*Cl* **00** *SC* **0** *P* **0** *L* **0** # 1

Brown, Matt — Huawei

*Comment Type* **E** *Comment Status* **D** *(bucket1)*

Keep 802.3ck aligned with the new revision 802.3dc.

*SuggestedRemedy*

With editorial license, align 802.3ck with the lastest draft of the new revision 802.3dc.

*Proposed Response* *Response Status* **W**

PROPOSED ACCEPT.

---

*Cl* **00** *SC* **0** *P* **0** *L* **0** # 13

Brown, Matt — Huawei

*Comment Type* **E** *Comment Status* **D** *(bucket1)*

In D2.2, the mixed-mode insertion loss parameter and variable names were updated to make them common throughout the draft and presumably to align with the mixed-mode return loss parameter and variable names as updated in D2.1. However, the adopted parameters names for insertion loss which include differential-mode do not match those for return loss.

*SuggestedRemedy*

Thoughout the draft…
Change "differential to common-mode return loss" to "differential-mode to common-mode return loss"
Change "common-mode to differential return loss" to "common-mode to differential-mode return loss"

*Proposed Response* *Response Status* **W**

PROPOSED ACCEPT IN PRINCIPLE.
This comment does not apply to the substantive changes between IEEE P802.3ck D2.2 and D2.1 or the unsatisfied negative comments from previous drafts. Hence it is not within the scope of the recirculation ballot.
However, the proposed change is an improvement to the draft.
Implement suggested remedy with editorial license.

---

*Cl* **1** *SC* **1.3** *P* **32** *L* **10** # 159

Ghiasi, Ali — Ghiasi Quantum/Inphi

*Comment Type* **TR** *Comment Status* **D** *MDI reference (bucket1)*

Per unsatisfied comment from D2.2 OSFP reference should be updated

*SuggestedRemedy*

Update reference to Rev. 4.1, August 2nd 2021

*Proposed Response* *Response Status* **W**

PROPOSED ACCEPT IN PRINCIPLE.
Implement suggested remedy with editorial license.

---

*Cl* **1** *SC* **1.3** *P* **32** *L* **11** # 160

Ghiasi, Ali — Ghiasi Quantum/Inphi

*Comment Type* **TR** *Comment Status* **D** *MDI reference (bucket1)*

Per unsatisfied comment from D2.2 QSFP-DD800 reference should be updated

*SuggestedRemedy*

Change reference to QSFP-DD/QSFP-DD800/QSFP112 Hardware Specifications 6.0, May 28 2021

*Proposed Response* *Response Status* **W**

PROPOSED ACCEPT IN PRINCIPLE.
Implement suggested remedy with editorial license except version is 6.01 rather than 6.0.

---

*Cl* **1** *SC* **1.3** *P* **32** *L* **14** # 153

Ghiasi, Ali — Ghiasi Quantum/Inphi

*Comment Type* **TR** *Comment Status* **D** *MDI labels*

Per unsatisfied comment from D2.2 need to add reference for SFP112

*SuggestedRemedy*

Replace SFP-DD with SFP-DD112 which supports 100 Gb/s operation.

*Proposed Response* *Response Status* **W**

PROPOSED REJECT.
SFP112 and SFP-DD112 terms are not used in normative references. See response to comment #155.

---

*Cl* **1** *SC* **1.3** *P* **32** *L* **14** # 151

Ghiasi, Ali — Ghiasi Quantum/Inphi

*Comment Type* **TR** *Comment Status* **D** *MDI labels*

Per unsatisfied comment from D2.2 SFP-DD112 reference should be updated.

*SuggestedRemedy*

Replace SFP-DD with SFP-DD112 which supports 100 Gb/s operation.

*Proposed Response* *Response Status* **W**

PROPOSED ACCEPT IN PRINCIPLE.
SFP112 and SFP-DD112 terms are not used in normative references. See response to comment #155.

*Cl* **1** *SC* **1.3** *P* **32** *L* **53** # 162

Ghiasi, Ali — Ghiasi Quantum/Inphi

*Comment Type* **TR** *Comment Status* **D** *MDI reference*

Per unsatisfied comment from D2.2 QSFP112 reference should be updated. The reference for QSFP112 missing

*SuggestedRemedy*

New reference: QSFP-DD/QSFP-DD800/QSFP112 Hardware Specifications are avilable from (http://www.qsfp-dd.com)

*Proposed Response* *Response Status* **W**

PROPOSED ACCEPT IN PRINCIPLE.

Change:
"QSFP-DD800 MSA QSFP-DD Specification for 800G operation, Rev 1.0, March 6, 2020"
To:
"QSFP-DD/QSFP-DD800/QSFP112 Hardware Specification – Rev 6.01 May 20,2021"

Add the following footnote:
"QSFP-DD, QSFP-DD800, and QSFP112 specifications are available from QSFP-DD MSA (http://www.qsfp-dd.com)"

Given the reference change above change "QSFP+" to "QSFP112".

Implement with editorial license.

*Cl* **1** *SC* **1.3** *P* **32** *L* **53** # 154

Ghiasi, Ali — Ghiasi Quantum/Inphi

*Comment Type* **ER** *Comment Status* **D** *MDI reference*

Per unsatisfied comment from D2.2 SFP-DD112 reference should be updated.

*SuggestedRemedy*

SFP-DD MSA SFP-DD/SFP-DD112/SFP112 Hardware Specification for SFP112 AND SFP DOUBLE DENSITY PLUGGABLE TRANSCEIVER, Rev 5.0, September 2021 (http://sfp-dd.com/).

*Proposed Response* *Response Status* **W**

PROPOSED REJECT.
The specification referenced in the suggested remedy is not a publicly available document.

*Cl* **1** *SC* **1.3** *P* **32** *L* **53** # 161

Ghiasi, Ali — Ghiasi Quantum/Inphi

*Comment Type* **ER** *Comment Status* **D** *MDI reference*

Per unsatisfied comment from D2.2 QSFP-DD800 reference should be updated. The reference for QSFP-DD800 now obsolute

*SuggestedRemedy*

New reference: QSFP-DD/QSFP-DD800/QSFP112 Hardware Specifications are avilable from (http://www.qsfp-dd.com)

*Proposed Response* *Response Status* **W**

PROPOSED ACCEPT IN PRINCIPLE.
Resolve using the response to comment #162.

*Cl* **1** *SC* **1.3** *P* **32** *L* **53** # 152

Ghiasi, Ali — Ghiasi Quantum/Inphi

*Comment Type* **TR** *Comment Status* **D** *MDI reference*

Per unsatisfied comment from D2.2 SFP-DD112 reference should be updated.

*SuggestedRemedy*

New reference: SFP-DD MSA SFP-DD/SFP-DD112/SFP112 Hardware Specification for SFP112 AND SFP DOUBLE DENSITY PLUGGABLE TRANSCEIVER, Rev 5.0, September 2021 (http://sfp-dd.com/).

*Proposed Response* *Response Status* **W**

PROPOSED REJECT.
The specification referenced in the suggested remedy is not a publicly available document.

*Cl* **1** *SC* **1.3** *P* **32** *L* **53** # 155

Ghiasi, Ali — Ghiasi Quantum/Inphi

*Comment Type* **TR** *Comment Status* **D** *MDI reference*

Per unsatisfied comment from D2.2 add reference for SFP112.

*SuggestedRemedy*

SFP-DD MSA SFP-DD/SFP-DD112/SFP112 Hardware Specification for SFP112 AND SFP DOUBLE DENSITY PLUGGABLE TRANSCEIVER, Rev 5.0, September 2021 (http://sfp-dd.com/).

*Proposed Response* *Response Status* **W**

PROPOSED REJECT.
The specification referenced in the suggested remedy is not a publicly available document.

*Cl* **45** *SC* **45.2.7.13.1** *P* **64** *L* **54** # 49

Ran, Adee Cisco

*Comment Type* **E** *Comment Status* **D** *(bucket1)*

Bit 6 is defined in this subclause, and is not mentioned in the referenced subclause 45.2.7.12.3.

*SuggestedRemedy*

Change "bits 7.49.6 through 7.49.0" to "bits 7.49.5 through 7.49.0".

*Proposed Response* *Response Status* **W**

PROPOSED ACCEPT.

*Cl* **69** *SC* **69.2.6** *P* **69** *L* **23** # 2

Brown, Matt Huawei

*Comment Type* **T** *Comment Status* **D** *EEE (bucket1)*

EEE is not supported by the Clause 163 PMDs.

*SuggestedRemedy*

Amend 69.2.6 as follows.
Change "With the optional EEE feature, described in Clause 78, Backplane Ethernet PHYs can achieve lower power consumption during periods of low link utilization."
To: "Some Backplane Ethernet PHYs support the optional EEE feature, described in Clause 78, to achieve lower power consumption during periods of low link utilization."

*Proposed Response* *Response Status* **W**

PROPOSED ACCEPT IN PRINCIPLE.
This comment does not apply to the substantive changes between IEEE P802.3ck D2.2 and D2.1 or the unsatisfied negative comments from previous drafts. 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* **80** *SC* **80.1.5** *P* **80** *L* **45** # 3

Brown, Matt Huawei

*Comment Type* **T** *Comment Status* **D** *(bucket1)*

100GAUI-1 C2C/C2M are relevant to the new PMDs specified in 802.3db.

*SuggestedRemedy*

Align Table 80-5 with 802.3db including 100GBASE-VR1/SR1. In columns for 120F/120G add "O" for the VR1/SR1 PMDs.

*Proposed Response* *Response Status* **W**

PROPOSED ACCEPT IN PRINCIPLE.
This comment does not apply to the substantive changes between IEEE P802.3ck D2.2 and D2.1 or the unsatisfied negative comments from previous drafts. 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* **93A** *SC* **93A** *P* **237** *L* **44** # 59

Mellitz, Richardd Samtec

*Comment Type* **TR** *Comment Status* **D** *HO AC CM voltage (CC)*

Common mode measurements are not well enough defined to precisely specify CM voltage at TP0v, TP1a, TP4 and TP2. In addition, all aspects of a common mode voltage may not be detrimental as illustrated in mellitz_3ck_adhoc_01_090821.

*SuggestedRemedy*

Add section "93A.6 Common Mode measurements". See presentation

*Proposed Response* *Response Status* **W**

PROPOSED REJECT.
The proposed solution was discussed in https://www.ieee802.org/3/ck/public/adhoc/sept08_21/mellitz_3ck_adhoc_01_090821.pdf.
Resolve in conjunction with comments 63, 60, 61,62, 64.
For task force review.

*Cl* **93A** *SC* **93A.1** *P* **229** *L* **39** # 34

Ran, Adee Cisco

*Comment Type* **E** *Comment Status* **D** *(bucket1)*

In the existing c(-2) row, "2nd" is written with superscript, but in the new c(-3) "3rd" is not.

Also, the tables specifying the values (120F-8, 162-19) use superscript.

*SuggestedRemedy*

Format "rd" in superscript.

*Proposed Response* *Response Status* **W**

PROPOSED ACCEPT.

*Cl* **93A** *SC* **93A.1.2.3** *P* **233** *L* **13** # 35

Ran, Adee Cisco

*Comment Type* **E** *Comment Status* **D** *COM pkg*

The new equations 93A-12a through 93A-14a are identical to the existing ones (without the "a") except for parameter names z_p2 and Z_c2 instead of z_p and Z_c. Having essentially duplicate equations is not a good service to the reader.

*SuggestedRemedy*

Change the paragraph after the editorial instruction to the following:

"For clauses that use a second package transmission line segment described by parameters z_p2 and Z_c2, the scattering parameters for the second transmission line are defined by Equation (93A–12), Equation (93A–13), and Equation (93A–14), with z_p2 substituting z_p and Z_c2 substituting Z_c."

(with _ denoting subscript).

Delete equations 93A-12a through 93A-14a.

*Proposed Response* *Response Status* **W**

PROPOSED ACCEPT IN PRINCIPLE.
Resolve using the response to comment #27

*Cl* **93A** *SC* **93A.1.6** *P* **235** *L* **15** # 113

Dawe, Piers Nvidia

*Comment Type* **E** *Comment Status* **D** *b(n) eqn*

The equation for b(n) is clumsy and hard to understand. When you study it enough, you can see that it is repetitive.

*SuggestedRemedy*

Make a substitution: s(n) = h(0)(ts + n.Tb)
Then the equation becomes

b(n) = { bbmin(n) s(n)/s(0) < bbmin(n) }
{ bbmax(n) s(n)/s(0) > bbmin(n) }
{ s(n)/s(0) otherwise }

Similarly for Eq 93A-27.

*Proposed Response* *Response Status* **W**

PROPOSED REJECT.
This is a restatement of D2.1 comment #118 which was rejected by the task force due to lack of consensus. The new comment provides a new equation form to consider. The proposed solution does not improve upon the accuracy or clarity of the existing equation.

*Cl* **120F** *SC* **120F.3.1** *P* **242** *L* **13** # 63

Mellitz, Richardd Samtec

*Comment Type* **TR** *Comment Status* **D** *HO AC CM voltage (CC)*

Common mode measurements are not well enough defined to precisely specify CM voltage at TP0v. In addition, all aspects of a common mode voltage may not be detrimental as illustrated in mellitz_3ck_adhoc_01_090821.

*SuggestedRemedy*

Remove item “AC common-mode RMS output voltage (max)”

*Proposed Response* *Response Status* **W**

PROPOSED REJECT.
The proposed solution requires consideration by the task force.
Resolve in conjunction with comments 60, 61,62, 64, 59.
For task force review.

*Cl* **120F** *SC* **120F.3.2.4** *P* **246** *L* **51** # 36

Ran, Adee Cisco

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

Item e in the list describes transmitter parameters used for calculation of COM. The transmitter device and package model options in 163.9.3.5 seem to be relevant here too, but there is no discussion or reference.

*SuggestedRemedy*

Add an item to the lettered list, between items d and e, preferably pointing to item e in 163.9.3.5, or alternatively copy the same content.

*Response* *Response Status* **W**

REJECT.

This comment was WITHDRAWN by the commenter.

*Cl* **120F** *SC* **120F.3.2.5** *P* **263** *L* **31** # 80

Dudek, Mike Marvell

*Comment Type* **T** *Comment Status* **D** *(bucket1)*

The name Ildd is not used in Table 120F-5 so it is confusing to use it in the specification on line 48

*SuggestedRemedy*

Include Ildd in the parameter name in Table 120F-5 (or write the parameter name out fully on line 48.

*Proposed Response* *Response Status* **W**

PROPOSED ACCEPT IN PRINCIPLE.
Implement the second option in the suggested remedy with editorial license.
[Editor's note: Change page from 247 to 263.]

*Cl* **120f** *SC* **120f.4** *P* **249** *L* **15** # 58

Mellitz, Richardd Samtec

*Comment Type* **TR** *Comment Status* **D** *Channel ERL (CC)*

Table 162-7 has a note for ERL “Cable assemblies with a COM greater than 4 dB are not required to meet minimum ERL”. The same should apply to Table 120F-7 channels for the same reason it was include included in table 162-2

*SuggestedRemedy*

For the entry “minimum ERL” add a note: “Channels with a COM greater than 4 dB are not required to meet minimum ER.”

*Proposed Response* *Response Status* **W**

PROPOSED REJECT.
This comment does not apply to the substantive changes between IEEE P802.3ck D2.2 and D2.1 or the unsatisfied negative comments from previous drafts. Hence it is not within the scope of the recirculation ballot.
Resolve using the response to comment #57.

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*Cl* **120G** *SC* **120G.3.1** *P* **261** *L* **3** # 38

Ran, Adee Cisco

*Comment Type* **TR** *Comment Status* **D** *HO output swing (CC)*

The host output differential peak-to-peak voltage is defined at TP1a so it is close to what a module input will have. The limit of 870 mV is too high for modern module host-side receivers which may used low-voltage CMOS processes. The reference CTLE is fully linear but real CTLEs may become nonlinear with such large signals and it may messs with its adaptation and CDR functionality and create much worse BER than what the reference receiver predicts.

Note that the module output "short" setting, which assumes a low-loss host channel (such that the receiver is close to the measurement point TP4), has a differential peak to peak limit of 600 mV.

*SuggestedRemedy*

Change the value of Differential peak-to-peak output voltage (max) with transmitter enabled from 870 to 600 mV.

In addition, if the steady-state voltage specification is added (subject of another comment), set the limit of that specification to 300 mV.

*Proposed Response* *Response Status* **W**

PROPOSED REJECT.
Comment #150 proposes an alternate solution.
The referenced comment regarding steady-state voltage is comment #37.
The proposed solution requires consideration by the task force.
For task force review.

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*Cl* **120G** *SC* **120G.3.1** *P* **261** *L* **3** # 37

Ran, Adee Cisco

*Comment Type* **TR** *Comment Status* **D** *HO output swing (CC)*

Following up on unsatisfied comment #37 against D2.1:

As demonstrated in https://www.ieee802.org/3/ck/public/21_07/ran_3ck_04b_0721.pdf, the differential peak to peak specification measured with PRBS13Q is broken, especially for host output, because the result is strongly dependent on the host channel and equalization applied.

Since the proposal to define/measure this parameter with other patterns was not accepted, this comment proposes a new specification, based on PRBS13Q, to verify that the output swing is not too high. Namely, v_f using the linear fit procedure, similar to 162.9.3.1.2, with the exception that the transmitter equalization is not specified (it is whatever the host sets it to).

v_f represents the asymptote of the (linear) step response of the transmitter, including any equalization applied. It can be used to predict the effect of arbitrarily long runs which are not present in PRBS13Q itself.

The suggested limit corresponds to Vdiffptp of 900 mV which was the assumed value for the host in all earlier C2M specifications. This limit may be somewhat too high but changing it is a different topic.

*SuggestedRemedy*

Add a row to Table 120G–1 with Parameter: Steady-state voltage v_f (max), Reference: 120G.5.4, Value: 450, Units: mV.

Add subclause 120G.5.4 with the following text:
120G.5.4 Steady-state voltage
The steady-state voltage v_f is defined as the sum of the linear fit pulse p(1) through p(M×Nv) divided by M with the specific equalization used by the transmitter. Nv is set equal to Np. The linear fit procedure for obtaining p and the values of M and Np are defined in 162.9.3.1.1.

*Proposed Response* *Response Status* **W**

PROPOSED REJECT.
Comment #38 suggests conditionally reducing the limit to 300 mV.
The following related presentation was provided for consideration:
https://www.ieee802.org/3/ck/public/adhoc/sept22_21/kochuparambil_3ck_adhoc_01_092221.pdf
The proposed solution requires consideration by the task force.
For task force review.

*Cl* **120G** *SC* **120G.3.1** *P* **261** *L* **13** # 60

Mellitz, Richardd — Samtec

*Comment Type* **TR** *Comment Status* **D** *HO AC CM voltage (CC)*

Common mode measurements are not well enough defined to precisely specify CM voltage at TP1a. In addition, all aspects of a common mode voltage may not be detrimental as illustrated in mellitz_3ck_adhoc_01_090821.

*SuggestedRemedy*

Replace item “AC common-mode RMS output voltage (max)”“Uncorrelated AC common mode SNR (min),
With ”Peak fitted AC common mode (max) Pmax_ccm” using a value of 50 mV

*Proposed Response* *Response Status* **W**

PROPOSED REJECT.
The proposed solution requires consideration by the task force.
Resolve in conjunction with comments 63, 61,62, 64, 59.
For task force review.
[Editor's note: Changed page from 161 to 261.]

*Cl* **120G** *SC* **120G.3.1** *P* **261** *L* **16** # 150

Dawe, Piers — Nvidia

*Comment Type* **T** *Comment Status* **D** *HO output swing (CC)*

We under-estimated the pattern dependency on Vpkpk

*SuggestedRemedy*

Reduce 870 mV to 800 mV

*Proposed Response* *Response Status* **W**

PROPOSED REJECT.
Comment #38 proposes an alternate solution.
The proposed solution requires consideration by the task force.
For task force review.

*Cl* **120G** *SC* **120G.3.1.1** *P* **261** *L* **34** # 39

Ran, Adee — Cisco

*Comment Type* **E** *Comment Status* **D** *(bucket1)*

This subclause specifies _limits_ to the RLdc, not the RLdc itself.

*SuggestedRemedy*

Change "Common-mode to differential return loss of the host output is shown in Equation (120G–1)" to "The minimum common-mode to differential return loss of the host output is defined by Equation (120G–1)".

*Proposed Response* *Response Status* **W**

PROPOSED ACCEPT IN PRINCIPLE.
This comment does not apply to the substantive changes between IEEE P802.3ck D2.2 and D2.1 or the unsatisfied negative comments from previous drafts. Hence it is not within the scope of the recirculation ballot.
However, the proposed changes are and improvement to the draft.
Implement the suggested remedy.

*Cl* **120G** *SC* **120G.3.1.5** *P* **263** *L* **8** # 114

Dawe, Piers — Nvidia

*Comment Type* **TR** *Comment Status* **D** *pattern numbers*

Removing any mention of the pattern numbers that have been used for module testing for 20 years, 40GBASE-CR4 and 100GBASE-CR10, and AUIs 83E and 120E, is not warranted. There is no need for the writer to obstruct module professionals. As this annex uses several test patterns like an optical PMD, it should have a table of test patterns giving the pattern number, which this draft lacks, and description, and reference for definition.

*SuggestedRemedy*

After
All counter-propagating signals are asynchronous to the co-propagating signals using the PRBS13Q (see 120.5.11.2.1) or PRBS31Q (see 120.5.11.2.2) pattern
add
PRBS13Q is also known as pattern 4 and PRBS31Q is also known as pattern 3.
If it's worth repeating the references to 120.5.11.2.1 and 120.5.11.2.2 in 120G.3.2.2 (and it is, because a module professional doesn't have a specific reason to read 120G.3.1.5 Host output eye height and vertical eye closure (VEC) ), add the same sentence there. It could be an informative NOTE. We could assume that someone using a stressed input section will read the section for one of the outputs, so I'm not asking to add the same information to the stressed input sections.

*Proposed Response* *Response Status* **W**

PROPOSED REJECT.
This comment is a restatement of D2.2 comment #119 with a modified suggested remedy.
D2.2 comment #119 requested a table listing patterns and providing patttern numbers.
There was no consensus by the task force to make the proposed changes.
The reference to pattern numbers is not necessary as this is not an opitical interface.

*Cl* **120G** *SC* **120G.3.2** *P* **264** *L* # 94

Dawe, Piers Nvidia

*Comment Type* **TR** *Comment Status* **D** *MO/MI DC CM voltage*

There used to be a footnote under the table: "DC common-mode voltage is generated by the host. Specification includes effects of ground offset voltage.", as in OIF VSR, and annexes 83E and 120E. That note told the reader how the system worked, and told him why these numbers aren't the same as in Table 120G-1, and everyone could get oin with earning their living. Now, there is a gratuitous, silly "DC common-mode voltage tolerance" spec row, which fussy customers will ask to see satisfied with a test report. If a module uses traditional capacitors, that's pointless. Notice that there is no equivalent spec in 162.11 Cable assembly characteristics (nor in annexes 83E and 120E).

*SuggestedRemedy*

Restore the DC common-mode voltage rows to the way they were and reinstate the table footnote. Delete 120G.3.2.4. Similarly in Table 120G-9, and delete 20G.3.4.5.

*Proposed Response* *Response Status* **W**

PROPOSED REJECT.
The information in the footnotes was not lost as it was moved to subclauses 120G.3.2.4 and 120G.3.4.5. The specifications as previously written had the implication as currently specified but required some extrapolation to come to that realization. The specifications as they were previously written were ambiguous. The assumption that there will be AC-coupling capacitors on the module is circular, since the specified common-mode voltages may force the use of a capacitor.

*Cl* **120G** *SC* **120G.3.2** *P* **264** *L* **10** # 96

Dawe, Piers Nvidia

*Comment Type* **T** *Comment Status* **D** *MO DPPV value*

For module output, the differential peak-to-peak output voltage (envelope) is weakly pattern dependent, predictably so because the loss to the observation point (TP4) is moderate and mostly known. The spec is clear and unambiguous and not broken because it tells the reader which pattern applies. The envelope at a "long mode" host IC would be lower than at TP4. However, it may be that we intended that the envelope at TP4 in service should be 900 mV, which I believe was the intention in other VSR-like specs.

*SuggestedRemedy*

If so, reduce the "900" in Table 120G-3 by ~4% to 845.

*Proposed Response* *Response Status* **W**

PROPOSED REJECT.
The proposed solution requires consideration by the task force.
For task force review.

*Cl* **120G** *SC* **120G.3.2** *P* **264** *L* **11** # 93

Dawe, Piers Nvidia

*Comment Type* **TR** *Comment Status* **D** *MO 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 than FE for a well set up output and the spec should reflect that. Host designers know their own loss and medium-loss hosts can take advantage of a better signal that cost the module nothing.

*SuggestedRemedy*

Change the eye height, long near end, so that it is 3 dB above long far end, e.g. 15 mV (far) and 21 mV (near) if long far is not changed. 3 dB is about half the loss from long near end to long far end, so long far end remains the harder one to meet.

*Proposed Response* *Response Status* **W**

PROPOSED REJECT.
This comment is a restatement of D2.1 comment #98, for which there was no consensus to make the proposed changes.
The intent of specifications is to enforce what is necessary not what is possible. However, as this comment states, a long-mode might be able to take advantage of the extra eye height.
For task force discussion.

Cl **120G** SC **120G.3.2** P **264** L **14** # 40

Ran, Adee Cisco

*Comment Type* **E** *Comment Status* **D** *MO/MI RLdc/RLcd*

In Table 120G–3, RLdc for module output refers to 120G.3.1.1 which is titled "Host output common-mode to differential return loss" and its text is specific to the host.

Similarly, in Table 120G–9, RLcd for module input refers to 120G.3.3.3 which is titled "Host input differential to common-mode return loss" and its text is specific to the host.

If we use the same specifications for both host and module, they should be defined accordingly.

*SuggestedRemedy*

In 120G.3.1.1, change the title to "Output common-mode to differential return loss", and in the text and caption of Figure 120G-5 change "host" to "host and module" or delete it.

Apply the corresponding changes in 120G.3.3.3.

*Proposed Response* *Response Status* **W**

PROPOSED REJECT.
This comment does not apply to the substantive changes between IEEE P802.3ck D2.2 and D2.1 or the unsatisfied negative comments from previous drafts. Hence it is not within the scope of the recirculation ballot.
This subclause tree is for host output. It is common to reference other subclauses for other interfaces within the same clause or other clauses without renaming the referenced clause.

Cl **120G** SC **120G.3.2.1** P **264** L **6** # 61

Mellitz, Richardd Samtec

*Comment Type* **TR** *Comment Status* **D** *HO AC CM voltage (CC)*

Common mode measurements are not well enough defined to precisely specify CM voltage at TP4. In addition, all aspects of a common mode voltage may not be detrimental as illustrated in mellitz_3ck_adhoc_01_090821.

*SuggestedRemedy*

Replace item “AC common-mode RMS output voltage (max)”
With ”Peak fitted AC common mode (max) Pmax_ccm” using a value of 50 mV

*Proposed Response* *Response Status* **W**

PROPOSED REJECT.
The proposed solution requires consideration by the task force.
Resolve in conjunction with comments 63, 60,62, 64, 59.
For task force review.

Cl **120G** SC **120G.3.2.2.1** P **265** L **46** # 97

Dawe, Piers Nvidia

*Comment Type* **TR** *Comment Status* **D** *MO SI 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 more than far minus near for long. As real host channels are not exactly like the theoretical reference host channel and host makers hate avoidable precision, measurement and record-keeping, 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

*Proposed Response* *Response Status* **W**

PROPOSED REJECT.
This comment is a restatement of D2.1 comment #102 for which there was no consensus to make the proposed changes.
No further convincing justification is provided with this comment.

Cl **120G** SC **120G.3.2.3** P **266** L **5** # 81

Dudek, Mike Marvell

*Comment Type* **T** *Comment Status* **D** *'L Tfx wording (CC) (bucket1)*

For the module test there is not a "host-facing connection"

*SuggestedRemedy*

Change "host facing connection" to module-facing connection"

*Proposed Response* *Response Status* **W**

PROPOSED ACCEPT.
[Editor's note: Changed page/line from 285/24 to 266/5.]

Cl **120G** SC **120G.3.2.3** P **266** L **5** # 41

Ran, Adee Cisco

*Comment Type* **TR** *Comment Status* **D** *'L Tfx wording (CC) (bucket1)*

When measuring module ERL, the test fixture (aka MCB) does not have a host-facing connection.

*SuggestedRemedy*

Change "host-facing" to "cable-facing".

*Proposed Response* *Response Status* **W**

PROPOSED ACCEPT IN PRINCIPLE.
Resolve using the response to comment #81.

*Cl* **120G** *SC* **120G.3.3** *P* **267** *L* **27** # 42

Ran, Adee Cisco

*Comment Type* **E** *Comment Status* **D** *(bucket1)*

The normative requirement of meeting the BER specification 120G.1.1 is stated in the host stressed input test subclause, 120G.3.3.5. There is no need for a footnote in Table 120G-7 that points to the same.

Similarly in Table 120G-9 (module stressed input).

*SuggestedRemedy*

Delete footnote a from both tables.

*Proposed Response* *Response Status* **W**

PROPOSED ACCEPT IN PRINCIPLE.
This comment does not apply to the substantive changes between IEEE P802.3ck D2.2 and D2.1 or the unsatisfied negative comments from previous drafts. 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* **120G** *SC* **120G.3.3** *P* **267** *L* **27** # 5

Brown, Matt Huawei

*Comment Type* **E** *Comment Status* **D** *(bucket1)*

In Table 120G-7, footnote "a" is redundant since the referenced subclause 120G.3.3.5 specifies the BER requirement.

*SuggestedRemedy*

Delete footnote a.

*Proposed Response* *Response Status* **W**

PROPOSED ACCEPT IN PRINCIPLE.
This comment does not apply to the substantive changes between IEEE P802.3ck D2.2 and D2.1 or the unsatisfied negative comments from previous drafts. 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* **120G** *SC* **120G.3.3.2** *P* **267** *L* **36** # 43

Ran, Adee Cisco

*Comment Type* **ER** *Comment Status* **D** *(bucket1)*

Subclause title is incorrect.

*SuggestedRemedy*

Change "Module" to "Host".

*Proposed Response* *Response Status* **W**

PROPOSED ACCEPT.

*Cl* **120G** *SC* **120G.3.3.3** *P* **267** *L* **43** # 44

Ran, Adee Cisco

*Comment Type* **T** *Comment Status* **D** *(bucket1)*

This subclause specifies _limits_ to the RLcd, not the RLcd itself.

*SuggestedRemedy*

Change "Differential to common-mode return loss of the host input is shown in Equation (120G–2)" to "The minimum differential to common-mode return loss of the host input is defined in Equation (120G–2)".

*Proposed Response* *Response Status* **W**

PROPOSED ACCEPT.
This comment does not apply to the substantive changes between IEEE P802.3ck D2.2 and D2.1 or the unsatisfied negative comments from previous drafts. 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* **120G** *SC* **120G.3.3.5** *P* **268** *L* **29** # 117

Dawe, Piers Nvidia

*Comment Type* **TR** *Comment Status* **D** *HI SI terminology (bucket1)*

802.3 is not a test spec (there was a companion standard for that which has been withdrawn). There is no requirement to test, only to comply. We provide definitions of measurable parameters, not measurement requirements. Making the naming more consistent.

*SuggestedRemedy*

Here and in Table 120G-10, change "Host stressed input test" to "Host stressed input tolerance". Change "Host stressed input tolerance is measured according to the procedure" to "Host stressed input tolerance is defined by the procedure" Similarly in 120G.3.4.2 Module stressed input test.

*Proposed Response* *Response Status* **W**

PROPOSED ACCEPT IN PRINCIPLE.
The title of 120G.3.3.5 should be updated to reflect the intent rather than the test.
In Table 120G-7 change "Host stressed input test" to "Host stressed input tolerance".
Change the title of 120G.3.3.5 to "Host stressed input tolerance".
In Table 120G-9 change "Module stressed input test" to "Module stressed input tolerance".
Change the title of 120G.3.3.5 to "Module stressed input tolerance".

*Cl* **120G** *SC* **120G.3.3.5.1** *P* **268** *L* **45** # 118

Dawe, Piers Nvidia

*Comment Type* **T** *Comment Status* **D** *HI SI PG output*

Before listing the impairments, this would be a good place to say that there is a pattern generator with adjustable amplitude, yet the four PAM4 levels are kept nominally (i.e. at low frequency) equally spaced.

*SuggestedRemedy*

Add sentence per comment. Similarly in 120G.3.3.4.1.

*Proposed Response* *Response Status* **W**

PROPOSED REJECT.
This comment does not apply to the substantive changes between IEEE P802.3ck D2.2 and D2.1 or the unsatisfied negative comments from previous drafts. Hence it is not within the scope of the recirculation ballot.
The referenced Figure 120G-9 showing the presence of a pattern generator. Adjustable amplitude is implicit in the calibration procedure in 120G.3.3.5.2.
However, it might be appropriate to formally constrain the relative level mismatch.
For task force discussion.

*Cl* **120G** *SC* **120G.3.3.5.1** *P* **269** *L* **2** # 119

Dawe, Piers Nvidia

*Comment Type* **T** *Comment Status* **D** *HI SI PG BW*

This used to say "corner frequency between 150 MHz and 300 MHz. This value is kept below the upper frequency limit of the pattern generator external modulator input" because some pattern generators have jitter bandwidths around 100 MHz.

*SuggestedRemedy*

Before arbitrarily deleting technical content, I would like to hear from the PG companies and users if this is still a problem, and if it is, whether a tactic such as relying on the PG's own response with no extra filter is reasonable, or what to do.

*Proposed Response* *Response Status* **W**

PROPOSED REJECT.
This comment does not apply to the substantive changes between IEEE P802.3ck D2.2 and D2.1 or the unsatisfied negative comments from previous drafts. Hence it is not within the scope of the recirculation ballot.
The comment incorrectly observes that the reference content has been deleted. The referenced text states states: "The low-pass filter has 20 dB/decade rolloff with a –3 dB corner frequency between 150 MHz and 300 MHz."
The suggested remedy does not provide an actionable remedy, but rather requests information.
[Editor's note: Invalid comment.]
[Editor's note: Changed page from 268 to 269.]

*Cl* **120G** *SC* **120G.3.3.5.1** *P* **269** *L* **12** # 120

Dawe, Piers Nvidia

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

short or long mode far-end

*SuggestedRemedy*

short or long mode far-end test or long mode near-end test

*Proposed Response* *Response Status* **W**

PROPOSED REJECT.
This comment does not apply to the substantive changes between IEEE P802.3ck D2.2 and D2.1 or the unsatisfied negative comments from previous drafts. Hence it is not within the scope of the recirculation ballot.
The comment does not provide any justification to support the proposed changes.
As written, the text requests that regardless of whether the host requests long mode or short mode, only the far end test is required.
For task force discussion.

*Cl* **120G** *SC* **120G.3.3.5.2** *P* **269** *L* **51** # 133

Dawe, Piers Nvidia

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

Changing the "pattern generator [pre-]emphasis" in step g will change the pattern generator transition time from step a.
More generally, is asking the pattern generator for a particular edge speed reasonable, or should the calibration be based on the signal at TP4 rather than the signal at TP1 and the tolerances of the mated compliance boards (and the frequency-dependent attenuator, for module stressed input tolerance).

*SuggestedRemedy*

In step a, say that, exceptionally, this pattern generator transition time is defined for neutral emphasis at the pattern generator output.
Similarly in 120G.3.4.3.2.

*Proposed Response* *Response Status* **W**

PROPOSED REJECT.
This comment does not apply to the substantive changes between IEEE P802.3ck D2.2 and D2.1 or the unsatisfied negative comments from previous drafts. Hence it is not within the scope of the recirculation ballot.
It might make sense to specify the pattern generator output equalization state for the transition time measurement. However, there is no explicit requirement for the pattern generator to support a neutral state as proposed.
For task force discussion.

*Cl* **120G** *SC* **120G.3.3.5.2** *P* **270** *L* **3** # 128

Dawe, Piers Nvidia

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

"transition time ... at TP4a", "jitter profile of the signal at the pattern generator output".
These are the same place apart from the DC block, and if that makes a difference it would be better to calibrate after it. Also 120G.3.5.2.2 says "at the output of the pattern generator" (words in a different order, so a search won't find both).

*SuggestedRemedy*

Change "at the pattern generator output" to "at Tp4a".

*Proposed Response* *Response Status* **W**

PROPOSED REJECT.
This comment does not apply to the substantive changes between IEEE P802.3ck D2.2 and D2.1 or the unsatisfied negative comments from previous drafts. Hence it is not within the scope of the recirculation ballot.
The comment does not provide sufficient justification to support the proposed change. Note also that the proposed change is technical, not editorial.
For task force discussion.

*Cl* **120G** *SC* **120G.3.3.5.2** *P* **270** *L* **11** # 45

Ran, Adee Cisco

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

"If the PRBS13Q pattern is used with a common clock, there is at least 31 UI delay between the PRBS13Q patterns on one lane and any other lane"

This sentence seems out of place after the calibration of the crosstalk signal transition time. Also it's unclear why 31 UI are required with a PRBS13Q.

Looking back at the corresponding text in 83E where this requirement was inherited from, it refers to PRBS31, and appears in reference to the effect of the crosstalk signals on the stress signal, not to the calibration of the crosstalk signal.

It seems that this text should refer to PRBS31Q after the crosstalk calibration is complete, to ensure that the different crosstalk sources are not in-phase (and appear uncorrelated).

This comment also applies to 120G.3.4.3.2 (module stressed input).

*SuggestedRemedy*

Move the quoted sentence to the end of the paragraph (item e) and change "PRBS13Q" to "PRBS31Q".

Implement similarly in 120G.3.4.3.2.

*Proposed Response* *Response Status* **W**

PROPOSED ACCEPT IN PRINCIPLE.
This comment does not apply to the substantive changes between IEEE P802.3ck D2.2 and D2.1 or the unsatisfied negative comments from previous drafts. Hence it is not within the scope of the recirculation ballot.
However, the proposed change is an improvement to the draft.
The way this procedure step is written PRBS13Q is a candidate pattern for the crosstalk signals, while allowing replacement with other patterns, including PRBS31Q, once calibration using PRBS13Q is complete. The minimum pattern offset of 31 might be also be intended to provide some time separation between PAM4 symbols taking ISI into account. However, a similar consideration for PRBS31Q might be warranted.
Delete:
"If the PRBS13Q pattern is used with a common clock, there is at least 31 UI delay between the PRBS13Q patterns on one lane and any other lane."
Insert the following sentence at the end of item e:
"If the PRBS13Q or PRBS31Q pattern is used with a common clock, there is at least 31 UI delay between the PRBS13Q or PRBS31Q patterns on one lane and any other lane."

*Cl* **120G** *SC* **120G.3.3.5.2** *P* **270** *L* **13** # 121

Dawe, Piers
Nvidia

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

This sentence used to say "The pattern may be changed to a valid 100GBASE-R, 200GBASE-R, or 400GBASE-R signal for amplitude calibration and the stressed input test". The same sentence was used for host stressed input calibration with target amplitude and transition time, and module stressed input calibration with target amplitude and slew time. It wasn't as clear as it could have been: crosstalk pattern or victim pattern? Amplitude calibration of crosstalk or victim? I believe it meant that the crosstalk pattern could be changed to a long one when calibrating the eye height of the victim. CEI 16.3.10.3.1 says "The crosstalk signal is calibrated at TP4 or TP1a using a QPRBS13-CEI pattern, then the pattern is changed to QPRBS31-CEI for the test".

*SuggestedRemedy*

Change "The pattern" to "The crosstalk pattern", change "amplitude calibration" to "stressed signal eye height and VEC calibration". Also in 120G.3.4.2.2 step e.

*Proposed Response* *Response Status* **W**

PROPOSED ACCEPT IN PRINCIPLE.
This comment does not apply to the substantive changes between IEEE P802.3ck D2.2 and D2.1 or the unsatisfied negative comments from previous drafts. 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* **120G** *SC* **120G.3.3.5.2** *P* **270** *L* **13** # 46

Ran, Adee
Cisco

*Comment Type* **TR** *Comment Status* **D** *HI SI method*

"The pattern may be changed to PRBS31Q (see 120.5.11.2.2), scrambled idle (see 82.2.11 and 119.2.4.9), or another valid 100GBASE-R, 200GBASE-R, or 400GBASE-R signal for amplitude calibration."

The "may" in this sentence means that the pattern may also _not_ be changed, so PRBS13Q can be used as the crosstalk pattern for EH/VEC calibration. But PRBS13Q is not a representative signal and the crosstalk it creates may be different from the other signals (which have wider spectrum). This gives room for undesired variability in test conditions.

Looking back at the corresponding text in 83E, it has "The pattern is changed", not optionally "may be changed".

This comment also applies to 120G.3.4.3.2 (module stressed input).

*SuggestedRemedy*

In the quoted sentence, change "may be" to "is", and change "for amplitude calibration" to "for amplitude and stressed signal calibration".

Implement similarly in 120G.3.4.3.2.

*Proposed Response* *Response Status* **W**

PROPOSED REJECT.
This comment does not apply to the substantive changes between IEEE P802.3ck D2.2 and D2.1 or the unsatisfied negative comments from previous drafts. Hence it is not within the scope of the recirculation ballot.
Since the crosstalk response passes very little low frequency (e.g., less than 1 GHz) signal, PRBS13Q should be sufficient as the pattern for a crosstalk signal and thus is a relevant candidate pattern.
The comment does not provide sufficient justification for the proposed changes.

*Cl* **120G** *SC* **120G.3.3.5.2** *P* **270** *L* **16** # 122

Dawe, Piers Nvidia

*Comment Type* **E** *Comment Status* **D** *HI SI method (bucket1)*

This says "the host PCB in 120G.3.2.2.1" while 120G.3.2.2.1 says "reference host channel"

*SuggestedRemedy*

Use the same name in both subclauses, e.g. change "host PCB" to "reference host channel". Or, change "The reference host channel is configured in the same way as the host PCB in 120G.3.2.2.1 ..." to "The reference host channel is configured according to 120G.3.2.2.1 ...".

*Proposed Response* *Response Status* **W**

PROPOSED ACCEPT IN PRINCIPLE.
This comment does not apply to the substantive changes between IEEE P802.3ck D2.2 and D2.1 or the unsatisfied negative comments from previous drafts. Hence it is not within the scope of the recirculation ballot.
However, the proposed change is an improvement to the draft.
Change "host PCB" to "reference host channel"

*Cl* **120G** *SC* **120G.3.3.5.2** *P* **270** *L* **17** # 123

Dawe, Piers Nvidia

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

"parameters in Table 120G–5 for far-end host channel type and the requested mode": but in one case, the near end needs a parameter from the table

*SuggestedRemedy*

parameters in Table 120G–5 for host channel type and the requested module output mode

*Proposed Response* *Response Status* **W**

PROPOSED REJECT.
This comment does not apply to the substantive changes between IEEE P802.3ck D2.2 and D2.1 or the unsatisfied negative comments from previous drafts. Hence it is not within the scope of the recirculation ballot.
The stressed input tolerance test is defined using only the far-end reference host channels, so only the far end parameters are required.

*Cl* **120G** *SC* **120G.3.3.5.2** *P* **270** *L* **19** # 130

Dawe, Piers Nvidia

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

If "differential peak-to-peak voltage" is supposed to convey the idea that the MSB and LSB are not adjusted separately as in 120E.3.3.2.1 and D2.0, it doesn't do it. Also, differential peak-to-peak voltage is limited at TP4, not the PG.

*SuggestedRemedy*

Change "differential peak-to-peak voltage are adjusted" to "amplitude are adjusted".
Change "voltage tolerance given" to "voltage tolerance at TP4 given".
See another comment against p268 line 45 about introducing the pattern generator.
Similarly in 120G.3.4.3.2 step g.

*Proposed Response* *Response Status* **W**

PROPOSED ACCEPT IN PRINCIPLE.
This comment does not apply to the substantive changes between IEEE P802.3ck D2.2 and D2.1 or the unsatisfied negative comments from previous drafts. Hence it is not within the scope of the recirculation ballot.
However, the proposed change is an improvement to the draft.
The other comment referenced in the suggested remedy is comment #118.
The amplitude rather than the DPPV is adjusted, so a change in wording may be warranted here.
The label in Table 120G-7 is "Differential peak-to-peak input voltage tolerance" without "at TP4", although TP4 is shown in the test point column. There is no ambiguity with the reference as written. No changes in this regard is warranted.
For task force discussion.

*Cl* **120G** *SC* **120G.3.3.5.2** *P* **270** *L* **19** # 7

Brown, Matt Huawei

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

In item g, the adjustment of jitter, voltage, and equalization to minimize VEC are iterative, but this is not clear in the description.

*SuggestedRemedy*

Update the description to reflect the interative nature. Update item g in 120G.3.4.3.2 in a similar way.

*Proposed Response* *Response Status* **W**

PROPOSED REJECT.
While addressing D2.1 comment #9, there was some agreement that the text should be updated to address the concerns expressed in this comment, however sufficient detail was not provided at that time. However, the suggested remedy for this comment does not provide sufficient detail to implement.

*Cl* **120g** *SC* **120g.3.3.5.2** *P* **270** *L* **21** # 66

Mellitz, Richardd — Samtec

*Comment Type* **TR** *Comment Status* **D** *HI/MI SI PG EQ*

The statement following statement offers little constraint on what may be used for preemphasis. “The pattern generator pre-emphasis and reference receiver settings that minimize VEC are used.” For example: Why couldn’t the pattern generator use a discrete mutli-tone (DMT) equalizer? There may be other examples.

*SuggestedRemedy*

Add a line indicating that the pattern generator pre-emphasis may be approximately the capability specified in 163.9.2

*Proposed Response* *Response Status* **W**

PROPOSED ACCEPT IN PRINCIPLE.
Resolve using the response to comment #56.

*Cl* **120G** *SC* **120G.3.3.5.2** *P* **270** *L* **21** # 56

Ran, Adee — Cisco

*Comment Type* **TR** *Comment Status* **D** *HI/MI SI PG EQ*

(CC - Host stressed input and Module stressed input)

The term "pattern generator pre-emphasis" is used in both procedures without any definition, and does not appear anywhere else. Furthermore, it is stated that the "settings that minimize VEC are used". But it is not stated from which set of settings the minimum is taken.

Pattern generators used to create the stressed input signal may be able to apply arbitrarily long FFEs for "pre-emphasis". Consider the following two cases:
1. An FFE that optimizes the signal (e.g., zero-forces the ISI) after the test channel and the reference RX with some CTLE setting (there is a different FFE for each CTLE setting even without any DFE)
2. An FFE that similarly optimizes the signal at the slicer of a DUT with a receiver which is different from the reference (for example, has a more capable equalizer with lower noise).

The FFE(s) (one per CTLE) of the first case would create the best VEC during stress calibration (which would require adding jitter to get the VEC to the target). The specification can be interpreted as if one of these multiple FFEs is the "pre-emphasis" that should be used (as there is no restriction), and each one creates a different stress. This does not make sense, as the signal in real life will not be optimized like that.

The FFE in the second case would create a signal that may look less ideal in calibdation (so less jitter will be added) but is actually better for the DUT. If we allow this FFE it can be used to game the test.

With no limitation on what "pre-emphasis" means, both cases above are equally valid; we do not expect people to go into the trouble of finding these FFE, but different people can use different settings and get different stressed signals which would defeat the purpose of a standard test. And other people may use signal generators with shorter FFEs or no FFE at all, creating even more variability in test conditions.

If we think the allosed "pre-emphasis" settings are not unlimited, we should specify what is allowed (and thus the optimization space for creating the stressed signal).

Although any specification would be better than none, the most reasonable specification would be the 5-tap FFE (3 pre, 1 post) in the COM model of clauses 162, 163, and annex 120D, which was used in multiple presentations that analyzed channels and stress signals, and will be widely implemented.

*SuggestedRemedy*

Insert the following paragraph after the 3rd paragraph of 120G.3.3.5.1 (Host stressed input test setup):

"The pattern genrator has pre-emphasis capability equivalent to the functional model of the transmit equalizer defined in 120F.3.1.2, with the coefficient values ranges and step sizes

in Table 120F–8."

Apply similarly for module stressed input test setup in 120G.3.4.3.1.

*Proposed Response* *Response Status* **W**

PROPOSED ACCEPT IN PRINCIPLE.
This comment proposes that test results will be very inconsistent since the strength of the tranmitter equalizer may very from just good enough to overkill. A similar sentiment is echoed by comments #66, #67, and #132.
#56 proposes PG EQ be constrained like the C2C TX in 120F.3.1.2
#66 and #67 proposes PG EQ be contrained like KR TX in 163.9.2
# 132 proposes PG EQ be constrained as having at most 2 taps with one post-cursor tap with value >= 0
Apply chosen constraint to both 120G.3.3.5.2 and 120G.3.4.3.1.
For task force discussion.

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*Cl* **120G** *SC* **120G.3.3.5.2** *P* **270** *L* **22** # 148

Dawe, Piers Nvidia

*Comment Type* **TR** *Comment Status* **D** *HI SI method*

The host stressed input signal is emulating a module so must obey the same rules. VEC and eye height must be in spec for both near end and far end. The signal should be adjusted to minimise VEC for both, or possibly to minimise VEC for far end while keeping in spec at near end. The eye height should match the target at far end and be graeter at near end.

*SuggestedRemedy*

This procedure needs road-testing before the draft can be said to be "without technical issues". In the meantime, add text to the draft to explain more fully what the procedure is.

*Proposed Response* *Response Status* **W**

PROPOSED REJECT.
Item g) instructs that the eye height of the smallest eye match the target value in Table 120G-8. Table 120G-8 provides only one value to be used for both near-end and far-end measurements.
Item g) instructs that VEC is within the limits in Table 120G-8. Table 120G-8 provide only one range (with maximum and minimum) to be used for both near-end and far-end measurements.
The module output specifications for eye height and VEC are the same for near-end and far-end.
There is no need for testing the host input with different target values and ranges for near-end and far-end.

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*Cl* **120G** *SC* **120G.3.3.5.2** *P* **270** *L* **22** # 132

Dawe, Piers Nvidia

*Comment Type* **TR** *Comment Status* **D** *HI/MI SI PG EQ*

Remove ambiguity. The reader doesn't know if the writer had precursor emphasis in mind, or calls any output emphasis "pre-". Also, we can reduce the search space and variation among stressed signal setups a little.

*SuggestedRemedy*

Change "pattern generator pre-emphasis" to "pattern generator emphasis". Add "There is no more than one pattern generator post-emphasis tap, with a positive or zero value." Similarly in 120G.3.4.3.2.

*Proposed Response* *Response Status* **W**

PROPOSED ACCEPT IN PRINCIPLE.
"Pre-emphasis" implies the equalization is provided by the transmitter rather than the receiver so the wording is not ambiguous.
Resolve using the response to comment #56.

---

*Cl* **120G** *SC* **120G.3.3.5.2** *P* **270** *L* **25** # 116

Dawe, Piers Nvidia

*Comment Type* **E** *Comment Status* **D** *(bucket1)*

Blank line

*SuggestedRemedy*

Remove

*Proposed Response* *Response Status* **W**

PROPOSED REJECT.
This comment does not apply to the substantive changes between IEEE P802.3ck D2.2 and D2.1 or the unsatisfied negative comments from previous drafts. Hence it is not within the scope of the recirculation ballot.
This "blank line" is a result of putting the table anchor on its own line to prevent odd formatting as the text moves around. We can optimize spacing issues like this closer to publication once the document is more stable.

*Cl* **120G** *SC* **120G.3.3.5.2** *P* **270** *L* **30** # 124

Dawe, Piers Nvidia

*Comment Type* **E** *Comment Status* **D** *(bucket1)*

Table format

*SuggestedRemedy*

Use a separate Units column as usual.

*Proposed Response* *Response Status* **W**

PROPOSED ACCEPT IN PRINCIPLE.
This comment does not apply to the substantive changes between IEEE P802.3ck D2.2 and D2.1 or the unsatisfied negative comments from previous drafts. 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* **120G** *SC* **120G.3.3.5.3** *P* **270** *L* **48** # 125

Dawe, Piers Nvidia

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

This says that "the pattern generator is set ... with sinusoidal jitter for each case in Table 162-16" then the HCB is detached from the MCB, implying that all SJ cases are used together (as one might for a TV receiver that must receive one channel while all others are active).
Editorial: detached and plugged are an odd pair.

*SuggestedRemedy*

After the stress has been calibrated, the pattern generator is set to generate PRBS31Q, scrambled idle, or another valid 100GBASE-R, 200GBASE-R, or 400GBASE-R sequence. The HCB is unplugged from the MCB and is plugged into the host under test. The host electrical output is enabled on all lanes with any of the patterns above. The sinusoidal jitter is stepped through the six cases in Table 162-16.

*Proposed Response* *Response Status* **W**

PROPOSED ACCEPT IN PRINCIPLE.
This comment does not apply to the substantive changes between IEEE P802.3ck D2.2 and D2.1 or the unsatisfied negative comments from previous drafts. 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* **120G** *SC* **120G.3.3.5.3** *P* **270** *L* **50** # 126

Dawe, Piers Nvidia

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

There's a problem with identifying which lanes are relevant. For "The host electrical output is enabled on all lanes with any of the patterns above", this is to include realistic crosstalk so it could include all 8 transmit lanes of a QSFP-DD, or maybe all the output lanes on the host if it makes a difference. While for "The host BER is the average of the BER of each of its lanes", only the lanes in the PMA (AUI) under test (1, 2 or 4 lanes) are relevant.
"Module BER" in 120G.3.4.2.3 is even more open to misinterpretation because we are so clear how many lanes a module has. But, terminology for this has been set up: the term "interface BER" occurs 19 times in section 6, and is defined in 86.8.2.1, 86.8.4.7, 86.8.4.8, 95.8.1.1...

*SuggestedRemedy*

Change paragraph to:
The relevant BER is the interface BER, which is the average of the BER of each of the lanes in the AUI under test.
If the test is performed with PRBS31Q, the BER of a PMA lane may be calculated using the bit error counter in the PMA test pattern checker (see 120.5.11.2.2) as the number of bit errors divided by the number of received bits.
If the test is performed with scrambled idle or another valid 100GBASE-R, 200GBASE-R, or 400GBASE-R sequence, the interface BER may be calculated using the host FEC decoder error counters (see 91.6 and 119.3.1), as the number of FEC symbol errors divided by the number of received bits.
Similarly in 120G.3.4.2.3.

*Proposed Response* *Response Status* **W**

PROPOSED ACCEPT IN PRINCIPLE.
This comment does not apply to the substantive changes between IEEE P802.3ck D2.2 and D2.1 or the unsatisfied negative comments from previous drafts. Hence it is not within the scope of the recirculation ballot.
However, the proposed change is an improvement to the draft.
The term "interface BER" is used exclusively in Clause 86 and Clause 95 and is related to optical PMDs. The term "host BER" is used in Annex 120E which specifies the 200GAUI-4 and 400GAUI-8, which are a more relevant to 120G.
However, it doesn't make sense to use multiple terms for essentially the same thing.
Implement the suggested remedy with editorial license.
For task force discussion.

*Cl* **120G** *SC* **120G.3.3.5.3** *P* **271** *L* **7** # 127

Dawe, Piers Nvidia

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

"Methods of extracting the received bit pattern and counting errors other than the ones described above may be used if they generate equivalent results" - more wordy than needed for something that shouldn't need saying each time.

*SuggestedRemedy*

Other methods of extracting the received bit pattern and counting errors may be used if they generate equivalent results.
Also in 120G.3.4.2.3.

*Proposed Response* *Response Status* **W**

PROPOSED REJECT.
This comment does not apply to the substantive changes between IEEE P802.3ck D2.2 and D2.1 or the unsatisfied negative comments from previous drafts. Hence it is not within the scope of the recirculation ballot.
The proposed changes do not improve the quality of the draft.

*Cl* **120G** *SC* **120G.3.4** *P* **271** *L* **36** # 6

Brown, Matt Huawei

*Comment Type* **E** *Comment Status* **D** *(bucket1)*

In Table 120G-9, footnote "a" is redundant since the referenced subclause 120G.3.4.3 specifies the BER requirement.

*SuggestedRemedy*

Delete footnote a.

*Proposed Response* *Response Status* **W**

PROPOSED ACCEPT IN PRINCIPLE.
This comment does not apply to the substantive changes between IEEE P802.3ck D2.2 and D2.1 or the unsatisfied negative comments from previous drafts. 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* **120G** *SC* **120G.3.4.3.2** *P* **273** *L* **32** # 129

Dawe, Piers Nvidia

*Comment Type* **E** *Comment Status* **D** *I method test setup (bucket1)*

"transition time ... at the input to the frequency-dependent attenuator", "jitter profile of the signal at the output of the pattern generator". These are the same place and the style guide says to use the same name for the same thing every time. Also the frequency-dependent attenuation/attenuator is not always present, and to measure transition time or jitter one connects the scope to the PG not to the attenuator. By the way, 120G.3.3.5.2 says "at the pattern generator output" (see another comment).

*SuggestedRemedy*

Change "at the input to the frequency-dependent attenuator" to "at the output of the pattern generator".

*Proposed Response* *Response Status* **W**

PROPOSED ACCEPT IN PRINCIPLE.
This comment does not apply to the substantive changes between IEEE P802.3ck D2.2 and D2.1 or the unsatisfied negative comments from previous drafts. Hence it is not within the scope of the recirculation ballot.
However, the proposes change is an improvement to the draft.
The comment refers to item a) in 120G.3.4.3.2 with reference to transition time measurement.
Item c) in 120G.3.4.3.2 refers to the output of the pattern generator with reference to jitter measurement.
Both reference points are on the same node so the same test point should be referenced.
Implement the suggested remedy with editorial license.

*Cl* **120G** *SC* **120G.3.4.3.2** *P* **273** *L* **34** # 112

Dawe, Piers Nvidia

*Comment Type* **TR** *Comment Status* **D** *HI SI method*

"as X as possible" is bad language in a standard or any kind of spec. How hard is the reader supposed to try? No expense spared!? This isn't a moonshot, what we ask for has to be achievable at a reasonable cost. I know in this case, the cost of getting to the differential peak-to-peak input voltage tolerance should not be a problem, but avoid bad language.

*SuggestedRemedy*

Change "The initial signal level is set as high as possible without exceeding the differential peak-to-peak input voltage tolerance given in Table 120G-9" to "The initial signal level does not exceed the differential peak-to-peak input voltage tolerance given in Table 120G-9, but may be set at the high end of the range for jitter calibration". Similarly in 120G.3.3.5.2.

*Proposed Response* *Response Status* **W**

PROPOSED REJECT.
The proposed changes do not improve the quality of the draft.

*Cl* **120G** *SC* **120G.3.4.3.2** *P* **273** *L* **54** # 8

Brown, Matt — Huawei

*Comment Type* **T** *Comment Status* **D** *MI SI FDA*

In D2.2 a precise definition of the target insertion loss for the frequency dependent attenuator was added. However, the frequency range over which to "match" the real channel is not specified.

*SuggestedRemedy*

Specify the frequency range over which the the frequency dependent attenuator must approximate the target insertion loss.
Perhaps 0.01 to 40 GHz.

*Proposed Response* *Response Status* **W**

PROPOSED ACCEPT IN PRINCIPLE.
Implement the suggested remedy and remove the editor's note.

---

*Cl* **120G** *SC* **120G.3.4.3.2** *P* **274** *L* **1** # 111

Dawe, Piers — Nvidia

*Comment Type* **T** *Comment Status* **D** *(bucket1)*

Table 162-20 contains parameters C0 and C1, which I believe should not be used here.

*SuggestedRemedy*

Say that parameters C0 and C1 do not apply.

*Proposed Response* *Response Status* **W**

PROPOSED REJECT.
The referenced equations 93A-13 and 93A-14 provide the s-parameters for only the PCB traces. As such it is not necessary to add text excluding the capacitors.

---

*Cl* **120G** *SC* **120G.3.4.3.2** *P* **274** *L* **1** # 105

Dawe, Piers — Nvidia

*Comment Type* **E** *Comment Status* **D** *(bucket1)*

Not a link

*SuggestedRemedy*

Make "Table 162-20" a link

*Proposed Response* *Response Status* **W**

PROPOSED ACCEPT.

---

*Cl* **120G** *SC* **120G.3.4.3.2** *P* **274** *L* **3** # 82

Dudek, Mike — Marvell

*Comment Type* **E** *Comment Status* **D** *(bucket1)*

The word "representing" is strange here

*SuggestedRemedy*

Change "representing" to "providing"

*Proposed Response* *Response Status* **W**

PROPOSED ACCEPT IN PRINCIPLE.
Resolve using the response to comment #106.

---

*Cl* **120G** *SC* **120G.3.4.3.2** *P* **274** *L* **4** # 109

Dawe, Piers — Nvidia

*Comment Type* **T** *Comment Status* **D** *(bucket1)*

I believe that when the complex numbers are boiled down to decibels, and noting that gamma0 is 0 and Zc is 100 ohm, the respones has the form Ildd = A.sqrt(f) + B.f exactly.

*SuggestedRemedy*

Please give the equation.

*Proposed Response* *Response Status* **W**

PROPOSED REJECT.
The equations provide the complex s-parameters necessary as a target for the frequency-dependent loss and the ILdd in decibles is provide in Figure 120G-11. It is not necessary to provide yet another equation.

---

*Cl* **120G** *SC* **120G.3.4.3.2** *P* **274** *L* **9** # 15

Lusted, Kent — Intel Corporation

*Comment Type* **ER** *Comment Status* **D** *MI SI FDA (bucket1)*

There is an editor's note to be removed in the next draft, pending changes to the Z_p value and the frequency range.

*SuggestedRemedy*

Resolve the value of z_p and adjust the frequency range as necessary

*Proposed Response* *Response Status* **W**

PROPOSED ACCEPT IN PRINCIPLE.
Resolve using the response to comment #8.

*Cl* **120G** *SC* **120G.3.4.3.2** *P* **274** *L* **9** # 106

Dawe, Piers Nvidia

*Comment Type* **T** *Comment Status* **D** *(bucket1)*

The 18.2 dB is information that lets the reviwer understand the spec - does it occur in the text or just in this editor's note?

*SuggestedRemedy*

Add it to the text: change "This represents..." to "the differential-mode insertion loss (18.2 dB) represents...

*Proposed Response* *Response Status* **W**

PROPOSED ACCEPT IN PRINCIPLE.
Change "representing ILdd from the output of the pattern generator to TP1a of 18.2 dB at 26.56 GHz. This represents 16 dB channel loss with an additional allowance for host transmitter package loss."
To ". The resulting insertion loss from the output of the pattern generator to TP1a is 18.2 dB at 26.56 GHz, representing 16 dB channel loss with an additional allowance for host transmitter package loss."

*Cl* **120G** *SC* **120G.3.4.3.2** *P* **274** *L* **17** # 72

Dudek, Mike Marvell

*Comment Type* **TR** *Comment Status* **D** *MI SI calibration*

The optimum value of CTLE peaking (gdc+gdc2) when calibrating the high loss stressed module receiver test is only 10.5dB. See Dudek_3ck_01_0921. Requiring at least 13dB is degrading the signal making it difficult to generate the signal (see e.g. Snapshot of Receiver Module Input Tests (no convergence on high-loss TP1a channel) and private discussions). Note also that the maximum allowed peaking for testing the host output should not be significantly different from this value. A presentation will be made.

*SuggestedRemedy*

Change -13dB to -10.5dB. Also in Table 120G-11 change the gdc values for TP1a range for -1<GDC2 <0 to -2 to -11,
the range for -2<GDC2 <-1 to -4 to -10, and
the range for -3<GDC2 <-2 to -4 to -9

*Proposed Response* *Response Status* **W**

PROPOSED ACCEPT IN PRINCIPLE.
This comment does not apply to the substantive changes between IEEE P802.3ck D2.2 and D2.1 or the unsatisfied negative comments from previous drafts. Hence it is not within the scope of the recirculation ballot.
However, the proposed change is an improvement to the draft.
Comment #131 proposes changes to the wording to the text referenced in this comment.
The following related presentation was provided for review…
https://www.ieee802.org/3/ck/public/21_09/dudek_3ck_01_0921.pdf
Implement the suggested remedy.
For task force discussion.

*Cl* **120G** *SC* **120G.3.4.3.2** *P* **274** *L* **17** # 131

Dawe, Piers Nvidia

*Comment Type* **T** *Comment Status* **D** *MI SI calibration*

This is open to misinterpretation: "For the high-loss case, the reference receiver CTLE is limited to settings where gDC + gDC2 is less than or equal to -13 dB. This restriction does not apply for the low-loss case." Even the previous text, "The CTLE setting, gDC+gDC2, has to be less than or equal to -13 dB" was misinterpreted to mean that there is no constraint on gDC + gDC2 for the low loss case. Yet the limits for the appropriate test point in Table 120G-11 still apply.
Actually, for a stressed signal calibration, we are looking for a signal where the optimum CTLE setting obeys the rules (so that the signal is not low stress but outside the expected range, but right stress and in the expected range).
See another comment for whether -13 dB is the right value.

*SuggestedRemedy*

Change "Eye height and VEC are measured at TP1a as described in 120G.5.2." to "Eye height and VEC are measured at TP1a as described in 120G.5.2, with an additional constraint for the high-loss case: the reference receiver CTLE setting that minimizes VEC has gDC + gDC2 less than or equal to -13 dB."
Delete "For the high-loss case, the reference receiver CTLE is limited to settings where gDC + gDC2 is less than or equal to -13 dB. This restriction does not apply for the low-loss case."

*Proposed Response* *Response Status* **W**

PROPOSED ACCEPT IN PRINCIPLE.
This comment does not apply to the substantive changes between IEEE P802.3ck D2.2 and D2.1 or the unsatisfied negative comments from previous drafts. Hence it is not within the scope of the recirculation ballot.
However, the proposed change is an improvement to the draft.
Comment #72 proposes to change the limit on the CTLE peaking gain.
Change "Eye height and VEC are measured at TP1a as described in 120G.5.2." to "Eye height and VEC are measured at TP1a as described in 120G.5.2 with the exception for the high-loss case that the reference receiver CTLE setting that minimizes VEC has gDC + gDC2 less than or equal to -13 dB."
Delete "For the high-loss case, the reference receiver CTLE is limited to settings where gDC + gDC2 is less than or equal to -13 dB. This restriction does not apply for the low-loss case."

*Cl* **120G** *SC* **120G.3.4.3.2** *P* **275** *L* **14** # 110

Dawe, Piers — Nvidia

*Comment Type* **T** *Comment Status* **D** *MI SI FDA*

The formula and target exist at all frequencies. The loss board consists of PCB and good grade microwave connectors. We should not be encouraging implementers to do a bad job above 40 GHz. It's a target, there is no spec on how "approximate" is good enough.

*SuggestedRemedy*

Graph the target up to the signalling rate as done in Figure 163B-1, delete the editor's note on the previous page.

*Proposed Response* *Response Status* **W**

PROPOSED ACCEPT IN PRINCIPLE.
Resolve using the response to comment #8.

---

*Cl* **120G** *SC* **120G.3.4.5** *P* **276** *L* **5** # 9

Brown, Matt — Huawei

*Comment Type* **T** *Comment Status* **D** *MO DC CM voltage*

The term "ground offset voltage" is not defined.

*SuggestedRemedy*

Provide explanation for what is meant by "ground offset voltage".

*Proposed Response* *Response Status* **W**

PROPOSED REJECT.
Adding an explanation as requested would be an improvement to the draft, however the suggested remedy does not provide sufficient detail to implement.

---

*Cl* **120g** *SC* **120g.3.4.5.2** *P* **274** *L* **19** # 67

Mellitz, Richardd — Samtec

*Comment Type* **TR** *Comment Status* **D** *HI/MI SI PG EQ*

The statement following statement offers little constraint on what may be used for preemphasis. “The pattern generator pre-emphasis and reference receiver settings that minimize VEC are used.” For example: Why couldn’t the pattern generator use a discrete mutli-tone (DMT) equalizer? There may be other examples.

*SuggestedRemedy*

Add a line indicating that the pattern generator pre-emphasis may be approximately the capability specified in 163.9.2

*Proposed Response* *Response Status* **W**

PROPOSED ACCEPT IN PRINCIPLE.
Resolve using the response to comment #56.

---

*Cl* **120G** *SC* **120G.4.1** *P* **276** *L* **11** # 10

Brown, Matt — Huawei

*Comment Type* **E** *Comment Status* **D** *(bucket1)*

The term "(informative)" would better be "(recommended)" and should align with 163.10.2 and 120F.4.2.

*SuggestedRemedy*

In the title of 120G.4.1 change "(informative)" to "(recommended)".

*Proposed Response* *Response Status* **W**

PROPOSED ACCEPT.

---

*Cl* **120G** *SC* **120G.4.1** *P* **276** *L* **13** # 47

Ran, Adee — Cisco

*Comment Type* **E** *Comment Status* **D** *channel IL (bucket1)*

The insertion loss cannot be compared to ("equal to or less than") an equation. The equation defines a limit; however, it is not measurable, so it can only be a recommendation.

*SuggestedRemedy*

Change "is expected to be equal to or less than" to "is recommended to be within the limits defined by".

*Proposed Response* *Response Status* **W**

PROPOSED ACCEPT IN PRINCIPLE.
The word "expected" was chosen intentionally to convey that the interface specifications were created with the assumption of a channel meeting this insertion loss criteria. However, the wording should be updated to reflect that the equation is in the form an inequality. Wording use elsewhere, e.g., 162.11.4, can be used.
Change "is expected to be equal to or less than" to "is expected to meet".

*Cl* **120G** *SC* **120G.4.1** *P* **276** *L* **14** # 48

Ran, Adee Cisco

*Comment Type* **T** *Comment Status* **D** *channel IL*

"For correct operation, the actual differential-mode to differential-mode insertion loss could be higher or lower than that given by Equation (120G–3) due to the channel ILD, return loss, and crosstalk"

This sentence is meaningless as written, and not helpful for readers, whatever the intended meaning is.

Looking at 83E, there was no such statement; the insertion loss that was provided in Equation (83E-1) was described as "typical application" with no attempt to make it even a recommendation. 120E changed it to a recommendation but did not add the quoted statement either.

This seems like a statement from the days when channels were specified by insertion loss limits, and that was a poor specification. We have no ground for making Equation 120G-3 anything other than a recommendation; and as such it does not need any disclaimers.

*SuggestedRemedy*

Delete the quoted sentence.

*Proposed Response* *Response Status* **W**

PROPOSED REJECT.
It is not clear what value the reference sentence has, however there may have been some sound logic for including it.
For task force discussion.

*Cl* **120G** *SC* **120G.5.2** *P* **277** *L* **17** # 104

Dawe, Piers Nvidia

*Comment Type* **T** *Comment Status* **D** *EO method*

This needs explanation/correction/deletion: "Unless specified otherwise the probabilities are relative to the number of PAM4 symbols measured." For a histogram, it should be the expectation of number of bad samples in the histogram / total number of samples *in the histogram*. In conventional eye mask terminology, hit ratios are hits in a keepout region / number of samples, assumed evenly distributed across 1 UI (see 86.8.3.2.1). Anyway, are there any probabilities outside eye height / VEC, which is covered later in this subclause and is indeed done per sample not per symbol.

*SuggestedRemedy*

Delete the sentence.

*Proposed Response* *Response Status* **W**

PROPOSED REJECT.
This comment does not apply to the substantive changes between IEEE P802.3ck D2.2 and D2.1 or the unsatisfied negative comments from previous drafts. Hence it is not within the scope of the recirculation ballot.
It is not clear what value the reference sentence has, however there may have been some sound logic for including it.
For task force discussion.

*Cl* **120G** *SC* **120G.5.2** *P* **277** *L* **29** # 115

Dawe, Piers Nvidia

*Comment Type* **T** *Comment Status* **D** *EO RR gdc*

In D2.1, max gDC for TP4 near-end was increased from -2 to -1. While hosts typically have bigger packages and more trace loss than modules, neither is required (e.g. an on-board repeater).

*SuggestedRemedy*

Consider if max gDC for TP1a should be increased similarly.

*Proposed Response* *Response Status* **W**

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

*Cl* **120G** *SC* **120G.5.2** *P* **277** *L* **32** # 100

Dawe, Piers Nvidia

*Comment Type* **TR** *Comment Status* **D** *EO RR bbmax*

My recent simulations don't use gDC as strong as the table allows, but occasionally, the first DFE tap hits the limit of 0.4

*SuggestedRemedy*

Increase bbmax(1) from 0.4 to 0.5, increase the minimum for gDC at TP1a and TP4 long far end.

*Proposed Response* *Response Status* **W**

PROPOSED REJECT.
This comment does not apply to the substantive changes between IEEE P802.3ck D2.2 and D2.1 or the unsatisfied negative comments from previous drafts. Hence it is not within the scope of the recirculation ballot.
The comment provides only annecdotal evidence.
For task force discussion.

*Cl* **120G** *SC* **120G.5.2** *P* **277** *L* **38** # 98

Dawe, Piers Nvidia

*Comment Type* **TR** *Comment Status* **D** *EO RR gdc*

The limits for TP4 gDC, gDC2 should not be the same for short and long output modes. Obviously, different channels will need different CTLE settings. Obviously, CTLE settings that only signals outside what the spec is designed for use, should be excluded, to make implementers set up their product correctly.

*SuggestedRemedy*

Create separate limits for TP4 short and long output modes, so 4 sets for TP4+, in the style of TP1a. If you don't have any better numbers, create them anyway with the same numbers in each set - but see another comment.

*Proposed Response* *Response Status* **W**

PROPOSED REJECT.
This comment is a restatement of D2.1 comment #103 and D2.0 comment #183, which were rejected on the basis of providing insufficient justification and detail.
This comment provides expanded justification, but the suggested remedy does not provide sufficient detail to implement.

*Cl* **120G** *SC* **120G.5.2** *P* **277** *L* **46** # 99

Dawe, Piers Nvidia

*Comment Type* **TR** *Comment Status* **D** *EO 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.

*SuggestedRemedy*

For Continuous time filter, DC gain for TP4 far-end (gDC), change to sets of limits that depend on gDC2 in the same style as for TP1a. The allowed values should be subsets of those for TP1a. For TP4 long far end, use minimum gDC 1 dB higher than allowed for TP1a; for TP4 short far end, 3 dB higher than for TP1a.

*Proposed Response* *Response Status* **W**

PROPOSED REJECT.
This comment is a restatement of D2.1 comment #104 and D2.0 comment #178, which were rejected on the basis of providing insufficient justification and detail.
This comment provides no new justification, but does provide more details for implementation.

*Cl* **120G** *SC* **120G.5.2** *P* **278** *L* **11** # 84

Calvin, John Keysight Technologies

*Comment Type* **TR** *Comment Status* **D** *EO RR bbmax*

The bbmax(1) is limited to .4. Reference contribution "DFE-TP1a-coefficient_limits_Calvin". In summary TP1a needs to support an 18.2dB channel, and the bbmax(1) hits the .4 limit at just 16.4dB in both emperical test setups and in COM.

*SuggestedRemedy*

Increase bbmax(1) to a maximum value of .55 or reduce the maximum channel for TP1a to 16.4dB.

*Proposed Response* *Response Status* **Z**

REJECT.

This comment was WITHDRAWN by the commenter.

*Cl* **120G** *SC* **120G.5.2** *P* **278** *L* **24** # 16

Lusted, Kent — Intel Corporation

*Comment Type* **ER** *Comment Status* **D** *(bucket1)*

There is an editor's note to be removed in the next draft, pending changes to thef_b value.

*SuggestedRemedy*

Reaffirm the correct f_b value and remove the editor's note

*Proposed Response* *Response Status* **W**

PROPOSED ACCEPT IN PRINCIPLE.
There were no comments submitted that expressed concern with the value of f_b.
Remove the editor's note.

*Cl* **120G** *SC* **120G.5.2** *P* **279** *L* **6** # 101

Dawe, Piers — Nvidia

*Comment Type* **TR** *Comment Status* **D** *EO mask*

This draft has a weighted rectangular eye mask spec with mask height = max(EHmin, EA/VECmax) and effective mask width ~2x0.03 UI, although it is described as a histogram 2x0.05 UI wide. Measuring a diamond eye with a rectangular mask provides weak and uncertain protection against too much jitter; de-weighting the sides of the histogram weakens it further; the effective BER criterion is hard to establish but seems to be around 1e-4, not 1e-5 as intended.
We need an eye mask that's more eye shaped, so that a higher proportion of the samples near the boundary are measured at full weight and contribute properly to the measurement. Eye mask measurement with a 10-sided mask has been pre-programmed into scopes for about 20 years, we should use established tools and methods where they work well.

*SuggestedRemedy*

Change from a 4-cornered weighted mask with corners at t = ts+/-0.05, V = y +/-H/2 to a 10-cornered unweighted mask with corners at t = ts+/-1/16, ts+/-0.05, ts+/-3/32, V = y +/-H/2, k +/-H*0.4, y. y is near VCmid, VCupp or VClow (vertically floating, as in D2.2).
H is max( EHmin, Eye Amplitude * 10^(-VECmax/20) ). Eye Amplitude is AVupp, AVmid or AVlow, as in D2.2.
This simple scalable method can remain as the EH and VEC limits are revised.

*Proposed Response* *Response Status* **W**

PROPOSED REJECT.
This comment is a restatement of D2.1 comment #106 and D2.0 comment #180 for which there was no consensus to make the proposed changes.
No new evidence or consensus has been provided.

*Cl* **120G** *SC* **120G.5.2** *P* **279** *L* **43** # 95

Dawe, Piers — Nvidia

*Comment Type* **TR** *Comment Status* **D** *EO mask*

The Gaussian weighting has the effect of destroying the histogram width, allowing bad fast eyes to pass, while giving the impression that the histogram width still applies. With a weighting standard deviation of 0.02 UI, the eye height is measured at around +/-0.03 UI rather than the +/-0.05 UI in the previous draft. Compare 120E with ESMW of 0.2 or 0.22 UI.

*SuggestedRemedy*

Remove the Gaussian weighting and set the eye height and VEC limits (which need revision anyway) appropriately.

*Proposed Response* *Response Status* **W**

PROPOSED REJECT.
The current method of determining eye height and VEC using a weighted window was introduced in D2.2 based on approved D2.1 comment #39. A final straw poll indicated acceptance of the response with a ratio (yes:no) of 21:11.
For task force discussion.

*Cl* **135** *SC* **135.5.7.2** *P* **123** *L* **49** # 75

Dudek, Mike — Marvell

*Comment Type* **E** *Comment Status* **D** *(bucket1)*

Inconsistent use of C2C

*SuggestedRemedy*

Either put C2C after all the variants or just the last one. Also on page

*Proposed Response* *Response Status* **W**

PROPOSED ACCEPT IN PRINCIPLE.
Put C2C once after all the variants on page 123.

*Cl* **136** *SC* **136.8.11.7.1** *P* **127** *L* **36** # 83

Kochuparambil, Beth Cisco Systems

*Comment Type* **E** *Comment Status* **D** *(bucket1)*

Sentence uses absolute language which is discouraged by the Style Guide, "always."

*SuggestedRemedy*

Change "This variable is always set to FALSE for 50 Gb/s per lane PHYs, otherwise it is set to TRUE." to "This variable is set to FALSE for 50 Gb/s per lane PHYs, otherwise it is set to TRUE."

*Proposed Response* *Response Status* **W**

PROPOSED REJECT.
This comment does not apply to the substantive changes between IEEE P802.3ck D2.2 and D2.1 or the unsatisfied negative comments from previous drafts. Hence it is not within the scope of the recirculation ballot.
The style guide discourages use of the "absolution verbiage" to avoid making guarantees. In this case, the use of always is in terms of an imposed requirement, not a guarantee. The intent in this case is to be clear that there are no exceptions. Use of "always" in this context in abundantly common throughout 802.3.

*Cl* **161** *SC* **161.5.2.6** *P* **139** *L* **52** # 24

Nicholl, Shawn Xilinx

*Comment Type* **TR** *Comment Status* **D** *language (bucket1)*

In response to P802.3ck/D2.0 Comment #162, P802.3ck/D2.1 revised the text to following:

The alignment markers shall be mapped to tx_scrambled_am<1284:0> in a manner that yields the same result as the process described in the remainder of this subclause

The new language is inconsistent with existing Clause 119, which bears much similarity to portions of Clause 161.

*SuggestedRemedy*

Propose to return to the text of P802.3ck/D2.0:

The alignment markers shall be mapped to am_txmapped<1284:0> in a manner that yields the same result as the following process.

*Proposed Response* *Response Status* **W**

PROPOSED ACCEPT IN PRINCIPLE.
This comment does not apply to the substantive changes between IEEE P802.3ck D2.2 and D2.1 or the unsatisfied negative comments from previous drafts. Hence it is not within the scope of the recirculation ballot.
However, the proposed change is an improvement to the draft.

On page 139 line 52 change:
“tx_scrambled_am<1284:0>”
To:
“am_txmapped<1284:0>”

On page 139 line 48 insert a new subclause heading:
“161.5.2.6.1 Alignment marker mapping”

On page 140 split the paragraph starting at line 48 to insert a new subclause heading:
“One group of aligned and reordered alignment markers are mapped every 20 × 16 384 66-bit blocks. This group of aligned and reordered alignment markers is called the “alignment marker group” and is labeled am_txmapped<1284:0>.

161.5.2.6.2 Alignment marker insertion
An alignment marker group shall be inserted so it appears in the output stream every 81 920 x 257-bit blocks.”

*Cl* **162** *SC* **162.8.1** *P* **165** *L* **48** # 92

Dawe, Piers — Nvidia

*Comment Type* **E** *Comment Status* **D** *IL terminology (CC)*

"differential-mode to differential-mode insertion loss" is unnecessarily wordy; everyone understands just "insertion loss" to mean differential-mode to differential-mode if they know it's a system or component that uses differential signalling, which is made plain above. Similarly for return loss. It would be disruptive and unnecessary to go through the many clauses in the base document for this, although the terminology and notation for mixed-mode and common-mode losses may be worth retrofitting.

*SuggestedRemedy*

Change "differential-mode to differential-mode insertion loss" to "insertion loss", change "differential-mode to differential-mode return loss" to "return loss" throughout the document.

*Proposed Response* *Response Status* **W**

PROPOSED REJECT.
The changes were made after task force discussion acceptance of D2.1 Comment #13.
The resolution was to:
"Implement the parameter names and variables names provided in slide 15 of the following presentation:
https://www.ieee802.org/3/ck/public/21_07/brown_3ck_01a_0721.pdf"
Resolution to comments against the new revision (802.3dc) has resulted in terminology different to what was recently adopted in 802.3ck D2.2. To minimize churn in 802.3ck, it would be best to defer this topic until after the next draft of 802.3dc is published.
For task force discussion.
[Editor's note: CC: many]

*Cl* **162** *SC* **162.9.3** *P* **170** *L* **12** # 73

Dudek, Mike — Marvell

*Comment Type* **TR** *Comment Status* **D** *TP0/TP5 (bucket1)*

In the context of 162 the "transmitter" includes the host PCB. The characteristis in 162A.2 do not include the host PCB and therefore should not be called just transmitter characteristics

*SuggestedRemedy*

Change to "Recommended transmitter characteristis at TP0 are provided in 162A.2"

*Proposed Response* *Response Status* **W**

PROPOSED ACCEPT IN PRINCIPLE.
Change to "Change to "Recommended transmitter characteristics at TP0 are provided in 162A.2"

*Cl* **162** *SC* **162.9.3** *P* **170** *L* **24** # 62

Mellitz, Richardd — Samtec

*Comment Type* **TR** *Comment Status* **D** *HO AC CM voltage (CC)*

Common mode measurements are not well enough defined to precisely specify CM voltage at TP2. In addition, all aspects of a common mode voltage may not be detrimental as illustrated in mellitz_3ck_adhoc_01_090821.

*SuggestedRemedy*

Replace item “AC common-mode RMS output voltage (max)”
With ”Peak fitted AC common mode (max) Pmax_ccm” using a value of 50 mV

*Proposed Response* *Response Status* **W**

PROPOSED REJECT.
The proposed solution requires consideration by the task force.
Resolve in conjunction with comments 63, 60, 61, 64, 59.
For task force review.

*Cl* **162** *SC* **162.9.3** *P* **170** *L* **32** # 87

Dawe, Piers — Nvidia

*Comment Type* **TR** *Comment Status* **D** *CR loss budget*

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*

As in dawe_3ck_01a_0721.pdf:
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 the training control field to advertise A, B or C to the other end.
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: 9.5-6.875 = 2.625 dB higher (26.25 dB to 27.25 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.
Add MDIO registers to report local and remote host ability to station management, for inventory and diagnostics.

*Proposed Response* *Response Status* **W**

PROPOSED REJECT.
This comment is a restatement of comment #92 against D2.1, which was rejected by the task force. This new comment provides only minor changes to the suggested remedy. A related straw poll (#10) indicated strong opposition to adopting this proposal therefore there was no consensus to make the proposed changes.
July 2021 Straw Poll #10 is reproduced here for reference…
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** *P* **170** *L* **46** # 65

Mellitz, Richardd — Samtec

*Comment Type* **TR** *Comment Status* **D** *TX jitter*

Since the jitter at TP2 may be viewed though a channel with a loss of approximately 17 dB (package, host interconnect, HCB) there will likely be measurements error from the phase modulation of the voltage time quantization. The consequence is the measured jitter will be larger than in table 162-10

*SuggestedRemedy*

Increase J_RMS, J3u, Even-odd jitter, pk-pk to [ #,#, # ] respectively. As consequence the jitter specified in the receiver interference tolerance (162.9.4.2) step d needs to change since it measured near the beginning of the channel. Change the reference on page 179 step d form table 162-10 to table 163-5

*Proposed Response* *Response Status* **W**

PROPOSED REJECT.
This comment does not apply to the substantive changes between IEEE P802.3ck D2.2 and D2.1 or the unsatisfied negative comments from previous drafts. Hence it is not within the scope of the recirculation ballot.

Per Figure 162A-3 the insertion loss from TP0 to TP2 is 10.975 dB and there is an additional loss of around 4 dB due to the transmit function package for a total of around 15 dB. This is lower insertion loss than considered in the comment.

Increasing the specified jitter values is not a good solution since it could allow higher jitter when the measurement is accurate.

The following related presentation was reviewed by the task force:
https://www.ieee802.org/3/ck/public/adhoc/sept22_21/calvin_3ck_adhoc_01_092221.pdf

During the presentation, the presenter recognized that the insertion loss assumptions were incorrect and subsequently withdrew his related comments #85 and #86.

The comment does not provide sufficient evidence to justify the proposed changes.

For task force review.

*Cl* **162** *SC* **162.9.3** *P* **170** *L* **47** # 86

Calvin, John — Keysight Technologies

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

Table 162.10 suggests a TP2 Jrms value of 23mUI and a J3u of 115mUI. The best possible case channel between TP0 and TP2 is 10.975dB which will support these Jitter numbers. The problem is nobody comes close to 10.975dB and most systems operate typically at 15.27dB which requires a higher value of J3u and Jrms.

*SuggestedRemedy*

The principal of conducting a precison jitter measurment at the end of a 10.975 or a 15.27dB channel should be re-visted. The loss driven slew rate limitations of the signal at say 15.27dB results in a higher AM to jitter conversion factor. This measurment should either be removed, or increased to J3u < 160mUI to allow for channel induced jitter amplification.

*Proposed Response* *Response Status* **Z**

REJECT.

This comment was WITHDRAWN by the commenter.

*Cl* **162** *SC* **162.9.3.1.1** *P* **172** *L* **8** # 23

Wu, Mau-Lin — MediaTek Inc.

*Comment Type* **TR** *Comment Status* **D** *TX Np*

For the linear-fit procedure adopted for TX SNDR calcuation, N_p = 200 shall be adopted, instead of N_p = 29. N_p = 29 was used for SNR_TX calibration in RITT test instead. Related rationale had been disclosed in previous contribution, wu_3ck_adhoc_01b_071421.pdf.

*SuggestedRemedy*

Change 'N_p = 29' to 'N_p = 200'.

*Proposed Response* *Response Status* **W**

PROPOSED ACCEPT IN PRINCIPLE.
Resolve using the response to comment #50.

*Cl* **162** *SC* **162.9.3.1.1** *P* **172** *L* **8** # 50

Ran, Adee — Cisco

*Comment Type* **TR** *Comment Status* **D** *TX Np*

Following up on unsatisfied comment #29 against D2.1:

The linear fit procedure is defined with Np=29, so the pulse response length is 29. Nv, the number of UIs that are considered for v_f calculation, cannot be higher than Np. In the multiple places that Nv is used, it needs an exception to use Np=200. This does not make sense.

As an example, in 163A.3.2.1 we have "where p(i) and M are defined in 162.9.3.1.1 and Nv is 200". This does not make sense if Np=29.

If 162.9.3.1.1 uses Np=200, this will be the default value, and there will be one exception in the case of SNDR where it should be set to 29. This would result in fewer exceptions.

*SuggestedRemedy*

1. In 162.9.3.1.1, change Np from 29 to 200.
2. In 162.9.3.3 (Output SNDR), change "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" to "with the exceptions that the test system response is specified in 162.9.3, and the linear fit procedure in 162.9.3.1.1 with Np=29 is used".
3. In 162.9.3.1.2 (Steady-state voltage and linear fit pulse peak) change "The steady-state voltage v_f 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" to "The steady-state voltage v_f is calculated as defined in 136.9.3.1.2 with the exception that Nv=200, and is determined from the linear fit pulse calculated by the procedure in 162.9.3.1.1".
4. In 163A.3.2.1 change "Nv is 200" to "Nv is set by the clause that invokes this method". (it is currently invoked only by 163.9.2.4 (Difference steady state voltage) which states "with Nv = 200").

*Proposed Response* *Response Status* **W**

PROPOSED ACCEPT.
[Editor's note: CC: 163, 162, 163A]

*Cl* **162** *SC* **162.9.3.1.1** *P* **172** *L* **8** # 55

Hidaka, Yasuo — Credo Semiconductor

*Comment Type* **ER** *Comment Status* **D** *TX Np*

Np for TX SNDR in clause 162.9.3.1.1 was changed from 200 in D2.0 to 29 in D2.1. However, I cannot find any comment on D2.0 to change Np for TX SNDR from 200 to 29. It seems that this was an editorial error to implement the resolution of comment #197 on D2.0 which was closed to change Np for RX ITT from 15 to 29 in clause 162.9.4.3.3. I cannot find a record of consensus to change Np for TX SNDR from 200 to 29 in clause 162.9.3.1.1.
So, I think Np for TX SNDR in clause 162.9.3.1.1 should remain 200.

*SuggestedRemedy*

Change Np for TX SNDR from 29 back to 200 on line 8 in page 172, clause 162.9.3.1.1.

*Proposed Response* *Response Status* **W**

PROPOSED ACCEPT IN PRINCIPLE.
Resolve using the response to comment #50.

*Cl* **162** *SC* **162.9.3.1.2** *P* **173** *L* **3** # 25

Ran, Adee — Cisco

*Comment Type* **TR** *Comment Status* **D** *TX Vf*

The definition of the steady-state voltage is currently a pointer to 136.9.3.1.2 with essentially three exceptions: the fitted pulse is calculated by another procedure (162.9.3.1.2), and Np and Nv are different. 136.9.3.1.2 itself is a simple definition of a sum of Nv values; there is no need for a reference to this definition, when all other things are exceptions.

What the reader is not told is that the required specification is with equalization turned off; this is written in 136.9.3.1.2 but as part of a normative requirement for the limits, which does not hold here (the values are different). One could interpret it as if it is required for all equalization settings (as implied by the text in 162.9.3.1.2), which is clearly not what we intend.

*SuggestedRemedy*

Change the first paragraph of 162.9.3.1.2 to the following:

The steady-state voltage v_f is defined as the sum of the linear fit pulse p(1) through p(M×Nv) divided by M, measured with transmit equalizer set to preset 1 (no equalization). Nv is set equal to Np. The linear fit procedure for obtaining p and the values of M and Np are defined in 162.9.3.1.1.

*Proposed Response* *Response Status* **W**

PROPOSED ACCEPT IN PRINCIPLE.
The proposed solution is a further improvement on the changes made in response to C#30 against D2.1. Implement the proposed response maintaining consistency with the resolution to comment #69.
For task force discussion.

*Cl* **162** *SC* **162.9.3.1.2** *P* **173** *L* **4** # 69

Healey, Adam — Broadcom Inc.

*Comment Type* **T** *Comment Status* **D** *TX Vf*

Steady state voltage is measured at the output of a lossy host channel without equalization and its value will be larger for larger Nv (at least up to a point). Setting Nv to 200 may overestimate the amplitude that the receiver will actually see since that amplitude will only be realized when Nv consecutive identical symbols are transmitted. The number of consecutive identical symbols transmitted during normal operation is likely to be much lower. This suggests that the value of Nv should be lower so that the measured steady state voltage is closer to the amplitude the receiver might see in practice.

*SuggestedRemedy*

Change Nv for the Clause 162 steady-state voltage calculation to 29.

*Proposed Response* *Response Status* **W**

PROPOSED ACCEPT IN PRINCIPLE.
The proposed solution requires consideration by the task force.
For task force review.

*Cl* **162** *SC* **162.9.3.4** *P* **174** *L* **47** # 102

Dawe, Piers — Nvidia

*Comment Type* **TR** *Comment Status* **D** *TX EOJ*

Having alternative normative patterns to measure one thing when the choice makes a difference, adds cost because the test has to be done both ways (if one way passes and the other fails). Also, the spec limit was relaxed from 0.019 UI to 0.025 to allow for PRBS13. We understand that the result would look better with PRBS9. There is no requirement to generate PRBS9.

*SuggestedRemedy*

Make PRBS13 normative, as usual. Use a different set of PRBS13Q pattern symbols used for jitter measurement vs. Table 120D-4 to reduce the pattern dependency issue.

*Proposed Response* *Response Status* **W**

PROPOSED REJECT.
This is a restatement of comment #109 against D2.1 which was rejected by the task force (insufficient remedy and lack of consensus to make the change). The comment does not provide new data or analysis to support it.

*Cl* **162** *SC* **162.9.3.4** *P* **174** *L* **49** # 103

Dawe, Piers — Nvidia

*Comment Type* **TR** *Comment Status* **D** *TX EOJ*

We know that CRU corner frequency makes a difference to EOJ measurement. Allowing an unbounded "4 MHz or anything you like that's lower" is very bad: how many attempts must the tester try before he can fail a bad part?

*SuggestedRemedy*

Pick a single definitive CRU corner, e.g. 1 MHz or 2 MHz. Add informative NOTE saying that we expect that if it passes with the usual 4 MHz, it would also pass with the lower corner frequency.

*Proposed Response* *Response Status* **W**

PROPOSED REJECT.
This is a restatement of comment #109 against D2.1 which was rejected by the task force (insufficient remedy and lack of consensus to make the change). The comment does not provide new data or analysis to support it.

*Cl* **162** *SC* **162.9.3.5** *P* **176** *L* **11** # 149

Dawe, Piers — Nvidia

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

Transition time is defined by the referenced 93A.5 which refers to 93A.2 which refers to 86A.5.3.3 which says "for electrical signals, the waveform is observed through a 12 GHz low-pass filter response (such as a Bessel-Thomson response)", and it's dependent on state of emphasis.

*SuggestedRemedy*

Change "Transition time" to "Rise time". Explain that that is 20-80%, unfiltered, as if at neutral emphasis. Coordinate with the maintenance project.

*Proposed Response* *Response Status* **W**

PROPOSED REJECT.
The terminology is consistent with 93A.5 in both 802.3cd-2018 and the latest 802.3dc draft. Any related changes in the new revision (802.3dc) can be considered once they are incorporated in the next draft.

*Cl* **162** *SC* **162.9.3.7** *P* **176** *L* **48** # 78

Dudek, Mike — Marvell

*Comment Type* **E** *Comment Status* **D** *RL terminology (bucket1)*

"common-mode to differential-mode insertion loss" appears to be used thoughout the document and "common-mode to differential-mode return loss" is used in 162B however "common-mode to differential return loss" is used here and in other places

*SuggestedRemedy*

Change all instances to "common-mode to differential-mode return loss"

*Proposed Response* *Response Status* **W**

PROPOSED ACCEPT IN PRINCIPLE.
Resolve using the response to comment #13.
[Editor's note: Changed page from 188 to 176.]

*Cl* **162** *SC* **162.9.4** *P* **177** *L* **29** # 74

Dudek, Mike — Marvell

*Comment Type* **TR** *Comment Status* **D** *TP0/TP5 (bucket1)*

In the context of 162 the "receiver" includes the host PCB. The characteristis in 162A.3 do not include the host PCB and therefore should not be called just receiver characteristics

*SuggestedRemedy*

Change to "Recommended receiver characteristis at TP5 are provided in 162A.3"

*Proposed Response* *Response Status* **W**

PROPOSED ACCEPT IN PRINCIPLE.
Change to: "Recommended receiver characteristics at TP5 are provided in 162A.3"

*Cl* **162** *SC* **162.9.4.3** *P* **178** *L* **47** # 22

Wu, Mau-Lin — MediaTek Inc.

*Comment Type* **TR** *Comment Status* **D** *(bucket1)*

The sentence refers to '162.9.4.3.3 item f' for SNR_TX calibration. However, there are no item f in 162.9.4.3.3. It shall be 'item e' in 162.9.4.3.3 for SNR_TX calbiration.

*SuggestedRemedy*

Change 'item f' to 'item e'.

*Proposed Response* *Response Status* **W**

PROPOSED ACCEPT.

*Cl* **162** *SC* **162.9.4.3.3** *P* **179** *L* **46** # 108

Dawe, Piers Nvidia

*Comment Type* **T** *Comment Status* **D** *RITT cal (bucket1)*

As far as I can see, sigma_bn is a number to be found, all the other inputs to Equation 162-12 (fb and f_hp) are constant in the draft: so the ratio sigma_hp/sigma_bn is fixed too, at a little less than 1.

*SuggestedRemedy*

Please tell the reader what that ratio is

*Proposed Response* *Response Status* **W**

PROPOSED ACCEPT IN PRINCIPLE.
Change equation (162-12) to show the constant value (0.6954) to be multiplied by sigma_bn^2.

*Cl* **162** *SC* **162.9.4.3.3** *P* **180** *L* **34** # 107

Dawe, Piers Nvidia

*Comment Type* **T** *Comment Status* **D** *RITT cal*

Help the reader understand what is going on

*SuggestedRemedy*

Please add the plot of Hhp to Figure 162-5, NSD(f) constraints

*Proposed Response* *Response Status* **W**

PROPOSED REJECT.
The referenced equation is a simple first order high-pass filter with 6 GHz corner frequency. Plotting this simple, well understood response is unnecessary. Adding to the current plot would detract from the intent of the plot.
[Editor's note: Changed page from 179 to 180.]

*Cl* **162** *SC* **162.11** *P* **184** *L* **29** # 88

Dawe, Piers Nvidia

*Comment Type* **T** *Comment Status* **D** *CA IL budget*

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 the training protocol and the cable's loss class from its I2C compliance code, so 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 - 0.5 = 25.5 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 figures 162A-3 and 162A-4.

*Proposed Response* *Response Status* **W**

PROPOSED REJECT.
This comment is a restatement of D2.1 comment #93 which was rejected as there were no changes to the host port types.
The suggested remedy is predicated on the adoption of Comment #87 to the draft.

*Cl* **162** *SC* **162.11.3** *P* **186** *L* **43** # 76

Dudek, Mike Marvell

*Comment Type* **T** *Comment Status* **D** *'L Tfx wording (CC) (bucket1)*

While testing the Cable ERL there isn't a "host-facing connection'

*SuggestedRemedy*

Change "host facing connection" to cable-facing connection"

*Proposed Response* *Response Status* **W**

PROPOSED ACCEPT IN PRINCIPLE.
Resolve using the response to comment #26.

*Cl* **162** *SC* **162.11.3** *P* **186** *L* **43** # 26

Ran, Adee Cisco

*Comment Type* **TR** *Comment Status* **D** *L Tfx wording (CC) (bucket1)*

When measuring cable assembly ERL, the test fixture (aka MCB) does not have a host-facing connection.

*SuggestedRemedy*

Change "host-facing" to "cable-facing".

*Proposed Response* *Response Status* **W**

PROPOSED ACCEPT.

*Cl* **162** *SC* **162.11.6** *P* **189** *L* **38** # 89

Dawe, Piers Nvidia

*Comment Type* **TR** *Comment Status* **D** *CA RLcc*

As in previous comments: this common mode return loss spec RLcc becomes useless at the frequency when the MCB loss is 1.8/2 dB, which is only 8.5 GHz. We need a common mode return loss spec to stop large common-mode voltages building up through multiple low-loss reflections. The revised proposed remedy for D2.1 comment 79 seems OK: 1.8 dB 0.5<= f <= 4 GHz, 1.4+0.1*f dB 4< f <= 30 GHz. The 30 GHz fmax allows margin for real-world coax-PCB transitions (although the mated compliance boards are specified >=3 dB to 50 GHz); the cable itself should pass this comfortably because it is insulated from the test by the MCB loss.

*SuggestedRemedy*

Use a frequency-dependent mask 1.8 dB 0.5<= f <= 4 GHz, 1.4+0.1*f dB 4< f <= 30 GHz. f is in GHz. Similarly for Tx, Table 162-11, 162.9.3.6.

*Proposed Response* *Response Status* **W**

PROPOSED REJECT.
This comment is a restatement of D2.1 comment #79.
The suggested remedy does not provide sufficient additional justification to support the change to the draft.

*Cl* **162** *SC* **162.11.7** *P* **191** *L* **38** # 91

Dawe, Piers Nvidia

*Comment Type* **TR** *Comment Status* **D** *COM DFE RSS (CC)*

The spec allows a cable 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. A limit of 0.045 works well with Bch2_b2p5_7_t. Similarly in 163.

*Proposed Response* *Response Status* **W**

PROPOSED REJECT.
This is a restatement of comment #96 against D2.1 which was rejected by the task force due to incomplete remedy and insufficient analysis. This new comment provides some new, but unsubtantiated information.
[Editor's note: CC: 162,163]

*Cl* **162** *SC* **162.11.7** *P* **191** *L* **39** # 90

Dawe, Piers Nvidia

*Comment Type* **TR** *Comment Status* **D** *COM DFE bgmax/min (CC)*

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. I know of only example channel with a tap like 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. In the case of Bch2_b2p5_7_t, reducing |bmaxg| from 0.05 to 0.03 increases COM by less than 0.1 dB, and the channel still passes comfortably. In this example, there were no taps that would be affected by reducing +ve bgmax from 0.05 to 0.03; one -ve tap was limited.

*SuggestedRemedy*

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

*Proposed Response* *Response Status* **W**

PROPOSED REJECT.
This is a restatement of comment #95 against D2.1 which was rejected by the task force de to insufficient supporting evidence. Some new information on the analysis of one channel is provided, but this is insufficient evidence to support the proposed changes.
[Editor's note: CC: 162, 163]

*Cl* **162** *SC* **162.11.7.1** *P* **192** *L* **8** # 27

Ran, Adee Cisco

*Comment Type* **E** *Comment Status* **D** *CA COM pkg (bucket1)*

The new equations 93A-13a and 93A-14a use a parameter z_p2 (instead of z_p in the existing equations 93A-13 and 93A-14). The text here refers to z_p, so the existing equations should be referenced instead.

*SuggestedRemedy*

Change 93A-13a to 93A-13 and 93A-14a to 93A-14.

Consider merging equations 93A-12a, 93A-13a, 93A-14a with their existing counterparts.

*Proposed Response* *Response Status* **W**

PROPOSED ACCEPT IN PRINCIPLE.
Implement the suggested remedy with editorial license

*Cl* **162** *SC* **162.11.7.1.1** *P* **192** *L* **37** # 77

Dudek, Mike Marvell

*Comment Type* **E** *Comment Status* **D** *(bucket1)*

typo

*SuggestedRemedy*

Change "an differential" to "a differential". Also on page 193 line 22

*Proposed Response* *Response Status* **W**

PROPOSED ACCEPT.

*Cl* **162** *SC* **162.11.7.2** *P* **194** *L* **18** # 156

Ghiasi, Ali Ghiasi Quantum/Inphi

*Comment Type* **ER** *Comment Status* **D** *MDI labels*

Per unsatisfied comment from D2.2.
Modules in table 162-21 must be updated with ones actually supporitng 100 Gb/s operation

*SuggestedRemedy*

Update SFP+ with SFP112
SFP-DD with SFP-DD112
QSFP+ with QSFP112
changes appllies to clauses 162, 162C and 162D

*Proposed Response* *Response Status* **W**

PROPOSED REJECT.
SFP112 and SFP-DD112 terms are not used in normative references. See response to comment #155.
For QSFP, resolve using the response to comment #162.

*Cl* **162A** *SC* **162A.4** *P* **287** *L* **45** # 18

Wu, Mau-Lin MediaTek Inc.

*Comment Type* **TR** *Comment Status* **D** *Host PCB ILdd*

The recommended maximum IL for TX or RX PCB is 6.875 dB at 26.56 GHz, which is defined in (162A-1). However, the equation of (162A-1) is not correct. By quick check of the equation, ILdd_PCBmax(26.56) ~= 6.6 dB, which is NOT 6.875 dB. According to the closed response of comment #18 in https://www.ieee802.org/3/ck/comments/draft1p3/8023ck_D1p3_final_closedcomments.pdf, the equation of (162A-1) shall be modified as "0.9809*(0.471*SQRT(f)+0.1194*f+0.002*(f^2))" . However, the equation of "0.9809*(0.417*SQRT(f)+0.1194*f+0.002*(f^2))" was adopted, instead, which is wrong.

*SuggestedRemedy*

Change (162A-1) from "0.9809*(0.417*SQRT(f)+0.1194*f+0.002*(f^2))" to "0.9809*(0.471*SQRT(f)+0.1194*f+0.002*(f^2))". Redraw Figure 162A-1 accordingly if necessary.

*Proposed Response* *Response Status* **W**

PROPOSED ACCEPT IN PRINCIPLE.
Change (162A-1) from "0.9809*(0.417*SQRT(f)+0.1194*f+0.002*(f^2))" to "0.9809*(0.471*SQRT(f)+0.1194*f+0.002*(f^2))".
Figure 162A-1 uses correct equation.

*Cl* **162A** *SC* **162A.4** *P* **288** *L* **42** # 85

Calvin, John Keysight Technologies

*Comment Type* **T** *Comment Status* **D** *Host PCB ILdd*

The text of "Note that the recommended maximum differential-mode to differential-mode insertion loss from TP0 to TP2 or from TP3 to TP5 is 10.975 dB at 26.56 GHz." represents the sum of the minimum mated test fixture insertion loss (4.1dB) + the host channel loss (6.875) which adds up to 10.975dB. In light of there not being an existance proof of a 4.1dB matted test fixture, and that the nominal matted test fixture loss is 7dB and a max of 8.4dB. We should have a higher recomended value to reflect actuall test systems.

*SuggestedRemedy*

Revise the "maximum TP0-TP2 to a nominal value of 7dB (typical MTF performance) + host channel loss (6.875dB) = 13.875dB.

*Proposed Response* *Response Status* **Z**

REJECT.

This comment was WITHDRAWN by the commenter.

*Cl* **162A** *SC* **162A.4** *P* **289** *L* **1** # 19

Wu, Mau-Lin MediaTek Inc.

*Comment Type* **TR** *Comment Status* **D** *Host PCB ILdd*

The recommended maximum IL from TP0 to TP2 is 10.975 dB at 26.56 GHz, which is defined in (162A-3). However, the equation of (162A-3) is not correct. By quick check of the equation, ILdd_HostMax(26.56) ~= 10.54 dB, which is NOT 10.975 dB. According to the closed response of comment #19 in https://www.ieee802.org/3/ck/comments/draft1p3/8023ck_D1p3_final_closedcomments.pdf, the equation of (162A-3) shall be modified as "1.5658*(0.471*SQRT(f)+0.1194*f+0.002*(f^2))" . However, the equation of "1.5658*(0.417*SQRT(f)+0.1194*f+0.002*(f^2))" was adopted, instead, which is wrong.

*SuggestedRemedy*

Change (162A-3) from "1.5658*(0.417*SQRT(f)+0.1194*f+0.002*(f^2))" to "1.5658*(0.471*SQRT(f)+0.1194*f+0.002*(f^2))". Redraw Figure 162A-2 accordingly if necessary.

*Proposed Response* *Response Status* **W**

PROPOSED ACCEPT IN PRINCIPLE.
Change (162A-3)
from "1.5658*(0.417*SQRT(f)+0.1194*f+0.002*(f^2))"
to "1.5658*(0.471*SQRT(f)+0.1194*f+0.002*(f^2))".
Figure 162A-2 uses correct equation.

*Cl* **162B** *SC* **162B.1.1** *P* **293** *L* **23** # 135

Dawe, Piers Nvidia

*Comment Type* **E** *Comment Status* **D** *formatting (bucket1)*

There's only one subclause in this annex, plus PICS, which makes it hard to find the what it contains from the contents.

*SuggestedRemedy*

Promote 162B.1.1 TP2 or TP3 test fixture to 162B.2, promote 162B.1.2 Cable assembly test fixture to 162B.3, promote 162B.1.3 Mated test fixtures to 162B.4.

*Proposed Response* *Response Status* **W**

PROPOSED ACCEPT IN PRINCIPLE.
Implement the suggested remedy with editorial licence.

*Cl* **162B** *SC* **162B.1.3** *P* **295** *L* **25** # 137

Dawe, Piers Nvidia

*Comment Type* **E** *Comment Status* **D** *wording (bucket1)*

"The TP2 or TP3 and cable assembly test fixtures" sounds like three test fixtures.

*SuggestedRemedy*

Change to "The TP2 or TP3 test fixture and the cable assembly test fixture".

*Proposed Response* *Response Status* **W**

PROPOSED ACCEPT.

*Cl* **162B** *SC* **162B.1.3.3** *P* **297** *L* **36** # 138

Dawe, Piers Nvidia

*Comment Type* **T** *Comment Status* **D** *MTF ILdc/ILdc*

If common-mode to differential-mode insertion loss is what we want to control, that's ILdc. However, we want to control both ILdc and Ilcd, as we have both RLcd and RLdc specs in 120G. There is an argument that they are the related, and specifying one is enough, but I'm not sure it always holds.

*SuggestedRemedy*

Specify both ILcd and ILdc. It may be possible to specify one in one direction and the other in the other: Scd21 and Sdc12, or Sdc21 and Scd12, where 1 is an input (instrument connector that would be connected to a pattern generator) and 2 is an output. I haven't thought through which we need, or maybe we need all four. It is simpler to require all four.

*Proposed Response* *Response Status* **W**

PROPOSED ACCEPT IN PRINCIPLE.
This comment does not apply to the substantive changes between IEEE P802.3ck D2.2 and D2.1 or the unsatisfied negative comments from previous drafts. Hence it is not within the scope of the recirculation ballot.
However, the proposed change is an improvement to the draft.
As pointed out by the comment both Ilcd and Ildc of the MTF must be similarly constrained. Since ILcd12 and ILdc21 are reciprocal and ILcd21 and ILdc12 reciprocal, the insertion loss mode conversion can be constrained by measuring either Ilcd (or Ildc) in both directions. The text as written was intended to require this but the wording could be improved.
Also, the variable "Ilcd" should be "Ildc" to correctly reflect the subclause title and text.
Change: "measured at either test fixture test interface"
To "measured in both directions"
and
Change variable name "Ilcd" to "Ildc".

*Cl* **162B** *SC* **162B.1.3.4** *P* **298** *L* **30** # 136

Dawe, Piers Nvidia

*Comment Type* **TR** *Comment Status* **D** *MTF RLcc*

Just as for the cable RLcc spec: this 3 dB becomes useless when the MCB trace loss is half of 3 = 1.5 dB (16 GHz).

*SuggestedRemedy*

As for the cable RLcc spec but 1 dB lower to 30 GHz, easing up to 50 GHz: 12 -9f dB 0.01 <= f <1, 3 dB 0.5<= f <= 4 GHz, 2.6+0.1*f dB 4< f <= 30 GHz, 9.5-1.3*f dB 30< f <= 50 GHz. f is in GHz.

*Proposed Response* *Response Status* **W**

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

*Cl* **162C** *SC* **162C.1** *P* **306** *L* **10** # 157

Ghiasi, Ali Ghiasi Quantum/Inphi

*Comment Type* **TR** *Comment Status* **D** *MDI pins table*

Per unsatisfied comment from D2.2.
Table 162C-3 needs to be better organized

*SuggestedRemedy*

An improved and beter organized table will be submited as ghiasi_3ck_01_0921.pdf

*Proposed Response* *Response Status* **W**

PROPOSED REJECT.
The following related presentation was provided for consideration:
https://www.ieee802.org/3/ck/public/21_09/ghiasi_3ck_01_0921.pdf
For task force discussion of cited presentation.

*Cl* **162D** *SC* **162D.1** *P* **316** *L* **14** # 139

Dawe, Piers Nvidia

*Comment Type* **E** *Comment Status* **D** *MDI pins (bucket1)*

A host can have other than six MDI connector receptacles. Aligning terminology with 162C.1, third sentence. The text mentions what's specified for hosts but doesn't discuss how many types there are for cables. This text can be simplified.

*SuggestedRemedy*

Change:
There are six MDI connector "receptacles" specified for hosts.
to
There are six MDI connector types.
or, change "There are six MDI connector "receptacles" specified for hosts. See Table 162D–1 references for receptacle and plug requirements." to "Table 162D-1 lists the six MDI connector types specified for hosts and cables."

*Proposed Response* *Response Status* **W**

PROPOSED ACCEPT IN PRINCIPLE.

Merge the two paragraphs together and change text to the follows:
"This annex describes cable assembly types specified in 162.11 for hosts with 100GBASE-CR1, 200GBASE-CR2, or 400GBASE-CR4 Physical Layers. The six MDI connector receptacles specified for hosts are given in Table 162D–1. This enables multiple cable assembly types with different combinations of the plug connectors at each end."

*Cl* **162D** *SC* **162D.1** *P* **316** *L* **21** # 158

Ghiasi, Ali Ghiasi Quantum/Inphi

*Comment Type* **TR** *Comment Status* **D** *MDI labels*

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

*Proposed Response* *Response Status* **W**

PROPOSED REJECT.
Resolve using the response to comment #156.

*Cl* **162D** *SC* **162D.1.1** *P* **317** *L* **6** # 140

Dawe, Piers — Nvidia

*Comment Type* **E** *Comment Status* **D** *CA types*

In table headers:
"supportable PMDs
Number"

*SuggestedRemedy*

Change to: Maximum number of PMDs (merge two cells vertically). Similarly in the following tables.
If changing to "maximum", change "supportable" to "maximum" in the text and table captions too, and in 162C.1.

*Proposed Response* *Response Status* **W**

PROPOSED REJECT.
This comment does not apply to the substantive changes between IEEE P802.3ck D2.2 and D2.1 or the unsatisfied negative comments from previous drafts. Hence it is not within the scope of the recirculation ballot.
The suggested change is not necessary.

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*Cl* **162D** *SC* **162D.1.1** *P* **317** *L* **6** # 141

Dawe, Piers — Nvidia

*Comment Type* **E** *Comment Status* **D** *wording (bucket1)*

other end

*SuggestedRemedy*

other end(s)

*Proposed Response* *Response Status* **W**

PROPOSED ACCEPT.
This comment does not apply to the substantive changes between IEEE P802.3ck D2.2 and D2.1 or the unsatisfied negative comments from previous drafts. 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.

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*Cl* **163** *SC* **163.9.2** *P* **207** *L* **43** # 64

Mellitz, Richardd — Samtec

*Comment Type* **TR** *Comment Status* **D** *HO AC CM voltage (CC)*

Common mode measurements are not well enough defined to precisely specify CM voltage at TP0v. In addition, all aspects of a common mode voltage may not be detrimental as illustrated in mellitz_3ck_adhoc_01_090821.

*SuggestedRemedy*

Remove item “AC common-mode RMS output voltage (max)”

*Proposed Response* *Response Status* **W**

PROPOSED REJECT.
The comment does not provide sufficient evidence for the proposed change.
Resolve in conjunction with comments 63, 60, 61,62, 59.
For task force review.

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*Cl* **163** *SC* **163.9.2** *P* **208** *L* **12** # 68

Healey, Adam — Broadcom Inc.

*Comment Type* **TR** *Comment Status* **D** *TX SNDR (CC)*

The reference for the SNDR specification is 162.9.3.3 which specifies Np to be 29. Reflections from the test fixture can easily have a round-trip delay exceeding 25 (29-1-Dp) UI which will degrade the SNDR measurement. However, such reflections have no relationship to the quality of the transmitter under test. Also, the introduction of the ISI_RES specification in Draft 2.2 limits intersymbol interference and makes it unnecessary to consider it again in the SNDR measurement. The purpose of SNDR, as the name suggests, is to limit noise and distortion. Prior specifications have used and Np value of 200 to avoid including intersymbol interference in the result.

*SuggestedRemedy*

Change Np for the Clause 163 SNDR specification to 200.

*Proposed Response* *Response Status* **W**

PROPOSED ACCEPT IN PRINCIPLE.
162.9.3.3 points to linear fit procedure in 162.9.3.1.1. Comments #23, #50, #55 suggest to change Np from 29 to 200 in 162.9.3.1.1
Resolve together with comments #23, #50, #55
[Editor's note: CC: 163, 162, 163A]
[Editor's note: Changed page from 207 to 208.]

*Cl* **163** *SC* **163.9.2.1.2** *P* **209** *L* **15** # 70

Healey, Adam Broadcom Inc.

*Comment Type* **T** *Comment Status* **D** *ERL parameter*

In Table 163-6, N is set to 20 UI but this seems to be too small given the 5 dB insertion loss allowance for the test fixture given in 163.9.2.1.1. Using the transmission line parameters in Table 162-20, a transmission line with 5 dB loss at 26.6 GHz can have a propagation delay almost twice N (and therefore a round-trip delay almost four times N). The significance of the N value is that reflections with delay larger than N are not considered in the ERL value. The N value should be extended so that all reflections added by the longest test fixtures allowed by the standard are counted in the ERL value. There is no obvious downside to increasing this value.

*SuggestedRemedy*

Change the "length of the reflection signal" N to 200.

*Proposed Response* *Response Status* **W**

PROPOSED ACCEPT IN PRINCIPLE.
This comment does not apply to the substantive changes between IEEE P802.3ck D2.2 and D2.1 or the unsatisfied negative comments from previous drafts. 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* **163** *SC* **163.9.2.1.3** *P* **209** *L* **27** # 79

Dudek, Mike Marvell

*Comment Type* **T** *Comment Status* **D** *TF RLcc*

As is stated in the editor's note the existing specification on the test fixture is not adequate to test the DUT. There is no reason that this test fixture can't use high quality RF connectors and therefore a significantly better performance should be obtainable.

*SuggestedRemedy*

Change 2 dB to 6dB.

*Proposed Response* *Response Status* **W**

PROPOSED ACCEPT IN PRINCIPLE.
Implement suggested remedy.
Remove the editor's note.
For task force review.

*Cl* **163** *SC* **163.9.2.1.3** *P* **209** *L* **33** # 14

Lusted, Kent Intel Corporation

*Comment Type* **ER** *Comment Status* **D** *TF RLcc*

There is an editor's note to be removed in the next draft, pending improvements to the test fixture specification.

*SuggestedRemedy*

Resolve the test fixture improvements and remove the editor's note

*Proposed Response* *Response Status* **W**

PROPOSED ACCEPT IN PRINCIPLE.
Resolve using the result of comment #79.

*Cl* **163** *SC* **163.9.2.6** *P* **210** *L* **38** # 71

Healey, Adam Broadcom Inc.

*Comment Type* **T** *Comment Status* **D** *TX ISI_RES*

The ISI_RES metric does not discriminate between the ISI caused by the test fixture and the ISI intrinsic to the transmitter under test. We are only interested in the latter and the impact of the test fixture should be considered. The test fixture impact is considered in ERL measurements by calculating the difference between the expected ERL and the measured ERL where the expected ERL is computed using a reference transmitter model and a measurement of the test fixture. It seems a similar process could be used to compute the difference between an expected ISI_RES and measured ISI_RES. However, effectiveness of such a process, or other processes, has not yet been demonstrated. At a minimum, it seems that a note like the one in 120D.3.1.7 (which defines a similar measurement for a similar purpose) should be included to advise users of the impact of the test fixture and encourage users to mitigate the impact.

*SuggestedRemedy*

Add the following note to the end of 163.9.2.6:
"NOTE- The observed ISI_RES can be significantly influenced by the measurement setup, e.g., reflections in cables and connectors. Careful calibration of the measurement setup is recommended."

Also change the title of 163.9.2.6 to "Residual intersymbol interference" (remove the hyphen per <https://www.ieee802.org/3/WG_tools/editorial/requirements/words.html>).

*Proposed Response* *Response Status* **W**

PROPOSED ACCEPT IN PRINCIPLE.
Implement the suggested remedy.
[Editor's note: Changed page from 211 to 210.]

*Cl* **163** *SC* **163.9.3.4** *P* **213** *L* **12** # 12

Brown, Matt Huawei

*Comment Type* **T** *Comment Status* **D** *RITT transition time (CC)*

In 163.9.3.4, step e, the reference transition time is "determined according to 163A.3.1.3". In 163A.3.1.3 the pulse response is calculated as follows, requiring Av and fb as input from the invoking clause. "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." The parameters Av and fb are not provided in 163.9.3.4. For calculation of transition time the amplitude is not important so Av could be set to an arbitrary value, e.g., 1.

*SuggestedRemedy*

In 163.9.3.4 specify fb equal to 53.125 GBd and Av equal to 400 mV.
Alternately...
In 163.9.3.4 specify fb equal to 53.125 GBd. In 163A.3.1.3 specify that the value of Av is 1.

*Proposed Response* *Response Status* **W**

PROPOSED ACCEPT IN PRINCIPLE.
fb and Av use values in Table 163-11
Resolve together with comment #30.
[Editor's note: Changed line number from blank to 12.]

*Cl* **163** *SC* **163.9.3.5** *P* **212** *L* **53** # 28

Ran, Adee Cisco

*Comment Type* **TR** *Comment Status* **D** *RITT transition time (CC)*

"Tr is determined at the die bump" suggests that it should be measured or calculated; but measurement at the die bump is not feasible, and the S-parameters may include some on-die elements (as in the reference model, Figure 93A-2), so "at the die bump" is not always correct.

This item is about a case where Tr is _known_.
Just as the s-parameters, Tr should be a value provided with the transmitter describing the signal fed to the s-parameters network.

*SuggestedRemedy*

Change
"Tr is determined at the die bump and defined according to the method in 120G.3.1.4 except that there is no observation filter"
to
"Tr should be provided as the value at the input of the device S-parameters network, as defined in 120G.3.1.4 but with no observation filter".

*Proposed Response* *Response Status* **W**

PROPOSED ACCEPT IN PRINCIPLE.
Change the sentence under discussion to:
"Tr is the transition time (see 120G.3.1.4) at the input of the device S-parameter network except that there is no observation filter"

*Cl* **163** *SC* **163.9.3.5** *P* **213** *L* **1** # 29

Ran, Adee Cisco

*Comment Type* **T** *Comment Status* **D** *RITT transition time (CC)*

120G.3.1.4 is referenced by all three items in the list. It is a pointer to 120E.3.1.5 with modified measurement filter, and 120E.3.1.5 itself is not a "measurement method" but a definition of the transition time.

*SuggestedRemedy*

Change "defined according to the method in" to "defined in", in all three bullets.

Change "and adjusted" to "adjusted" in the second bullet.

*Proposed Response* *Response Status* **W**

PROPOSED ACCEPT IN PRINCIPLE.
Resolve the concern about the first bullet using the response to comment #28.
In the second bullet change "Tr is the transmitter transition time measured using the method in 120G.3.1.4 and adjusted to remove the effect of the observation filter" to "Tr is the measured transmitter transition time (see 120G.3.1.4) adjusted to remove the effect of the observation filter"
Resolve the concern about the third bullet using the response to comment #30.
Implement with edtorial license.

*Cl* **163** *SC* **163.9.3.5** *P* **213** *L* **9** # 30

Ran, Adee Cisco

*Comment Type* **ER** *Comment Status* **D** *RITT transition time (CC)*

The third item in this list is very unclear. My understanding is that it is about a case where the transmitter is a packaged device with unknown S-parameters and transition time, but it contains some test fixture (defined as TP0-TP0a in 93C) with known S-parameters, and the signal can be measured at TP0a.

In this case, the _reference_ transmitter model should be used, but its transition time should be adjusted so that the reference value matches the _measured_ transition time at TP0a.

This should be written more clearly.

*SuggestedRemedy*

Change the third item to
"If the transmitter comprises a device with unknown S-parameters and transition time, and a TP0 to TP0a trace with known S-parameters, then the transmitter device package model S^(tp) in 93A.1.2 is used, and Tr is determined from measurement at TP0a and the TP0 to TP0a S-parameters. The transmitter's transition time (as defined in 120G.3.1.4) is measured at TP0a with transmitter equalization turned off by setting coefficients to preset 1 values (see 162.9.3.1.3). Tr is set as the value in Equation (93A–46) that would result in the reference transition time Tr(ref), determined according to 163A.3.1.3, being equal to the measured transition time."

*Proposed Response* *Response Status* **W**

PROPOSED ACCEPT IN PRINCIPLE.
Change the third item to
"If the transmitter is composed of a device with unknown S-parameters and transition time then the transmitter device package model S^(tp) in 93A.1.2 is used, and Tr is determined from measurement at TP0v and the TP0 to TP0v S-parameters. The transmitter transition time (see 120G.3.1.4) is measured at TP0v with transmit equalization turned off by setting coefficients to preset 1 values (see 162.9.3.1.3). Tr is set as the value in Equation (93A–46) that would result in the reference transition time Tr(ref), determined according to 163A.3.1.3 with fb and Av equal to values in Table 163-11, being equal to the measured transition time."
Implement with editorial license.

*Cl* **163** *SC* **163.9.3.5** *P* **213** *L* **11** # 4

Brown, Matt Huawei

*Comment Type* **E** *Comment Status* **D** *RITT transition time (CC)*

Some words are missing.

*SuggestedRemedy*

Change "determined accord to 163A.3.1.3 is the transmitter transition time"
To: "determined accord to 163A.3.1.3 is equal to the transmitter transition time"

*Proposed Response* *Response Status* **W**

PROPOSED ACCEPT IN PRINCIPLE.
Resolve using the resolution to comment #30.

*Cl* **163** *SC* **163.9.3.5** *P* **213** *L* **12** # 31

Ran, Adee Cisco

*Comment Type* **E** *Comment Status* **D** *ransition time (CC) (bucket1)*

"with transmitter equalization off by setting coefficients to preset 1 values (see 162.9.3.1.3)." is awkward: equalization not "off by", it is "turned off by", not "off by".

*SuggestedRemedy*

Change "transmitter equalization off " to "transmitter equalization turned off".

*Proposed Response* *Response Status* **W**

PROPOSED ACCEPT IN PRINCIPLE.
For consistency with other clauses refer to "transmit equalization" rather than "transmitter equalization".
Change "transmitter equalization off" to "transmit equalization turned off".

*Cl* **163** *SC* **163.9.3.5** *P* **213** *L* **13** # 32

Ran, Adee Cisco

*Comment Type* **TR** *Comment Status* **D** *RITT transition time (CC)*

In the third case, the measured value is compared to a reference value Tr(ref); there is no need to have the measurement "adjusted to remove the effect of the observation filter", because the observation filter is also included in the calculation of Tr(ref) in 163A.3.1.3 (H_BT(f) in Equation 163A-2).

Following up on unsatisfied comment #21 against D2.1 it seems that the filter is indeed missing from Figure 163A-3. If the calibration of the ITT in 120F becomes aligned to 163 (subject of another comment), then the editor's note in 163A.3.1.3 will be addressed.

*SuggestedRemedy*

In the third item, delete "and adjusted to remove the effect of the observation filter".

*Proposed Response* *Response Status* **W**

PROPOSED ACCEPT IN PRINCIPLE.
The resolution to this comment is dependent on the resolution to comment #54, which proposes changes to the transition time measurement method in 163A.3.1.3.
For task force discussion.

*Cl* **163** *SC* **163.10.1** *P* **215** *L* **9** # 57

Mellitz, Richardd Samtec

*Comment Type* **TR** *Comment Status* **D** *Channel ERL (CC)*

Table 162-7 has a note for ERL “Cable assemblies with a COM greater than 4 dB are not required to meet minimum ERL”. The same should apply to Table 163-10 channels for the same reason it was include included in table 162-2

*SuggestedRemedy*

For the entry “minimum channel ERL” add a note: “Channels with a COM greater than 4 dB are not required to meet minimum ER.”

*Proposed Response* *Response Status* **W**

PROPOSED REJECT.
Comment #58 requests a similar change for the C2C channel characteristics.
The comment likely was intending to refer to Table 162-17 rather than Table 162-7.
The footnote a in Table 162-17 was inherited from Clause 136 in 802.3cd-2018. The footnote in Table 136-16 was added in 802.3cd Draft 3.3 per Draft 3.2 comment #r02-23.
https://www.ieee802.org/3/cd/comments/8023cd_D32_comment_received_by_clause.pdf
The comment does not provide sufficient evidence to make the proposed change.
[CC: 163, 120F]

*Cl* **163** *SC* **163.10.1** *P* **215** *L* **13** # 21

Wu, Mau-Lin MediaTek Inc.

*Comment Type* **TR** *Comment Status* **D** *(bucket1)*

The 'value' of 'Common-mode to differential-mode insertion loss, IL_dc' shall be 'Equation (163-8)', instead of 'Equation (163-7)'.

*SuggestedRemedy*

Change the 'value' of 'Common-mode to differential-mode insertion loss, IL_dc' from "Equation (163-7)" to "Equation (163-8)".

*Proposed Response* *Response Status* **W**

PROPOSED ACCEPT.

*Cl* **163** *SC* **163.13.4.3** *P* **226** *L* **7** # 33

Ran, Adee Cisco

*Comment Type* **T** *Comment Status* **D** *(bucket1)*

In item TC14 value/comment has the nominal value. But the mandatory requirement is a range specified in Table 163-5.

For consistency, item TC12 should also refer to the table.

*SuggestedRemedy*

Change value/comment to "Per Table 163-5" in both items.

*Proposed Response* *Response Status* **W**

PROPOSED ACCEPT.

*Cl* **163A** *SC* **163A.3.1** *P* **320** *L* **23** # 142

Dawe, Piers Nvidia

*Comment Type* **E** *Comment Status* **D** *(bucket1)*

Make it easier to see what S(0) is

*SuggestedRemedy*

In figures 163A-2, 3 and 4, change "Reference channel" to "Reference channel S(0)"

*Proposed Response* *Response Status* **W**

PROPOSED ACCEPT.

Cl **163A** SC **163A.3.1.1** P **321** L **15** # 143

Dawe, Piers Nvidia

*Comment Type* **E** *Comment Status* **D** *COM pkg*

Duplication

*SuggestedRemedy*

Move this sentence to p 320 line 53: "If the invoking clause lists more than one set of reference package parameters, the calculation is performed with the longer package trace length." At line 35, delete "If the invoking clause lists more than one set of reference package parameters, the calculation in Equation (163A–3) is performed with the longer package trace length."

*Proposed Response* *Response Status* **W**

PROPOSED ACCEPT IN PRINCIPLE.
Implement the suggested remedy with editorial license, maintaining consistency with the resolution to comment #52 and #53.

---

Cl **163A** SC **163A.3.1.1** P **321** L **15** # 51

Hidaka, Yasuo Credo Semiconductor

*Comment Type* **T** *Comment Status* **D** *(bucket1)*

The reference pulse response peak, v^(ref)_{peak} must be the max value of h(t), if h(t) has multiple peaks.

*SuggestedRemedy*

Change "the peak value" to "the maximum value" on line 15 and line 29 in page 321.

*Proposed Response* *Response Status* **W**

PROPOSED ACCEPT.

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Cl **163A** SC **163A.3.1.1** P **321** L **16** # 53

Hidaka, Yasuo Credo Semiconductor

*Comment Type* **T** *Comment Status* **D** *(bucket1)*

This location was overlooked in comment #23 on D2.1. Apply the same change as comment #23 on D2.1 to this location.

*SuggestedRemedy*

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

*Proposed Response* *Response Status* **W**

PROPOSED ACCEPT.

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Cl **163A** SC **163A.3.1.1** P **321** L **36** # 52

Hidaka, Yasuo Credo Semiconductor

*Comment Type* **T** *Comment Status* **D** *(bucket1)*

Comment #23 on D2.1 was not correctly implemented. It should be the longest "transmitter" package trace length.

Apply the same change on line 52 in page 322.

*SuggestedRemedy*

Change "the longest package trace length" to "the longest transmitter package trace length".

*Proposed Response* *Response Status* **W**

PROPOSED ACCEPT.

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Cl **163A** SC **163A.3.1.1** P **322** L **23** # 54

Hidaka, Yasuo Credo Semiconductor

*Comment Type* **TR** *Comment Status* **D** *RITT transition time (CC)*

As a result of resolution for comment #73 on D2.1, the observation filter (i.e. BT4 filter) was removed from the measurement of transmitter transition time for RX interference tolerance test in clause 163.9.3.5, step e. Therefore, the observation filter should be removed from the calculation of transmitter reference transition time.
Besides, Figure 163A-3 should include the step response.

This comment is continuation from comment #21 on D2.1.

*SuggestedRemedy*

Add a new equation to define H^(0)_noBT(f) by removing H_BT(f) from Equation (163A-2). This new equation is labeled as (163A-X) below.

On line 23, change "H^(0)(f) from Equation (163A-2)" to "H^(0)_noBT(f) from Equation (163A-X)".

Change h(t) to h_noBT(t) on line 23 and in Equation (163A-5) on line 37.

Change u(t) to u_noBT(t) on line 26 and line 43 and in Equation (163A-5) on line 37.

In Figure 163A-3, change h(t) to h_noBT(t). After h_noBT(t), add a block of Equation (163A-5) (or just a capital Sigma) followed by u_noBT(t) with a label of "Step response".

Remove editor's note at the top of page 322.

*Proposed Response* *Response Status* **W**

PROPOSED ACCEPT IN PRINCIPLE.
Implement the suggested remedy with editorial license.

*Cl* **163A** *SC* **163A.3.1.2** *P* **321** *L* **45** # 134

Dawe, Piers Nvidia

*Comment Type* **E** *Comment Status* **D** *ERL RV (bucket1)*

This says "The reference ERL value is determined from the reference PTDR response using the method in 93A.5.2..." yet 93A.5.2 finds the effective reflection waveform, Reff(t), by time gating and weighting the PTDR waveform, PTDR(t).

*SuggestedRemedy*

Do you mean 93A.5.2 to 93A.5.5?

*Proposed Response* *Response Status* **W**

PROPOSED ACCEPT IN PRINCIPLE.
Change the text to "The reference ERL value is determined using the method in 93A.5..."

*Cl* **163A** *SC* **163A.3.1.3** *P* **321** *L* **53** # 144

Dawe, Piers Nvidia

*Comment Type* **E** *Comment Status* **D** *wording (bucket1)*

The method for obtaining the reference transition time using the measured test fixture scattering parameters and the reference transmitter and package models are defined below, and are outlined in Figure 163A–3.

*SuggestedRemedy*

method ... is ... is

*Proposed Response* *Response Status* **W**

PROPOSED ACCEPT.

*Cl* **163A** *SC* **163A.3.1.3** *P* **322** *L* **3** # 17

Lusted, Kent Intel Corporation

*Comment Type* **ER** *Comment Status* **D** *RITT transition time (CC)*

There is an editor's note to be removed in the next draft, to align the ITOL test in 163 and 120G.

*SuggestedRemedy*

Align the ITOL tests and remove the editor's notes

*Proposed Response* *Response Status* **W**

PROPOSED ACCEPT IN PRINCIPLE.
Resolve using the response to comment #54.

*Cl* **163A** *SC* **163A.3.1.3** *P* **322** *L* **24** # 11

Brown, Matt Huawei

*Comment Type* **E** *Comment Status* **D** *(bucket1)*

This is sequence of steps in method to determine transition time.

*SuggestedRemedy*

Convert the method to a lettered list.

*Proposed Response* *Response Status* **W**

PROPOSED ACCEPT.

*Cl* **163A** *SC* **163A.3.1.3** *P* **322** *L* **27** # 145

Dawe, Piers Nvidia

*Comment Type* **E** *Comment Status* **D** *(bucket1)*

Out of order

*SuggestedRemedy*

Swap equations 163A-5 and 4

*Proposed Response* *Response Status* **W**

PROPOSED REJECT.
The ordering of the equations follows convention.

*Cl* **163A** *SC* **163A.3.2.2** *P* **323** *L* **44** # 146

Dawe, Piers Nvidia

*Comment Type* **T** *Comment Status* **D** *(bucket1)*

Give the units

*SuggestedRemedy*

Say that ERL(ref) and ERL(meas) are in decibels

*Proposed Response* *Response Status* **W**

PROPOSED ACCEPT.
[Editor's note: Changed page from 232 to 323.]

*Cl* **163A** *SC* **163A.4** *P* **323** *L* **53** # 20

Wu, Mau-Lin MediaTek Inc.

*Comment Type* **T** *Comment Status* **D** *(bucket1)*

The sentence of "An example test fixture and its reference values are provided in 163B.3." here is not correct, due to the example test fixture shown in 163B.3 is for TP0v, instead of TP5v.

*SuggestedRemedy*

Remove the sentence of "An example test fixture and its reference values are provided in 163B.3."

*Proposed Response* *Response Status* **W**

PROPOSED ACCEPT.

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*Cl* **163B** *SC* **163B.2** *P* **325** *L* **21** # 147

Dawe, Piers Nvidia

*Comment Type* **T** *Comment Status* **D** *Example TF*

Complete the example

*SuggestedRemedy*

As this is a Clause 163 example, there's another package length zp = 12. Give both ERLs in 163B.3, e.g. in the text, with the lower value in Table 163B-1, and say which zp the ERL in the table is based on. Better, use two columns in table 163B-1.
Delete the sentence "Although clauses using the TP0v methodology may require the ERL reference value to be calculated at more than one package length, only one is shown here." - as far as I know, all clauses using the TP0v methodology require the ERL reference value to be calculated two package lengths.

*Proposed Response* *Response Status* **W**

PROPOSED REJECT.
This comment does not apply to the substantive changes between IEEE P802.3ck D2.2 and D2.1 or the unsatisfied negative comments from previous drafts. Hence it is not within the scope of the recirculation ballot.
The example is to help check calculation results as in table 163B-1. One package length is sufficient.
This comment decribes a general suggestion but does not provide sufficient details to implement, e.g. exact values to be put in Table 163B-1.