Cl **FM** *SC* **FM** *P* **1** *L* **31** # 26

Ran, Adee Cisco systems

Comment Type **E** *Comment Status* **A** *bucket1*

802.3cv is published.

SuggestedRemedy

Change "IEEE Std 802.3cv-20xx" to "IEEE Std 802.3cv-2021", here and on page 16.

Response *Response Status* **C**

ACCEPT.

Cl **00** *SC* **0** *P* **0** *L* **0** # 20

Brown, Matt Huawei

Comment Type **E** *Comment Status* **A** *bucket1*

According to the style manual subclause 16.4, table notes should be placed as follows: "A table note should be set immediately following the table to which it belongs, enclosed within the boxed table, above the bottom border of the table."
Several table notes were added to several tables in recent drafts but not placed according to this guidance.

SuggestedRemedy

Fix the table note at the following page/line: 169/24, 179/21, 251/46, 255/25, 283/28

Response *Response Status* **C**

ACCEPT.

[Editor's note: CC: 120G, 162, 162B]

Cl **00** *SC* **0** *P* **0** *L* **0** # 5

Brown, Matt Huawei

Comment Type **E** *Comment Status* **A** *bucket1*

802.3ck will not be incorporated into the next amendment (802.3dc) so it will be amendment to that revision.

SuggestedRemedy

Convert draft to be an amendment of new revision (802.3dc) rather than an amendment of 802.3-2018.

Response *Response Status* **C**

ACCEPT.

Cl **80** *SC* **80.1.5** *P* **80** *L* **45** # 2

Brown, Matt Huawei

Comment Type **T** *Comment Status* **A** *PHY table (bucket1)*

In Table 80-4a, 100GAUI-1 C2C and C2M have been added to several PHY types, but the physical layer tables in the corresponding PMD clauses have not been updated.

SuggestedRemedy

Amend the 100 Gb/s physical layer tables in clauses 138 and 140 to include 100GAUI-1 C2C and C2M sublayers.

Response *Response Status* **C**

ACCEPT.

Cl **93A** *SC* **93A.1.6** *P* **225** *L* **15** # 118

Dawe, Piers Nvidia

Comment Type **E** *Comment Status* **R** *b(n) equation (bucket3)*

The equation for b(n) is clumsy and hard to follow

SuggestedRemedy

b(n) = min(max(h.... , bbmin(n)), bbmax(n))

Response *Response Status* **C**

REJECT.

The suggested remedy does not improve upon the clarity of the existing equation.

There is no consensus to make the proposed change.

Cl **116** *SC* **116.1.4** *P* **98** *L* **18** # 3

Brown, Matt Huawei

Comment Type **T** *Comment Status* **A** *PHY table (bucket1)*

In Table 116-3, 200GAUI-2 C2C and C2M have been added to several 200 Gb/s PHY types, but the physical layer tables in the corresponding PMD clauses have not been updated.

SuggestedRemedy

Amend the 200 Gb/s physical layer tables in clauses 121 and 122 to include 200GAUI-2 C2C and C2M sublayers.

Response *Response Status* **C**

ACCEPT.

Cl **116** *SC* **116.1.4** *P* **99** *L* **18** # 4

Brown, Matt
Huawei

Comment Type **T** *Comment Status* **A** *PHY table (bucket1)*

In Table 116-4, 400GAUI-4 C2C and C2M have been added to several 400 Gb/s PHY types, but the physical layer tables in the corresponding PMD clauses have not been updated.

SuggestedRemedy

Amend the 400 Gb/s physical layer tables in clauses 122, 123, 124, 138, 150, and 151 to include 400GAUI-4 C2C and C2M sublayers.

Response *Response Status* **C**

ACCEPT.

Cl **120** *SC* **120.5.1** *P* **107** *L* **54** # 16

Sun, Junqing
Credo Semiconductor

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

SSPRQ usually causes confusion in the field to be used as receive pattern. A note in the spec will help to clarify.

SuggestedRemedy

Add "and SSPRQ" after "square wave" in the second paragraph of 120.5.1. This paragraph will be "Test patterns that are intended for transmitter testing, such as square wave for SSPRQ, may not be correctly recovered by an adjacent PMA."

Proposed Response *Response Status* **Z**

REJECT.
This comment was WITHDRAWN by the commenter.
[Editor's note: changed page/line from 108/46]

Cl **120** *SC* **120.5.11.2.a** *P* **110** *L* **48** # 80

Dudek, Mike
Marvell

Comment Type **E** *Comment Status* **A** *bucket1*

120.5.7 should be a hot link

SuggestedRemedy

fix it

Response *Response Status* **C**

ACCEPT.

Cl **120F** *SC* **120F.3.1** *P* **232** *L* **32** # 76

Dudek, Mike
Marvell

Comment Type **TR** *Comment Status* **A** *TX residual ISI*

The value for SNDR is measured using the method in 162.9.3.3 which uses Np=29, however chip to chip reference receiver is only a 6 tap DFE. Transmitters with significant residual ISI beyond the length of the DFE will pass this Tx specification and will not work in the system.

SuggestedRemedy

Add an extra Tx specification "Residual ISI (max) value 0.027". Defined as the value of Sigma_e/Vpeak where sigma_e and Vpeak are as defined in 162.9.3.3 except that Np=11 is used instead of Np=29.

Response *Response Status* **C**

ACCEPT IN PRINCIPLE.

The following presentation was reviewed by the task force:
https://www.ieee802.org/3/ck/public/21_07/dudek_3ck_01_0721.pdf

For the transmitter characteristics for 163 and 120F implement the residual ISI parameter per the suggested remedy and dudek_3ck_01_0721, except specify as dB (-31 dB) rather than a ratio (0.027). Implement with editorial license.

[Editor's note: CC: 163, 120F]

Cl **120G** *SC* **120G.3.1** *P* **250** *L* **12** # 121

Dawe, Piers
Nvidia

Comment Type **TR** *Comment Status* **A** *AC CM noise*

As discussed, AC common-mode output voltage (max) 17.5 mV isn't reasonable at double the signalling rate of 120E with the same connectors and layout skew.

SuggestedRemedy

Increase to 25 mV, both host and module output.

Response *Response Status* **C**

ACCEPT IN PRINCIPLE.

This comment does not apply to the substantive changes between IEEE P802.3ck D2.1 and D2.0 or the unsatisfied negative comments from the initial ballot.
Hence it is not within the scope of the recirculation ballot.

Resolve using the response to comment #46.

Cl **120G** *SC* **120G.3.1** *P* **250** *L* **12** # 46

Ran, Adee Cisco systems

Comment Type **TR** *Comment Status* **A** *AC CM noise*

"AC common-mode RMS output voltage (max)" specification of 17.5 mV is not feasible for high-volume, multi-port products. The common-mode output may include a component correlated to the differential output, e.g. from mode conversion on the host channel. A module receiver is expected to be quite tolerant to a correlated common-mode signal.

As suggested in ran_3ck_adhoc_20210630, there are two reasonable alternatives:
a) increase the allowed RMS voltage to 30 mV (as is allowed for the CR transmitter measured on an HCB - likely the same point - and where the common-mode concern is greater due to conversion in the cable assembly).
b) Keep the 17.5 mV specification but only for the component uncorrelated to the differential signal; use the linear fitted pulse response method (which is already referred to in 120G.5.2) to calculate the linear fitted pulse response characteristics of the common-mode output, and define the AC common-mode noise as the RSS of sigma_n and sigma_v.

Note: This comment is only about the host output; module output is more controlled and modules can be designed to have low mode conversion so the correlated component is expected to be small. Modules should not be allowed to generate 30 mV RMS, so if option a is chosen, the module output specification should not be changed.

SuggestedRemedy

Preferably implement option a in the comment.

Response *Response Status* **U**

ACCEPT IN PRINCIPLE.

This comment does not apply to the substantive changes between IEEE P802.3ck D2.1 and D2.0 or the unsatisfied negative comments from the initial ballot.
Hence it is not within the scope of the recirculation ballot.

Comment 121 proposes to increase the value to 25 mV.

This comment proposes to either:
(a) change the value to 30 mV
(b) change the parameter to relate to only the uncorrelated noise
There is not sufficient evidence that the correlated noise is indeed tolerable by the receiver (e.g., conversion from CM to DM in receiver might be non-linear or CM might have much larger channel transit time than DM)

The resolution to comment #123 indicates there is not consensus to make the change proposed in option (b), above.

Following straw polls #3 and #4, there was consensus to close this comment changing the value to 25 mV.

Change the AC common-mode RMS output voltage (max) for module output and host output to 25 mV.

Straw poll #3, pick one (direction)
Straw poll #4, Chicago rules (direction)
To address comments #46 and #121, for the module output and host output AC CM noise (max) I would support:
A: no change
B: change to 25 mV
C: change to 30 mV
Straw poll #3
A: 12 B: 13 C: 9
Straw poll #4
A: 15 B: 25 C: 21

Cl **120G** *SC* **120G.3.1** *P* **250** *L* **18** # 61

Ghiasi, Ali Ghiasi Quantum/Inphi

Comment Type **TR** *Comment Status* **D** *HO EH/VEC*

Data from Ghiasi page 7
https://www.ieee802.org/3/ck/public/adhoc/apr21_21/ghiasi_3ck_adhoc_01a_042121.pdf
and Calvin page 4
https://www.ieee802.org/3/ck/public/adhoc/jun30_21/calvin_3ck_adhoc_01_063021.pdf
indicate meeting current VEO/VEC at TP1a not feasible to meet

SuggestedRemedy

Considering that on a system all 32 ports plus lanes must meet the TP1a, the best in practice channels should have margin to pass not fail. This is an area that we need more measurement but given what we know at this point VEC should be increased to 13 dB and VEO reduced to 8.5 mV

Proposed Response *Response Status* **Z**

REJECT.

This comment was WITHDRAWN by the commenter.

Cl **120G** *SC* **120G.3.1** *P* **250** *L* **25** # 58

Ghiasi, Ali — Ghiasi Quantum/Inphi

Comment Type **TR** *Comment Status* **A** *HO TT*

Transition time host requesting short mode or long mode is for TP4

SuggestedRemedy

Please revert to 10 ps in draft D2.0, please move this parameter to TP4 table 120G-3

Response *Response Status* **C**

ACCEPT IN PRINCIPLE.

This comment relates to the host output transition time specified in Table 120G-1.

Separate values for host long and short modes were added per D2.1 comment #188.

The justification was that the host input and host output PCB insertion loss will likely be similar, which is reflected in the transition times chosen for the host input crosstalk calibration. This must also be explicitly allowed and constrained at the hout output.

However, it would be helpful in Table 120G-1 to point to the subclause that defines long and short modes.

Add a footnote to the sub-rows for long and short modes in Table 120G-1 pointing to 120G.3.2.1.

Cl **120G** *SC* **120G.3.1.2** *P* **251** *L* **41** # 100

Dawe, Piers — Nvidia

Comment Type **TR** *Comment Status* **A** *ERL Tfx*

This fixed time value of time-gated propagation delay Tfx is unworkable because the HCB is defined by its loss not its transit time. While HCBs for connectors with few lanes such as SFP+ may be constructed from PCB, those for connectors with many lanes such as QSFP-DD are challenged by fanout and may use cabled construction with the same loss and much greater delay than a PCB. The discontinuity at cable-PCB interface which is in the connector body, several inches from the coax connector and near the module connector, should be windowed out just like the coax connector itself, it's not part of the DUT. The HCB transit time is known, just as its loss is, so we can use that in the windowing. Notice that in 163 and 120F, "The value of Tfx is twice the delay from TP5v to TP5", so it's known there.

SuggestedRemedy

Change 0.3 ns to twice the delay between the test fixture test connector and the test fixture host-facing connection minus 0.2 ns, or 85% of the delay. This gives the cabled HCB designer the length of the module PCB less about 30 mm to position up to 16 coax-PCB transitions. Make a similar change in 162.9.3.5 (HCB for CR).
Make similar changes in 120G.3.2.3 and 162.11.3 (MCB).

Response *Response Status* **C**

ACCEPT IN PRINCIPLE.

[Editor's note: CC: 120G, 162]

Per straw polls #11 and #12 there is sufficient consensus to accept the suggested remedy.

Implement the suggested remedy with editorial license.

Straw poll #11
I support making the changes proposed in the suggested remedy for comment #100.
A: Yes
B: No
C: Need more information
A: 11 B: 8 C: 10

Straw poll #12 (decision)
I support making the changes proposed in the suggested remedy for comment #100.
Yes: 16
No: 14

Cl **120G** *SC* **120G.3.1.5** *P* **252** *L* **15** # 8

Brown, Matt — Huawei

Comment Type **E** *Comment Status* **A** *transition time (bucket1)*

Reference to transition time methodology.

SuggestedRemedy

Change "transition time" to "transition time (see 120G.3.1.4)".
Repeat at:
page 254, line 13
page 258, lines 43/44
page 262, lines 10/11

Response *Response Status* **C**

ACCEPT IN PRINCIPLE.

Implement the suggested remedy with editorial license.

Cl **120G** *SC* **120G.3.1.5** *P* **252** *L* **16** # 120

Dawe, Piers — Nvidia

Comment Type **TR** *Comment Status* **A** *test system response*

"without the use of a reference receiver" which occurs several times, is misleading; the BT4 filter, which is the reference receiver response in so many clauses, applies.

SuggestedRemedy

Change to "observed through the Bessel-Thomson response of 120G.3.1 in place of the reference receiver of 120G.5.2" or similar. Several places.

Response *Response Status* **C**

ACCEPT IN PRINCIPLE.

This comment does not apply to the substantive changes between IEEE P802.3ck D2.1 and D2.0 or the unsatisfied negative comments from the initial ballot.
Hence it is not within the scope of the recirculation ballot.

There could be some misinterpretation since the reference receiver as defined in 120G.5.2 includes the effect of the test equipement filter. Also, since the response is prescriptive, it should not be in parentheses.
On page 252, line 16…
Change: "calibrated at TP4 (without the use of a reference receiver)"
To: "calibrated at TP4 using a test system with a response as defined in 120G.3.1 rather than the reference receiver of 120G.5.2"
Apply similarly at page/line: 254/12, 258/43, and 262/10.
Implement with editorial license.

Cl **120G** *SC* **120G.3.1.5** *P* **252** *L* **20** # 47

Ran, Adee — Cisco systems

Comment Type **ER** *Comment Status* **A** *test setup figures*

Figure 120G–6 should be edited to correctly show the plugging of the HCB into either the MCB or the host under test, and the locations of test points, similarly to the updated Figure 120G–9.

Similarly for Figure 120G–7 for plugging into the MCB.

SuggestedRemedy

Update the figures with editorial license.

Response *Response Status* **C**

ACCEPT.

Cl **120G** *SC* **120G.3.2** *P* **253** *L* **1** # 48

Ran, Adee — Cisco systems

Comment Type **E** *Comment Status* **A** *bucket1*

"Table 120G–3—Module output characteristics (at TP4)" - Parentheses are inconsistent with other similar tables (Host output in this annex, and Transmitter characteristics elsewhere).

SuggestedRemedy

Change title to "Module output characteristics at TP4"

Response *Response Status* **C**

ACCEPT.

Cl **120G** *SC* **120G.3.2** *P* **253** *L* **11** # 97

Dawe, Piers Nvidia

Comment Type **TR** *Comment Status* **R** *MO VEC/EH*

The driver swing has to be aggressively reduced from 600 mV pk-pk to deliver only 15 mV at near end, short mode. 120E has 70 mV, and D1.4 had 24 mV, ghiasi_3ck_adhoc_01a_042121 shows 35 mV (before Vpkpk was reduced). Yet a host can usefully optimise for e.g. different crosstalk or noise if given a reasonable signal strength. A NIC has no high-loss ports so it can do this even if a switch won't. There is room to increase this weak signal without overloading the receiver. Also, making the limits more like reality encourages more consistent module setup across the industry.

SuggestedRemedy

Increase the eye height, short mode near end, by 1.1 dB from 15 mV to 17 mV

Response *Response Status* **U**

REJECT.

This comment pertains to the module output eye height (min) for short mode, near end.

The comment does not provide sufficient evidence that the proposed change is necessary.

Cl **120G** *SC* **120G.3.2** *P* **253** *L* **11** # 98

Dawe, Piers Nvidia

Comment Type **TR** *Comment Status* **R** *MO VEC/EH*

If the eye height limit is the same at long near end as at long far end, there is huge margin at near end and the implementer is encouraged to optimise for far end or beyond, only limited by the NE VEC spec, while we want modules to be set up consistently, for the full range from near to far. EH is naturally larger at NE for a well set up output.

SuggestedRemedy

Increase the eye height, long mode near end, by 3 dB from 15 mV to 21 mV

Response *Response Status* **U**

REJECT.

This comment pertains to the module output eye height (min) for long mode, near end.

The comment does not provide sufficient evidence that the proposed change is necessary.

Cl **120G** *SC* **120G.3.2** *P* **253** *L* **12** # 62

Ghiasi, Ali Ghiasi Quantum/Inphi

Comment Type **TR** *Comment Status* **A** *MO VEC/EH*

TP4 VEC can be lowered from current 12 dB to 11 dB to allow additional penalty for real host channel and host ASIC

SuggestedRemedy

Reduce TP4 VEC=11 dB, see ghiasi_3ck_01_0721

Response *Response Status* **C**

ACCEPT IN PRINCIPLE.

This comment pertains to the module output VEC (max).

Slides 7 and 8 of the following presentation was reviewed by the task force:
https://www.ieee802.org/3/ck/public/21_07/ghiasi_3ck_01_0721.pdf

The slide shows that with the current g_dc constraints VEC fails for the long mode, near-end measurement. The comment suggests that g_dc max for TP4 far-end be increased from -3 dB to -2 dB. With this change to the g_DC limit there is no need to change VEC (max).

Cl **120G** *SC* **120G.3.2** *P* **253** *L* **13** # 59

Ghiasi, Ali Ghiasi Quantum/Inphi

Comment Type **TR** *Comment Status* **D** *MO VEC/EH*

TP4 long VEO at max loss drops to 12 mV

SuggestedRemedy

Reduce TP4 high loss VEO=12 mV, see ghiasi_3ck_01_0721

Proposed Response *Response Status* **Z**

REJECT.

This comment was WITHDRAWN by the commenter.

Cl **120G** *SC* **120G.3.2** *P* **253** *L* **20** # 49

Ran, Adee Cisco systems

Comment Type **TR** *Comment Status* **A** *MO DC CM voltage tolerance*

footnote b says "Specification includes effects of ground offset voltage." - what does it mean?

It is unclear why the module needs a specification of DC common-mode voltage at all, given that its output is AC coupled (per 120G.1). Without AC coupling in the module, the limits given in this table are not reasonable.

SuggestedRemedy

Clarify what the quoted sentence mean, or delete it.

Consider removing the DC common mode voltage specification.

Response *Response Status* **C**

ACCEPT IN PRINCIPLE.

This comment does not apply to the substantive changes between IEEE P802.3ck D2.1 and D2.0 or the unsatisfied negative comments from the initial ballot.
Hence it is not within the scope of the recirculation ballot.

The comment is referring to module output "DC common-mode voltage" specifications which are intended to define a tolerance for the module output to host DC bias voltage. A DC common-mode voltage tolerance specification is required as the module output, whether it be a discrete capacitor or decoupling on the die, must tolerate the DC common-mode voltage applied by the host input. This is a necessary requirement and thus should not be deleted. However, this specification as written is difficult to interpret.

Implement slide 16 of brown_3ck_02b_0721 with editorial license.

Cl **120G** *SC* **120G.3.2** *P* **253** *L* **22** # 50

Ran, Adee Cisco systems

Comment Type **ER** *Comment Status* **A** *MO DC CM voltage tolerance*

"DC common-mode voltage (max)" - assuming this specification is not removed, it should refer to footnote b, not footnote a.

SuggestedRemedy

change footnote reference from a to b.

Response *Response Status* **C**

ACCEPT IN PRINCIPLE.

This comment does not apply to the substantive changes between IEEE P802.3ck D2.1 and D2.0 or the unsatisfied negative comments from the initial ballot.
Hence it is not within the scope of the recirculation ballot.

Resolve using the response to comment #49.

Cl **120G** *SC* **120G.3.2.2** *P* **254** *L* **24** # 60

Ghiasi, Ali Ghiasi Quantum/Inphi

Comment Type **ER** *Comment Status* **A** *test setup figures*

Figure 120G-7 could be improved with relation of module DUT, switch, and there is no need for DC blocks on the output of HCB

SuggestedRemedy

Please center MCB with HCB above and module DUT under to make it more clear that both are inserted into MCB, remove DC blocks from HCB, and improve the switch figure

Response *Response Status* **C**

ACCEPT IN PRINCIPLE.

Implement the suggested remedy with editorial license, except leave the DC blocks in diagram.

Cl **120G** *SC* **120G.3.2.2.1** *P* **254** *L* **51** # 102

Dawe, Piers Nvidia

Comment Type **TR** *Comment Status* **R** *MO SI host reference channel*

The near end and far end should be placed far enough apart so that the module implementer has little choice what emphasis to use, so that all modules are set up similarly. As short is easier than long, this means that far minus near (mm or dB) for short should be at least as much as far minus near for long. As real host channels are not exactly like the theoretical reference host channel, there should be a healthy overlap of short and long to give the host room for its implementation. D2.0's 160 mm delivered on both these criteria, D2.1's 133 mm doesn't.

SuggestedRemedy

Change 133 to 150, change 80 to 90

Response *Response Status* **U**

REJECT.

The comment does not provide sufficient justification for the proposed changes.

There may be some benefit to balancing the length range between short and long modes. Further analysis is encouraged.

Cl **120G** *SC* **120G.3.3** *P* **255** *L* **34** # 51

Ran, Adee Cisco systems

Comment Type **TR** *Comment Status* **A** *MO AC CM noise tolerance*

The host should tolerate the AC common mode output allowed for the module output. Even if this is not included in the stressed input test, this expectation should be part of the host input specification.

SuggestedRemedy

Add a row to Table 120G–7 with parameter "AC common-mode input voltage tolerance (RMS)" and value based on Table 120G–3.

Response *Response Status* **C**

ACCEPT IN PRINCIPLE.

Comment #55 proposes a similar change to the host input.

Implement slide 19 of brown_3ck_02b_0721 with editorial license.

Strawpoll #8 (decision)
I support addressing comment #51 and #55 using slide 19 of brown_3ck_02b_0721.
Yes: 15
No: 12

Cl **120G** *SC* **120G.3.3.1** *P* **256** *L* **4** # 52

Ran, Adee Cisco systems

Comment Type **E** *Comment Status* **A** *bucket1*

It is preferable to refer to the value in table 120G-7 than to repeat it.

SuggestedRemedy

Change "for any signaling rate in the range
53.125 GBd ± 100 ppm" to "for any signaling rate in the range specified in Table 120G-7".

Response *Response Status* **C**

ACCEPT.

Cl **120G** *SC* **120G.3.3.4** *P* **256** *L* **50** # 122

Dawe, Piers Nvidia

Comment Type **TR** *Comment Status* **A** *HI/MI SI method*

While we are upturning this section, we might as well do it correctly. 802.3 is not a test spec. There is no requirement to test, only to comply.

SuggestedRemedy

Change "The host stressed input tolerance is tested using the test setup described in 120G.3.3.4.1 which is calibrated as described in 120G.3.3.4.2, and the test procedure in 120G.3.3.4.3." to "The host stressed input tolerance is defined by the test procedure in 120G.3.3.4.3 using the test setup described in 120G.3.3.4.1, which is calibrated as described in 120G.3.3.4.2." Similarly in 120G.3.4.2 Module stressed input test.

Response *Response Status* **C**

ACCEPT IN PRINCIPLE.
The intent of the suggested remedy is an improvement to the quality of the draft. However, for consistency in the draft the language should be consistent with other clauses. Use similar clause 162.9.4.2 as a template.
Change: "The host stressed input tolerance is tested using the test setup described in 120G.3.3.4.1 which is calibrated as described in 120G.3.3.4.2, and the test procedure in 120G.3.3.4.3."
To: "Host stressed input tolerance is measured according to the procedure described in 120G.3.3.4.1 through 120G.3.3.4.3."
Update 120G.3.4.2 Module stressed input test in a similar way.
Implement with editorial license.

Cl **120G** *SC* **120G.3.3.4.1** *P* **257** *L* **31** # 89

Wu, Mau-Lin MediaTek Inc.

Comment Type **E** *Comment Status* **A** *bucket1*

"host reference channel" here means "reference host channel" in other places. It would be better to align with other places.

SuggestedRemedy

Change "host reference channel" to "reference host channel"

Response *Response Status* **C**

ACCEPT.

Cl **120G** *SC* **120G.3.3.4.1** *P* **258** *L* **18** # 65

Ghiasi, Ali Ghiasi Quantum/Inphi

Comment Type **ER** *Comment Status* **R** *test setup figures*

The figure can improve

SuggestedRemedy

Please consider following improvements:
- Make line to either stress or DUT solid and the other dotted
- The arrows in the Host under test are confusing

Response *Response Status* **U**

REJECT.

There is no consensus to make the proposed changes.

Cl **120G** *SC* **120G.3.3.4.2** *P* **258** *L* **33** # 53

Ran, Adee Cisco systems

Comment Type **T** *Comment Status* **A** *HI SI method*

Unlike the jitter levels in step c, the initial signal levels in the calibration procedure are not defined. Using inappropriately low levels can result in bad jitter measurement in step c.

To achieve good jitter measurement, the initial output levels should be as high as possible without exceeding the differential peak to peak specification.

Also applies in module stressed input test, 120G.3.4.2.2.

SuggestedRemedy

Add guidance to step a to use initial signal level as high as possible such that the differential peak-to-peak input voltage tolerance given in Table 120G–9 is not exceeded.

Response *Response Status* **C**

ACCEPT IN PRINCIPLE.

Implement the suggested remedy with editorial license.

Straw poll #9 (decision)
To address comment #53, I support implementing the suggested remedy.
Yes: 18
No:5

Cl **120G** *SC* **120G.3.3.4.2** *P* **258** *L* **36** # 54

Ran, Adee — Cisco systems

Comment Type **T** *Comment Status* **D** *HI SI SJ*

The host stressed input calibration is performed with PRBS13Q and with SJ at 40 MHz (case F of table 162-16). This frequency is not coherent with the PRBS13Q cycle, so the combination of SJ and ISI can create different signal statistics depending on the alignment of the SJ cycle and the PRBS13Q cycle. This can create variability in eye metrics and may require repeated or long measurements.

If the calibration is done with an SJ whose frequency is coherent with the PRBS13Q cycle, data collection can be done with a period which has an integer number of PRBS13Q cycles and integer number of SJ cycles. This can reduce the variability of the calibration. The different frequency would not affect the test which is performed with much longer pattern anyway.

It would be preferable to use a frequency of f_b*6/8191 (approximately 38.915 MHz) instead of 40 MHz during calibration. This would enable more repeatable calibration if the data is collected from an integer multiple of 6 PRBS13Q cycles. The frequency difference should have little effect as the proposed frequency is still far out the reference CRU bandwidth.

Also applies to module stressed input calibration, 120G.3.4.2.2.

SuggestedRemedy

Change item b from "Sinusoidal jitter is applied with frequency and amplitude per case F in Table 162–16." to:

"Sinusoidal jitter is applied with a frequency of at least 38 MHz and pk-pk amplitude of 0.05 UI."

Add the following informative note after the list:
NOTE—It is recommended to use a sinusoidal jitter frequency which is coherent to the frequency of the PRBS13Q pattern, such as f_b*6/8191 where f_b is the signaling rate of the pattern generator (approximately 38.915 MHz) and calculate eye height and VEC from 6N full cycles of the sinusoidal jitter, where N is an integer.

Apply similar changes in 120G.3.4.2.2.

Implement with editorial license.

Proposed Response *Response Status* **Z**

REJECT.

This comment was WITHDRAWN by the commenter.

Cl **120G** *SC* **120G.3.3.4.2** *P* **258** *L* **39** # 72

Dudek, Mike — Marvell

Comment Type **E** *Comment Status* **A** *HI SI method*

The final values of jitter used in the test are unlikely to match these values of Jrms and J4u because crosstalk is added in step e and random jitter is adjusted in step g. It would be helpful to the reader to indicate this.

SuggestedRemedy

Add to the end of bullet c. "Note that these are initial jitter values. They will be modified by the addition of crosstalk in step e and adjustment of random jitter in step g" Add this to the end of bullet c on page 262 as well.

Response *Response Status* **C**

ACCEPT IN PRINCIPLE.

Implement the suggested remedy with editorial license.

Cl **120G** *SC* **120G.3.3.4.2** *P* **259** *L* **4** # 71

Dudek, Mike — Marvell

Comment Type **T** *Comment Status* **A** *HI SI method*

The pattern generator pre-emphasis should be optimized for the host stressed input just as it is for the module stressed input.

SuggestedRemedy

Add a sentence to the end of bullet g. "The pattern generator pre-emphasis and reference receiver settings that minimize VEC are used."

Response *Response Status* **C**

ACCEPT.

Cl **120G** *SC* **120G.3.3.4.2** *P* **259** *L* **16** # 66

Ghiasi, Ali — Ghiasi Quantum/Inphi

Comment Type **TR** *Comment Status* **D** *HI SI EH/VEC*

Host stress input VEC is too high and does not account for real host channel and ASIC packge and VEO can be as small as 12 mV

SuggestedRemedy

Reduce VEC=11-11.5 dB range and VEO to 12 mV, see ghiasi_3ck_01_0721

Proposed Response *Response Status* **Z**

REJECT.

This comment was WITHDRAWN by the commenter.

Cl **120G** *SC* **120G.3.3.4.2** *P* **259** *L* **20** # 90

Wu, Mau-Lin MediaTek Inc.

Comment Type **TR** *Comment Status* **A** *bucket1*

The 'Value' for 'Crosstalk differential peak-to-peak voltage' is 870, which is without unit. Unit of voltage shall be included here as other items.

SuggestedRemedy

Change '870' to '870 mV'

Response *Response Status* **W**

ACCEPT.

Cl **120G** *SC* **120G.3.4** *P* **260** *L* **9** # 55

Ran, Adee Cisco systems

Comment Type **TR** *Comment Status* **A** *MI AC CM noise tolerance*

The module should tolerate the AC common mode output allowed for the host output. Even if this is not included in the stressed input test, this expectation should be part of the module input specification.

SuggestedRemedy

Add a row to Table 120G–9 with parameter "AC common-mode input voltage tolerance (RMS)" and value based on Table 120G–1.

Response *Response Status* **C**

ACCEPT IN PRINCIPLE.

Comment #51 proposes a similar change to the host input.

Resolve using the response to comment #51.

Cl **120G** *SC* **120G.3.4.1** *P* **260** *L* **30** # 56

Ran, Adee Cisco systems

Comment Type **E** *Comment Status* **A** *bucket1*

It is preferable to refer to the value in table 120G-9 than to repeat it.

SuggestedRemedy

Change "for any signaling rate in the range
53.125 GBd ± 100 ppm" to "for any signaling rate in the range specified in Table 120G-9".

Response *Response Status* **C**

ACCEPT.

Cl **120G** *SC* **120G.3.4.2.1** *P* **261** *L* **4** # 36

Ran, Adee Cisco systems

Comment Type **TR** *Comment Status* **A** *MI reference channel*

The test setup includes "Frequency-dependent attenuation representing the host channel" but the frequency dependence is not defined. The only requirement is given in step f of 120G.3.4.2.2 as 18.2 dB at 26.56 GHz - a single frequency. This can be implemented by a notch filter - obviously not what we intend.

The attenuator should be specified across a wide frequency range. The suggested remedy is to use a reference PCB model. Alternatively, a frequency mask can be used.

SuggestedRemedy

With editorial license, define the frequency-dependent attenuation based on the PCB model of 162.11.7.1 (as in Annex 163B) with zp=461 mm (value scaled from Annex 163B to create 18.2 dB at 26.5625).

Response *Response Status* **C**

ACCEPT IN PRINCIPLE.

Implement the suggested remedy with editorial license and with the following additional considerations:
- retain text stating 18.2 dB @ 26.5625 GHz
- mention the channel should approximate this prescribed response
- include figure with plot of IL curve

Cl **120G** *SC* **120G.3.4.2.2** *P* **262** *L* **18** # 68

Ghiasi, Ali Ghiasi Quantum/Inphi

Comment Type **TR** *Comment Status* **D** *MI EH/VEC*

Data from Ghiasi page 7
https://www.ieee802.org/3/ck/public/adhoc/apr21_21/ghiasi_3ck_adhoc_01a_042121.pdf
and Calvin page 4
https://www.ieee802.org/3/ck/public/adhoc/jun30_21/calvin_3ck_adhoc_01_063021.pdf
indicate meeting current VEO/VEC at TP1a not feasible to meet

SuggestedRemedy

This is an area that we need more measurement but given what we know at this point VEC should be increased to 13 to 13.5 dB and VEO reduced to 8.5 mV to support Lim Channels, see ghiasi_3ck_01_0721

Proposed Response *Response Status* **Z**

REJECT.

This comment was WITHDRAWN by the commenter.

Cl **120G** *SC* **120G.3.4.2.2** *P* **262** *L* **26** # 9

Brown, Matt Huawei

Comment Type **T** *Comment Status* **R** *MI SI method*

This step g) has criteria for VEC which might be interpreted as conflicting.
"The pattern generator random
... are adjusted so that ... VEC is within the limits in Table 120G–10."
"The pattern generator pre-emphasis and
reference receiver settings that minimize VEC are used."
I believe the the latter criteria was intended to specify that for each pattern generator output jitter/voltage the pre-emphasis is adjusted to minimize VEC.

SuggestedRemedy

Change: "The pattern generator pre-emphasis and reference receiver settings that minimize VEC are used."
To: "For any jitter and voltage setting, the pattern generator pre-emphasis and reference receiver settings that minimize VEC are used."

Response *Response Status* **C**

REJECT.

The intent is that the step g is an iterative or automatic process such that the conditions in both second and last sentences are simultaneously met.

However, a complete consensus proprosal to address this is necessary.

Cl **120G** *SC* **120G.5.2** *P* **265** *L* **12** # 105

Dawe, Piers Nvidia

Comment Type **TR** *Comment Status* **R** *RR gdc*

When gDC2 is -2, we allow no more than -(-12-2) = 14 dB of peaking, yet when gDC2 is -3, we allow -(-13-3) = 16 dB, yet the channel loss should not be higher. This doesn't make sense.

SuggestedRemedy

For TP1a, change -12 -12 -13 to -12 -11 -10 or -12 -12 -11 (so the strongest CTLE peaking for the highest two gDC2 categories is the same).

Response *Response Status* **U**

REJECT.
The comment does not provide sufficient justification for the proposed changes.

Cl **120G** *SC* **120G.5.2** *P* **265** *L* **16** # 103

Dawe, Piers Nvidia

Comment Type **TR** *Comment Status* **R** *RR gdc*

The limits for TP4 gDC, gDC2 should not be the same for short and long output modes.

SuggestedRemedy

Create separate limits for TP4 short and long output modes, so 4 sets for TP4+, in the style of TP1a.

Response *Response Status* **U**

REJECT.

This comment is a restatement of D2.0 comment #179, which was rejected on the basis of insufficient justification and detail. It adds request to provide 4 sets of values in the style used for TP1a but does not provide specific values. No further justification is provided.

The comment does not provide sufficient justification for the proposed changes nor does the suggested remedy provide sufficient detail to implement.

Cl **120G** *SC* **120G.5.2** *P* **265** *L* **25** # 104

Dawe, Piers Nvidia

Comment Type **TR** *Comment Status* **R** *RR gdc*

As a lot of the channel for TP4 far-end is known exactly and the max loss to TP4 far end is less than to TP1a, the range of gDC, gDC2 combinations should be a subset of the TP1a ones. As for TP1a, I believe the strongest gDC and gDC2 should add to a constant.

SuggestedRemedy

For Continuous time filter, DC gain for TP4 far-end (gDC), change to a set of limits that depend on gDC2 in the same style as for TP1a, with the strongest gDC and gDC2 adding to a constant. The allowed values should be a subset of those for TP1a.

Response *Response Status* **U**

REJECT.
This comment is a restatement of D2.0 comment #178, which was rejected on the basis of insufficient justification and detail. No further justification or implementation detail is provided.
The comment does not provide sufficient justification for the proposed changes nor does the suggested remedy provide sufficient detail to implement.

Cl **120G** *SC* **120G.5.2** *P* **265** *L* **51** # 38

Ran, Adee Cisco systems

Comment Type **ER** *Comment Status* **A** *bucket1*

The list in this subclause starts at h) instead of a).

SuggestedRemedy

Change the list format to start at a).

Response *Response Status* **W**

ACCEPT.

Cl **120G** *SC* **120G.5.2** *P* **265** *L* **51** # 10

Brown, Matt Huawei

Comment Type **E** *Comment Status* **A** *bucket1*

Method should start at step "a)" not "h)"

SuggestedRemedy

Reformat list to start at "a)".

Response *Response Status* **C**

ACCEPT.

Cl **120G** *SC* **120G.5.2** *P* **266** *L* **23** # 106

Dawe, Piers Nvidia

Comment Type **TR** *Comment Status* **A** *EO method*

This draft has a primitive rectangular eye mask spec with mask height = max(EHmin, EA/VECmax) and mask width = 0.1 UI, although it is described as a histogram. Measuring a diamond eye with a rectangular mask is an inefficient, inaccurate way of measuring signal quality and provides weak and uncertain protection against too much jitter. Its effective width is less than its actual because of the 1e-5 probability criterion and the inefficient shape.
De-weighting the sides of the histogram/mask would make this worse, equivalent to increasing the target BER by 10x or so. A higher VEC / smaller EH limit with the rectangular mask would allow more jittered and more varied signals, particularly for very short host channels (see Mike Dudek's work) that can have faster edges than higher loss ones. The target BER is not going to change.
We need an eye mask that's more eye shaped, so that a higher proportion of the samples are near the boundary and contribute to the measurement.

SuggestedRemedy

Change from a 4-cornered mask with corners at t = ts+/-0.05, V = y +/-H/2 to a 10-cornered mask with corners at t = ts+/-0.05, ts+/-1/16, ts+/-3/32, V = y +/-H/2, k +/-H*0.4, y. y is near VCmid, VCupp or VClow (vertically floating, as in D2.1).
H is max(EHmin, Eye Amplitude * 10^(-VECmax/20)). Eye Amplitude is AVupp, AVmid or AVlow, as in D2.1.
This simple scalable method can remain as the EH and VEC limits are revised. Scopes have been measuring with 10-sided masks for many years, it's not more difficult than a rectangular mask and gives better results.

Response *Response Status* **U**

ACCEPT IN PRINCIPLE.

This comment is a restatement of D2.0 comment #127, which was rejected on the basis of insufficient justification and insufficient analysis to show equivalent or better interoperability.

Straw polls 5, 6, and 7 indicate there is no consesus to make the proposed change. However, the resolution to comment #39 addresses the concern expressed in this comment.

Cl **120G** *SC* **120G.5.2** *P* **266** *L* **25** # 39

Ran, Adee Cisco systems

Comment Type **TR** *Comment Status* **A** *EO method*

As has been reported in calvin_3ck_adhoc_01_063021, the authors have been "unable to reliably close the calibration loop on TP1a at 12.5dB VEC with precision lab equipment" for insertion loss of 16.4 dB. This suggests that the VEC specification may be unfeasible.

Allowing a higher (worse) VEC for transmitters (host/module outputs) might pass bad receivers with very closed eyes, which will put more burden on receivers (even if the signal in stressed input test does not change, receivers will have to work with transmitters that have the same VEC due to other reasons, e.g. a "rectangular eye" closed by high noise that can't be equalized, rather than ISI).

Instead of lowering the VEC bar for transmitters, we should look at the definition of VEC and make it more suitable to the expected eye shape of good transmitters after processing with the reference receiver (this shape is not rectangular), taking into account the expected behavior of real receivers.

The calculation of VEC and EH from a CDF accumulated over ts ± 0.05 UI gives the same weight to all phases. This makes sense if the receiver's phase is distributed uniformly in this window; it supposedly makes sense it we don't know where the receiver will sample within this region and account for sampling error. But the eye is not independent of the receiver - it is shaped by the receiver's equalization, and in the reference receiver we assume a certain behavior.

A receiver is expected to optimize its equalization (CTLE+DFE or equivalent) at the sampling point ts - this is part of the measurement procedure (currently steps k and l) - which would result in the maximum vertical opening being at ts. We should assume the average sampling phase is then ts; any difference between the optimized phase and the average phase is an implementation penalty that should be covered by the minimum EH.

A real receiver's CDR does not have a uniform phase distribution around its mean; the probability of sampling at either -0.05 UI or +0.05 UI from ts is smaller than the probability of sampling closer to ts. The rare events where the sample is taken far from ts contribute less to the average BER, so they should be weighted down in the calculation of the CDFs. Having equal weights as in the current method is overly pessimistic in both EH and VEC.

It is therefore proposed to apply a weighting function to the sampled data based on the phase.

SuggestedRemedy

A detailed proposal will be provided in a presentation.

Response *Response Status* **C**

ACCEPT IN PRINCIPLE.

This comment does not apply to the substantive changes between IEEE P802.3ck D2.1 and D2.0 or the unsatisfied negative comments from the initial ballot.

Hence it is not within the scope of the recirculation ballot.

The following presentation analyzed the effect of the currently specified measurement method. A similar analysis is required to make any changes.
Https://www.ieee802.org/3/ck/public/20_10/healey_3ck_01a_1020.pdf

The following presentation was reviewed by the task force:
https://www.ieee802.org/3/ck/public/21_07/ran_3ck_01a_0721.pdf

Per straw polls 5, 6, and 7 there was consensus to implement the proposal in ran_01a (slide 9) with sigma_r set to 0.02 UI.

Implement the method in ran_01a (slide 9) with sigma_r set to 0.02 UI.

Straw poll #5 (chicago rules) direction
Straw poll #6 (pick one) direction
For the eye opening method in 120G.5.2 I would support:
A: a weighted method similar to comment #39 and ran_01a
B: a multi-sided eye mask similar to comment #106
C: no change
D: need more information
#5: A: 25 B: 15 C: 13 D: 11
#6: A: 15 B: 8 C: 11 D: 5

Straw poll #7 (decision)
I support resolving comment #39 using the proposal in ran_01a (slide 9) except with standard deviation (sigma_r) of 0.02 UI.
Yes: 21
No: 11

Cl **161** *SC* **161.5.2.8** *P* **134** *L* **3** # 18

Brown, Matt — Huawei

Comment Type **E** *Comment Status* **A** *bucket1*

To address the editor's note a simple change to 161.5.2.9 can address the main concern of D2.1 Comment #163. The terms "FEC encode" and "Reed-Solomon" encoded should be reconciled. All other references in Clause 161 to encoding are preceded by "Reed-Solomon" not "FEC". The same holds for decoder except for one instance.
Reed-Solomon encoder 3x
Reed-Solomon encoding 1x
Reed-Solomon encoded 2x
Reed-Solomon encode 2x
FEC encoded 1x
Reed-Solomon decode 1x
Reed-Solomon decoding 1x
Reed-Solomon decoder 9x
decoder 1x

SuggestedRemedy

In 161.5.2.9, change "FEC encoded" to "Reed-Solomon" encoded.
In 161.5.3.3 (page 136, line 31), change "decoder" to "Reed-Solomon decoder"

Response *Response Status* **C**

ACCEPT IN PRINCIPLE.

Resolve the first part of the suggested remedy using the response to comment #27.
In 161.5.3.3 (page 136, line 31), change "decoder" to "Reed-Solomon decoder"

Cl **161** *SC* **161.5.2.9** *P* **134** *L* **3** # 27

Ran, Adee — Cisco systems

Comment Type **T** *Comment Status* **A** *bucket1*

The text can be made more precise to avoid possible confusion of "FEC encoded" vs. "Reed-Solomon encoded" and to clarify where the codewords come from and what is being distributed.

SuggestedRemedy

Change "Once the data has been FEC encoded, two FEC codewords" to "Once the data has been encoded per 161.5.2.8, two resulting codewords"

On line 16, change "Once the data has been Reed-Solomon encoded and interleaved, it shall be distributed" to "tx_out<1087:0> shall be distributed".

Response *Response Status* **C**

ACCEPT IN PRINCIPLE.

Change "Once the data has been FEC encoded, two FEC codewords" to "Once the data has been Reed-Solomon encoded, two resulting FEC codewords"
On line 16, change "Once the data has been Reed-Solomon encoded and interleaved, it shall be distributed" to "tx_out<1087:0> shall be distributed".

Cl **162** *SC* **162.1** *P* **149** *L* **15** # 82

Wu, Mau-Lin — MediaTek Inc.

Comment Type **E** *Comment Status* **A** *bucket1*

The hyperlink of "Figure 162-1" is not correct. It is linked to Table 162-1.

SuggestedRemedy

Correct the hyperlink of "Figure 162-1".

Response *Response Status* **C**

ACCEPT.

Cl **162** *SC* **162.9.3** *P* **162** *L* **12** # 83

Wu, Mau-Lin — MediaTek Inc.

Comment Type **E** *Comment Status* **A** *bucket1*

There is no "hyperlink" to 162A.2.

SuggestedRemedy

The hyperlink ot 162A.2 shall be added in the sentence "The transmitter characteristics at TP0 are provided informatively in 162A.2."

Response *Response Status* **C**

ACCEPT.

Cl **162** *SC* **162.9.3** *P* **163** *L* **5** # 28

Ran, Adee Cisco systems

Comment Type **TR** *Comment Status* **A** *bucket1*

In Table 162–10 the first parameter is "Signaling rate, each (nominal)" - but the value is 53.125 ± 50 ppm so this label is incorrect (nominal is 53.125).

This label is inconsistent: in Table 163-5 it is just "Signaling rate", in Table 120F-1 and Table 120G-1 it is "Signaling rate, each lane (range)".

The "(range)" seems correct. The words "each lane" are unnecessary - all parameters in these tables are per-lane.

Make the label consistent across the similar tables.

SuggestedRemedy

Change the label to "Signaling rate (range)" in all 4 tables.

Response *Response Status* **W**

ACCEPT IN PRINCIPLE.

This comment does not apply to the substantive changes between IEEE P802.3ck D2.1 and D2.0 or the unsatisfied negative comments from the initial ballot.
Hence it is not within the scope of the recirculation ballot.

Change the label to "Signaling rate, each lane (range)" for all 4 tables.
[Editor's note: CC: 120F, 120G, 162, 162]

Cl **162** *SC* **162.9.3** *P* **163** *L* **10** # 123

Mellitz, Richard Samtec

Comment Type **TR** *Comment Status* **R** *AC CM noise*

Table 162-10 specifies AC common-mode RMS voltage, vcmi (max) note b just changes to a PRBS13Q with method described in 93.8.1.3. The problem is that coherent CM signal are included in differential measurements like SNDR, Jitter, and Linear fit pulse peak ratio. That means it is the coherent part if AC CM is double counted.

SuggestedRemedy

Add note to line 10 (vcmi) indicating that the CM mode measurement is only for the non-coherent CM part of the measurement.

This applies to Tables 163-5, 120F-1, 120G-1, and 120G-3

Response *Response Status* **U**

REJECT.

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

This comment does not apply to the substantive changes between IEEE P802.3ck D2.1 and D2.0 or the unsatisfied negative comments from the initial ballot.
Hence it is not within the scope of the recirculation ballot.

The following presentation was reviewed by the task force:
https://www.ieee802.org/3/ck/public/21_07/mellitz_3ck_01a_0721.pdf.
Resolve in conjunction with comment #46.

Based on straw poll #2, there is not sufficient consensus to implement the proposed changes.

Straw poll #1 (direction)
I would support the AC CM voltage test methodology in Comment #123 and the related presentation mellitz_3ck_01_0721.
Yes: 18
No: 6
Need more information: 13
Abstain: 3

Straw poll #2 (decision)
For the resolution of comment #123, I support adopting the AC CM voltage test methodology in Comment #123 and the related presentation mellitz_3ck_01a_0721.
Yes: 15
No: 16

[Editor's note: CC: 163, 120F, 120G]

Cl **162** *SC* **162.9.3** *P* **163** *L* **15** # 99

Dawe, Piers
Nvidia

Comment Type **E** *Comment Status* **A** *bucket1*

Now that we have established a consistent way of naming these return losses, let's make it easier for the reader to find them.

SuggestedRemedy

Please add "RLcc", "RLdc" and so on in the table rows as we do for ERL, VEC, vf and others, throughout the draft. Also in running text such as 162.9.3.6. Similarly Rpeak.

Response *Response Status* **C**

ACCEPT.

Cl **162** *SC* **162.9.3** *P* **163** *L* **18** # 92

Dawe, Piers
Nvidia

Comment Type **TR** *Comment Status* **R** *host/CA IL*

The draft CR loss budget wastes over 3 dB in nearly every case. The relative range of host losses, 6.875/2.3 = 3:1, is too small for switch layout yet not needed for NICs.
The recommendation for the host traces plus BGA footprint and host connector footprint, 6.875 dB, compares very poorly with C2M's host insertion loss up to 11.9 dB, making passive copper to this draft expensive and unattractive for a switch, yet a full range of NICs can be made with only 3.75 dB. Server-switch links are asymmetric in form factor (e.g. QSFP-DD to 2 x QSFP) and will get made with an asymmetric loss budget, so it would be better for the standard to regularise what will happen anyway. C2M already has short and long ports.
This change would also benefit CR switch-switch links because the shortest ports would get credit for their low loss.
The symmetric budget is used for some designs under way and may be useful in future for LOM, so it is kept here, and the better way added.

SuggestedRemedy

3 classes of CR ports, host loss allocations of A 10, B 6.875, C 3.75 dB. B is as D2.1.
A connects to C, B to B or C, C to A, B or C.
Use 2 bits in Clause 73 Auto-Negotiation Link codeword Base Page to advertise A, B or C to the other end. In the Priority Resolution function, an A port ignores a 100G/lane Technology Ability Field bit from an A or B port, a B port ignores a 100G/lane Technology Ability Field bit from an A port.
In Table 162-10, add limits A and C for linear fit pulse peak ratio (min). Change text in 162.9.3.1.2 to refer to the table.
In Table 162-14, add columns for Test 2 (high loss), A and C, with test channel insertion loss: A: 6.875-3.75 = 3.125 dB lower (20.5 dB to 21.5 dB), and C: 10-6.875 = 3.125 dB higher (26.75 dB to 27.75 dB). No change needed for Test 1.
In 162A.4, add equations for IL_PCBmax and ILHostMax A and B and show them in Fig 162A-1 and 2. In 162A.5, add Value columns A, C in Table 162A-1 (ILChmin and ILMaxHost differ). Adjust figures 162A-3 and 4.

Response *Response Status* **U**

REJECT.

D2.0 straw polls #6 and #7 indicated interest in exploring multiple CR port types. However, consensus is needed to make a change of this magnitude.

The following presentation was reviewed by the task force:
https://www.ieee802.org/3/ck/public/21_07/dawe_3ck_01a_0721.pdf

Based on straw poll #10, there is not sufficient consensus to implement the proposed changes in dawe_3ck_01a_0721.

Strawpoll #10 (direction)
I support P802.3ck specifying multiple CR host types such as in dawe_3ck_01_0721.
Y: 7

N: 24
A: 8

Cl **162** *SC* **162.9.3.1.1** *P* **165** *L* **5** # 29

Ran, Adee Cisco systems

Comment Type **TR** *Comment Status* **R** *Np value*

Here it is stated that Np takes the value 29, but this value is only effective for calculation of SNDR. Other invocations of this procedure, for vf and vpeak, use Nv=200 instead. Nv appears several times and looks like a parameter, but it is not - it is a value that replaces Np; this is not stated anywhere.

In the remaining use of the linear fit, for calculation of the equalizer coefficients used in 162.9.3.1.3, 162.9.3.1.4, and 162.9.3.1.5, it does not matter whether 29 or 200 UI are used. So Np=29 is important only for SNDR, which is the exception.

Having two parameters instead of one parameter which takes two values is unnecessary and confusing.

SuggestedRemedy

In 162.9.3.1.1, change "Np=29" to "Np=200".

In 162.9.3.3 (Output SNDR) change "with the exception that the linear fit procedure in 162.9.3.1.1 is used" to "with the exception that the linear fit procedure in 162.9.3.1.1 is used with Np=29 instead of 200".

In 162.9.3.1.2 (Steady-state voltage and linear fit pulse peak) delete "using Nv=200".

In 163.9.2.3 (Difference steady state voltage) delete "with Nv = 200".

In 163A.3.1.1 (Steady-state voltage and pulse peak reference values) change "Nv" to "Np" (3 times).

In 163B.2 (Characteristics) delete "With Nv = 200".

With editorial license, change any remaining occurrence of Nv to Np.

Response *Response Status* **U**

REJECT.

The following presentation was reviewed by the task force at a previous ad hoc meeting.
https://www.ieee802.org/3/ck/public/adhoc/july14_21/wu_3ck_adhoc_01a_071421.pdf.

There is no consensus to make the proposed changes at this time.

[Editor's note: CC: 162, 163, 163A, 163B]

Cl **162** *SC* **162.9.3.1.2** *P* **166** *L* **4** # 30

Ran, Adee Cisco systems

Comment Type **TR** *Comment Status* **A** *vf method*

"The steady-state voltage vf is defined in 136.9.3.1.2, and is determined using Nv=200 and the linear fit pulse peak ratio calculated by the procedure in 162.9.3.1.1"

It is determined _from_ the linear fit pulse, and the _peak ratio_ is irrelevant here.

Also, 162.9.3.1.1 does not use the parameter Nv - it has Np which is 13. This is the subject of another comment.

SuggestedRemedy

Change this sentence to
"The steady-state voltage vf is defined in 136.9.3.1.2, and is determined from the linear fit pulse peak ratio calculated by the procedure in 162.9.3.1.1 with the exception that Np is replaced by Nv=200" or "with Np=200".

Response *Response Status* **C**

ACCEPT IN PRINCIPLE.

This comment does not apply to the substantive changes between IEEE P802.3ck D2.1 and D2.0 or the unsatisfied negative comments from the initial ballot.
Hence it is not within the scope of the recirculation ballot.

However, the proposed change is an improvement to the draft.

Change: "The steady-state voltage vf is defined in 136.9.3.1.2, and is determined using Nv=200 and the linear fit pulse peak ratio calculated by the procedure in 162.9.3.1.1."
To: "The steady-state voltage vf is defined in 136.9.3.1.2, and is determined from the linear fit pulse calculated by the procedure in 162.9.3.1.1 with the exception that Np and Nv are equal to 200."

Cl **162** *SC* **162.9.3.1.2** *P* **166** *L* **5** # 107

Dawe, Piers Nvidia

Comment Type **T** *Comment Status* **A** *vf value*

Redundantly stating normative requirements is bad practice. Table 162-10 is normative.

SuggestedRemedy

Change "The steady-state voltage shall be greater than or equal to 0.387 V and less than or equal to 0.6 V" to "The steady-state voltage shall be within the limits given in Table 162-10", "meet the requirements specified in Table 162-10", or similar.

Response *Response Status* **C**

ACCEPT IN PRINCIPLE.

Change: "The steady-state voltage shall be greater than or equal to 0.387 V and less than or equal to 0.6 V"
To: "The steady-state voltage shall meet the requirements specified in Table 162-10"

Cl **162** *SC* **162.9.3.3** *P* **167** *L* **31** # 78

Dudek, Mike Marvell

Comment Type **T** *Comment Status* **A** *SNDR test response*

The measurement method for SNDR in 120D.3.1.6 uses a 33MHz filter bandwidth, which would take precedence over the statement that for Transmitter electrical characteristics "A test system with a fourth-order Bessel-Thomson low-pass response with 40 GHz 3 dB bandwidth is to be used for all transmitter signal measurements, unless otherwise specified as it is "otherwise specified". This was probably not intended and there is potential ambiguity here that should be removed. However as the Rx is only expected to have approximately the Nyquist bandwidth measuring SNDR to 40GHz may be excessive and we should consider using a narrower bandwidth.

SuggestedRemedy

Add a sentence. A test system with a fourth-order Bessel-Thomson low-pass response with 40 GHz 3 dB bandwidth should be used.

Response *Response Status* **C**

ACCEPT IN PRINCIPLE.

Change the text in 162.9.3.3 to the following:
"The transmitter SNDR is defined by the measurement method described in 120D.3.1.6 with the exceptions that a test system with response as specified in 162.9.3 and the linear fit procedure in 162.9.3.1.1 are used."
Implement with editorial license.

Cl **162** *SC* **162.9.3.4** *P* **167** *L* **47** # 109

Dawe, Piers Nvidia

Comment Type **TR** *Comment Status* **R** *EOJ method*

Allowing 4 different ways to measure the same thing, admitting that they will give different results yet not ranking them, is too indecisive, and forces people to do all four tests in borderline cases. Worse, "lower than 4 MHz" is open-ended and introduces yet more uncertainty.

SuggestedRemedy

Pick one pattern and CRU corner as definitive, the others can be "if it passes/fails this it would have passed/failed".

Response *Response Status* **C**

REJECT.

The suggested remedy is not sufficiently complete to implement.

There is no consensus to make the proposed changes.

Cl **162** *SC* **162.9.3.4** *P* **168** *L* **1** # 31

Ran, Adee Cisco systems

Comment Type **ER** *Comment Status* **A** *bucket1*

120D.3.1.2 is not the correct reference for the pattern symbols and thresholds.

SuggestedRemedy

Change 120D.3.1.2 to Table 120D–4.

Response *Response Status* **W**

ACCEPT.

Cl **162** *SC* **162.9.3.4** *P* **168** *L* **22** # 24

Hidaka, Yasuo Credo Semiconductor, Inc.

Comment Type **E** *Comment Status* **A** *bucket1*

164 on the row F10 and the column of index of last symbol is a typo.

SuggestedRemedy

Change 164 with 264.

Response *Response Status* **C**

ACCEPT.

Cl **162** *SC* **162.9.4** *P* **170** *L* **29** # 111

Dawe, Piers — Nvidia

Comment Type **E** *Comment Status* **A** *TP5 specifications (bucket3)*

The receiver specifications at TP5 are provided informatively in 162A.3: that's not what 162A.3 says.

SuggestedRemedy

The *recommended* receiver specifications at TP5 are... Also change the title of 162A.3, Receiver characteristics at TP5, to Recommended receiver characteristics at TP5.

Response *Response Status* **C**

ACCEPT IN PRINCIPLE.

The suggested change in wording in 162.9.4 is an improvement to the draft. However, if this text is changed, then similar text in 162.9.3 Transmitter characteristics should be updated.

It is not necessary to update the title for subclauses 162A.2 and 162A.3 since Annex 162A is informative and the text introduces the specifications as recommended.

In 162.9.3…
change "The transmitter characteristics at TP0 are provided informatively in 162A.2."
to "Recommended transmitter characteristics are provided in 162A.2."

In 162.9.4…
change "The receiver specifications at TP5 are provided informatively in 162A.3."
to "Recommended receiver characteristics are provided in 162A.3."

[Editor's note: CC: 162, 162A]

Cl **162** *SC* **162.9.4** *P* **170** *L* **39** # 32

Ran, Adee — Cisco systems

Comment Type **ER** *Comment Status* **A** *signaling rate (bucket1)*

The receiver specifications tables the signaling rate parameter has inconsistent name across tables. In Table 162–14 it is "Signaling rate", in Table 163–8 "Receiver signaling rate", in Table 120F–4, Table 120G–7, and Table 120G–9 "Signaling rate, each lane (range)".

The word "(range)" seems correct. The words "each lane" are unnecessary - all parameters in these tables are per-lane. Similarly "Receiver" is unnecessary.

Make the label consistent across the similar tables.

SuggestedRemedy

Change the label to "Signaling rate (range)" in all 4 tables.

Response *Response Status* **W**

ACCEPT IN PRINCIPLE.

This comment does not apply to the substantive changes between IEEE P802.3ck D2.1 and D2.0 or the unsatisfied negative comments from the initial ballot.
Hence it is not within the scope of the recirculation ballot.

Change in all tables to be consistent with Table 120G-9:
"Signaling rate, each lane (range)"
[Editor's note: CC: 120F, 120G, 162, 163]

Cl **162** *SC* **162.9.4.1** *P* **171** *L* **4** # 33

Ran, Adee — Cisco systems

Comment Type **T** *Comment Status* **A** *UI value (bucket1)*

"This translates to a nominal unit interval of 18.82353 ps" - even with 5 digits after the decimal, this is not the nominal unit interval but an approximation.

In fact, 4 digits (0.1 fs resolution) result in about 1 ppm error, which is sufficient for any practical purpose.

SuggestedRemedy

Change "18.82353" to "approximately 18.8235".

Response *Response Status* **C**

ACCEPT.

Cl **162** *SC* **162.9.4.2** *P* **171** *L* **12** # 84

Wu, Mau-Lin MediaTek Inc.

Comment Type **TR** *Comment Status* **A** *bucket1*

The peak-to-peak differential output voltage is defined in Table 162-10 footnote b, instead of "footnote a".

SuggestedRemedy

Change "Table 162-10 footnote a" to "Table 162-10 footnote b".

Response *Response Status* **W**

ACCEPT IN PRINCIPLE.

This comment does not apply to the substantive changes between IEEE P802.3ck D2.1 and D2.0 or the unsatisfied negative comments from the initial ballot.
Hence it is not within the scope of the recirculation ballot.

However, the proposed change is an improvement to the draft.

Implement the suggested remedy.

Cl **162** *SC* **162.9.4.3.3** *P* **172** *L* **25** # 6

Brown, Matt Huawei

Comment Type **E** *Comment Status* **A** *transition time (bucket1)*

Transition time is referred to here as "20% to 80% transition time". It is defined explicitly in 120E.3.1.5. Transition time is usually referred to elsewhere in draft as just "transition time". Align terminology.

SuggestedRemedy

Change "20% to 80% transition time" to "transition time"

Response *Response Status* **C**

ACCEPT.

Cl **162** *SC* **162.9.4.3.3** *P* **173** *L* **25** # 112

Dawe, Piers Nvidia

Comment Type **TR** *Comment Status* **A** *bucket1*

fhp is not defined.

SuggestedRemedy

Define fhp

Response *Response Status* **W**

ACCEPT IN PRINCIPLE.

Implement the suggested remedy with editorial license.

Cl **162** *SC* **162.9.4.3.3** *P* **173** *L* **38** # 113

Dawe, Piers Nvidia

Comment Type **E** *Comment Status* **A** *broadband noise (bucket2)*

"sigma_bn is the RMS broadband noise amplitude" means nothing because the text doesn't call it that.

SuggestedRemedy

Add "RMS broadband noise amplitude" to the text where sigma_bn is mentioned (step g).

Response *Response Status* **C**

ACCEPT IN PRINCIPLE.

Implement the suggested remedy with editorial license.

Cl **162** *SC* **162.9.4.3.4** *P* **174** *L* **8** # 114

Dawe, Piers Nvidia

Comment Type **TR** *Comment Status* **A** *bucket1*

These equations for spectral density mask are too obscure.

SuggestedRemedy

Add a graph

Response *Response Status* **W**

ACCEPT IN PRINCIPLE.

Implement the suggested remedy with editorial license.

Cl **162** *SC* **162.9.4.4.2** *P* **175** *L* **18** # 85

Wu, Mau-Lin MediaTek Inc.

Comment Type **E** *Comment Status* **A** *bucket1*

The reference here is missed in D2.1. It's (see 162.9.4.3.4 in D2.0). No comments were accepted to change this in D2.0.

SuggestedRemedy

Change "(see)" to "(see 162.9.4.3.4)"

Response *Response Status* **C**

ACCEPT IN PRINCIPLE.

Reference to 162.9.4.3.4 is not helpful since that subclause does not address added sinusoidal jitter. Given that the previous subclause 162.9.4.4.1 describes the test setup including sinusoidal jitter this reference can be deleted.
Delete "(see)".

Cl **162** *SC* **162.9.4.6** *P* **176** *L* **11** # 115

Dawe, Piers Nvidia

Comment Type **ER** *Comment Status* **R** *RLdc/RLcd graphs (bucket3)*

Don't waste the reader's time.

SuggestedRemedy

Combine the graphs for Transmitter common mode to differential return loss and Receiver differential to common-mode return loss.

Response *Response Status* **U**

REJECT.

This comment does not apply to the substantive changes between IEEE P802.3ck D2.1 and D2.0 or the unsatisfied negative comments from the initial ballot.
Hence it is not within the scope of the recirculation ballot.

The two graphs represent requirements for different components, which happen in this case to have identical responses.

There is no consensus to make the proposed changes.

[Editor's note: Changed page from 175.]

Cl **162** *SC* **162.11** *P* **177** *L* **29** # 93

Dawe, Piers Nvidia

Comment Type **T** *Comment Status* **R** *host/CA IL*

The poor max cable loss makes CR unattractive, while all NICs and some ports on any switch have host loss going to waste. Enabling longer cables on a minority of links is needed.
In the remedy, each host knows the other host's loss class through AN and the cable's loss class from its I2C compliance code, so the situation is just like any other CR scenario, no extra management features needed in the spec for the long cable class.

SuggestedRemedy

2 classes of cable, which could be called "short" (19.75 dB, as today) and "long", 19.75+2*(6.875-3.75) = 19.75+6.25 = 26 dB max (achievable cable length 3 m). Long cables connect port types C (see another comment) at both ends, short cables connect a valid combination of A, B, C.
In 162.11.2, cable assembly insertion loss, change text to refer to Table 162-17.
In 162.11.7.1.1, add zp = 30.7 mm for the "short" cable.
In Table 162A-1, add a column for the A-short-A scenario (ILCamax differs).
Illustrate in Figure 162A-4.

Response *Response Status* **C**

REJECT.

Per the resolution to comment #92, there are no changes to the host port types and this comment is overtaken by events.

[Editor's note: CC: 162, 162A]

Cl **162** *SC* **162.11.6** *P* **181** *L* **38** # 94

Dawe, Piers Nvidia

Comment Type **TR** *Comment Status* **R** *CA RLcc*

Relaxing the already very loose CM RL spec from 2 dB to 1.8 dB at all frequencies isn't justified. This draft spec becomes useless at the frequency when the MCB loss is 1.8/2 dB, which is only 8.5 GHz.

SuggestedRemedy

Use a frequency-dependent mask e.g. 1.6 + 0.01f. Similarly for Tx, Table 162-11, 162.9.3.6.

Response *Response Status* **U**

REJECT.

The basis for the change to the cable assembly CM-to-CM RL spec from 2 dB to 1.8 dB was given in the following presentation.
Https://www.ieee802.org/3/ck/public/21_01/champion_3ck_01a_0121.pdf

The comment and suggested remedy does not provide sufficient information or justification to support a change to the draft.

Cl **162** *SC* **162.11.6** *P* **181** *L* **38** # 79

Dudek, Mike Marvell

Comment Type **T** *Comment Status* **R** *CA RLcc*

As was pointed out in the unsatisfied comment # 177 against draft 2.0 the existing specification for common mode return loss limit effectively doesn't exist once the test fixture loss exceeds 0.9dB. The rejection however had a valid point that there is a potential issue up to 4GHz where the loss is low.

SuggestedRemedy

Change the limit to 1.8dB from 0 to 4GHz, 2.2-0.1*f from 4GHz to 40GHz.

Response *Response Status* **C**

REJECT.

The commenter provided the following update to the suggested remedy.
1.8 0.5</= f(GHz) </= 4 GHz
1.4+0.1*f 4< f(GHz) </= 30 GHz

The revised specification may result in currently posted channels failing.

The comment and updated suggested remedy does not provide sufficient justification to support the change to the draft.

Further analysis and a consensus proposal is required.

Cl **162** *SC* **162.11.7** *P* **183** *L* **39** # 95

Dawe, Piers Nvidia

Comment Type **TR** *Comment Status* **R** *COM bbgmax*

The normalized DFE coefficient minimum limit bbmin for taps 3 to 12 is -0.03. It doesn't make sense that taps 13 to 40 could be worse, -0.05. If I have understood the data correctly, the example channels we have don't need this. (Remember, these are reference receiver limits not hard cable or channel limits anyway; a cable or channel can go beyond a tap limit if it makes up the COM another way, e.g. with acceptable crosstalk.)

SuggestedRemedy

Change bgmax 0.05 to bbgmax 0.05, bbgmax -0.03. Also in 163.

Response *Response Status* **U**

REJECT.

This comment does not apply to the substantive changes between IEEE P802.3ck D2.1 and D2.0 or the unsatisfied negative comments from the initial ballot.
Hence it is not within the scope of the recirculation ballot.

The following presentation showed that some backplane channels had floating tap coefficient values of <-0.03.
https://www.ieee802.org/3/ck/public/19_09/heck_3ck_01_0919.pdf
The comment does not provide an assessment of the impact to those channels.
[Editor's note: CC: 162, 163]

Cl **162** *SC* **162.11.7** *P* **183** *L* **40** # 96

Dawe, Piers Nvidia

Comment Type **TR** *Comment Status* **R** *COM DFE RSS*

The spec allows a cable (not even the whole 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 worse than +/-0.05 for all these 9 taps. That's a very bad cable! and not likely to get made: there won't be that many reflections in the same area. (Remember, these are reference receiver limits not hard cable limits anyway; a cable can go beyond a tap limit if it makes up the COM another way, e.g. with acceptable crosstalk.)
We don't need to provide all the receiver power and complexity to cope with unreasonably bad cables.

SuggestedRemedy

Use another DFE root-sum-of-squares limit for positions 13-24. Similarly in 163, but as 163 specifies the complete channel while 162 uses clean synthetic host traces, the limit should be higher.

Response *Response Status* **U**

REJECT.

This comment does not apply to the substantive changes between IEEE P802.3ck D2.1 and D2.0 or the unsatisfied negative comments from the initial ballot.
Hence it is not within the scope of the recirculation ballot.

The suggested remedy is not complete nor has sufficient analysis been provided.

Cl **162** *SC* **162.11.7.1** *P* **184** *L* **7** # 81

Dudek, Mike Marvell

Comment Type **E** *Comment Status* **A** *bucket1*

93A.1.2.3, Equation 93A-13, 93A-14 and Table 162-19 should be hot links or green text.

SuggestedRemedy

fix them

Response *Response Status* **C**

ACCEPT.

Cl **162** *SC* **162.11.7.1** *P* **184** *L* **8** # 86

Wu, Mau-Lin MediaTek Inc.

Comment Type **E** *Comment Status* **A** *bucket1*

There is no "hyperlink" to Table 162-19.

SuggestedRemedy

Add hyperlink to Table 162-19

Response *Response Status* **C**

ACCEPT.

Cl **162A** *SC* **162A.4** *P* **273** *L* **40** # 108

Dawe, Piers Nvidia

Comment Type **T** *Comment Status* **R** *host PCB IL*

The recommended minimum insertion loss allocation for the transmitter or receiver differential controlled impedance PCBs, 2.3 dB, has been set the same as the 2.3 dB MCB PCB IL without evidence as to what happens with less loss. 2.3 dB is 1/3 of the maximum host trace loss (6.875 dB) which is too small a ratio to lay out a switch PCB. 92A.4 and 136A.4 use a ratio of 1/5.8 which allows more flexibility in host layout than 1/3 does. 120G has host insertion loss up to 11.9 dB (11.9/2.3 = 5.2/1, which is OK. If it wasn't wanted, the C2M max loss would not have been increased as it was).

SuggestedRemedy

Reduce the recommended minimum insertion loss allocation for the CR transmitter or receiver differential controlled impedance PCBs to whatever is justified. If the reasonable limit is a strong function of host package reflection, state whether the recommendation is for a "nominal worst" package, or what. If there is no justification, remove the recommendation.

Response *Response Status* **C**

REJECT.

See comment response #180 D2.0 Slides 4 and 5 of the following presentation were reviewed by the task force:
https://www.ieee802.org/3/ck/public/adhoc/apr28_21/dawe_3ck_adhoc_01_042821.pdf

Slide 3 of the following presentation was reviewed by the task force:
https://www.ieee802.org/3/ck/public/21_05/diminico_3ck_04b_0521.pdf

The IL pcb min and max are derived on the basis of PCB material IL and via IL . The PCB IL assumed is 1.24 dB/in and via of 0.68 dB @26.56 GHz. With consideration for maintaining reasonable minimum length while allowing loss between TX and connector. Ilpcb(min)=(0.76 in*1.24 dB/in)+(2*0.68) dB = ~ 2.3 dB.

Reducing the insertion loss could cause reflections that may adversely affect system performance.

The comment does not provide sufficient justification for the proposed changes and specific alternate specification was not provided.

Cl **162A** *SC* **162A.5** *P* **277** *L* **30** # 11

Brown, Matt Huawei

Comment Type **E** *Comment Status* **A** *terminology (bucket1)*

The acronym "IL" is often used to represent "insertion loss" in text, but is never formally introduced.

SuggestedRemedy

Either introduce it properly, e.g., "insertion loss (IL)" or expand it everywhere.

Response *Response Status* **C**

ACCEPT IN PRINCIPLE.

Introduce the acronym properly, e.g., "insertion loss (IL) with editorial license.

Cl **162B** *SC* **162B.1.2.1** *P* **280** *L* **41** # 12

Brown, Matt Huawei

Comment Type **E** *Comment Status* **A** *bucket1*

Ilcatf and f should be italic.

SuggestedRemedy

Format as italic.

Response *Response Status* **C**

ACCEPT.

Cl **162B** *SC* **162B.1.3.5** *P* **286** *L* **43** # 15

Brown, Matt Huawei

Comment Type **T** *Comment Status* **R** *transition time*

Measurement method for transition times is never specified. I assume it is the same as for PMD specifications per 120E.3.1.5. To be consistent with other clauses and annexes should be "transition time" not "rise and fall timers". Given explicit methodology in 120E.3.1.5 and to be common with other clauses can delete "20% to 80%" since this is helpful but not complete.

SuggestedRemedy

With editorial license specify that the transition time is measured according to 120E.3.1.5. Throughout 162B, change "20% to 80% rise and fall times" to "transition time".

Response *Response Status* **C**

REJECT.

The parameter names should not be changed as they relate to specific parameters in a referenced calculation.

Cl **162C** *SC* **162C.1** *P* **290** *L* **20** # 64

Ghiasi, Ali
Ghiasi Quantum/Inphi

Comment Type **TR** *Comment Status* **R** *MDI names*

Table 162C-1 should be updated with MDI that actually operate at 53.1 GBd, currenlty what is specified are MDIs that either operate at 10.3 GBd or 25.78 GBd

SuggestedRemedy

Please replace SFP+ with SFP112
http://sfp-dd.com
SFP-DD with SFP-DD112
http://sfp-dd.com
QSFP+ with QSFP112 for reference see
http://www.qsfp-dd.com/wp-content/uploads/2021/05/QSFP-DD-Hardware-Rev6.01.pdf

Response *Response Status* **U**

REJECT.

This comment does not apply to the substantive changes between IEEE P802.3ck D2.1 and D2.0 or the unsatisfied negative comments from the initial ballot.
Hence it is not within the scope of the recirculation ballot.

This is a restatement of comment D2.0 comment #45 with some additional information.
Comment #57 is requesting similar changes in Annex 162D.

MDI names align with 1.3 normative references in 802.3ck and the base standard.

If there are newer more appropriate normative references then these must be made available to the task force and new comments need to be submitted to request add new references.

Cl **162C** *SC* **162C.1** *P* **292** *L* **5** # 63

Ghiasi, Ali
Ghiasi Quantum/Inphi

Comment Type **TR** *Comment Status* **R** *MDI pins*

The pin map for Table 162C-3 is all messed up

SuggestedRemedy

I will include pin maps for all the MDI connectors in the ghiasi_3ck_02_0721

Response *Response Status* **U**

REJECT.

This comment does not apply to the substantive changes between IEEE P802.3ck D2.1 and D2.0 or the unsatisfied negative comments from the initial ballot.
Hence it is not within the scope of the recirculation ballot.

For task force reviewed of the following presentation:
https://www.ieee802.org/3/ck/public/21_07/ghiasi_3ck_02_0721.pdf

The suggested remedy does not provided sufficient information to make changes to the draft.

A more complete proposal is required.

Cl **162D** *SC* **162D.1** *P* **302** *L* **21** # 57

Ghiasi, Ali — Ghiasi Quantum/Inphi

Comment Type **TR** *Comment Status* **R** *MDI names*

Table 162D-1, 162D-2, 162D-3, and 162D-4 should be updated with MDI that actually operate at 53.1 GBd, currenlty what is specified are MDIs that either operate at 10.3 GBd or 25.78 GBd

SuggestedRemedy

Please replace SFP+ with SFP112
http://sfp-dd.com
SFP-DD with SFP-DD112
http://sfp-dd.com
QSFP+ with QSFP112 for reference see
http://www.qsfp-dd.com/wp-content/uploads/2021/05/QSFP-DD-Hardware-Rev6.01.pdf

Response *Response Status* **U**

REJECT.

This comment does not apply to the substantive changes between IEEE P802.3ck D2.1 and D2.0 or the unsatisfied negative comments from the initial ballot.
Hence it is not within the scope of the recirculation ballot.

Comment #57 is requesting similar changes in Annex 162C.

Resolve using the response to comment #64.

Cl **163** *SC* **163.9.2** *P* **199** *L* **46** # 110

Dawe, Piers — Nvidia

Comment Type **T** *Comment Status* **A** *TX RLcc*

2 dB RLcc is very weak. We have such a lenient spec in C2M and CR because that's what front-panel connectors do; here, there is no connector in the DUT.

SuggestedRemedy

Change to 3 +0.01f dB or whatever is reasonable for an IC and package. The 0.01 can be expressed as a fraction of test fixture loss.

Response *Response Status* **C**

ACCEPT IN PRINCIPLE.

Set RLcc (min) to 3.25 dB.

Cl **163** *SC* **163.9.2** *P* **200** *L* **5** # 19

Brown, Matt — Huawei

Comment Type **T** *Comment Status* **A** *table note (bucket1)*

Table 163-5 is a normative table, but footnote c relating to transmitter waveform is a recommendation.

SuggestedRemedy

Convert footnote c to a table note (see style manual 16.4) or delete footnote c.

Response *Response Status* **C**

ACCEPT IN PRINCIPLE.

This can also be fixed by placing the recommendation in regular text.
The comment equally applies to footnote c in Table 162-10.
Remove footnote c from Table 163-5 and Table 162-10 and add a new sentence to the end of the first paragraph in 162.9.3.1.4 as follows:
"It is recommended that the same step size is used for all coefficients."

Cl **163** *SC* **163.9.2** *P* **200** *L* **12** # 75

Dudek, Mike — Marvell

Comment Type **TR** *Comment Status* **A** *TX residual ISI*

In dudek_3ck_01_0521 it was shown that with larger values of Cp it is possible to have transmitters that pass all the transmitter specifications but only provide 1.5dB COM on channels that pass the channel specifications. This was confirmed in li_3ck_adhoc_01_063021. In Li_3ck_adhoc_01_063021 it was also shown that a tightening of ERL specifications to fail these bad transmitters would also fail transmitters with varying values of Rd and other paramters that give 3.0dB COM on these same channels. Another Tx parameter is needed to fail the high Cp Tx's while still passing the Tx's with variable Rd. A presentation will be made in support of this comment.

SuggestedRemedy

Add an extra Tx specification "Residual ISI (max) value 0.027". Defined as the value of Sigma_e/Vpeak where sigma_e and Vpeak are as defined in 162.9.3.3 except that Np=11 is used instead of Np=29.

Response *Response Status* **C**

ACCEPT IN PRINCIPLE.

[Editor's note: Changed page from 199.]

This comment does not apply to the substantive changes between IEEE P802.3ck D2.1 and D2.0 or the unsatisfied negative comments from the initial ballot.
Hence it is not within the scope of the recirculation ballot.

Resolve using the response to comment #76.

[Editor's note: CC: 163, 120F]

Cl **163** *SC* **163.9.2** *P* **200** *L* **12** # 17

Brown, Matt Huawei

Comment Type **E** *Comment Status* **A** *table footnote (bucket2)*

For the SNDR specification in Table 163-5, footnote d is redundant. The reference column points to 162.9.3.3 which provides the exact same information as footnote a.

SuggestedRemedy

Delete footnote a.

Response *Response Status* **C**

ACCEPT IN PRINCIPLE.

Resolve using the response to comment #77.

Cl **163** *SC* **163.9.2** *P* **200** *L* **21** # 77

Dudek, Mike Marvell

Comment Type **E** *Comment Status* **A** *table footnote (bucket2)*

Footnote d to table 163-5 just duplicates the information in the short section that this footnote refers to.

SuggestedRemedy

Delete the footnote.

Response *Response Status* **C**

ACCEPT IN PRINCIPLE.

Similar footnote "d" in Table 162-10 and Table 120F-1 is also redundant and thus should be deleted as well.

Delete footnote d in Table 162-10, Table 163-5, and Table 120F-1.

Cl **163** *SC* **163.9.2.1.3** *P* **201** *L* **27** # 117

Dawe, Piers Nvidia

Comment Type **TR** *Comment Status* **A** *TF RLcc (bucket2)*

Test fixture common-mode to common-mode return loss should be way better than the worst module connector! And needs to be significantly better than the spec for the IC+TF.

SuggestedRemedy

Change 2 to something sensible

Response *Response Status* **U**

ACCEPT IN PRINCIPLE.

This comment does not apply to the substantive changes between IEEE P802.3ck D2.1 and D2.0 or the unsatisfied negative comments from the initial ballot.
Hence it is not within the scope of the recirculation ballot.

This comment does not provide sufficient details for implementation.

The test fixture RLcc value is too small to permit measurement of a transmitter RLcc as specified. However, there is no consensus on an appropriate new specification. Further analysis and consensus is required.

Add an editor's note pointing out the issue as above calling for contributions to address this.

Cl **163** *SC* **163.9.3.1** *P* **202** *L* **37** # 34

Ran, Adee Cisco systems

Comment Type **E** *Comment Status* **A** *signaling rate (bucket1)*

It is preferable to refer to the value in table 163-8 than to repeat it. (The NOTE can stay as it is).

SuggestedRemedy

Change "for any signaling rate in the range
53.125 GBd ± 100 ppm" to "for any signaling rate in the range specified in Table 163-8".

Response *Response Status* **C**

ACCEPT.

Cl **163** *SC* **163.9.3.5** *P* **204** *L* **39** # 7

Brown, Matt
Huawei

Comment Type **E** *Comment Status* **A** *transition time*

Transition time is presumably per the method in 120E.3.1.5 for all instances in this subclause. Also, given that transition time is fully defined in 120E.3.1.5 and the common term used in the draft is simply "transition time", "20% to 80% transition time" should be "transition time".

SuggestedRemedy

On page 204 line 39, change "transition time" (first instance) to "transition time (see 120E.3.1.5)".
On page 204 line 45 change "20% to 80% transition time" to "transition time (see 120E.3.1.5)".
Consider adding text in one place specifying that transition time is per 120E.3.1.5 so this does not have to be repeated multiple times.

Response *Response Status* **C**

ACCEPT IN PRINCIPLE.

Resolve using the response to comment #73.

Cl **163** *SC* **163.9.3.5** *P* **204** *L* **45** # 73

Dudek, Mike
Marvell

Comment Type **TR** *Comment Status* **A** *transition time*

The filtered Ht(f) should be using the transition time of the signal generator, however the measured transition time might be interpreted as measured with the 40GHz 3dB bandwidth used for all Tx measurements. Also nothing is stated as to how the signal is measured at the transmitter output and what the Tx FFE is set to.

SuggestedRemedy

Change "where Tr is the same as the measured 20% to 80% transition time of the signal at the transmitter output" to "where Tr is the same as the measured transition time of the signal at the transmitter output corrected for the measurement bandwidth. The transition time is measured using the method in 120E.3.1.5 with a 40GHz 3dB bandwidth and the risetime is corrected to remove the effect of this measurement bandwidth.

Response *Response Status* **C**

ACCEPT IN PRINCIPLE.

Implement the following with editorial license:

In the first sub-bullet on item e, insert: “Tr is determined at the die bump and defined according to the method in 120G.3.1.4 except there is no observation filter."

In the second sub-bullet on item e replace:
"where Tr is the same as the measured 20% to 80% transition time of the signal at the transmitter output."
with
“where Tr is the transmitter transition time, which is measured using the method in 120G.3.1.4 and adjusted to remove the effect of the observation filter.”

In the third sub-bullet on item e replace:
"is equal to the transmitter transition time measured at TP0v using the method in 120E.3.1.5 with the transmitter equalizer turned off."
with
“is the transmitter transition time measured at TP0v with the transmitter equalizer turned off, using the method in 120G.3.1.4 and adjusted to remove the effect of the observation filter.”

Cl **163** *SC* **163.9.3.5** *P* **204** *L* **50** # 74

Dudek, Mike — Marvell

Comment Type **TR** *Comment Status* **A** *transition time*

The method of measuring the transition time in 120E.3.1.5 uses a 33GHz measurement filter in the measurement which isn't appropriate for 100G PAM4 however bullet k states that the 40GHz 3dB bandwidth is used. The method in 163A.3.1.3 does not have any measurement filter. These need to be the same.

SuggestedRemedy

Change "is equal to the transmitter transition time measured at TP0v using the method in 120E.3.1.5 with the transmitter equalizer turned off." to "is equal to the transmitter transition time measured at TP0v with the transmitter equalizer turned off. The transition time is measured using the method in 120E.3.1.5 with a 40GHz 3dB bandwidth and the risetime is corrected to revmoe the effect of this measurement bandwidth.

Response *Response Status* **C**

ACCEPT IN PRINCIPLE.

Resolve using the response to comment #73.

Cl **163** *SC* **163.9.3.5** *P* **204** *L* **51** # 35

Ran, Adee — Cisco systems

Comment Type **E** *Comment Status* **A** *RIT TX off*

"with the transmitter equalizer turned off" - preferably be consistent with most other places in this draft which use the wording "set to preset 1 (no equalization)".

Also is 162.9.4.3.3 with a variation on the wording - preferably change that one too.

SuggestedRemedy

Use the term "preset 1 (no equalization)" in all places.

Response *Response Status* **C**

ACCEPT IN PRINCIPLE.
[Editor's note: CC: 163, 162]

In 162.9.4.3.3, 162.9.4.3.5, and 163.9.3.5, and elsewhere if appropriate, change the text to the following:

"with transmitter equalization off by setting coefficients to preset 1 values (see 162.9.3.1.3)"

Implement with editorial license.

Cl **163** *SC* **163.9.3.5** *P* **205** *L* **30** # 44

Ran, Adee — Cisco systems

Comment Type **E** *Comment Status* **A** *bucket1*

"Q3d" is formatted with inconsistent roman/italic font.

SuggestedRemedy

For consistency with clause 162, use italics for all occurrences of Q3d.

Response *Response Status* **C**

ACCEPT.

Cl **163** *SC* **163.9.3.5** *P* **205** *L* **31** # 25

Hidaka, Yasuo — Credo Semiconductor, Inc.

Comment Type **E** *Comment Status* **A** *bucket1*

Symbol Q3 remains in NOTE 1.

SuggestedRemedy

Change Q(Q3) with Q(Q3d).

Response *Response Status* **C**

ACCEPT.

Cl **163** *SC* **163.9.3.5** *P* **205** *L* **31** # 45

Ran, Adee — Cisco systems

Comment Type **TR** *Comment Status* **A** *bucket1*

In NOTE 1, "Q(Q3)" should be "Q(Q3d)".

SuggestedRemedy

Change per comment.

Response *Response Status* **W**

ACCEPT.

Cl **163** *SC* **163.10** *P* **206** *L* **38** # 87

Wu, Mau-Lin — MediaTek Inc.

Comment Type **TR** *Comment Status* **A** *bucket1*

Maximum AC-coupling 3 dB corner frequency shall be 50 kHz, instead of 50 Hz, based on 163.10.7

SuggestedRemedy

Change the "Unit" in Table 163-10 from "Hz" to "kHz"

Response *Response Status* **W**

ACCEPT.

Cl **163** *SC* **163.10** *P* **206** *L* **40** # 88

Wu, Mau-Lin MediaTek Inc.

Comment Type **TR** *Comment Status* **A** *bucket1*

The note "a" here is specific for Cable assembly and shall be removed, due to this is KR Clause

SuggestedRemedy

Remove note a

Response *Response Status* **W**

ACCEPT IN PRINCIPLE.

When this table was created in D2.1 the referenced footnote was accidentally included.
There was no comment to include the provision in this footnote.
Delete table footnote a.

Cl **163A** *SC* **163A.3.1.1** *P* **307** *L* **13** # 40

Ran, Adee Cisco systems

Comment Type **TR** *Comment Status* **A** *pulse response*

"Obtain the output pulse response, h(t), using Equation (93A–23) and Equation (93A–24) with H(0)(f) from Equation (163A–2), where At and Tb are specified by the clause that invokes this method"

Clause 163 and annex 120F which invoke this method do not specify At and Tb - the invoking text refers to the COM tables, which include the parameters Av and fb instead. The reader may be left wondering what At and Tb are.

This can be remedied by pointing to 93A.1.5 instead of equations (93A–23) and (93A–24). 93A.1.5 includes the equations and the definition of Tb based on fb, and At is defined as Av.

Also applies to 163A.3.1.3, P308 L23.

SuggestedRemedy

Change the quoted sentence to:

"Obtain the output pulse response, h(t), as defined in 93A.1.5, with H(0)(f) from Equation (163A–2), where Av and fb are specified by the clause that invokes this method."

Apply also in 163A.3.1.3.

Response *Response Status* **C**

ACCEPT IN PRINCIPLE.

This comment does not apply to the substantive changes between IEEE P802.3ck D2.1 and D2.0 or the unsatisfied negative comments from the initial ballot.
Hence it is not within the scope of the recirculation ballot.

However, the proposed changes are an improvement to the draft.

Implement the suggested remedy.

Cl **163A** *SC* **163A.3.1.1** *P* **307** *L* **33** # 91

Wu, Mau-Lin MediaTek Inc.

Comment Type **E** *Comment Status* **A** *language (bucket2)*

For the definition of N_v here, it would be better to change it from "represents the number of symbols to include in the steady-state voltage calculation" to "represents the number of symbols to be included in the steady-state voltage calculation".

SuggestedRemedy

Change from "represents the number of symbols to include in the steady-state voltage calculation" to "represents the number of symbols to be included the steady-state voltage calculation"

Response *Response Status* **C**

ACCEPT IN PRINCIPLE.

Change the definition to:
"represents the number of symbols included in the steady-state voltage calculation"

Cl **163A** *SC* **163A.3.1.3** *P* **308** *L* **18** # 21

Hidaka, Yasuo Credo Semiconductor, Inc.

Comment Type **TR** *Comment Status* **A** *measurement filter*

A measurement filter of BT filter is already included, because the step response is derived from the pulse response h(t) that uses the BT filter.

Figure 163A-3 is not correct, because the effect of BT filter is included.

SuggestedRemedy

Remove Editor's note in page 308.

Change Figure 163A-3 as follows:
Add H_BT(f) in the same way as Figure 163A-2.
Append a block of "Equation (163A-5)" followed by "Stepresponse u(t)" at the end after "Pulse response h(t)".

Response *Response Status* **U**

ACCEPT IN PRINCIPLE.

This subclause needs to be aligned with the interference tolerance test in 163 and 120F, but there is no consensus to make related changes at this time.

Add an editorial note that this method needs to be aligned with the interference tolerance test in 163 and 120F.

Cl **163A** *SC* **163A.3.1.3** *P* **308** *L* **25** # 22

Hidaka, Yasuo Credo Semiconductor, Inc.

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

f_r is also a parameter specified by the clause that invokes this method but missing in the list.

SuggestedRemedy

Change "A_t and T_b" with "A_t, T_b and f_r" in page 308 line 25.
Apply the same change to page 307 line 13.

Proposed Response *Response Status* **Z**

REJECT.

This comment was WITHDRAWN by the commenter.

Cl **163A** *SC* **163A.3.1.3** *P* **308** *L* **43** # 1

Brown, Matt Huawei

Comment Type **E** *Comment Status* **A** *bucket1*

extra closing parenthesis "Tr(ref))"

SuggestedRemedy

remove extra closing parenthesis

Response *Response Status* **C**

ACCEPT.

Cl **163A** *SC* **163A.3.1.3** *P* **308** *L* **52** # 23

Hidaka, Yasuo Credo Semiconductor, Inc.

Comment Type **T** *Comment Status* **A** *language (bucket2)*

There may be more than two sets of reference package parameters. Also, this should be taken from the transmitter package parameter.

SuggestedRemedy

Change "the longer package trace length" with "the longest transmitter package trace length".

Apply the same change to page 307 line 36.

Response *Response Status* **C**

ACCEPT.

Cl **163A** *SC* **163A.3.2** *P* **309** *L* **3** # 41

Ran, Adee Cisco systems

Comment Type **ER** *Comment Status* **A** *language (bucket2)*

"In this subclause, difference parameters quantify the difference between measured values and reference values, and are used to determine whether a transmitter meets the pass/fail requirements for a given parameter"

This subclause _defines_ the difference parameters. The pass/fail requirements are not in this annex.

SuggestedRemedy

Change the subclause text to
"This subclause defines the parameters that quantify the difference between measured values and reference values".

Response *Response Status* **W**

ACCEPT IN PRINCIPLE.

This comment does not apply to the substantive changes between IEEE P802.3ck D2.1 and D2.0 or the unsatisfied negative comments from the initial ballot.
Hence it is not within the scope of the recirculation ballot.

However, the proposed changes are an improvement to the draft.

Cl **163A** *SC* **163A.3.2.1** *P* **309** *L* **9** # 42

Ran, Adee Cisco systems

Comment Type **TR** *Comment Status* **A** *vpeak/vf*

This subclause points to 162.9.3.1.2 for the definition of v_f and to 162.9.3.1.1 for the procedure, but 162.9.3.1.2 does not define the method, it refers to 136.9.3.1.2 with exception parameters, and adds normative requirements which are irrelevant for 163A. The fact that v_f and v_peak are defined with PRESET0 is unclear (it is only part of the irrelevant normative statements) and the fact that measurements are at TP0v is not mentioned at all.

In addition, while v_peak definition refers to 162.9.3.1.1 (which itself refers to 85.8.3.3.4 and 85.8.3.3.5), the definition of v_f refers to 136.9.3.1.2 which then refers to 85.8.3.3 step 3, which does not point to the actual procedure (which is in 85.8.3.3.5). These are parallel and long paths of references with exceptions, which are very unfriendly to the reader.

Also, "Measure the transmitter output steady-state voltage… and the linear fit pulse response peak voltage..." is phrased as a test procedure. But this should be just a definition of the difference parameter.

The suggested remedy is a rewrite for clarity and for clarification that preset 0 is used and the measurement is at TP0v.

SuggestedRemedy

Change the first paragraph to the following:

The measured linear fit pulse peak v_peak(meas) and steady-state voltage v_f(meas) are calculated from a linear fit pulse response p(k) obtained from measurement at TP0v with the transmit equalizer set to preset 1 (no equalization) using the method defined in 162.9.3.1.1.

v_peak(meas) is the peak value of p(k). v_f(meas) is defined by equation (163A-x).

\Sigma{i=1}{M×Nv) p(i)/M
Where p(i) and M are defined in 162.9.3.1.1 and Nv is 200.

Response *Response Status* **C**

ACCEPT IN PRINCIPLE.

This comment does not apply to the substantive changes between IEEE P802.3ck D2.1 and D2.0 or the unsatisfied negative comments from the initial ballot.
Hence it is not within the scope of the recirculation ballot.

However, the proposed changes are an improvement to the draft.

Implement the suggested remedy with editorial license.

Cl **163A** *SC* **163A.3.2.2** *P* **309** *L* **33** # 43

Ran, Adee

Cisco systems

Comment Type **E** *Comment Status* **A** *language (bucket2)*

"Measure the ERL using the method defined in 93A.5" is phrased as a test procedure. But this should be just a definition of the difference parameter.

The reference to 93A.5 should be in the definition of ERL(meas).

SuggestedRemedy

Delete the quoted sentence.

Change "ERL(meas) is the measured ERL" to "ERL(meas) is the ERL calculated from measurement as defined in 93A.5)".

Response *Response Status* **C**

ACCEPT.