not the optimal setting in many cases, and may not be a good starting point, which can cause long link-up times.

In cases where the channel and link partner are known (typical in backplane or C2C), another initial setting may be preferable.

To enable fast link up in such cases, it is proposed that the coefficients in OUT_OF_SYNC state be taken from MDIO registers instead of being fixed. The default values of the registers will create the current preset 1 settings [0 0 0 1 0], so that when the channel is unknown the behavior is unchanged from D1.2.

SuggestedRemedy

Two new sets of R/W registers should be allocated. Each set corresponds to the 5 coefficient values, one register each.
"Initial coefficient vector" hold the values that will be set in OUT_OF_SYNC.
"Current coefficient vector" holds the current coefficients.

The encoding of these registers is implementation dependent, but is consistent between the sets.

Presentation with more details is planned.

Proposed Response *Response Status* **Z**

REJECT.

This comment was WITHDRAWN by the commenter.

Cl **162** *SC* **162.9.3.1.3** *P* **151** *L* **33** # 143

Ran, Adee
Intel

Comment Type **T** *Comment Status* **A** *Tx electrical*

(cross-clause)
Transmitter presets 2 and 3 are currently TBDs.

It is proposed to use these presets as starting points for high-loss and low-loss channels.

Preset 2 in the suggested remedy is based on COM simulations of 2 m cable + 2*110 mm host board, and 1.5 m cable + 2*55 host board, and several backplane channels (results are quite similar).

Preset 3 for in the suggested remedy is aimed at short reach channels (more relevant for backplane/C2C), has minimum c(0) assumed in COM and no equalization, for channels that may need reduced swing. Even if equalization is required, this can be used as a convenient starting point of an optimization algorithm.

Presets are based on the maximum allowed step size of 2.5% and should have a tolerance of one step.

Clause 163 and Annex 120F do not have explicit settings but are going to be affected by this change.

SuggestedRemedy

Change the TBD values in the table as follows:

Preset 2: -0.025, 0.075, -0.25, 0.65, 0
Preset 3: 0, 0, 0, 0.525, 0

Set tolerance of +/- 0.025 for all presets (including preset 1 and OUT_OF_SYNC).

Response *Response Status* **C**

ACCEPT IN PRINCIPLE

Resolve using the response to comment #104.

Cl **162** *SC* **162.9.3.1.5** *P* **152** *L* **19** # 144

Ran, Adee Intel

Comment Type **T** *Comment Status* **A** *bucket*

(cross-clause)

There is no requirement in the transmitter characteristics for the range of c(0).

While the maximum is 1 by definition of the measurement method, the minimum is only implied by the minimum value of c(-1) and an assumption that the sum of absolute coefficients is capped at 1 (which may not be true in all implementations).

Even assuming that the sum is not larger than 1, the implied minimum of c(0) is 0.66, while the COM search range assumes 0.54 is possible.

SuggestedRemedy

Add the following paragraph before the NOTE:

Having received sufficient "decrement" requests so that it is at its minimum value, c(0) shall be less than or equal to 0.54.

Add a row in table 162-9: "value at minimum state for c(0) (max.)" with reference to this subclause and value 0.54.

Add similar rows in table 163-5 and table 120F-1.

Response *Response Status* **C**

ACCEPT.

Cl **162** *SC* **162.9.3.2** *P* **152** *L* **24** # 145

Ran, Adee Intel

Comment Type **T** *Comment Status* **A** *Tx electrical*

Addressing TBD equation 162-5.

Recommendations of maximum host board IL at the Nyquist frequency would be valuable for board design. Minimum recommendations should also be given, to reduce ISI from reflections.

Unlike previous generations, the assumption in this project is that host board is built of ultra-low-loss material where the loss at a large part of the spectrum is close to the loss at Nyquist. The IL equation has relatively little additional value and will be harder to justify. Therefore we can remove this TBD equation.

Recommended loss should be given at 26.56 GHz, not 25.56 GHz.

Also, since the effect of the test fixture may vary between MDIs and form factors, it would be helpful to recommend the IL from TP0 to the MDI and from the MDI to TP5 in addition. These are given in Figure 162A–1 as 6.875 dB each; this should be considered a maximum value.

Note that host board design should also minimize reflections, which may require a different specification or recommendation, but that is not proposed at this point.

SuggestedRemedy

Change the text of 162.9.3.2 to the following two paragraph, removing the equation:

The recommended insertion loss at 26.56 GHz from TP0 to TP2 or from TP3 to TP5 (including the test fixture) is between 7.1 dB and 10.975 dB.

The recommended insertion loss at 26.56 GHz from TP0 to the MDI pads (not including the MDI receptacle and test fixture) is between 3 dB and 6.875 dB.

Response *Response Status* **C**

ACCEPT IN PRINCIPLE.

Resolve using the response to comment #40.

Cl **162** *SC* **162.9.4.4.2** *P* **156** *L* **50** # 146

Ran, Adee Intel

Comment Type **T** *Comment Status* **A**

Comment #33 against D1.1 suggested jitter tolerance requirements at additional frequencies between the measurement points of Table 120D–7, but only addressed clause 163. The same argument also holds in 162 (which currently points to Table 120D–7) and in 120F (which has Table 120F–5, identical to Table 163–9).

SuggestedRemedy

To address the concern of comment #33 in all 3 places together:

1. Add another column in Table 120F–5, with frequency 0.4 and amplitude 0.5, changing the labels in the first row as necessary.
2. Change the reference in 162.9.4.4.2 from Table 120D–7 to Table 120F–5.
3. In 163.9.2.4, either delete Table 163–9 and refer to Table 120F–5 instead, or apply similar changes to Table 163–9.

Response *Response Status* **C**

ACCEPT IN PRINCIPLE

In Table 163-9, add another column with frequency 0.4 and amplitude 0.5, changing the labels in the first row as necessary.

Move Table 163-9 to Clause 162 in place of reference to Table 120D-7.

Refer to this table from the jitter tolerance subclauses in Clause 163 and Annex 120F.

Implement with editorial license.

Cl **162** *SC* **162.11.4** *P* **159** *L* **6** # 147

Ran, Adee Intel

Comment Type **T** *Comment Status* **R** *bucket5 CA*

Addressing D-C return loss of the cable assembly, which is TBD.

In clause 92 the D-C return loss was specified for PMD Tx (92.8.3.3), Rx (92.8.4.3), and for the cable assembly (92.10.4) with identical equations. These specifications were all carried into clause 110 and clause 136 with no change.

Specification for the PMD Tx/Rx are suggested in other comments (note: two possible remedies).

Specifications for the CA may be identical to those of the PMD, or different. If they are different, the suggested remedy includes a limit equation based on 92.10.4, with scaled frequencies.

If the numbers in the equation are not in consensus they can be replaced with TBDs.

SuggestedRemedy

f the specifications for the PMD (subject of other comments) can be used for the CA, use references to the PMD specs here instead of repeating the equations. In that case, 162.11.6 can be deleted.

If the specifications for the CA are different from those of the PMDs, then change 162.11.6 content as follows:

162.11.6 Cable assembly Common-mode to differential return loss
Common-mode signal can be generated in the transmitter or as signal reflected from the receiver. Common-mode signal propagating into the channel can be converted back to a differential signal and result in differential noise propagating toward the receiver. To limit this effect, a minimum common-mode to common-mode return loss is required.

The common-mode to differential mode return loss of the cable assembly shall meet Equation (162–new).

CDRL(f) ≥
22-10*f/f_N, 0.01 ≤ f ≤ f_N
15-3*f/f_N, f_N< f < 40
Where
f_N=26.5625 is the Nyquist frequency in GHz
f is the frequency in GHz
CDRL(f) is the common-mode to differential return loss in dB at frequency f

Response *Response Status* **C**

REJECT.

Resolve using the response to comment #71.

Cl **162** *SC* **162.11.5** *P* **159** *L* **10** # 148

Ran, Adee Intel

Comment Type **T** *Comment Status* **R**

Addressing D-C conversion (insertion) loss which is TBD.

In clause 92 the D-C conversion loss was specified relative to the differential insertion loss, with minimum of 10 dB flat from 10 MHz up to the Nyquist frequency, then decreasing linearly to 6.3 dB at 15.7 GHz, and a flat 6.3 dB up to 19 GHz (Equation 92-29).

Minimum mode conversion loss is important to control the differential noise into the receiver, with Tx allowed CM noise (up to 30 mV RMS) and possible additional noise from D-C return loss.

The difference from insertion loss is a good method assuming the common mode noise has a flat spectrum (similar to the victim signal). If the common mode noise is concentrated at low frequencies where the channel does not attenuate much, then it may only be reduced to 10 mV RMS, which is a large amount of noise. We don't have reason to assume that, but it may be worth tightening the specs (future work required).

It is suggested to use a specification similar to clause 92 scaled to the new Nyquist frequency, and modified to extend the slope to 1.25*26.5625, where the equation creates a flat 10 dB line between 0.01-26.5625 GHz, a constant slope until 33.203125 GHz, and a flat 5.75 dB line between 33.203125-40 GHz.

If the numbers in the equation are not in consensus they can be replaced with TBDs.

SuggestedRemedy

Change the content of 162.11.5 to the following:

162.11.5 Cable assembly differential to common-mode conversion loss

Conversion between differential and common-mode signals can result in degradation of the signal at the receiver, and in introduction of differential noise into the receiver. To limit these effects, the differential to common-mode mode conversion loss, relative to the insertion loss, has to be limited.

The difference between the cable assembly differential to common-mode conversion loss and the cable
assembly insertion loss shall meet Equation (162-new).

CDCL(f) - IL(f) ≥
10, 0.01 ≤ f ≤ f_N
27-17*f/f_N, f_N < f ≤ 1.25*f_N
5.75, 1.25*f_N < f < 40
Where
f_N=26.5625 is the Nyquist frequency in GHz
f is the frequency in GHz
CDCL(f) is the common-mode to differential inversion loss in dB at frequency f
IL(f) is the differential insertion loss in dB at frequency f

Response *Response Status* **C**

REJECT.

See also 181, 71, and 74.

There is no consensus to address the TBD at this time.

Cl **162** *SC* **162.11.7** *P* **159** *L* **20** # 149

Ran, Adee Intel

Comment Type **T** *Comment Status* **A**

(cross-clause)
Addressing the value of T_r used in COM, which is currently TBD.

Tr is not mesurable, but it implicitly affects the transmitter specification peak/Vf which is measurable, and is also TBD in 162, 163 and 120F.

The proposed value for Tr (as used in COM, prior to the device package model) is 7.5 ps. This values matches results of feasible transmitter devices and will enable reasonble values of peak/Vf.

Note that the value 6.16 ps has been used in prior analysis, but has never been adopted. This latter value is overly aggressive and does not enable feasible design of transmitters. The proposed value has only a mild effect on COM results in comparison.

A presentation supporting this value and possible values for peak/Vf at Tp0 or TP0a (possibly informative) will be provided.

SuggestedRemedy

Change TBD to 7.5 ps in 162.11.7, in 163.10, and in 120F.4.1.

Response *Response Status* **C**

ACCEPT IN PRINCIPLE.

A related presentation was not submitted.

Implement the suggested remedy.

Cl **162** *SC* **162.11.7** *P* **159** *L* **20** # 150

Ran, Adee Intel

Comment Type **T** *Comment Status* **A** *COM*

(cross-clause)

The transmission line parameters in the package model in COM have been the same since 802.3, and are hard-coded in Table 93A–3.

In the COM spreadsheets used in this project there are somewhat different values for these parameters (presented in http://www.ieee802.org/3/ck/public/19_01/benartsi_3ck_01_0119.pdf, but not explicitly adopted into any of the drafts).

Validation of a proposed package model has been presented at the same meeting (http://www.ieee802.org/3/ck/public/19_01/heck_3ck_01_0119.pdf), but with the old TL parameters. So it is not clear if the modified parameters are in consensus.

SuggestedRemedy

If there is consensus that the parameters should change, then a new table should be created for the new values and used in 162,163, and 120F, and possibly a provision should be made in Annex 93A to use differnt parameters if supplied.

Otherwise, the COM spreadsheets should rever to use the existing values (out of scope of the editorial team...)

Response *Response Status* **C**

ACCEPT IN PRINCIPLE.

Implement the suggested remedy for 162, 163, and 120F with editorial license using the parameters in similar comment #53 which was accepted for Clause 163 only.

The referenced presentations are here:
http://www.ieee802.org/3/ck/public/19_01/benartsi_3ck_01_0119.pdf
http://www.ieee802.org/3/ck/public/19_01/heck_3ck_01_0119.pdf

Cl **162** *SC* **162.11.7** *P* **159** *L* **41** # 151

Ran, Adee Intel

Comment Type **E** *Comment Status* **A** *bucket*

(cross clause)
For a consistent notation of the numeric values of capacitances , change text of Cb to 3e-5 nF. Alternatively use exponent of -6 everywhere and set Cd=120e-6, Cb=30e-6, Cp=87e-6

SuggestedRemedy

Per comment. Apply in 162.11.7, in 163.10, and in 120F.4.1.

Response *Response Status* **C**

ACCEPT.

Cl **162** *SC* **162.11.7** *P* **160** *L* **43** # 152

Ran, Adee Intel

Comment Type **T** *Comment Status* **A** *bucket5 CA*

SNR_TX of the CR PHY needs to be somewhat lower than the corresponding CK PHY COM value (33 dB), to account for crosstalk that is introduced by practical host board routing. The mathematical host board model that is used in COM does not introduce any crosstalk.

Proposed value is 32.5 dB.

SuggestedRemedy

Change TBD to 32.5 dB.

Response *Response Status* **C**

ACCEPT IN PRINCIPLE.

Resolve using response to comment #37.

Cl **163** *SC* **163.9.1.2** *P* **178** *L* **52** # 153

Ran, Adee Intel

Comment Type **T** *Comment Status* **A** *bucket2*

(Cross-clause)
The test feature normative insertion loss requirements are not realistic for real devices, especially with multiple lanes.

Also, as presented in http://www.ieee802.org/3/ck/public/20_01/mellitz_3ck_01a_0120.pdf, the variations allowed within the recommendations create significant variations in results of compliance parameters. This is obvisouly not a viable methodology anymore.

It is suggested to replace the test fixture requirements with an explicit equation describing s-parameters of a transmission line with 4 dB IL (using equation 93A–14 with appropriate parameters) such that TP0a is well-defined, and create informative specifications at this TP0a. Alternatively, informative specifications can be given at TP0.

Normaitve requirements should use a new methodology based on measued or extracted test fixture s-parameters.

Also applies to Annex 120F.

SuggestedRemedy

A presentation with more details will be provided.

Response *Response Status* **C**

ACCEPT IN PRINCIPLE.

This comment applies to both 163 and 120F.

The commenter is referring to the following presentation:
http://www.ieee802.org/3/ck/public/20_07/benartsi_3ck_01_0720.pdf

The new test point TP0v and related test fixture are adopted per the response to comment #33.

Retain the TP0a test point and test fixture specifications, but change to an informative specification.

Implement with editorial license.

Cl **163** *SC* **163.9.1.2** *P* **179** *L* **48** # 154

Ran, Adee Intel

Comment Type **T** *Comment Status* **A** *TF RL*

The reference return loss requirements have questionable value or justification, the RL specifications have been replaced by ERL. The ERL calculation practically excludes the test fixture effect.

SuggestedRemedy

Delete the content from "The differential return loss of the test fixture" to the end of 163.9.1.2.

Response *Response Status* **C**

ACCEPT IN PRINCIPLE.

The resolution of comment #153 changes TP0a specifications to informative. The resolution of comment #34 adds new specifications for TP0-TP0v in Clause 163 and Annex 120F.

In addition to the specifications added by comment #34, add the following specification, with editorial license:

"ERL of the test fixture is measured at TP0v, using Nbx=0, Tfx=0, and N=20. The ERL shall be greater than or equal to TBD."

Cl **163** *SC* **163.9.2.3** *P* **182** *L* **6** # 155

Ran, Adee Intel

Comment Type **T** *Comment Status* **R** *TX SNDR Parameter*

(cross-clause)
Addressing Np in SNDR calculation for receiver interference tolerance testing, which is TBD.

The corresponding test in clause 162 sets Np to 15 UI . This value may be debated, but there seems to be no reason to have a different value here.

Note that linear fit is done with Nv=200 for the vf measurement. A smaller number can create lower SNDR, by converting the tail of the pulse to noise. Using this SNDR as SNR_TX, lower SNR_TX results in lower COM, so less noise should be injected to reach the COM target. This may favor the DUT in the RITT measurement.

Also applies in 120F.3.2.3.

SuggestedRemedy

Change TBD to 15 in both places.

Response *Response Status* **C**

REJECT.

[Editor's note: Changed page from 181.]

There is no consensus to make a change at this time.

Cl **163** *SC* **163.9.2.3** *P* **181** *L* **53** # 156

Ran, Adee Intel

Comment Type **T** *Comment Status* **A** *RITT*

The Rx test channel is calculated excluding the Rx device package model, and with a transition time filter with Tr=TBD. In 802.3cd this Tr was based on measurement at TP0, which may be after a package of a compliant device (this may be more representative than an instrument-grade transmitter).

The measured transition time at TP0 does not represent all the signal integrity effects of 100G packaged devices and test fixtures. Omitting a package model altogether and using only the transition time filter and ideal termination would not model internal reflections or reflection of signal returning from the test channel. This would lead to an optimistic COM result which may require addition of noise.

If the signal source does include a package or any other discontinuity then in practice there will be reflections and the signal will be worse than what COM (without package) predicts, resulting in overstressed test.

In the test method of annex 93C, this issue has been addressed by the statement "… the transmitter package model is included only if a compliant transmitter with a similar termination is used. If a transmitter with high quality termination is used... the termination is modeled as ideal and a Gaussian low pass filter is added". But later KR clauses (starting at 111) removed this condition and required using only a transition time filter, with value calculated from a measurement at TP0a. This may not be justifiable anymore with 100G devices.

If the signal source used in a test is a device which has known internal discontinuities modeled as s-parameters (e.g. from extraction, s-parameter measurement, or calculation from measured Tx output) then these s-parameters should be included in the calculated test channel.

SuggestedRemedy

Replace item d with the following:

d) In the calculation of COM (list item 7 in 93A.2), if the transmitter is a device with known s-parameters and transition time, these parameters should be used instead of the transmitter package model in 93A.1.2. If the transmitter is a packaged device with unknown parameters, then the package model in 93A.1.2 is used, with zp of test 1 in Table 163–10 and Tr as specified in 163.10. If a calibrated instrument-grade transmitter is used, the transmitter termination is modeled as ideal and a Gaussian low pass filter is added as defined in 93A.2.

Similar changes may also be required for clause 162 and annex 120F, with possible modifications as necessary.

Response *Response Status* **C**

ACCEPT IN PRINCIPLE.

Comment #38 discusses the same topic.

Change bullet d) to:
d) In the calculation of COM, if the transmitter is a device with known sparameters and transition time Tr, these parameters should be used
instead of the transmitter package model in 93A.1.2. If a calibrated instrument-grade transmitter is used, The transmitter device package model S(tp) is omitted from Equation (93A–3) in the calculation of COM. The filtered voltage transfer function H(k)(f) calculated in Equation (93A–19) uses the filter Ht(f) defined by Equation (93A–46), where Tr is calculated as Tr = 1.09*Trm-4.32 ps and Trm is the measured 20% to 80% transition time of the signal at TP0a. Trm is measured using the method in 120E.3.1.5. Trm is measured with transmitter equalizer turned off.Apply the change to 120F.

Cl **163** *SC* **163.9.2.3** *P* **182** *L* **49** # 157

Ran, Adee Intel

Comment Type **T** *Comment Status* **R** *TF RL*

"The return loss of the test setup in Figure 93C–4 measured at TP5 replica towards TPt meets the
requirements of Equation (163–2)."

Equation (163–2) is the reference return loss of a transmitter test fixture. It is irrelevant here, as the test channel at TP5 is a channel, not a transmitter.

The channel has ERL requirements, and no RL requirements.

SuggestedRemedy

Change the quoted sentence to

"The effective return loss of the test setup in Figure 93C–4 measured at TP5 replica towards TPt meets the
requirements of 163.10.2."

Response *Response Status* **C**

REJECT.

Although the resolution of comments #34 and #153 makes the return loss in 163.9.1.2 informative, comments #11078 and #170 have been resolved using this return loss for TP5a replica in Annex 120F. For consistency, Clause 163 should use the same requirements at TP5a as in Annex 120F.

There was no consensus to implement the suggested remedy.

Cl **163** *SC* **163.13.4.3** *P* **192** *L* **13** # 158

Ran, Adee Intel

Comment Type **E** *Comment Status* **A** *bucket*

Wrong cross-reference.

SuggestedRemedy

Change 120D.3.1.4 (external reference) to 162.9.3.1.2 (internal reference).

Response *Response Status* **C**

ACCEPT.

Cl **93A** *SC* **93A.1.2.4** *P* **198** *L* **37** # 159

Ran, Adee Intel

Comment Type **E** *Comment Status* **A** *bucket4*

The usage of cascades of "cascade()" in equations in this annex is becoming inconvenient.

The function is defined in 93A.1.2.1, but only for two arguments, which got us to where we are.

SuggestedRemedy

Bring in 93A.1.2.1 and add another shorthand notation: cascade(A, B, C) is equivalent to cascade(cascade(A, B), C).

Use the new notation to simplify the equations here and in clause 162.

Response *Response Status* **C**

ACCEPT IN PRINCIPLE.

Implement the suggested remedy but generalizing to support any number of sections with editorial license.

Cl **93A** *SC* **93A.1.2.4** *P* **199** *L* **4** # 160

Ran, Adee Intel

Comment Type **E** *Comment Status* **A** *bucket*

A graphic representation of the network with annotation of the various S's would be very helpful.

SuggestedRemedy

Add a figure, perhaps based on slide 6 of http://www.ieee802.org/3/ck/public/18_11/benartsi_3ck_01_1118.pdf and/or slide 3 of http://www.ieee802.org/3/ck/public/adhoc/jun12_19/healey_3ck_adhoc_01_061219.pdf .

Response *Response Status* **C**

ACCEPT IN PRINCIPLE.

Implement the suggested remedy with editorial license.

Cl **120A** *SC* **120A.5** *P* **201** *L* **20** # 161

Ran, Adee Intel

Comment Type **E** *Comment Status* **A** *bucket*

duplicated label "MMD8" in the figure.

SuggestedRemedy

delete one copy.

Response *Response Status* **C**

ACCEPT.

Cl **120F** *SC* **120F.3.1** *P* **204** *L* **48** # 162

Ran, Adee Intel

Comment Type **T** *Comment Status* **A** *bucket*

"53 GHz 3 dB bandwidth" only here. In clauses 162 and 163 it is 40 GHz. I assume this is an oversight.

SuggestedRemedy

Change "53 GHz" to "40 GHz".

Response *Response Status* **C**

ACCEPT IN PRINCIPLE.

Resolve using the response to comment #134.

Cl **120F** *SC* **120F.3.1** *P* **205** *L* **19** # 163

Ran, Adee Intel

Comment Type **E** *Comment Status* **A** *bucket*

For consistency with the rest of the document, "Steady state" should be "Steady-state".

SuggestedRemedy

Add hyphens (twice).

Response *Response Status* **C**

ACCEPT.

Cl **120F** *SC* **120F.3.1** *P* **205** *L* **20** # 164

Ran, Adee Intel

Comment Type **E** *Comment Status* **A** *bucket*

In this table there are occurrences of "min" and "max" both with and without a period.

This should be standardized at least on a per-clause basis, and preferably across the draft.

SuggestedRemedy

Since these are abbreviations, it is suggested to include a period. Preferably change globally in the draft.

Response *Response Status* **C**

ACCEPT IN PRINCIPLE.

Change occurrences of "min." and "max." (with period) to "min" and "max" (without period), as appropriate, throughout the draft.

Cl **120F** *SC* **120F.3.1** *P* **205** *L* **20** # 165

Ran, Adee Intel

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

(cross clause)
Addressing Vf (min) in C2C which is TBD.

The minimum allowed value should be 0.4 as in C163.

C162 has a lower value 0.387, possibly due to measurement with Nv=13 in clause 136. As the measurement in C162 is done with Nv=200, it isn't clear why the value should be lower than in C163. If there is a reason, a footnote or informative NOTE would be helpful to avoid confusion.

SuggestedRemedy

Change TBD to 0.4.

Consider changing the value in Table 162–9 to 0.4, or adding a note with explanation of the different value.

Proposed Response *Response Status* **Z**

REJECT.

This comment was WITHDRAWN by the commenter.

Cl **120F** *SC* **120F.3.1** *P* **205** *L* **21** # 166

Ran, Adee Intel

Comment Type **T** *Comment Status* **A**

The reference for linear fit pulse peak is 120D.3.1.4, which uses Nv=13. This is inadequate for the higher loss in this project.

Also, 120D.3.1.4 includes control of the 3-tap equalizer, but here we have 5 taps.

SuggestedRemedy

Change reference for linear fit pulse peak to 162.9.3.1.2.

Response *Response Status* **C**

ACCEPT.

Cl **120F** *SC* **120F.3.1** *P* **205** *L* **22** # 167

Ran, Adee Intel

Comment Type **T** *Comment Status* **A**

Minimum and maximum tap value and step sizes refer to 136.9.3.1.4, but in this project we have different specifications in clause 162 (an additional tap, and uniform step size limits).

SuggestedRemedy

Change references for step sizes and ranges to 162.9.3.1.4 and 162.9.3.1.5 respectively.

Response *Response Status* **C**

ACCEPT.

Cl **120F** *SC* **120F.3.1** *P* **205** *L* **29** # 168

Ran, Adee Intel

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

Jitter specifications refer to 120D.3.1.8 which expliciitly states that they hold at any equalization setting. But this is not feasible and not important.

In C162 and C163 there is a footnotw that jitter is measured in a single equalizer setting. Another comment suggests making it more explicit.

SuggestedRemedy

If my other comment does not apply here:
Add a table footnote that "J3u, JRMS, and even-odd jitter measurements are made with a single transmit equalizer setting selected to compensate for the loss of the transmitter package and TP0 to TP0a test fixture" similar to Table 163-5.

Proposed Response *Response Status* **Z**

REJECT.

This comment was WITHDRAWN by the commenter.

Cl **120F** *SC* **120F.3.2.2** *P* **208** *L* **10** # 169

Ran, Adee Intel

Comment Type **T** *Comment Status* **A** *bucket6*

"The reference impedance for common-mode return loss measurements is 25 Ohm"

Is this statement helpful (or even correct) for D-C conversion? It does not appear in similar places in existing clauses. This clause does not discuss common-mode (to common-mode) return loss.

Practically, the conversion RL is obtained from single-ended s-parameter measurements with a reference of 50 Ohm.

SuggestedRemedy

Delete this sentence.

Response *Response Status* **C**

ACCEPT IN PRINCIPLE.

Delete the referenced sentence.

For both 163 and 120F, add text elsewhere similar to 162.11.1 to specify the reference impedance for differential-mode and common-mode.

Cl **120F** *SC* **120F.3.2.3** *P* **208** *L* **53** # 170

Ran, Adee Intel

Comment Type **T** *Comment Status* **A** *bucket2*

Addressing TBD in test setup requirements.

"The return loss of the test setup in Figure 93C–4 measured at TP5 replica towards TPt meets the
requirements of Equation (TBD)."

The test fixture can be considered as a channel that the transmitter is connected to. As such, it should meet the ERL requirements of the channel. There are no return loss requirements for a channel.

SuggestedRemedy

Change the quoted sentence to

"The effective return loss of the test setup in Figure 93C–4 measured at TP5 replica towards TPt meets the
requirements of 120F.4.3."

Response *Response Status* **C**

ACCEPT IN PRINCIPLE.

Resolve using the response to comment #11078.

Cl **120F** *SC* **120F.3.2.3** *P* **209** *L* **39** # 171

Ran, Adee Intel

Comment Type **T** *Comment Status* **A**

Addressing minimum RSS_DFE4 which is TBD.

The corresponding parameter in Table 163–8 is 0.05. This is a very mild requirement when the reference receiver in COM has large b_max. There is no reason not to use this value here too.

SuggestedRemedy

Change TBD to 0.05 twice.

Response *Response Status* **C**

ACCEPT.

Cl **120G** *SC* **120G.1** *P* **219** *L* **17** # 172

Ran, Adee Intel

Comment Type **T** *Comment Status* **A**

The figure shows a host insertion loss of up to 11.9 dB, but in 120G.3.4.1.1 (module stressed input procedure) one of the test cases has 18.2 dB insetion loss, which "represents 16 dB channel loss with an additional allowance for host transmitter package loss". The informative graph at 120G.4.1 also looks like 16 dB.

SuggestedRemedy

Likely, change the value in the figure to 16 dB.

Response *Response Status* **C**

ACCEPT IN PRINCIPLE.

120G.3.4.1.1 (P232/L8) refers to the channel IL, which is from host transmitter to module receiver including the transmitter package, as opposed to the host IL.

In Figure 120G-2, the channel loss, which is a sum of the section losses, is 16 dB.

It would be helpful to show the aggregate loss in the figure.

In Figure 120G-2, designate the insertion loss from host component to module component as 16 dB.

Also, in 120G.4.1, add a cross reference back to Figure 120G-2.

Cl **120G** *SC* **120G.3.1** *P* **221** *L* **17** # 173

Ran, Adee Intel

Comment Type **T** *Comment Status* **D** *bucket2*

Addressing EMSW which is TBD.

EMSW is not a meaningful measure for a receiver with DFE, since the eye's shape depends on the delay and the transfer function of DFE's feedback path. A DFE mathematical model can have arbitrary delay and transfer function so the value of EMSW (or any eye width parameter) is not well defined.

Furthermore, the DFE typically optimizes the eye height, but not necessarily the eye width (whihc requires equalizing the transitions). Trying to optimize for both EW and EH with a single DFE has been done in early versions of PCI express, it can be a futile exercise, and it is not what a real receiver will do anyway.

As the experience with COM has shown, for lossy channels and DFE receivers the equalized EH is a good enough figure of merit. Real receivers do not care about asymmetry caused by the DFE.

It is suggested to remove EMSW, at least until evidence of the need for it and a robust measurement method is presented.

SuggestedRemedy

Remove the EMSW specification in this subclause, and also in 120G.3.2 and Table 120G–5 and Table 120G–8.

Proposed Response *Response Status* **Z**

PROPOSED REJECT.

This comment was WITHDRAWN by the commenter.

Cl **120G** *SC* **120G.3.1.2** *P* **222** *L* **1** # 174

Ran, Adee Intel

Comment Type **E** *Comment Status* **D** *RLCD*

In another comment (against clause 162) I am suggesting a CD return loss equation which is equivalent to equation 120G-1, but uses a parameter F_N for better readability.

It is suggested to apply a similar change in this equation. Alternatively, have a single equation and multiple references to it.

SuggestedRemedy

Per comment. Apply in 162.11.7, in 163.10, and in 120F.4.1.

Proposed Response *Response Status* **Z**

REJECT.

This comment was WITHDRAWN by the commenter.

Cl **120G** *SC* **120G.3.2** *P* **224** *L* **29** # 175

Ran, Adee Intel

Comment Type **T** *Comment Status* **A**

Unlike a host transmitter, which has a fixed known channel and can be tuned to optimize the signal at the receiver input, the module has no knowledge of the channel. A fixed signal setting (swing and equalization) can be optimized for a high loss channel but will be inappropriate for a low loss channel, and vice versa.

To enable host management to choose the appropriate signal swing and equalization for the host channel in use, the module output should have more than one setting, and a control method to choose between them.

Discussions at this point indicate that it is desired to have no more than two settings. The suggested remedy is based on that. Future proposal may refine this idea.

SuggestedRemedy

Define two separate tests for the module output, near-end and far-end.

In the near-end test, only the near-end specifications are measured, with an MCB only. In the far-end test, only the far-end specifications are measured, with an MCB and a frequency dependent attenuator (specified strcitly to create the effect of a maximum-loss host channel).

The module shall have a 2-valued control variable (mapped to an MDIO register, although actual interface may be different) to select between two settings of its ouput. One setting will be tested in the near-end test and another will be tested in the far-end test.

Response *Response Status* **C**

ACCEPT IN PRINCIPLE.

Adopt a near end and a far end setting with an MDIO register bit to select between the setting as discussed in slide 9 of ran_3ck_01b_0720. Implement with editorial license.

Strawpoll #8 (decision)
I support closing comment 175 with: Adopt a near end and a far end setting with an MDIO register bit to select between the setting as discussed in slide 9 of ran_3ck_01b_0720. Implement with editorial license.
Yes: 37
No: 10

Cl **120G** *SC* **120G.3.2** *P* **224** *L* **42** # 176

Ran, Adee Intel

Comment Type **T** *Comment Status* **R**

the Differential peak-to-peak output voltage is way too large, and if it is implemented it can overwhelm the host receiver.

With a long host channel, pre-equalization will be required and will attenuate low frequencies, while the channel attenuates high frequencies, creating a lower PtP signal at the host Rx.

With a short host channel, there will be lower attenuation by the channel, and equalization may not be required. in that case the full swing will create a large signal at the host Rx input.

A hosts receiver that can function with a smaller swing over a lossy channel doesn't need this large signal (which may be bad for it). Reduced swing in the module output may be necessary in some channels.

SuggestedRemedy

Change the differential peak-to-peak output maximum specification to 400 mV PtP, both for the near-end test and the far-end test. Clarify that different module output settings may be used in the tests.

Change the input tolerance reuqiremement in Table 120G–4 accordingly.

Response *Response Status* **C**

REJECT.

Straw poll #6, indicated most support for adopting the values for far-end and near-end differential peak to peak voltage (max.) as proposed on slide 9 of ran_3ck_01b_0720.

The closed response to comment #175 adopted two equalization settings for module transmitter.

Based on strawpoll #9, there is no consensus to close to the comment with the proposed values.

Strawpoll #9 (decision)
I would support closing comment 176 setting far-end and near-end differential peak to peak voltage (max) to 600 mV as proposed on slide 9 of ran_3ck_01b_0720.
Yes: 19
No: 20

Cl **120G** *SC* **120G.3.2** *P* **224** *L* **45** # 177

Ran, Adee Intel

Comment Type **T** *Comment Status* **A**

Addressing Near-end eye height, differential (min) and Far-end eye height, differential (min) which are TBDs.

The host output is now specified in terms of VEC. There is no reason that the module output should not use this specification method.

The proposed limit values are based on host output specification, and are the same for near-end and for far-end, at this time. The limit values may be adjusted in future drafts. The module can use different settings to meet the near-end and far-end requirements.

SuggestedRemedy

Change the minimum NEEH and FEEH values in Table 120G–3 to 15 mV. Add rows for Near-end VEC and Far-end VEC, both with maximum value of 9 dB. Clarify that different module output settings may be used in the tests.

Response *Response Status* **C**

ACCEPT IN PRINCIPLE.

For NE EH…
#177 proposes 15 mV
#135 proposes 50 mV
#191 proposes 40 mV

For FE EH…
#177 proposes 15 mV
#192 proposes 20 mV
#107 proposes 24 mV

For NE VEC…
#177 proposes 9 dB
#108 proposes 7.5 dB

For FE VEC…
#177 proposes 9 dB
#109 proposes 7 dB

The following presentations were reviewed:
http://www.ieee802.org/3/ck/public/20_07/ghiasi_3ck_02_0720.pdf
http://www.ieee802.org/3/ck/public/20_07/hidaka_3ck_01_0720.pdf
http://www.ieee802.org/3/ck/public/20_07/ran_3ck_01b_0720.pdf

Straw polls #4 and #5, indicated strong support for adopting the values for far-end and near-end VEC and EH as proposed on slide 9 of ran_3ck_01b_0720.

The closed response to comment #175 adopted two equalization settings for module transmitter.

Set far-end VEC (max) to 7.5 dB
Set near-end VEC (max) to 7.5 dB
Set far-end EH (min) to 24 mV
Set near-end EH (min) to 24 mV

[Editor's note added after the comment was closed:
The URL for second listed presentation should be the following…
http://www.ieee802.org/3/ck/public/20_07/hidaka_3ck_01d_0720.pdf
]

Cl **120G** *SC* **120G.3.3.2** *P* **227** *L* **37** # 178

Ran, Adee Intel

Comment Type **T** *Comment Status* **A**

With two available module settings, one for near-end and one for far-end, a host tested for host stressed input should be allowed to choose when module setting it prefers.

The test should be modified to let the host calibrate the stress either at the MCB output, or after a frequency-dependent attenuator as specified for module output far-end testing. meeting the required BER at one of the settings is sufficient.

SuggestedRemedy

Change 120G.3.3.2.1 text and Figure 120G–8 per the comment.

Response *Response Status* **C**

ACCEPT IN PRINCIPLE.

Comment #175 adopted a pair of TP4 TX settings to address low-loss and high-loss host channels. The setting is to be selected as appropriate by the host.

Implement the suggested remedy with editorial license.

Cl **120G** *SC* **120G.3.3.2.1** *P* **229** *L* **4** # 179

Ran, Adee Intel

Comment Type **E** *Comment Status* **R** *bucket4*

The injected jitter in the host stressed input test (C2M) is described as follows:
"Random jitter and bounded uncorrelated jitter are added such that the output of the pattern generator approximates the output jitter profile given by maximum JRMS and maximum J4u, and complies with the even-odd jitter specification, in Table 120F–1"

But Table 120F–1 is in the other annex, for C2C - which seems like an error. But it isn't: In Annex 120D this was written explicitly with reference to the C2C specification:

"Random jitter and bounded uncorrelated jitter are added such that the output of the pattern generator approximates the 200GAUI-4 and 400GAUI-8 C2C output jitter profile given in Table 120D–1".

If this is the intent it should be stated more explicitly, as was done in 120D.

SuggestedRemedy

Change
"approximates the output jitter profile given by maximum JRMS and maximum J4u, and complies with the even-odd jitter specification, in Table 120F–1"
To
"approximates the output jitter profile given by maximum JRMS and maximum J4u, and complies with the even-odd jitter specification, of the corresponding chip-to-chip transmitter in Table 120F–1"

Response *Response Status* **C**

REJECT.

There is only one jitter specification in Table 120F-1 so no further qualification is required.

Cl **162B** *SC* **162B.1** *P* **247** *L* **11** # 180

DiMinico, Christopher MC Communications

Comment Type **TR** *Comment Status* **A** *bucket7 CR*

Proposals for 162B.1 Mated Test Fixtures specification TBDs

SuggestedRemedy

Specifications for TBDs;
- 162B.1.3.1 Mated test fixtures differential insertion loss FOMILD
- 162B.1.3.2 Mated test fixtures differential return loss
- 162B.1.3.3 Mated test fixtures common-mode conversion insertion loss
- 162B.1.3.6 Mated test fixtures integrated crosstalk noise

See diminico_3ck_01_0720.pdf

Response *Response Status* **C**

ACCEPT IN PRINCIPLE.

The following presentation was reviewed at a previous ad hoc meeting:
http://www.ieee802.org/3/ck/public/adhoc/jun10_20/haser_3ck_adhoc_01c_062420.pdf

There was no consensus to address the value for MTF FOM_ILD at this time.

For MTF RLDD, CM conversion loss, and ICN resolve using the responses to comments #92, #86, #88.

Cl **162** *SC* **162.11** *P* **157** *L* **24** # 181

DiMinico, Christopher MC Communications

Comment Type **TR** *Comment Status* **A** *bucket5 CA*

Proposals for 162.11 cable assembly specification TBDs

SuggestedRemedy

162.11.2 Cable assembly insertion loss
The measured insertion loss of a cable assembly shall be greater than or equal to the minimum cable
assembly insertion loss given in TBD and illustrated in TBD.
162.11.3 Cable assembly ERL
Transition time associated with a pulse Tr TBD
Cable assembly ERL at TP1 and at TP4 shall be greater than or equal to TBD dB for cable assemblies that have a COM less than 4 dB.
162.11.4 Differential to common-mode return loss TBD
162.11.5 Differential to common-mode conversion loss TBD
162.11.6 Common-mode to common-mode return loss TBD
162.11.7 Cable assembly Channel Operating Margin
Tr is TBD ps
Transmitter signal-to-noise ratio SNRTX TBD

See diminico_3ck_01_0720.pdf

Response *Response Status* **C**

ACCEPT IN PRINCIPLE.

Implement the CA insertion loss proposed on slide 4 of the following presentation http://www.ieee802.org/3/ck/public/20_07/diminico_3ck_02d_0720.pdf.

Resolve for cable assembly ERL, RL_CD, IL_CD, RL_CC, COM T_r, and COM SNR_TX using the responses to comments 71, 148, 73, 149, 37, and 45.

Cl **162A** *SC* **162A** *P* **243** *L* **34** # 182

DiMinico, Christopher MC Communications

Comment Type **TR** *Comment Status* **A**

Proposals for 162A Annex 162A
TP0 and TP5 test point parameters and channel characteristics TBDs

SuggestedRemedy

162A.4 recommended maximum and minimum printed circuit board trace insertion losses TBDs
162A.5 Channel insertion loss
ILMaxHost(f) TBD
ILCamin(f) TBD
See diminico_3ck_01_0720.pdf

Response *Response Status* **C**

ACCEPT IN PRINCIPLE.

[Editor's note: changed clause from 162.]

The following was not reviewed. A later presentation (diminico_3ck_02d_0720) superceded it.

http://www.ieee802.org/3/ck/public/20_07/diminico_3ck_01_0720.pdf

There is no consensus to adopt the proposed specification for maximum PCB insertion loss.

For the minimum PCB insertion loss, adopt the specification on slide 10 of diminico_3ck_02d_0720. Implement with editorial license.

Cl **120F** *SC* **120F.3.1** *P* **205** *L* **23** # 183

Sun, Junqing Credo Semiconductor

Comment Type **TR** *Comment Status* **A**

TX FIR Range can be optimized for C2C applications

SuggestedRemedy

value at min. state for c(–3) (max.) = -0.05
value at max. state for c(–2) (min.) = 0.10
value at min. state for c(–1) (max.) = -0.28
value at min. state for c(1) (max.) = -0.1
see presentation sun_3ck_01_0720

Response *Response Status* **C**

ACCEPT IN PRINCIPLE

Reviewed the following presentation:
http://www.ieee802.org/3/ck/public/20_07/sun_3ck_01_0720.pdf

For the TX characteristics, implement the tap range and step size on slide 9 of the presentation except:
c(-1) min value is -0.30
c(0) min value is 0.55

Cl **120F** *SC* **120F.4.1** *P* **211** *L* **25** # 184

Sun, Junqing Credo Semiconductor

Comment Type **TR** *Comment Status* **A**

TX FIR Range can be optimized for C2C applications

SuggestedRemedy

value at min. state for c(–3) (max.) = -0.04
value at max. state for c(–2) (min.) = 0.10
value at min. state for c(–1) (max.) = -0.28
value at min. state for c(0) (max.) = 0.6
value at min. state for c(1) (max.) = -0.1
see presentation sun_3ck_01_0720

Response *Response Status* **C**

ACCEPT IN PRINCIPLE

Reviewed the following presentation:
http://www.ieee802.org/3/ck/public/20_07/sun_3ck_01_0720.pdf

For the COM parameters, implement the tap range and step size on slide 9 of the presentation.

Cl **162** *SC* **162.9.4.3.3** *P* **155** *L* **33** # 185

Sekel, Steve Keysight Technologies

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

The swtich from J4u to J3u in equation 162-8 results in the math failing (SQRT of negative result) with some of the legal values of parameters in the test setup. Refer to calvin_0ck1a_0612

SuggestedRemedy

Either change back to using J4u for this parameter, or add a limit to the term under the square root to be >= 0.

Proposed Response *Response Status* **Z**

REJECT.

This comment was WITHDRAWN by the commenter.

Cl **163** *SC* **163.9.2.3** *P* **182** *L* **26** # 186

Sekel, Steve Keysight Technologies

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

(same problem as in equation 162-8 described above)
The swtich from J4u to J3u in equation 163-3 results in the math failing (SQRT of negative result) with some of the legal values of parameters in the test setup. Refer to calvin_0ck1a_0612

SuggestedRemedy

Either change back to using J4u for this parameter, or add a limit to the term under the square root to be >= 0.

Proposed Response *Response Status* **Z**

REJECT.

This comment was WITHDRAWN by the commenter.

Cl **120F** *SC* **120F.4.1** *P* **212** *L* **18** # 187

Ghiasi, Ali — Ghiasi Quantum/Inphi

Comment Type **TR** *Comment Status* **A**

Normalized DFE taps are larger than necessary

SuggestedRemedy

The largest DFE taps observed for C2C channels B1max=0.65 and B2-B6(max)=0.1. See ghiasi_3ck_01_0620

Response *Response Status* **C**

ACCEPT IN PRINCIPLE.

[Editor's note: change subclause from 120F.4.2.]

The following presentation was reviewed by the task force:
http://www.ieee802.org/3/ck/public/20_07/ghiasi_3ck_01a_0720.pdf

Change bmax(1) to 0.65
Change bmax(2) to 0.15
Change bmax(3:6) to 0.1

Cl **120F** *SC* **120F.4.1** *P* **212** *L* **24** # 188

Ghiasi, Ali — Ghiasi Quantum/Inphi

Comment Type **TR** *Comment Status* **A** *COM eta0*

Eta0 of 8.2e-9 is too low for a low power C2C innterface

SuggestedRemedy

Increase eta0 to 4.1E-8 inline with C2M noise spectral density, see ghiasi_3ck_01_0620

Response *Response Status* **C**

ACCEPT IN PRINCIPLE.

[Editor's note: Changed SC/P/L from 120F.4.2/212/18.]

The following presentation was reviewed by the task force:
http://www.ieee802.org/3/ck/public/20_07/ghiasi_3ck_01a_0720.pdf

Set the C2C channel COM eta_0 value to 2E-8.

Cl **120F** *SC* **120F.4.1** *P* **210** *L* **13** # 189

Ghiasi, Ali — Ghiasi Quantum/Inphi

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

Bmax values are TBDs

SuggestedRemedy

Replace TBD with B1max=0.5 and B[2-5]max=0.1 ghiasi_3ck_02_0320.pdf

Proposed Response *Response Status* **Z**

REJECT.

This comment was WITHDRAWN by the commenter.

Cl **120G** *SC* **120G.3.2** *P* **224** *L* **21** # 190

Ghiasi, Ali — Ghiasi Quantum/Inphi

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

To keep C2C power low need to limit max loss including package/filter

SuggestedRemedy

Add new line to table 120F-5, Total IL_wpkgs_wTr (max)=28 dB

Proposed Response *Response Status* **Z**

REJECT.

This comment was WITHDRAWN by the commenter.

Cl **120G** *SC* **120G.3.2** *P* **224** *L* **46** # 191

Ghiasi, Ali — Ghiasi Quantum/Inphi

Comment Type **TR** *Comment Status* **A** *bucket3*

Near end EH are TBD.

SuggestedRemedy

Near end EH=40 mV, see ghiasi_3ck_02_0620

Response *Response Status* **C**

ACCEPT IN PRINCIPLE.

[Editor's note: changed subclause/page/line from 120F.4.2/211/46]

Resolve using the response to comment #177.

Cl **120G** *SC* **120G.3.2** *P* **224** *L* **48** # 192

Ghiasi, Ali — Ghiasi Quantum/Inphi

Comment Type **TR** *Comment Status* **A** *bucket3*

Far end eye height is TBD.

SuggestedRemedy

Far end EH=20 mV, see ghiasi_3ck_02_0620

Response *Response Status* **C**

ACCEPT IN PRINCIPLE.

[Editor's note: change subclause/line/page from 120F.4.2/211/48.]

Resolve using the response to comment #177.

Cl **120G** *SC* **120G.3.2** *P* **224** *L* **37** # 193

Ghiasi, Ali — Ghiasi Quantum/Inphi

Comment Type **TR** *Comment Status* **A** *bucket3*

Near VEC is TBD.

SuggestedRemedy

Near end VEC=7.5 dB, see ghiasi_3ck_02_0620

Response *Response Status* **C**

ACCEPT IN PRINCIPLE.

[Editor's note: changed subclause/page/line from 120F.4.2/211/48.]

Resolve using the response to comment #177.

Cl **120G** *SC* **120G.3.2** *P* **224** *L* **37** # 194

Ghiasi, Ali — Ghiasi Quantum/Inphi

Comment Type **TR** *Comment Status* **A** *bucket3*

Far VEC is TBD.

SuggestedRemedy

Far end VEC=7.5 dB, see ghiasi_3ck_02_0620

Response *Response Status* **C**

ACCEPT IN PRINCIPLE.

[Editor's note: SC/page/line changed from 120F.4.2/211/48.]

Resolve using the response to comment #177.

Cl **120G** *SC* **120G.3.2** *P* **224** *L* **37** # 195

Ghiasi, Ali — Ghiasi Quantum/Inphi

Comment Type **TR** *Comment Status* **A**

Reference equalizer to measure nearend and farend need to be defined

SuggestedRemedy

Reference the 4T DFE, but with following exception for near end B1max=0.15 and B2-B4(max)=0.05, far end equalizer B1max=0.35, B2-B4(max)=0.1. see ghiasi_03ck_02_0620

Response *Response Status* **C**

ACCEPT IN PRINCIPLE.

[Editor's note: changed SC/page/line from 120F.4.2/211/48]

The following presentation was reviewed by the task force:
http://www.ieee802.org/3/ck/public/20_07/ghiasi_3ck_02_0720.pdf

For TP4a NE measurement, set b_max to {0.4,0.15,0.1,0.1}
For TP4a FE measurement, set b_max to {0.4,0.15,0.1,0.1}

Implement with editorial license.

Cl **120g** *SC* **120g.3.3.2** *P* **227** *L* **49** # 196

Ghiasi, Ali — Ghiasi Quantum/Inphi

Comment Type **TR** *Comment Status* **A** *bucket7 C2M*

Host stress far end eye height is TBD

SuggestedRemedy

Far end EH=20 mV, see ghiasi_3ck_02_0620

Response *Response Status* **C**

ACCEPT IN PRINCIPLE.

Resolve using the response to comment #115.

Cl **120g** *SC* **120g.3.3.2** *P* **227** *L* **49** # 197

Ghiasi, Ali — Ghiasi Quantum/Inphi

Comment Type **TR** *Comment Status* **A**

Far end VEC is not listed

SuggestedRemedy

Far end VEC=7.5 dB, see ghiasi_3ck_02_0620

Response *Response Status* **C**

ACCEPT IN PRINCIPLE.

The following presentations were reviewed by the task force.
http://www.ieee802.org/3/ck/public/20_07/ghiasi_3ck_02_0720.pdf
http://www.ieee802.org/3/ck/public/20_07/hidaka_3ck_01_0720.pdf

The value for TP4a FE VEC should match the value for TP4 FE VEC. The value for TP4 FE VEC as adopted by comment #177 is 7.5 dB.

Set that TP4a FE stressed eye VEC target value to 7.5 dB.

Implement with editorial license.

Cl **120G** *SC* **120G.3.2** *P* **224** *L* **46** # 198

Ghiasi, Ali — Ghiasi Quantum/Inphi

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

Near-end eye height is TBD

SuggestedRemedy

Replace TBD with 50 mV see ghiasi_3ck_01_0320

Proposed Response *Response Status* **Z**

REJECT.

This comment was WITHDRAWN by the commenter.

Cl **120G** *SC* **120G.3.4.1** *P* **230** *L* **47** # 199

Ghiasi, Ali — Ghiasi Quantum/Inphi

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

Far end ESMW is TBD

SuggestedRemedy

Replace TBD with 0.175 UI see ghiasi_3ck_01_0320

Proposed Response *Response Status* **Z**

REJECT.

This comment was WITHDRAWN by the commenter.

Cl **120G** *SC* **120G.3.4.1** *P* **230** *L* **35** # 200

Ghiasi, Ali — Ghiasi Quantum/Inphi

Comment Type **TR** *Comment Status* **A**

Module stress eye height is TBD

SuggestedRemedy

This should be the same as TP1a 15 mV

Response *Response Status* **C**

ACCEPT IN PRINCIPLE.

[Editor's note: change SC/page/line from 120G.3.2/224/33.]

Implement the suggested remedy.

Cl **120G** *SC* **120G.5.2** *P* **235** *L* **16** # 201

Ghiasi, Ali — Ghiasi Quantum/Inphi

Comment Type **TR** *Comment Status* **A**

CTLE gain setting for TP4 nearend are TBD

SuggestedRemedy

see ghiasi_3ck_02_0620 where includes min g_DC and g_DC_HP, min g_DC=5 dB and min g_DC_HP=2 dB

Response *Response Status* **C**

ACCEPT IN PRINCIPLE.

[Editor's note: change reference from 120G.3.4.1.1.]

The following presentations were reviewed by the task force:
http://www.ieee802.org/3/ck/public/20_07/ghiasi_3ck_02a_0720.pdf
http://www.ieee802.org/3/ck/public/20_07/hidaka_3ck_01d_0720.pdf

For TP4 near-end…
Set gdc2 range = -2 to 0.
Set gdc range = -5 to -2. Same range for all gdc2 settings.

Cl **120G** *SC* **120G.5.2** *P* **235** *L* **23** # 202

Ghiasi, Ali — Ghiasi Quantum/Inphi

Comment Type **TR** *Comment Status* **A**

CTLE gain setting for TP4 far end are TBD

SuggestedRemedy

see ghiasi_3ck_02_0620 where includes min g_DC and g_DC_HP, min g_DC=10 dB and min g_DC_HP=3 dB

Response *Response Status* **C**

ACCEPT IN PRINCIPLE.

[Editor's note: change subclause from 120G.3.4.1.1.]

The following presentations were review by the task force:
http://www.ieee802.org/3/ck/public/20_07/ghiasi_3ck_02a_0720.pdf
http://www.ieee802.org/3/ck/public/20_07/hidaka_3ck_01d_0720.pdf

For TP4 far-end…
Set gdc2 range = -3 to -1.
Set gdc range = -9 to -3. Same range for all gdc2 settings.

Cl **162** *SC* **162.9.3** *P* **148** *L* **24** # 203

Ghiasi, Ali — Ghiasi Quantum/Inphi

Comment Type **TR** *Comment Status* **R** *AC CM*

30 mV AC common mode has significant amount of penalty given that RLCD ~RLDC or 12 dB depending on the loss of the channel the penalty can be 1-3 mV RMS

SuggestedRemedy

Consider reducing 30 mV RMS to 17.5 mV RMS

Response *Response Status* **C**

REJECT.

There is no consensus to change the TX AC CM noise values at this time.

Resolve using the response to comment #28.

Cl **162** *SC* **162.11.7** *P* **159** *L* **34** # 204

Ghiasi, Ali — Ghiasi Quantum/Inphi

Comment Type **TR** *Comment Status* **R** *bucket8 COM*

COM receiver reference model does not excite common mode and model is fully symmetrical between P/N. Unless COM reference model has common mode excitation only differential aspect of the S4P exercised.

SuggestedRemedy

Non-idealities in COM can be introduced by following:
-Termination mismatch P/N 3%
- Package P +/- 10%
-Package N +/- 10%
But the total RLM should still be 95%.

Response *Response Status* **C**

REJECT.

COM mode impairment is indeed not fully considered in COM. However the suggested remedy does not provide clear information to implement.

There is no consensus to implement the suggested remedy at this time. More empirical evidence and consensus building is required.

See also comment #206.

Cl **163** *SC* **163.9.1** *P* **177** *L* **38** # 205

Ghiasi, Ali — Ghiasi Quantum/Inphi

Comment Type **TR** *Comment Status* **R** *bucket3*

30 mV AC common mode has significant amount of penalty given that RLCD ~RLDC or 12 dB depending on the loss of the channel the penalty can be 1-3 mV RMS

SuggestedRemedy

Consider reducing 30 mV RMS to 17.5 mV RMS

Response *Response Status* **C**

REJECT.

[Editor's note: changed page from 148.]

Resolve using the response to comment #28.

Cl **163** *SC* **163.10** *P* **184** *L* **14** # 206

Ghiasi, Ali — Ghiasi Quantum/Inphi

Comment Type **TR** *Comment Status* **R** *COM parameter*

COM receiver reference model does not excite common mode and model is fully symmetrical between P/N. Unless COM reference model has common mode excitation only differential aspect of the S4P exercised.

SuggestedRemedy

Non-idealities in COM can be introduced by following:
-Termination mismatch P/N 3%
- Package P +/- 10%
-Package N +/- 10%
But the total RLM should still be 95%.

Response *Response Status* **C**

REJECT

COM mode impairment is indeed not fully considered in COM. However the suggested remedy does not provide clear information to implement.

There is no consensus to implement the suggested remedy at this time. More empirical evidence and consensus building is required.

Cl **120G** *SC* **120G.3.1** *P* **221** *L* **23** # 207

Ghiasi, Ali — Ghiasi Quantum/Inphi

Comment Type **TR** *Comment Status* **R**

Unless one end of the link has common mode termination the 17.5 mV allowed common mode does not get absorbed

SuggestedRemedy

Add common mode return loss with following equation = 12 - 9*f/1e9 dB up to 1 GHz
3 dB from 1GHz to 50 GHz
See ghiasi_03_0620

Response *Response Status* **C**

REJECT.

[Editor's note: changed subclause from 120G.3.]

The following presentation was reviewed at an ad hoc meeting:
http://www.ieee802.org/3/ck/public/20_07/ghiasi_3ck_03_0720.pdf

There is no consensus to make the proposed changes at this time.

Cl **120G** *SC* **120G.3.2** *P* **224** *L* **52** # 208

Ghiasi, Ali — Ghiasi Quantum/Inphi

Comment Type **TR** *Comment Status* **R**

Unless one end of the link has common mode termination the 17.5 mV allowed common mode does not get absorbed

SuggestedRemedy

Add common mode return loss with following equation = 12 - 9*f/1e9 dB up to 1 GHz
3 dB from 1GHz to 50 GHz
See ghiasi_03_0620

Response *Response Status* **C**

REJECT.

[Editor's note: changed line from 23.]

The following presentation was reviewed at an ad hoc meeting:
http://www.ieee802.org/3/ck/public/20_07/ghiasi_3ck_03_0720.pdf

There is no consensus to make the proposed changes at this time.

Cl **120G** *SC* **120G.3** *P* **222** *L* **2** # 209

Ghiasi, Ali — Ghiasi Quantum/Inphi

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

Common mode to Differential conversion could be improved

SuggestedRemedy

New propose limit for RLDC=22 -20(f/25.78) up to 12.89 GHz and 12 dB from 12.89 to 50 GHz.
See ghiasi_03_0620

Proposed Response *Response Status* **Z**

REJECT.

This comment was WITHDRAWN by the commenter.

[Editor's note: change page/line from 221/52.]

Cl **120G** *SC* **120G.3.2** *P* **224** *L* **52** # 210

Ghiasi, Ali — Ghiasi Quantum/Inphi

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

Common mode to Differential conversion could be improved

SuggestedRemedy

New propose limit for RLDC=22 -20(f/25.78) up to 12.89 GHz and 12 dB from 12.89 to 50 GHz.
See ghiasi_03_0620

Proposed Response *Response Status* **Z**

REJECT.

This comment was WITHDRAWN by the commenter.

[Editor's note: Changed line from 25.]

Cl **120G** *SC* **120G.3.2** *P* **224** *L* **30** # 211

Ghiasi, Ali — Ghiasi Quantum/Inphi

Comment Type **TR** *Comment Status* **A** *bucket7 C2M*

The reference 4T equalizer given that TP4 near end and far end are measured with near ideal MCB vs host channels with via, need to consider impairment due to long barrel vias.

SuggestedRemedy

ghiasi_02_0620 investigates use of C0/C1 as in the CR methodology as one option, this method may result variation in the measurement due to interference but perhaps a better method is to increase eta_0 from 4.1E-8 to account for the board impairments. Eta_0 at TP4 near end is increased by 5x to account short channel impairments and eta_0 at TP4 far end increased by 2x from 4.1E-8. The contribution show that increasing eta_0 is a viable option. The 3rd option is just keep eta_0 at 4.1 E-8 without C0/C1 but instead reduce VEC and increase VEO. 1st option - increase eta_0, 2nd option - tighten the limit on VEO/VEC with eta_0=4.1E-8, 3rd option - add C0/C1.

Response *Response Status* **C**

ACCEPT IN PRINCIPLE.

Resolve using the response to comment #212.

Cl **120G** *SC* **120G.3.3.2** *P* **227** *L* **37** # 212

Ghiasi, Ali — Ghiasi Quantum/Inphi

Comment Type **TR** *Comment Status* **A**

The reference 4T equalizer will be calibrated with ideal HCB-MCB vs host channels with long barrel via, need to make sure the host is not over stressed given that host channel has more impairments.

SuggestedRemedy

ghiasi_02_0620 investigates use of C0/C1 as in the CR methodology as one option, this method may result variation in the measurement due to interference but perhaps a better method is to increase eta_0 from 4.1E-8 to account for the board impairments. Eta_0 at TP4 near end is increased by 5x to account short channel impairments and eta_0 at TP4 far end increased by 2x from 4.1E-8. The contribution show that increasing eta_0 is a viable option. The 3rd option is just keep eta_0 at 4.1 E-8 without C0/C1 but instead reduce VEC and increase VEO. 1st option - increase eta_0, 2nd option - tighten the limit on VEO/VEC with eta_0=4.1E-8, 3rd option - add C0/C1.

Response *Response Status* **C**

ACCEPT IN PRINCIPLE.

It appears that the comment is proposing modifications to the reference receiver used for measurement of the host stressed input (TP4a) eye opening parameters.

The following presentation was reviewed by the task force:
http://www.ieee802.org/3/ck/public/20_07/ghiasi_3ck_02_0720.pdf

Resolve using the same channel characteristics adopted in the response to comment #130.

Cl **120G** *SC* **120G.3.1** *P* **221** *L* **34** # 213

Ghiasi, Ali — Ghiasi Quantum/Inphi

Comment Type **TR** *Comment Status* **R** *bucket4*

Editorial note regarding 17.5 mV common mode can be removed as this is reasonable limit and realxing the common mode has implications due to mode conversion.

SuggestedRemedy

Remove the editorial note

Response *Response Status* **C**

REJECT.

[Editor's note: Changed line from 13.]

Based the response to comment #28 in regard to KR and C2C there is discussion about concern with these specifications, but there is no consensus to make any changes at this time.

Cl **120G** *SC* **120G.3.2** *P* **224** *L* **41** # 214

Ghiasi, Ali — Ghiasi Quantum/Inphi

Comment Type **TR** *Comment Status* **R** *bucket4*

Editorial note regarding 17.5 mV common mode can be removed as this is reasonable limit and realxing the common mode has implications due to mode conversion.

SuggestedRemedy

Remove the editorial note

Response *Response Status* **C**

REJECT.

Based the response to comment #28 in regard to KR and C2C there is discussion about concern with these specifications, but there is no consensus to make any changes at this time.

Cl **120G** *SC* **120G.3.3** *P* **227** *L* **3** # 215

Maki, Jeffery — Juniper Networks

Comment Type **TR** *Comment Status* **A**

There is no prescription for channel equalization. The standard needs to be as prescriptive for the host as for the module. Module implementers need to know what they can expect of the host as must as the host must know what it can expect of the module. Both are parties to adoption and adherence to the standard.

SuggestedRemedy

Add the following sentence after the first sentence of the subclause, "Channel equalization is provided by an adaptive equalizer in the host."

Response *Response Status* **C**

ACCEPT.

Cl **83** *SC* **83.1.1** *P* **85** *L* **16** # 216

Dudek, Mike Marvell.

Comment Type **T** *Comment Status* **A** *bucket8*

According to table 80-3a a number of PHYs (e.g. 100GBASE-KR1 can optionally use the Clause 83 PMA. However this revised scope statement does not include that table.

SuggestedRemedy

Add an extra sentence. The 100GBASE-R PMA may also be used with those Phys indicated in Table 10-3a.

Response *Response Status* **C**

ACCEPT IN PRINCIPLE.

Add an extra sentence:

"The 100GBASE-R PMA may also be used with some PMDs in Table 80-3a."

Cl **162** *SC* **162.11.7.1.1** *P* **162** *L* **14** # 217

Dudek, Mike Marvell.

Comment Type **T** *Comment Status* **A** *bucket*

S(HOSPT) definition isn't good.

SuggestedRemedy

Change to "is the host transmitter PCB signal path"

Response *Response Status* **C**

ACCEPT.

Cl **162** *SC* **162.11.7.1.1** *P* **162** *L* **16** # 218

Dudek, Mike Marvell.

Comment Type **T** *Comment Status* **A** *bucket*

S(HOSPR) definition isn't related to the transmitter PCB signal path.

SuggestedRemedy

Change to "is the host receiver PCB signal path"

Response *Response Status* **C**

ACCEPT.

Cl **162** *SC* **162.11.7.1.1** *P* **161** *L* **51** # 219

Dudek, Mike Marvell.

Comment Type **T** *Comment Status* **A** *bucket6*

S(HOSP) is not correct.

SuggestedRemedy

Change it to S(HOSPR)

Response *Response Status* **C**

ACCEPT.

Cl **162** *SC* **162.9.4.3.3** *P* **154** *L* **49** # 220

Dudek, Mike Marvell.

Comment Type **T** *Comment Status* **A** *bucket*

The name has changed S(HOSP) is no longer defined in 162.11.7.1.1

SuggestedRemedy

Change S(HOSP) to S(HOSPR) in two places. Also on page 162 lines 28, 37, 42 and 49. Also on page 163 line 1.

Response *Response Status* **C**

ACCEPT.

Cl **162** *SC* **162.11.7.1.2** *P* **162** *L* **49** # 221

Dudek, Mike Marvell.

Comment Type **T** *Comment Status* **A** *bucket*

S(HOTxSP) is not defined.

SuggestedRemedy

Change S(HOTxSP) to S(HOSPT)

Response *Response Status* **C**

ACCEPT.

Cl **163** *SC* **163.9.1** *P* **178** *L* **5** # 222

Dudek, Mike Marvell.

Comment Type **T** *Comment Status* **A** *TX FIR*

It would be good to add the same recommendation for equal step sizes for backplane as has been added for copper cable.

SuggestedRemedy

Add the footnote "Implementations are recommended to use the same step size for all coefficients." to the transmitter output waveform

Response *Response Status* **C**

ACCEPT

Cl **163** *SC* **163.9.1.1** *P* **178** *L* **29** # 223

Dudek, Mike Marvell.

Comment Type **E** *Comment Status* **A** *bucket*

Duplicate period at the end of the paragraph

SuggestedRemedy

delete one.

Response *Response Status* **C**

ACCEPT.

Cl **120F** *SC* **120F.3.1.1** *P* **205** *L* **39** # 224

Dudek, Mike Marvell.

Comment Type **E** *Comment Status* **A** *bucket*

There can be better wording. "For parameters that do not appear in Table 120F–2, take values from Table 120F–6."

SuggestedRemedy

Replace with "Parameters that do not appear in Table 120F–2 take values from Table 120F–6. Also in a similar fashion on page 208 line 3, and page 213 line 28. Note that this wording is what is used in 120G.3.1.3

Response *Response Status* **C**

ACCEPT IN PRINCIPLE.

Implement suggested remedy with editorial license.

Cl **120G** *SC* **120G.5.2** *P* **235** *L* **10** # 225

Dudek, Mike Marvell.

Comment Type **T** *Comment Status* **A**

Some channels appear to want GDC2 of less than -2dB even though GdC is more than -8dB

SuggestedRemedy

Change the 8dB to 6dB for GDC2 less than -2dB.

Response *Response Status* **C**

ACCEPT IN PRINCIPLE.

Change -8 dB to -6 dB for g_DC2 less than -2 dB.

Cl **120G** *SC* **120G.5.2** *P* **235** *L* **48** # 226

Dudek, Mike Marvell.

Comment Type **E** *Comment Status* **R** *bucket*

The wording of this paragraph could be improved.

SuggestedRemedy

Change "Capture the PRBS13Q signal y1(k) with the effect of low-pass response equivalent to the specified receiver noise filter with associated parameter fr in Table 120G–9, and using a clock recovery unit with a corner frequency of 4 MHz and slope of 20 dB/decade." to Capture the PRBS13Q signal y1(k) with the effect of low-pass response equivalent to the specified receiver noise filter with associated parameter fr in Table 120G–9, using a clock recovery unit with a corner frequency of 4 MHz and slope of 20 dB/decade."

Response *Response Status* **C**

REJECT.

The LPF and CRU are two distinct processes so use of the word "and" is appropriate.

Cl **162D** *SC* **162D.1** *P* **270** *L* **14** # 227

Dudek, Mike Marvell.

Comment Type **T** *Comment Status* **A** *bucket4*

The text says five specified connectors but the list in table 162D-1 has six entries.

SuggestedRemedy

Change "five" to "six". Also on line 32.

Response *Response Status* **C**

ACCEPT.

Cl **120G** *SC* **120G.3.3.2.1** *P* **229** *L* **15** # 228

Ran, Adee Intel

Comment Type **T** *Comment Status* **A** *bucket7 C2M*

"The far-end eye height and vertical eye closure are measured according to the method in 120G.5.2"

The method in 120G.5.2 describes a "reference receiver" using COM method (references to 93A) and parameters in a table. it is perhaps suitable for analyzing a directly measured signal (near-end), but does not mention anything about far-end.

In comparison, the reference receiver for 50G C2M is defined in 120E.3.2.1.1, and for the far-end measurement it includes a loss channel:

"The signal measured at TP4 is first convolved with a loss channel (~6.4 dB loss at Nyquist) that represents the worst case channel loss. The loss channel is the host trace defined in 92.10.7.1.1 with Zp = 151 mm."

In order to define far-end measurements, some loss channel has to be included.

Using a convolution may not capture possible effects of reflections from that channel towards the HCB/MCB. It would be preferable to include a physical loss channel in the measurement (as done e.g. in the CR receiver test, see 110.8.4.2.2). However, changing the methodology from 120E may require more consensus, so the suggested remedy is to continue using a computational channel.

The host channel model in clause 162 is updated from the one in clause 92 (referenced by 120E) to include more capacitances and different loss parameters. The length should be set to create a 16 dB loss at 26.56 GHz. Calculation yields 407 mm.

SuggestedRemedy

Add a paragraph after the existing one in 120G.5.2 with the following text:

For the far-end measurements, the signal measured at TP4 is first convolved with a loss channel that represents the maximum host board loss, and then processed by the reference receiver. The loss channel is the host trace defined in 162.11.7.1 with Zp = 407 mm.

Response *Response Status* **C**

ACCEPT IN PRINCIPLE.

Resolve using the response to comment #130.

Cl **120G** *SC* **120G.3.3.2.1** *P* **228** *L* **6** # 229

Ran, Adee Intel

Comment Type **E** *Comment Status* **A** *bucket*

"The reference receiver includes a reference receiver as specified in 120G.5.2"

SuggestedRemedy

Change to
"The reference receiver is specified in 120G.5.2"

Response *Response Status* **C**

ACCEPT.

Cl **162** *SC* **162.11.7.1.1** *P* **162** *L* **15** # 230

Ran, Adee Intel

Comment Type **E** *Comment Status* **A** *bucket*

"S(HOSPT) is the host transmitter or PCB signal path" and then "S(HOSPR) is the host (transmitter or receiver) PCB signal path"

Text does not make sense.

SuggestedRemedy

Change to
"S(HOSPT) is the transmitter's host PCB signal path"
"S(HOSPR) is the receiver's host PCB signal path"

Response *Response Status* **C**

ACCEPT IN PRINCIPLE.

Resolve using the response to comment #217 and #218.

Cl **120G** *SC* **120G.5.2** *P* **236** *L* **9** # 231

Ran, Adee Intel

Comment Type **T** *Comment Status* **R**

This subclause specifies measurement of "eye opening parameters eye height, eye width, and vertical eye closure".

Item e here:
"e) Compute the receiver input signal yrx(k) by applying the effect of the DFE to y2(k) using the
sampling phase ts"

May cause ambiguity in the resulting eye diagram, which can yield different EW and ESMW results.

The reason is that it does not fully specify how the sampling phase ts is used. To create a "nice" eye diagram, the DFE feedback is typicallly applied after some delay relative to ts. The time when the DFE feedback is applied will affect the eye shape, width and ESMW (though not the eye height at ts, which is maximized by the DFE coefficients).

Note that this delay is not necessarily what a real receiver will have, and the eye may not correspond to the performance of real receivers.

In another comment I suggest to remove the ESMW specification. Following the statements above, The EW specification may also be worth removing. EH (which does not depend on the DFE feedback timing) should be enough.

Without EW, jitter measurement and calibration should be done using other means. Jitter injected in host stressed input test is already calibrated using C2C methods. Jitter for host and module outputs can be specified using C2C methods too.

SuggestedRemedy

Remove all EW specifications and change the text in this subclause to omit EW.

(Alternatively. if ESMW and/or EW are retained, then the application of the DFE feedback should be specified explicitly. I would suggest specifying that the DFE feedback effect starts 1/2 UI after ts.)

Add jitter specifications J4U, JRMS, and EOJ, for host output and module output, using references to 120F.3.1 (same values as in Table 120F–1).

Response *Response Status* **C**

REJECT.

Note that comment #173 proposes to drop ESMW as well.

A straw poll taken at the July 24 ad hoc meeting indicated strong support to remove the ESMW and EW parameters.

Strawpoll #7 (decision)
I support removing the EW and ESMW parameters and replacing with jitter specifications as proposed in the suggested remedy of comment #231.
Yes: 11
No: 22

Although there was interest expressed in removing the EW/ESMW parameters, an appropriate alternate constraint may be necessary. Further work and consensus building is necessary.

There is no consensus to implement the suggested remedy.

Cl **1** *SC* **1.3** *P* **31** *L* **9** # 232

Dawe, Piers Nvidia

Comment Type **ER** *Comment Status* **A**

In the standards world, there is no such thing as QSFP112, and no expectation that there will be a specification of that name. QSFP specifications are published by the SFF Committee (now part of SNIA), and are mostly independent of operating speed.

SuggestedRemedy

Delete "QSFP112", add the relevant SFF specifications: some of SFF-8661 SFF-8662 SFF-8672 SFF-8663 SFF-8683 SFF-8679 SFF-8636 REF-TA-1011 SFF-8665 (take advice from the SFF committee for which).

Response *Response Status* **C**

ACCEPT IN PRINCIPLE.

In 1.3, list the following normative references:
DSFP MSA Dual small form factor pluggable module, Rev. 1.0 September 12, 2018
OSFP MSA Specification for OSFP octal small form factor pluggable module, Rev 3.0 March 14th, 2020
QSFP+ - Specification for QSFP+ 28 Gb/s 4X Pluggable Transceiver Solution SFF-8665, Rev 1.9, June 29, 2015
QSFP-DD800 MSA QSFP-DD Specification for 800G operation, Rev 1.0 March 6, 2020
SFP+ Specification for SFP+ Module and Cage, SFF-8432, Rev 5.2a November 30, 2018
SFP-DD MSA SFP-DD Hardware Specification for SFP double density 2X pluggable transceiver, Rev 3.0 April 10, 2019

Throughout the draft…
Replace "SFP112" with "SFP+"
Replace "SFP112-DD" with "SFP-DD"
Replace "QSFP112" with "QSFP+"
Replace "QSFP112-DD" with "QSFP-DD800"

Implement with editorial license.

Cl **1** *SC* **1.3** *P* **31** *L* **14** # 233

Dawe, Piers Nvidia

Comment Type **E** *Comment Status* **A** *bucket7 CR MDI*

There is no mention of QSFP-DD800 in the document

SuggestedRemedy

Use it (explaining the relationship between QSFP-DD and QSFP-DD800) or remove it. Alternatively, say in the editor's note that the references for QSFP-DD and QSFP-DD800 will be updated as those documents evolve.

Response *Response Status* **C**

ACCEPT IN PRINCIPLE.

Resolve using the response to comment #232.

Cl **1** *SC* **1.3** *P* **31** *L* **16** # 234

Dawe, Piers Nvidia

Comment Type **ER** *Comment Status* **A** *bucket7 CR MDI*

In the standards world, there is no such thing as SFP112, and I am not aware that there will be a specification of that name. SFP specifications are published by the SFF Committee (now part of SNIA), and are mostly independent of operating speed.

SuggestedRemedy

Delete "SFP112", add the relevant SFF specification(s): some of SFF-8432 SFF-8071 SFF-8432 SFF-8433 SFF-8431 SFF-8419 SFF-8472 REF-TA-1011 SFF-8402 (take advice from the SFF committee for which).

Response *Response Status* **C**

ACCEPT IN PRINCIPLE.

Resolve using the response to comment #232.

Cl **120F** *SC* **120F.4.1** *P* **212** *L* **19** # 235

Dawe, Piers Nvidia

Comment Type **TR** *Comment Status* **A**

It isn't reasonable to expect a real receiver to provide a DFE tap strength of -0.85. Therefore, the channel should not be specified as if the receiver can do that. Further, there is an advantage in knowing that the sign of a tap can't change. Just as for CR and KR, sensible limits can be chosen without burdening the channels. See comment against 162.11.7 and new Heck presentation for more explanation

SuggestedRemedy

Add minimum tap weight limits:
Tap 1: min +0.3
Tap 2: min +0.05
All other taps: min -0.04 (same as KR)
Update definition of COM in 93A.1.

Response *Response Status* **C**

ACCEPT IN PRINCIPLE.

The commenter is referring to the following presentation:
http://ieee802.org/3/ck/public/adhoc/jun17_20/heck_3ck_adhoc_01_061720.pdf

Implement the following with editorial license:

Add minimum tap weight limits:
Tap 1: min +0.3
Tap 2: min +0.05
All other taps: min -0.04

Update definition of COM in 93A.1.

Cl **120F** *SC* **120F.4.1** *P* **212** *L* **24** # 236

Dawe, Piers Nvidia

Comment Type **TR** *Comment Status* **A** *COM eta0*

One-sided noise spectral density of 8.2e-9 V2^/GHz is extremely aggressive and optimistic and was chosen to make 28 dB backplane channels pass COM. It is not appropriate for this 20 dB spec. The point of C2C is that it's not KR; something must be easier to make it different.
If there were no NEXT, we might scale 8.2e-9 by 8 - 1 dB or 5 times, giving 4.1e-8, higher than 50G/lane C2C's (120C) 2.6e-8 and the same as 100G/lane C2M's 4.1e-8. 8 for loss, 1 for BER 1e-6 vs. 1e-5.

SuggestedRemedy

Change to 1e-8, lower than 50GBASE-CR (1.64e-8) and less than half 50G/lane C2C (120C, 2.6e-8) (half would account for the doubled signalling rate, so receiver noise is a smaller proportion of the budget in 120F than 120C).

Response *Response Status* **C**

ACCEPT IN PRINCIPLE.

Resolve using the response to comment #188.

Cl **120G** *SC* **120G.3.1** *P* **221** *L* **19** # 237

Dawe, Piers Nvidia

Comment Type **TR** *Comment Status* **R** *invalid*

The low-loss C2M analysis should be revisited with the new COM.

SuggestedRemedy

It may be that eye height and VEC for the very short channels are better than we have written down here.

Response *Response Status* **C**

REJECT.

The comment is not valid. The comment does not provide explanation of problem or justification for change.The suggested remedy does not propose an actionable change to the draft.

Cl **120G** *SC* **120G.3.2** *P* **224** *L* **44** # 238

Dawe, Piers Nvidia

Comment Type **TR** *Comment Status* **A** *bucket6*

Unlike CR and KR, the host receiver can't choose what the module output should be like. The module output is supposed to be set to a compromise that's good enough for all hosts. But it may turn out that that's not feasible. Yet we want to avoid fussy tuning schemes that burden the simple module output and the management entity that may be controlling multiple modules.

SuggestedRemedy

First choice: continue with present plan.
Second choice: let the host receiver sort out its channel (if crosstalk or reflections are bad, use a better equalizer).
Third choice: host tells module to use one of just two sets of specs; for low loss host channels and for high loss host channels. Module must be capable of both. Host selects one, by a means we don't specify, based on knowledge of its own preference and channel loss. Eye parameters defined at TP4 and after loss 2 for the low loss setting, after loss 1 and loss 3 for the high loss setting. Generous overlap between the two loss ranges so the host can choose by very simple means. Consider reduced pk-pk V max for the low loss setting.
Don't try to micro-manage the module.

Response *Response Status* **C**

ACCEPT IN PRINCIPLE.

Resolve using the response to comment #175.

Cl **120G** *SC* **120G.4.1** *P* **233** *L* **34** # 239

Dawe, Piers Nvidia

Comment Type **T** *Comment Status* **R** *bucket8 channel*

Is it really necessary that the response should be above -42 dB at 51 GHz?

SuggestedRemedy

Add an f^2 term in the second part of Eq. 120G-2, reduce the other terms so that the gradient is the same at Nyquist.

Response *Response Status* **C**

REJECT.

The comment does not provide any justification for the proposed change nor does the suggested remedy provide a complete solution to implement.

Cl **120G** *SC* **120G.4.2** *P* **235** *L* **17** # 240

Dawe, Piers Nvidia

Comment Type **TR** *Comment Status* **A** *bucket7 C2M*

Here are the combinations of gDC and gDC2 which I thought we had agreed on a conference call after a good discussion - but it turns out we adopted the TP1a limits only.

SuggestedRemedy

TP4 near end:
gDC2 | gDC
0: | -2 to -4
-1: | -2 to -5
-2: | -4 to -5
-3: | (none)
TP4 far end:
gDC2 | gDC
0: | -2 to -4
-1: | -2 to -7
-2: | -4 to -10
-3: | -8 to -10

Response *Response Status* **C**

ACCEPT IN PRINCIPLE.

Resolve using the responses to comments #201 and #202.

Cl **120G** *SC* **120G.5.2** *P* **235** *L* **41** # 241

Dawe, Piers Nvidia

Comment Type **TR** *Comment Status* **A**

A negative first DFE tap means the DFE is taking emphasis out of the signal. In C2M, this should never happen: remember this is a measurement of a signal not a channel, the idea is that a signal with only mild emphasis or shaping is transmitted, there is always some channel loss, and the receiver equalizes a low-pass-filtered signal. Real receivers don't have to cope with over-emphasised signals: in CR and KR they can ask the far transmitter to reduce its emphasis, in C2C the management entity does that on the receiver's behalf. In C2M, the receiver has to tolerate any compliant signal, so the equalizer limits in the eye measurement have to be set more carefully than in COM. The real receiver is not required to be constructed like the COM receiver, and low power receiver designs often can't remove emphasis (because they shouldn't need to).
The first DFE tap minimum and the CTLE gDC maximum must be chosen together to stop people setting up C2M outputs badly.
Further, there should be realistic tap minima for all the taps, as for C2C, KR and CR (see other comments).
See hidaka_3ck_adhoc_01_021920 slide 8 for example tap weights found. Remember that these weights aren't the only acceptable solutions: for example, b1 gDC and TxFIR setting can be traded.

SuggestedRemedy

Tap 1 min +0.1 (max is 0.4)
Tap 2 min -0.15 (max is 0.15)
Taps 3, 4 min -0.05 (max is 0.1)
Adjust names of limits and 93A.1 to support separate max and min limits (see other comments).

Response *Response Status* **C**

ACCEPT IN PRINCIPLE.

[Editor's note: changed SC from 120G.4.2.]

The referenced presentation is here:
http://www.ieee802.org/3/ck/public/adhoc/feb19_20/hidaka_3ck_adhoc_01_021920.pdf

Implement the suggested remedy for both TP1a and TP4 NE/FE.

Implement with editorial license.

Cl **120G** *SC* **120G.5.2** *P* **235** *L* **43** # 242

Dawe, Piers Nvidia

Comment Type **TR** *Comment Status* **R**

It may be that too few scopes can achieve this level of noise (which should warn us that it might be challenging for product receivers too!) As it may be undesirable to attempt to remove or deconvolve noise from a measurement, the solution is to increase the one-sided noise spectral density eta0. Then, this fixed noise makes signals from high loss hosts look relatively worse than from low loss hosts. To avoid that and include something for low-loss ripple effects (see Dudek presentations), we can use a second signal-strength-dependent noise to balance up the reported eye openings across a range of host losses

SuggestedRemedy

Increase eta0 to what is needed for practical measurements.
Use a second noise term proportional to the eye height (after equalization) i.e.
K*sum(AVupp + AVmid + AVlow). Use its variance similarly to eta0's, as in steps f and g.

Response *Response Status* **C**

REJECT.

[Editor's note: change SC from 120G.4.2.]

Further details and analysis are required. There is no consensus to implement the proposed methodology at this time.

Cl **120G** *SC* **120G.4.2** *P* **236** *L* **15** # 243

Dawe, Piers Nvidia

Comment Type **TR** *Comment Status* **A**

D1.1 comment 142: "Should account for scope noise as TDECQ does", "Allow RSSing out the scope noise (as done in TDECQ) if it's significant." It turns out that it is significant, but that the scopes can handle this; we should not second-guess them.

SuggestedRemedy

Change step g from:
Compute an eye diagram from yrx(k), including the effect of Gaussian noise with variance calculated in the previous step.
to:
Compute an eye diagram from yrx(k), including the effect of Gaussian noise with variance calculated in the previous step, but taking into account that some noise from to the measurement instrument's noise is already in y2(k).
(We could say yrx(k) instead of y2(k), the noise is the same)

Response *Response Status* **C**

ACCEPT IN PRINCIPLE.

Implement suggested remedy with editorial license.

Cl **120G** *SC* **120G.5.2** *P* **234** *L* **6** # 244

Dawe, Piers Nvidia

Comment Type **T** *Comment Status* **A** *bucket4*

120G.3 says "A test system with a fourth-order Bessel-Thomson low-pass response with 40 GHz 3 dB bandwidth is to be used for all output signal measurements, unless otherwise specified." This adds "a receiver noise filter as defined in 93A.1.4.1". Too much filtering.

SuggestedRemedy

Use only one of them. For example, insert a sentence "The receiver noise filter is used instead of the Bessel-Thomson low-pass response of 120G.3."

Response *Response Status* **C**

ACCEPT IN PRINCIPLE.

Change:
Capture the PRBS13Q signal y1(k) with the effect of low-pass response equivalent to the specified receiver noise filter with associated parameter fr in Table 120G–9, and using a clock recovery unit with a corner frequency of 4 MHz and slope of 20 dB/decade.
To:
"Capture the PRBS13Q signal y1(k) with the effect of low-pass response equivalent to the specified receiver noise filter with associated parameter fr in Table 120G–9 (instead of the test system response specified in 120G.3.1), and using a clock recovery unit with a corner frequency of 4 MHz and slope of 20 dB/decade."

Cl **120G** *SC* **120G.5.2** *P* **234** *L* **8** # 245

Dawe, Piers Nvidia

Comment Type **TR** *Comment Status* **A** *bucket*

"The following procedure should be used": no, there is no need to follow the procedure, only to make the product good enough. This is not a standard for testing. I know this is wrong in 120E.4.2 too, but it's easy to fix here.

SuggestedRemedy

Change "The following procedure should be used to obtain the eye height eye width, and vertical eye closure parameters, as illustrated by Figure 120E-13." to "Eye height, eye width, and vertical eye closure parameters, as illustrated by Figure 120E-13, are defined by the following procedure."

Response *Response Status* **C**

ACCEPT.

Cl **120G** *SC* **120G.5.2** *P* **236** *L* **20** # 246

Dawe, Piers Nvidia

Comment Type **T** *Comment Status* **A**

This criterion "The values of eye height, eye width, and vertical eye closure are the values obtained with the combination of gDC and gDC2 that produces the minimum value of vertical eye closure where eye height also meets the target value" would fail a signal that passes all 3 criteria on a different Rx setting but fails ESMW at the setting for best VEC.
We learnt in previous C2M projects that best vertical and best horizontal opening weren't at the same setting.
Editorial: the idea is not to meet a target, it is to meet or exceed a limit.

SuggestedRemedy

Change to:
The values of eye height, eye width, and vertical eye closure are the values obtained with the combination of gDC and gDC2 that produces the minimum value of vertical eye closure where eye height and ESMW also comply with the limits in the appropriate table.
Editorial: ESMW isn't really a measurement, it's a mask. Maybe define ESW as the measurement?

Response *Response Status* **C**

ACCEPT IN PRINCIPLE.

The commenter is requesting to changes to the criteria for finding the measured values of EH, EW, and VEC. First, that the criteria includes ESMW in addition to eye height. Second, that the clarify the intent of the criteria.

According to discussions related to the response to comment #231,
there is constroversy over whether the EW/ESMW parameters should be retained. EW or ESMW should not be added to the criteria at this time.

Resolve this comment using the response to comment #123.

Cl **162** *SC* **162.11.7** *P* **160** *L* **48** # 247

Dawe, Piers Nvidia

Comment Type **TR** *Comment Status* **A**

It isn't reasonable to expect a real receiver to provide a DFE tap strength of -0.85. Therefore, the channel should not be specified as if the receiver can do that. Further, there is an advantage in knowing that the sign of a tap can't change.
kasapi_3ck_01_1119 slide 7 shows the first DFE tap >0.42 for the critical channels. Another analysis showed the same for 27 backplane channels. Slide 6 of heck_3ck_01_0919 (107 channels) shows that the DFE taps are 2 and 3 are always strongly positive, and no taps <-0.045, yet the draft would allow such untypical/hypothetical channels.
We wanted to check that low loss channels would not do something surprising before adopting sensible limits that don't burden real channels. See new Heck presentation.
Remember that channels that go a little outside a tap weight pay a very small increase in COM for the excess ISI noise that they cause (see another comment), so the limits for the smaller taps should be set a bit tighter than the worst channel we want to pass.
Cable channels are smoother than backplane channels but can have higher loss:

SuggestedRemedy

Add minimum tap weight limits:
Tap 1: min +0.3
Tap 2: min +0.05
All other taps: min -0.03 (tighter than for KR).
Turn the existing "Normalized DFE coefficient magnitude limit"s into "Normalized DFE coefficient limit"s.
Update definition of COM in 93A.1.

Response *Response Status* **C**

ACCEPT IN PRINCIPLE.

Referenced presentation is here:
http://www.ieee802.org/3/ck/public/adhoc/jun17_20/heck_3ck_adhoc_01_061720.pdf

Implement the suggested remedy with editorial license.

Cl **162** *SC* **162.11.7** *P* **161** *L* **4** # 248

Dawe, Piers Nvidia

Comment Type **TR** *Comment Status* **R** *bucket8 CA COM*

The analysis that led to the equalizer length choice needs to be revisited with the new COM.

SuggestedRemedy

If there is a significant improvement with the latest COM, remove positions 25-40 and define positions 13-24 as the tail, with 2 or 3 floating groups of 3 taps and an RSS limit.

Response *Response Status* **C**

REJECT.

This comment does not provide sufficient evidence the suggested remedy will not disqualify channels the task force has agreed to pass.

Cl **162** *SC* **162.11.7** *P* **161** *L* **6** # 249

Dawe, Piers Nvidia

Comment Type **TR** *Comment Status* **R** *bucket8 CA COM*

The spec allows a channel to have its COM calculated with 9 taps in the range 13 to 24 clipped at +/-0.05 - which means that the channel's pulse response could be a little worse than +/-0.05 for these taps. That's a very bad channel! We don't need to provide all the receiver power and complexity to cope with it.

SuggestedRemedy

Use another DFE root-sum-of-squares limit for positions 13-24.

Response *Response Status* **C**

REJECT.

The suggested remedy does not provide clear information to implement. Sufficient evidence has not been provided to justify the proposed change. More empirical evidence and consensus building is required.

Cl **162** *SC* **162.11.7** *P* **185** *L* **36** # 250

Dawe, Piers Nvidia

Comment Type **TR** *Comment Status* **R** *bucket8 CA COM*

As the effect of exceeding the DFE floating tap tail root-sum-of-squares limit increases parabolically as the channel exceeds the limit, the limit must be set a little lower than the worst channel we wish to allow to have an effect at the right point. OAch4 with COM 2.75 gave an unconstrained RSS_tail of 0.022, but CR channels should be smoother than OAch4. Setting the limit 0.01 lower than that might affect its COM by 0.1 dB (vs. no limit) which seems like a gentle effect. However, it seems that the latest COM gives a more optimistic result anyway; this channel may not need the tail taps at all.

SuggestedRemedy

If there is no improvement with the latest COM AND the via capacitances in 162.11.7.1.1 fully represent the tail pulse response of the hosts, change the DFE floating tap tail root-sum-of-squares limit to 0.012.
If the tail pulse response of the hosts is not all in this COM calculation, the COM equalizer should differ to the KR one, for the same silicon.
If there is a small improvement with the latest COM or the tail pulse response of the hosts is not all in this COM calculation, further reduce the limit accordingly.
If there is a significant improvement, remove taps 25-40 and apply a tail tap RSS limit to positions 13-24.

Response *Response Status* **C**

REJECT.

The simulations to make the determinations in the suggested remedy are not available.

There is no consensus to implement the suggested remedy at this time. More empirical evidence and consensus building is required.

Cl **162** *SC* **162.11.7.2** *P* **163** *L* **32** # 251

Dawe, Piers Nvidia

Comment Type **ER** *Comment Status* **A** *bucket7 CR MDI*

In the standards world, there is no such thing as SFP112, and I am not aware that there will be a specification of that name. SFP specifications are published by the SFF Committee (now part of SNIA), and are mostly independent of operating speed.

SuggestedRemedy

Change to "SFP28" which is what 802.3cd uses but the indication of a slower signalling rate in the name may cause confusion, or "SFP+" which is more generic.

Response *Response Status* **C**

ACCEPT IN PRINCIPLE.

Resolve using the response to comment #232.

Cl **162** *SC* **162.11.7.2** *P* **163** *L* **32** # 252

Dawe, Piers Nvidia

Comment Type **ER** *Comment Status* **A** *bucket7 CR MDI*

SFP112-DD is not its correct name

SuggestedRemedy

Change to SFP-DD (as in subclause 1.3) throughout the document.

Response *Response Status* **C**

ACCEPT IN PRINCIPLE.

Resolve using the response to comment #232.

Cl **162** *SC* **162.11.7.2** *P* **163** *L* **32** # 253

Dawe, Piers Nvidia

Comment Type **ER** *Comment Status* **A** *bucket7 CR MDI*

In the standards world, there is no such thing as QSFP112, and no expectation that there will be a specification of that name. QSFP specifications are published by the SFF Committee (now part of SNIA), and are mostly independent of operating speed.

SuggestedRemedy

Change to "QSFP28" which is what 802.3cd uses but the indication of a slower signalling rate in the name may cause confusion, or "QSFP+" which is more generic and in line with the latest SFF-8679.

Response *Response Status* **C**

ACCEPT IN PRINCIPLE.

Resolve using the response to comment #232.

Cl **162** *SC* **162.11.7.2** *P* **163** *L* **32** # 254

Dawe, Piers Nvidia

Comment Type **ER** *Comment Status* **A** *bucket7 CR MDI*

QSFP112-DD is not its correct name

SuggestedRemedy

Change to QSFP-DD and/or QSFP-DD800 (as in subclause 1.3) throughout the document.
Twice in Table 162-18, three times in 162.12, several times in 162C and 162D.

Response *Response Status* **C**

ACCEPT IN PRINCIPLE.

Resolve using the response to comment #232.

Cl **162** *SC* **162.9.3.1.1** *P* **150** *L* **15** # 255

Dawe, Piers Nvidia

Comment Type **T** *Comment Status* **R** *Tx electrical*

Back in Clause 85, the DFE has 14 taps (Nb), the linear fit pulse length Np is 8 and the equalizer length Nw is 7. So the SNDR measurement doesn't forgive reflections in the transmitted waveform that the DFE can't equalise. Here, we have a DFE with up to 40 UI, Np is 200, Nv is 200? Or do we still use Nw of 7 from Clause 85?

SuggestedRemedy

Is Nv meant to be Nw?
I wonder if 200 (for something) is far too long.

Response *Response Status* **C**

REJECT.

Per discussion, Nv is not the same as Nw.

There is general agreement that the value for Nv must be properly defined, but there is no consensus on a value to use.

Cl **162** *SC* **162.9.3.1.3** *P* **151** *L* **21** # 256

Dawe, Piers Nvidia

Comment Type **T** *Comment Status* **A** *bucket*

"ic_req" appears without explanation. I can see that it may be mapped to an MDIO register, but those registers follow the hardware, they don't define it. The reader doesn't know it's in Figure 136-9 because you haven't told him, and anyway that's too arcane.

SuggestedRemedy

Explain what it is, with appropriate references to 162.8.11 and 136.8.11.something.

Response *Response Status* **C**

ACCEPT IN PRINCIPLE.

Add a reference to 136.8.11.7.1 with editorial license.

Cl **162** *SC* **162.9.3.1.3** *P* **151** *L* **30** # 257

Dawe, Piers Nvidia

Comment Type **T** *Comment Status* **A** *Tx electrical*

Starting the transmitter up with maximum swing seems bad for two reasons: it suddenly adds a lot of crosstalk to neighbouring links, before this link has established that the high swing is needed or desirable; and it may stress the linearity of the receiver. It would be better to start at a low to medium swing, and the receiver ask to turn it up if it wishes.

SuggestedRemedy

Reduce c(0) in one or both of OUT_OF_SYNC and NEW_IC preset 1. If necessary, create another row for the traditional neutral at max setting used for testing - but as it seems that may never be useful in practice, maybe we should avoid that.
Also, in 162.9.4.3.4, reduce the starting amplitude for the training phase in RITT (presently 800 mV peak-to-peak differential "on an alternating 0-3 pattern").
Similarly in 163 as appropriate.

Response *Response Status* **C**

ACCEPT IN PRINCIPLE.

Resolve using the response to comments #103 and #104.

Cl **162** *SC* **162.9.3.1.5** *P* **152** *L* **3** # 258

Dawe, Piers Nvidia

Comment Type **T** *Comment Status* **A** *bucket*

There seem to be rules here to ensure that c(-3), c(-2), c(-1) and c(1) can be moved over defined ranges, but not for c(0).

SuggestedRemedy

What is the intention? What should attempting to adjust c(0) be able to achieve and what is out of bounds?
Write down whatever information is missing in Table 162-9 and here. If it isn't missing, put it in in Table 162-9 and cross-reference it from this section.
Adjust Clause 163 consistent with this.

Response *Response Status* **C**

ACCEPT IN PRINCIPLE.

Resolve using the response to comment #144.

Cl **162** *SC* **162.9.4.3.4** *P* **155** *L* **47** # 259

Dawe, Piers Nvidia

Comment Type **T** *Comment Status* **A** *bucket*

"800 mV peak-to-peak differential when measured on an alternating 0-3 pattern": we don't have unnatural test patterns, but there are suitable sequences in the usual mixed-frequency signals such as PRBS13Q.
Notice that 163.9.2.3 has a different definition: "The test transmitter is constrained such that for any transmitter equalizer setting the differential peak-to-peak voltage (see 93.8.1.3) is less than or equal to 800 mV." 93.8.1.3 doesn't define a pattern or sequence and is for PAM2 anyway.

SuggestedRemedy

Change "pattern" to "sequence". Reconcile 163.9.2.3.

Response *Response Status* **C**

ACCEPT.

Cl **162A** *SC* **162A.5** *P* **245** *L* **26** # 260

Dawe, Piers Nvidia

Comment Type **T** *Comment Status* **A** *bucket*

Please help the reader understand the equivalence of some loss items in this figure by aligning the mated test fixtures with TP1 and TP2 Compare Figure 92A-2.

SuggestedRemedy

Please move the mated test fixtures to the left to:
Align TP1 and the end of the MCB.
Align TP2 and the end of the HCB.

Response *Response Status* **C**

ACCEPT.

Cl **163** *SC* **163.10** *P* **185** *L* **27** # 261

Dawe, Piers Nvidia

Comment Type **TR** *Comment Status* **A** *bucket5 dfe*

It isn't reasonable to expect a real receiver to provide a DFE tap strength of -0.85. Therefore, the channel should not be specified as if the receiver can do that. Further, there is an advantage in knowing that the sign of a tap can't change.
kasapi_3ck_01_1119 slide 7 shows the first DFE tap >0.42 for the critical channels. Another analysis showed the same for 27 backplane channels. Slide 6 of heck_3ck_01_0919 (107 channels) shows that the DFE taps are 2 and 3 are always strongly positive, and no taps <-0.045, yet the draft would allow such untypical/hypothetical channels.
We wanted to check that low loss channels would not do something surprising before adopting sensible limits that don't burden real channels: see new Heck presentation. Remember that channels that go a little outside a tap weight pay a very small increase in COM for the excess ISI noise that they cause (see another comment), so the limits for the smaller taps should be set a bit tighter than the worst channel we want to pass.

SuggestedRemedy

Add minimum tap weight limits:
Tap 1: min +0.3
Tap 2: min +0.05
All other taps: min -0.03 (looser than for CR).
Turn the existing "Normalized DFE coefficient magnitude limit"s into "Normalized DFE coefficient limit"s.
Update definition of COM in 93A.1.

Response *Response Status* **C**

ACCEPT IN PRINCIPLE.

An analysis has been presented in ad hoc:
http://www.ieee802.org/3/ck/public/adhoc/jun17_20/heck_3ck_adhoc_01_061720.pdf

Note that comment #247 against Clause 162 with a similar comment text and suggested remedy was accepted and closed.

Implement the suggested remedy with editorial license.

Cl **163** *SC* **163.10** *P* **185** *L* **33** # 262

Dawe, Piers Nvidia

Comment Type **TR** *Comment Status* **R** *COM parameter*

The analysis that led to the equalizer length choice needs to be revisited with the new COM.

SuggestedRemedy

If there is a significant improvement with the latest COM, remove positions 25-40 and define positions 13-24 as the tail, with 2 or 3 floating groups of 3 taps and an RSS limit.

Response *Response Status* **C**

REJECT

This comment does not provide sufficient evidence the suggested remedy will not disqualify channels the task force has agreed to pass.

Cl **163** *SC* **163.10** *P* **185** *L* **34** # 263

Dawe, Piers Nvidia

Comment Type **TR** *Comment Status* **R** *COM parameter*

The spec allows a channel to have its COM calculated with 9 taps in the range 13 to 24 clipped at +/-0.05 - which means that the channel's pulse response could be a little worse than +/-0.05 for these taps. That's a very bad channel! We don't need to provide all the receiver power and complexity to cope with it.

SuggestedRemedy

Use another DFE root-sum-of-squares limit for positions 13-24.

Response *Response Status* **C**

REJECT

The suggested remedy does not provide clear information to implement. Sufficient evidence has not been provided to justify the proposed change. More empirical evidence and consensus building is required.

Cl **163** *SC* **163.10** *P* **185** *L* **36** # 264

Dawe, Piers Nvidia

Comment Type **TR** *Comment Status* **R** *COM parameter*

As the effect of exceeding the DFE floating tap tail root-sum-of-squares limit increases parabolically as the channel exceeds the limit, the limit must be set a little lower than the worst channel we wish to allow to have an effect at the right point. OAch4 with COM 2.75 gave an unconstrained RSS_tail of 0.022. Setting the limit 0.01 lower than that might affect its COM by 0.1 dB (vs. no limit) which seems like a gentle effect. However, it seems that the latest COM gives a more optimistic result anyway; this channel may not need the tail taps at all.

SuggestedRemedy

If there is no improvement with the latest COM, change the DFE floating tap tail root-sum-of-squares limit to 0.012.
If there is a small improvement with the latest COM, further reduce the limit accordingly.
If there is a significant improvement with the latest COM, remove taps 25-40 and apply a tail tap RSS limit to positions 13-24.

Response *Response Status* **C**

REJECT

The simulations to make the determinations in the suggested remedy are not available.

There is no consensus to implement the suggested remedy at this time. More empirical evidence and consensus building is required.

Cl **93A** *SC* **93A.1.2.4** *P* **198** *L* **53** # 265

Dawe, Piers Nvidia

Comment Type **T** *Comment Status* **A** *COM parameter*

Typos in 93A. Eq 93A–16a has S(rp) on both sides. S(l2) has appeared from nowhere. Table 93A-1, COM parameters, says "See 93A.1.2" for zp2 yet it's not here.

SuggestedRemedy

Should the rp on the right be rd?
Explain what zp2 represents. Maybe modify 93A.1.2.3 to say that S(l2) is derived from zp2 in the same way that S(l) is derived from zp. (z is a bad choice for a length anyway, it looks too much like an impedance.)

Response *Response Status* **C**

ACCEPT IN PRINCIPLE.

Implement the suggested remedy with editorial license.

Cl **162** *SC* **162.7** *P* **142** *L* **45** # 11007

Marris, Arthur Cadence Design Systems

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

[Comment resubmitted from Draft 1.1. 162.7, P137, L6]

Many of the control and status variables in Tables 162-5 and 162-6 are not described or referenced in Clause 162.

SuggestedRemedy

Remove rows from Table 162-5 and 162-6 that refer to variables that are not mentioned in Clause 162

Proposed Response *Response Status* **Z**

REJECT.

This comment was WITHDRAWN by the commenter.

Cl **163** *SC* **163.9.2.4** *P* **183** *L* **23** # 11033

Ben Artsi, Liav Marvell

Comment Type **T** *Comment Status* **A** *jitter tolerance [CC]*

[Comment resubmitted from Draft 1.1. 163.9.2.4, P180, L47]

Reciever jitter tolerance test is specified at specific frequency points with no specified extrapolation between frequency points. More specifically, 5UI at 40KHz, 0.15UI at 1.33MHz 0.05UI at 4-40MHz. Tx is measured when applying high pass filter on the jitter filtering out much of the low frequency jitter of a transmitter. A transmitter may still comply with the TX specifications and have much more than 0.15UI of jitter at frequecies which reside around a few handers of Hz. Since there is no Rx jitter tolerance requirement at these frequencies: A transmitter may have relatively high jitter at low frequencies and still be compliant. The Rx may not be able to tolerate this jitter while being compliant as well. The interoperability between these specified Tx and Rx is questionable.

SuggestedRemedy

Add a sentence that the reciever is expected to meet any frequency point between the specified in table 163-9 while jitter tolerance requirement is linearly extrapolated between any consecutive specified frequency points.

Response *Response Status* **C**

ACCEPT IN PRINCIPLE

Resolve using the response to comment #146.

Cl **120F** *SC* **120F.4.4** *P* **213** *L* **47** # 11034

Ben Artsi, Liav Marvell

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

[Comment resubmitted from Draft 1.1. 120F.1, P201, L49]

C2C applications dictate external DC blocking cap even in cases when the Rx is capable of directly connecting to the Tx side

SuggestedRemedy

Add a sentence similar to the 802.3bj: Should the capacitor be implemented outside TP0 and TP5, it is the responsibility of implementors to consider any necessary modifications to common-mode and channel specifications required for interoperability as well as any impact on the verification of transmitter and receiver compliance.

Proposed Response *Response Status* **Z**

REJECT.

This comment was WITHDRAWN by the commenter.

Cl **120F** *SC* **120F.3.2.4** *P* **210** *L* **29** # 11036

Ben Artsi, Liav Marvell

Comment Type **T** *Comment Status* **A** *jitter tolerance [CC]*

[Comment resubmitted from Draft 1.1. SC120F.3.2.4, P207, L22]

Reciever jitter tolerance test is specified at specific frequency points with no specified extrapolation between frequency points. More specifically, 5UI at 40KHz, 0.15UI at 1.33MHz 0.05UI at 4-40MHz. Tx is measured when applying high pass filter on the jitter filtering out much of the low frequency jitter of a transmitter. A transmitter may still comply with the TX specifications and have much more than 0.15UI of jitter at frequecies which reside around a few handers of Hz. Since there is no Rx jitter tolerance requirement at these frequencies: A transmitter may have relatively high jitter at low frequencies and still be compliant. The Rx may not be able to tolerate this jitter while being compliant as well. The interoperability between these specified Tx and Rx is questionable.

SuggestedRemedy

Add a sentence that the reciever is expected to meet any frequency point between the specified in table 163-9 while jitter tolerance requirement is linearly extrapolated between any consecutive specified frequency points.

Response *Response Status* **C**

ACCEPT IN PRINCIPLE

Resolve using the response to comment #146.

Cl **162** *SC* **162.9.4.3** *P* **154** *L* **3** # 11037

Ben Artsi, Liav Marvell

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

[Comment resubmitted from Draft 1.1. 162.9.4.3, P152, L38]

Receiver characteristics lacks the definition of capability to tollerate common mode noise at the reciever input

SuggestedRemedy

Add the required capability of Rx common mode broadband noise tolerance and set it at TBD at least for now

Proposed Response *Response Status* **Z**

REJECT.

This comment was WITHDRAWN by the commenter.

Cl **163** *SC* **163.9.2** *P* **180** *L* **50** # 11038

Ben Artsi, Liav Marvell

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

[Comment resubmitted from Draft 1.1. 163.9.2, P178, L45]

Receiver characteristics lacks the definition of capability to tollerate common mode noise at the reciever input

SuggestedRemedy

Add the required capability of Rx common mode broadband noise tolerance and set it at TBD at least for now

Proposed Response *Response Status* **Z**

REJECT.

This comment was WITHDRAWN by the commenter.

Cl **163** *SC* **163.10** *P* **184** *L* **1** # 11039

Ben Artsi, Liav Marvell

Comment Type **T** *Comment Status* **A** *channel RLDC*

[Comment resubmitted from Draft 1.1. 163.10, P181, L26]

Differential to common mode conversion loss is not defined for a TP0 to TP5 interconnect channel characteristics

SuggestedRemedy

Specify that the differential to common mode conversion loss of TP0 to TP5 shall be [TBD] and correlated to the capability defined in 162.11.5 when measured with an MCB

Response *Response Status* **C**

ACCEPT IN PRINCIPLE.

Add differential to common mode conversion loss of TP0 to TP5 with the specification TBD.

Cl **120F** *SC* **120F.1** *P* **204** *L* **22** # 11059

Ran, Adee Intel

Comment Type **T** *Comment Status* **A**

[Comment resubmitted from Draft 1.1. 120F.1, P202, L31]

"If implemented, the transmitter equalization feedback mechanism described in 120D.3.2.3 may be used to identify an appropriate setting"

As presented in ran_3ck_adhoc_02_021920, that mechanism supports the equalizer that was specified in the original CAUI-4 C2M (Annex 83D), which has only 3 taps with 5% coefficient resolution. The PAM4 AUIs defined in 802.3.bs (120D.3.1.5) and re-used in 802.3cd have kept this structure. However, we now have a 5-tap equalizer with a finer resolution. Even if pre-cursor tap c(-3) is removed as suggested in 120F.3.1.4 it would not be identical to the FFE in Annex 83D.

Therefore, re-using this method for 100GAUI-1 is impossible and new method should be defined. Possible solutions include a training protocol as in the PMD control function, new management variables and registers, or combinations of the two approaches.

SuggestedRemedy

A presentation with possible solutions is planned.

Response *Response Status* **C**

ACCEPT IN PRINCIPLE.

The following presentation was reviewed by the task force:
https://www.ieee802.org/3/ck/public/20_07/ran_3ck_02b_0720.pdf

Implement the proposal in ran_3ck_02b_0720 with editorial license with the following corrections:
- on slide 7 refer to table 120F-#2 instead of 120F-#1
- on slide 7 refer to table 120F-#2 instead of 120F-2a
- on slide 6 refer to table 120F-#1 instead of 120F-2a

Cl **120G** *SC* **120G.3.2** *P* **224** *L* **43** # 11060

Ran, Adee Intel

Comment Type **T** *Comment Status* **A** *bucket3*

[Comment resubmitted from Draft 1.1. 120G.3.2, P224, L37]

Signal swing and Tx equalization are important in PAM4 since the receiver has a limited linear range. A large swing at the host input may prevent linear operation and detection of PAM4. Attenuation has been used in past Rx designs, but it is becoming harder to implement with the large bandwidth requirements for 100G.

The current module output specifications have limited information about output swing and ISI (only implicitly through far-end eye height and far-end precursor ISI ratio, which are defined with a single channel), and do not mention any control of the Tx setting. With the large range of C2M host channels, it is unlikely that a fixed Tx setting will be usable for all hosts.

Actual modules even in 50G have some control of equalization and swing. There are indications that this control is required for actual operation.

If we ignore this capability in the specifications, some hosts may not be able to operate with the settings used for module output compliance; this means the module compliance specs are useless and measuring them is a waste of time.

The standard should at least mention the module's Tx control capabilities (with reference to external documents) and preferably define requirements for them, with management variables and control registers. It will be beneficial if the Tx specifications include these capabilities.

SuggestedRemedy

A presentation is planned with further details.

Response *Response Status* **C**

ACCEPT IN PRINCIPLE.

The following presentation was reviewed by the task force at a previous task force meeting:
http://www.ieee802.org/3/ck/public/adhoc/may27_20/ran_3ck_adhoc_01_052720.pdf

The closed response to comment #175 adopts two module output (transmitter) settings, which addresses the configuration of the module output.

According to the closed response to comment #176, there is no consensus at this time to change the module output differential peak to peak voltage specification.

Cl **120F** *SC* **120F.3.1** *P* **205** *L* **20** # 11070

Mellitz, Richard Samtec

Comment Type **TR** *Comment Status* **D** *TX vfmin*

[Comment resubmitted from Draft 1.1. 120F.3.1, P203, L30]

C2C, KR, and CR devices may be the same ports on chips. Align Av, Afe, and Ane with Vf in table 163-5

SuggestedRemedy

Replace with Vfmin=0.413

Proposed Response *Response Status* **Z**

REJECT.

This comment was WITHDRAWN by the commenter.

Cl **120F** *SC* **120F.3.2.3** *P* **208** *L* **54** # 11078

Healey, Adam Broadcom Inc.

Comment Type **T** *Comment Status* **A**

[Comment resubmitted from Draft 1.1. 120F.3.2.3, P206, L48]

I believe the intent is for the return loss of the test setup to have "test fixture" grade performance.

SuggestedRemedy

In item b), change "Equation (TBD)" to "Equation (163-2)" (Test fixture reference return loss limit).

Response *Response Status* **C**

ACCEPT IN PRINCIPLE.

Comment #170 proposes using ERL in 120F.4.3.
Comment #11078 proposes using DRL in 163.9.1.2 (KR test fixture specification).

There was general agreeement that the return loss should be representation of test equipment grade in order to ensure reproducible measurements.

Replace Equation (TBD) and related text with "the return loss specifications in 163.9.1.2". Implement with editorial license.

Cl **45** *SC* **45.2.1.129** *P* **52** *L* **50** # 11082

Healey, Adam Broadcom Inc.

Comment Type **T** *Comment Status* **A**

[Comment resubmitted from Draft 1.1. 45.2.1.129, P50, L50]

Chip-to-chip transmitter equalization register definitions have been are written as being general for 100/200/400GAUI-n but 100GAUI-1, 200GAUI-2, and 400GAUI-4 appear to be on a trajectory to have different tap counts and coefficient step sizes.

SuggestedRemedy

The correct amendment to 45.2.1.129 through 45.2.1.132 seems to be to indicate these registers are specific to 100GAUI-n (n > 1), 200GAUI-n (n > 2) and 400GAUI-n (n > 4) until the Annex 120F taps counts, coefficient step sizes, and control scheme are finalized. At this point it seems likely a different set of registers would be needed for Annex 120F controls.

Response *Response Status* **C**

ACCEPT IN PRINCIPLE.

Resolve using the response to comment #11059.

Cl **120G** *SC* **120G.3.2** *P* **224** *L* **44** # 11097

Ghiasi, Ali Ghiasi Quantum/Inphi

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

[Comment resubmitted from Draft 1.1. 120G.3.2, P224, L44]

Near end ESMW is TBD

SuggestedRemedy

Replace TBD with 0.175 UI see ghiasi_3ck_01_0320

Proposed Response *Response Status* **Z**

REJECT.

This comment was WITHDRAWN by the commenter.

Cl **120G** *SC* **120G.3.2** *P* **224** *L* **46** # 11098

Ghiasi, Ali Ghiasi Quantum/Inphi

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

[Comment resubmitted from Draft 1.1. 120G.3.2, P224, L46]

Near-end eye height is TBD

SuggestedRemedy

Replae TBD with 50 mV see ghiasi_3ck_01_0320

Proposed Response *Response Status* **Z**

REJECT.

This comment was WITHDRAWN by the commenter.

Cl **120G** *SC* **120G.3.2** *P* **224** *L* **47** # 11099

Ghiasi, Ali Ghiasi Quantum/Inphi

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

[Comment resubmitted from Draft 1.1. 120G.3.2, P224, L47]

Far end ESMW is TBD

SuggestedRemedy

Replace TBD with 0.175 UI see ghiasi_3ck_01_0320

Proposed Response *Response Status* **Z**

REJECT.

This comment was WITHDRAWN by the commenter.

Cl **120G** *SC* **120G.3.2** *P* **224** *L* **48** # 11100

Ghiasi, Ali Ghiasi Quantum/Inphi

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

[Comment resubmitted from Draft 1.1. 120G.3.2, P224, L44]

Far-end eye height is TBD

SuggestedRemedy

Replace TBD with 20 mV see ghiasi_3ck_01_0320

Proposed Response *Response Status* **Z**

REJECT.

This comment was WITHDRAWN by the commenter.

Cl **120G** *SC* **120G.3.3.2** *P* **227** *L* **45** # 11101

Ghiasi, Ali
Ghiasi Quantum/Inphi

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

[Comment resubmitted from Draft 1.1. 120G.3.3.2, P227, L15]

Farend ESMW is TBD

SuggestedRemedy

Replace TBD with 0.175 UI see ghiasi_3ck_01_0320

Proposed Response *Response Status* **Z**

REJECT.

This comment was WITHDRAWN by the commenter.

Cl **120G** *SC* **120G.3.3.2** *P* **227** *L* **46** # 11102

Ghiasi, Ali
Ghiasi Quantum/Inphi

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

[Comment resubmitted from Draft 1.1. 120G.3.3.2, P227, L16]

Farend EW is TBD

SuggestedRemedy

Replace TBD with 0.175 UI see ghiasi_3ck_01_0320

Proposed Response *Response Status* **Z**

REJECT.

This comment was WITHDRAWN by the commenter.

Cl **120G** *SC* **120G.3.3.2** *P* **227** *L* **49** # 11103

Ghiasi, Ali
Ghiasi Quantum/Inphi

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

[Comment resubmitted from Draft 1.1. 120G.3.3.2, P227, L19]

Far-end eye height is TBD

SuggestedRemedy

Replace TBD with 20 mV see ghiasi_3ck_01_0320

Proposed Response *Response Status* **Z**

REJECT.

This comment was WITHDRAWN by the commenter.

Cl **120G** *SC* **120G.3.4.1** *P* **230** *L* **34** # 11104

Ghiasi, Ali
Ghiasi Quantum/Inphi

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

[Comment resubmitted from Draft 1.1. 120G.3.4.1, P229, L40]

ESMW is TBD

SuggestedRemedy

Replace TBD with 0.12 UI see ghiasi_3ck_01_0320

Proposed Response *Response Status* **Z**

REJECT.

This comment was WITHDRAWN by the commenter.

Cl **120G** *SC* **120G.3.4.1** *P* **230** *L* **38** # 11105

Ghiasi, Ali
Ghiasi Quantum/Inphi

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

[Comment resubmitted from Draft 1.1. 120G.3.4.1, P229, L46]

Eye height is TBD

SuggestedRemedy

Replae TBD with 15 mV see ghiasi_3ck_01_0320

Proposed Response *Response Status* **Z**

REJECT.

This comment was WITHDRAWN by the commenter.

Cl **120G** *SC* **120G.3.4.1** *P* **230** *L* **38** # 11106

Ghiasi, Ali
Ghiasi Quantum/Inphi

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

[Comment resubmitted from Draft 1.1. 120G.3.4.1, P229, L44]

Eye width is TBD

SuggestedRemedy

Replace TBD with 0.12 UI see ghiasi_3ck_01_0320

Proposed Response *Response Status* **Z**

REJECT.

This comment was WITHDRAWN by the commenter.

Cl **120G** *SC* **120G.5.2** *P* **235** *L* **1** # 11116

Ghiasi, Ali — Ghiasi Quantum/Inphi

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

[Comment resubmitted from Draft 1.1. 120G.4.2, P232, L9]

TP4 need its own reference receiver table

SuggestedRemedy

Create a new table that references table of gDC/gDC2 for TP4. In the new table DFE normalized coefficent b1max=0.15, b[2-4]max=0.05 and n0=8.37e-9

Proposed Response *Response Status* **Z**

REJECT.

This comment was WITHDRAWN by the commenter.

Cl **120G** *SC* **120G.5.2** *P* **235** *L* **1** # 11117

Ghiasi, Ali — Ghiasi Quantum/Inphi

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

[Comment resubmitted from Draft 1.1. 120G.4.2, P232, L9]

TP5 need its own reference receiver table

SuggestedRemedy

Create a new table that references table of gDC/gDC2 for TP4. In the new table DFE normalized coefficent b1max=0.3, b[2-4]max=0.08 and n0=8.37e-9

Proposed Response *Response Status* **Z**

REJECT.

This comment was WITHDRAWN by the commenter.

Cl **120G** *SC* **120G.3.1.2** *P* **222** *L* **2** # 11119

Ghiasi, Ali — Ghiasi Quantum/Inphi

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

[Comment resubmitted from Draft 1.1. 120G.3.1.2, P222, L2]

RLCD return loss can be improved

SuggestedRemedy

RLCD=30-30*f/25.78 dB, from 10 MHz to 12.89 GHz
RLCD=15 dB 12.89 to 53 GHz
See ghiasi_3ck_03_0320

Proposed Response *Response Status* **Z**

REJECT.

This comment was WITHDRAWN by the commenter.

Cl **120G** *SC* **120G.3.4** *P* **230** *L* **9** # 11124

Ghiasi, Ali — Ghiasi Quantum/Inphi

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

[Comment resubmitted from Draft 1.1. 120G.3.4, P229, L15]

RLCD return loss can be improved

SuggestedRemedy

RLCD=30-30*f/25.78 dB, from 10 MHz to 12.89 GHz
RLCD=15 dB 12.89 to 53 GHz
See ghiasi_3ck_03_0320

Proposed Response *Response Status* **Z**

REJECT.

This comment was WITHDRAWN by the commenter.

Cl **120G** *SC* **120G.3.2** *P* **224** *L* **52** # 11125

Ghiasi, Ali — Ghiasi Quantum/Inphi

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

[Comment resubmitted from Draft 1.1. 120G.3.2, P224, L52]

RLCD return loss can be improved

SuggestedRemedy

RLCD=30-30*f/25.78 dB, from 10 MHz to 12.89 GHz
RLCD=15 dB 12.89 to 53 GHz
See ghiasi_3ck_03_0320

Proposed Response *Response Status* **Z**

REJECT.

This comment was WITHDRAWN by the commenter.

Cl **120G** *SC* **120G.5.2** *P* **235** *L* **48** # 11142

Dawe, Piers — Mellanox

Comment Type **TR** *Comment Status* **D** *Scope noise*

[Comment resubmitted from Draft 1.1. 120G.4.2, P232, L39]

Should account for scope noise as TDECQ does.

SuggestedRemedy

Allow RSSing out the scope noise (as done in TDECQ) if it's significant.

Proposed Response *Response Status* **Z**

REJECT.

This comment was WITHDRAWN by the commenter.

Cl **120F** *SC* **120F.3.1** *P* **205** *L* **23** # 11144

Dawe, Piers — Mellanox

Comment Type **TR** *Comment Status* **R**

[Comment resubmitted from Draft 1.1. 120F.3.1, P203, L32]

The third precursor has only minor value for "28 dB" channels, so I don't expect it will be worthwhile for "20 dB" channels, yet it adds complexity to the silicon and the tuning. This is not KR or CR, it should be done with simpler silicon, like C2M.

SuggestedRemedy

Remove the third precursor.

Response *Response Status* **C**

REJECT

The comment does not provide sufficient evidence to support the change.

The following presentation shows an improvement due to c(-3) of 0.1 to 0.8 dB in COM for channels with COM near 3 dB.

Http://www.ieee802.org/3/ck/public/adhoc/mar04_20/sun_3ck_adhoc_01_030420.pdf

Removing the c(-3) would result in marginal channels failing.

Cl **120F** *SC* **120F.3.1** *P* **205** *L* **27** # 11151

Dudek, Mike — Marvell

Comment Type **T** *Comment Status* **A** *bucket*

[Comment resubmitted from Draft 1.1. 120F.3.1, P203, L38]

Footnote b to table 163-5 which updates the linear fit procedure for measuring SNDR should be applied to chip to chip as well as backplane.

SuggestedRemedy

Add the same footnote to the SNDR row in Table 120F-1.

Response *Response Status* **C**

ACCEPT IN PRINCIPLE.

Add the following footnote to the SNDR parameter in Table 120F-1:
"Measurement uses the method described in 120D.3.1.6 with the exception that the linear fit procedure in 162.9.3.1.1 is used."

Cl **120F** *SC* **120F.3.2.3** *P* **209** *L* **9** # 11156

Li, Mike Intel

Comment Type **TR** *Comment Status* **R**

[Comment resubmitted from Draft 1.1. 120F.3.2.3, P207, L5]

Np TBD

SuggestedRemedy

Change it to 18 (length of TX pre-taps + RX DFE taps+main tap)

Response *Response Status* **C**

REJECT.

There is no consensus to implement the suggested remedy at this time.

Cl **162** *SC* **162.11.7** *P* **161** *L* **14** # 11161

Palkert, Tom Molex

Comment Type **T** *Comment Status* **A** *bucket5 eta0*

[Comment resubmitted from Draft 1.1. 162.11.7, P160, L27]

One sided noise spectral density for passive copper cables was changed from 8.2x10-9 to 1x10-8. This went too far causing adverse impacts on COM results.

SuggestedRemedy

Change One-sided noise spectral density from to 1x10-8 to 1x10-9. (Supporting presentation)

Response *Response Status* **C**

ACCEPT IN PRINCIPLE.

Resolve using the response to comment #69.

Cl **162** *SC* **162.11.7** *P* **160** *L* **42** # 11162

Palkert, Tom Molex

Comment Type **T** *Comment Status* **A** *bucket5 CA*

[Comment resubmitted from Draft 1.1. 162.11.7, P160, L6]

Need value for SNRtx

SuggestedRemedy

Make SNRtx = 33dB (See supporting presentation)

Response *Response Status* **C**

ACCEPT IN PRINCIPLE.

Resolve using the response to comment #37.

Cl **162** *SC* **162.9.4.5** *P* **157** *L* **11** # 11163

Palkert, Tom Molex

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

[Comment resubmitted from Draft 1.1. 162.9.4.5, P156, L14]

ERL measurement should not be required for high values of COM

SuggestedRemedy

Add sentence 'If COM is greater than 4 dB the ERL limit does not apply

Proposed Response *Response Status* **Z**

REJECT.

This comment was WITHDRAWN by the commenter.

Cl **162** *SC* **162.5** *P* **140** *L* **18** # 11164

Palkert, Tom Molex

Comment Type **T** *Comment Status* **R** *Medium delay*

[Comment resubmitted from Draft 1.1. 162.5, P135, L18]

One way delay thru medium of 14ns is insufficient for DAC delay times.

SuggestedRemedy

Change value back to 20 ns

Response *Response Status* **C**

REJECT

The commenter is encouraged to provide more in depth analysis to support the proposed remedy.